The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION

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Summer 1996

A New Look At Optics

OPTOMETRIC EDUCATION

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Cover slide courtesy of Varilux.

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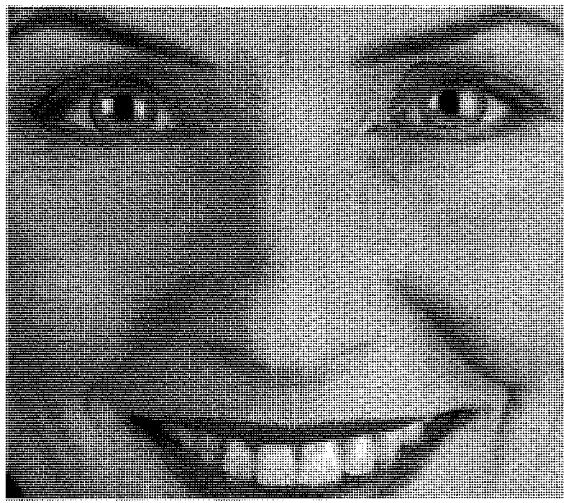

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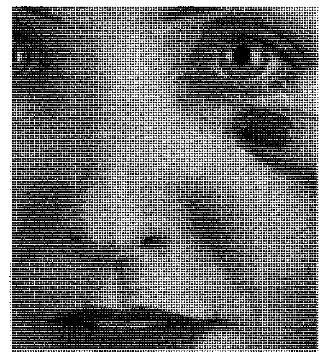

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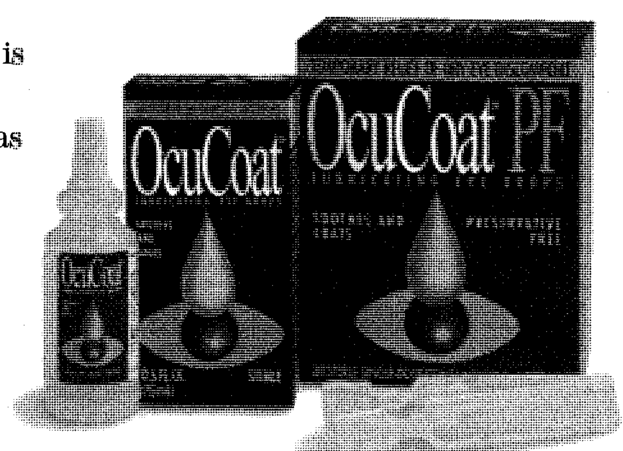

References:
1. Data on file, Storz Ophthalmics, Inc, St. Louis, MO.
2. *Information Resources, Inc, Info Scan Markets.* Total US Drug, 52 weeks ending December 31, 1995.

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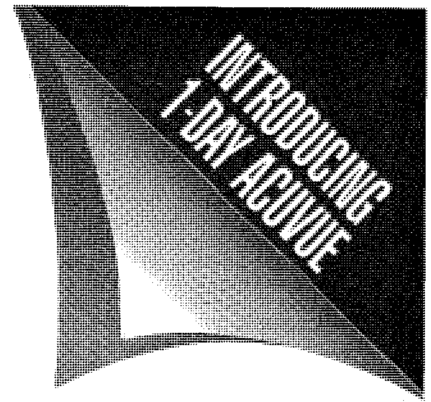

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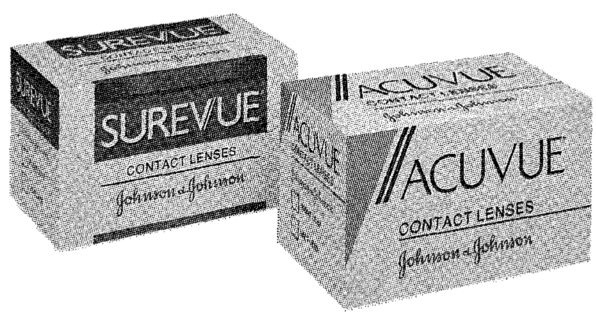

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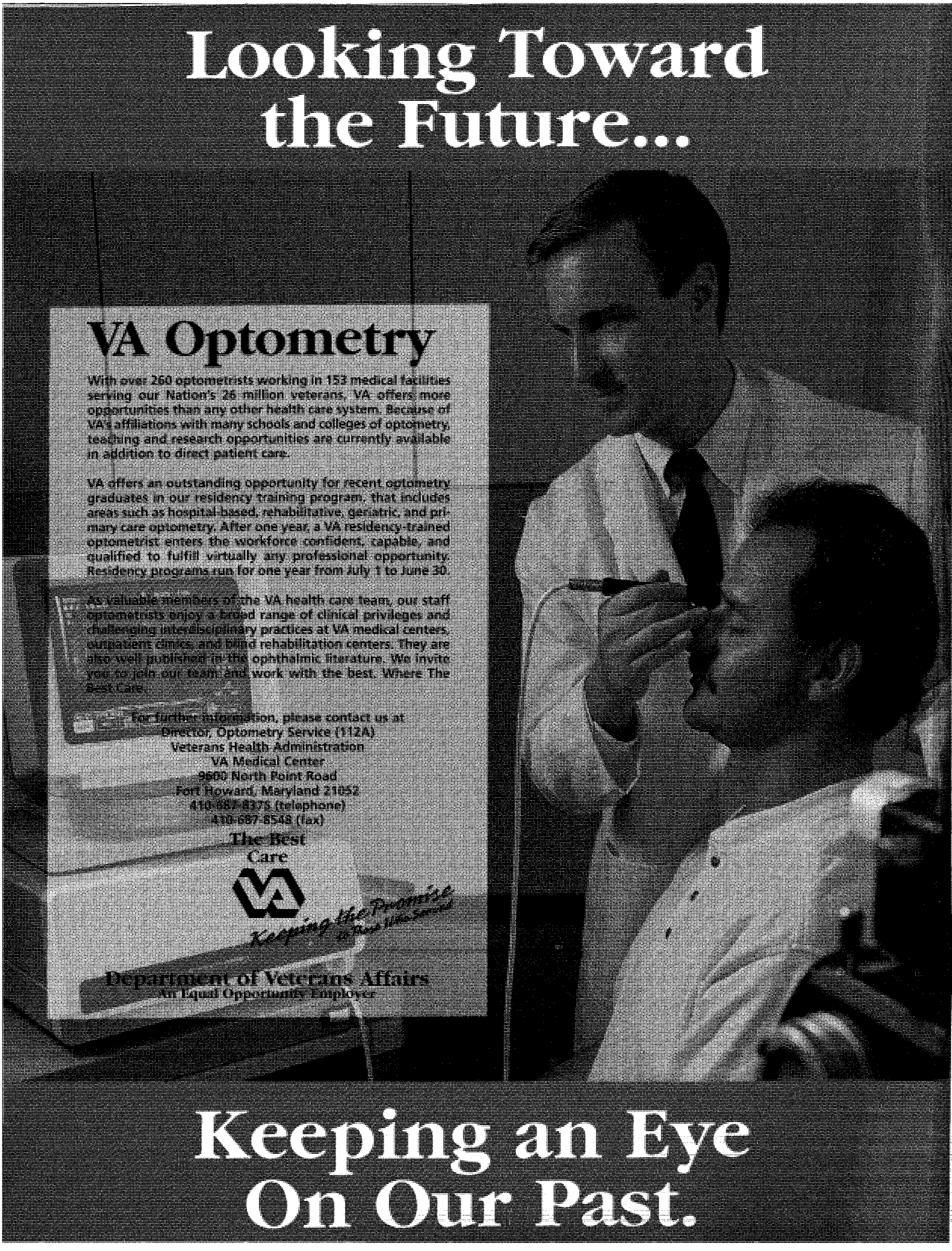
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GUEST

EDITORIAL

Curricular Change — A Fork in the Road or a Broader Avenue?

Felix M. Barker, II, O.D., M.S.

In reading Dr. Sheedy's insightful article encouraging a "back to basics" approach, we are challenged once again to consider a recurring dilemma in optometric education. With our long standing emphasis on expanding scope of practice, how can we hope to maintain and develop our more traditional aspects of eye care? This is especially critical for optometry, as Dr. Sheedy points out, due to the increasing significance of ophthalmic eyewear to the economic growth of our practices. This traditional dilemma has recently become more important because of the pressures we feel from healthcare reform and the extensions of our practice responsibility that are being fueled by technological advancement.

As optometric educators, we frequently discuss this issue from the perspective of our curricula, considering that they are generally "overgrown" with topical material and that we need to make changes by removing or reducing the emphasis of a more traditional subject in favor of a newer rising priority. Nevertheless, as Dr. Sheedy states, we cannot abandon the basic aspects of our profession's position within the healthcare arena, especially since these unique aspects of our service to our patients are the very foundation of our position of strength as a primary care profession. No, the process of change for optometry is not an "either-or" situation. But how then can we expect to cope with the growing pressures upon our curricula and other educational resources?

Definitive solutions will always be specific to each program and will require extensive involvement of both faculty and administrators striving together to achieve the most appropriate balance of priorities. But it is crucial that the necessary dialogue occur and that there is a continuing commitment to an ongoing and balanced process of curricular review.

Perhaps we can gain strength of purpose in this dilemma by viewing the issue from another perspective. Recently, the baseball great, Yogi Berra, in accepting an honorary degree, reminded us of a few of his "Yogi-isms." One of these sage pieces of advice is particularly appropriate to this discussion, namely that "when you come to a fork in the road...take it!"

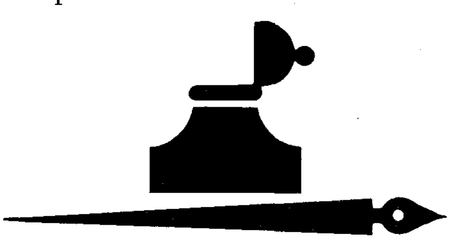
Like Yogi's "fork in the road," optometry's perennial discussion about the role of change often seems to indicate that a dichotomous decision is necessary, that we must somehow choose one path or the other. Yet we know, as Yogi's advice to "take it" would suggest, that the answer to this apparent dilemma does not involve a branching away from any aspect of our current professional responsibilities but rather an acceptance of broader responsibilities. As educators, we are challenged to deal with increasing demands upon our talents, but acceptance of this challenge and a decision to move ahead are both easier to accomplish in the context of a "broader avenue" of opportunity.

As Dr. Sheedy's comments suggest, continued attention to traditional areas of optometric expertise is essential. But at the same time, we must continue to expand the scope of our practices and develop more technologically sophisticated methods of practice. This will undoubtedly require us to call upon our creative resources in increasing measure, but we must never stand at any perceived crossroads or "fork in the road" wondering which way to go.

The way to go is ahead, together.

Letters to the Editor

I am writing to thank your reviewers for introducing your readers to one of Lifelearn Eyecare's CD-ROM based educational products for eye care professionals — *Fundus Fundamentals* (reviewed in *Optometric Education, Volume 21, Number 3, Spring, 1996, p. 73).* The title is actually Fundus Fundamentals — an Interactive Visual Review Tool for the Fundus, as the intent of the CD was to present primarily visual information. This visual approach also explains why more detailed pathology and treatment information was not included. We are, however, taking the suggestion to increase "depth" under consideration at this point.



I apologize for the difficulty seeing the entire screen. The vagaries of Windows prevail! You must actually be in 800x600 resolution (16,000 or more colors) AND have "small fonts" specified to see the entire screen at one time — why this change in font size affects the overall dimensions of the viewer has not been well-explained, but it does work.

Lifelearn Eyecare is a private company based in the School of Optometry at the University of Waterloo. Our mandate is to provide high-quality continuing education and education materials to eye care professionals. As such, the contact information in the review is out of date. We should be contacted c/o School of Optometry, University of Waterloo, Waterloo, Ontario, CANADA N2L 3G1 (519) 885-1211, ext 5408, fax: (519) 725-0784, e-mail: rpotvin@sciborg.uwaterloo.ca.

Dr. Rick Potvin
President
Lifelearn Eyecare

Computer Software Reviews

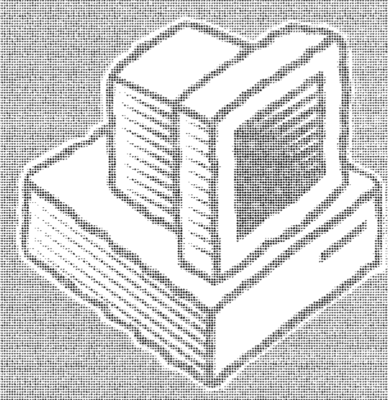
The Merck Manual Textstack for Mac and Windows Application, The Keyboard Stacks, Personal/individual versions $99.00; institutional (5 work stations) site license $299.00.

The Merck Manual has long been a standard medical reference used almost universally for access to clear and concise information on various diseases. By making it available as a CD-ROM software application, Keyboard Publishing has increased accessibility, quick retrieval time, and flexibility to the process of acquiring the information. It is available for either IBM or MAC platforms. Updated versions will be available as new textbook-format editions are published.

The Textstack comes in an individual or personal product (not networkable) or one may purchase a five workstation site license which can then be networked. The teacher/institutional versions also have a "Transcriber" which adds limited mini-authoring capability. Thus the user can pool information, add his/her own information through annotation and put together a final product. The transcriber in Textstack allows a teacher to create customized paths for students.

The Textstack I reviewed employs the standard Windows format with a number of buttons at the top of the screen. The "Content" button provides access to a Table of Contents with the topic and the numbers of chapters on that topic. By clicking onto the topic, one can then go through a progression of tables which subdivides the material; alternatively in those sections with small amounts of information, one can access the text directly. One handy location feature is a "page status" side-box which allows the user to identify the location of the material for later use. There is also standard bookmark capability. There are subheadings which provide additional definitions or material and a "Go back" button to return to previous steps.

Students seem to prefer this format to the textbook format; they are more apt to use it; the information is readily accessible; and it provides very concise information about a disease or syndrome.



Ordering Information:
The Merck Manual Textstack for
Mac and Windows Application
The Keyboard Stacks
482 Norristown Road
Suite 117
Blue Bell, PA 19422
Tel: (610) 832-0945
fax: (610) 832-0948

The "Index" button allows for searching on an extensive list of keywords: it identifies the section, chapter and subheadings under which the keyword concept can be located as well as a list of related topics. There is also a separate "Search" function through which one is told the number of times the topic appears in the text. It automatically displays the first instance, and one can then move through all identified locations. The page status box is also displayed for retrieval purposes.

A "History" button provides the list of activities that have just been performed by the author. This too allows one to return to a previous activity.

There are a number of advantages to the Merck Manual in computerized format: students seem to prefer this format to the textbook format; they are more apt to use it; the information is readily accessible; and it provides very concise information about a disease or syndrome. The transcriber option is attractive to the faculty if one wishes the student to navigate through a prescribed path of information.

I would recommend this product to those faculty who wish to incorporate some data retrieval into their students' assignments. It certainly is an easy introduction to this form of data retrieval for students who might otherwise be computer phobic. In summary, for both the student and the clinician, the Merck Manual continues to be an excellent source of information rendered even more accessible through this computerized version.

Reviewer: Dr. Pierrette Barker
Pennsylvania College of Optometry

OPHTHALMIC INDUSTRY NEWS

Companies appearing on these pages are members of ASCO's Sustaining Member Program. Sustaining Members are listed on the inside front cover of each issue. Membership is open to manufacturers and distributors of ophthalmic equipment and supplies and pharmaceutical companies.

Varilux Sponsors Fifth Annual Optometry Super Bowl

David Leonard, a fourth year student at the **Southern California College of Optometry,** took the first place award of $1,000 at the fifth annual Varilux Optometry Super Bowl. **Patrick Dawson** of **The Ohio State University** received $500 as second place winner, and **Nova Southeastern University** student **Mike Mandese** took home $250 for third place. Over 800 students attended the annual event as part of the American Optometric Student Association meeting hosted by **Pacific University College of Optometry.**

Sponsored by Varilux Corporation, the Optometry Super Bowl pits contestants from schools and colleges of optometry in a battle for academic supremacy, with questions being asked from all areas of optometry and general trivia. **Rod Tahran, O.D.,** vice president of professional relations, served as host. **Cheri McMahon** from **Pacific University** was the official timekeeper and **Danne Ventura,** manager of professional relations, **Varilux Corporation,** kept score. The panel of judges included American Optometric Association President Don Jarnagin, O.D., president-elect T. Joel Byers, O.D., and dean of **Pacific University College of Optometry Les Walls, O.D., M.D.**

"Varilux values this opportunity to support optometric education. The knowledge of the student competitors is outstanding," commented Rod Tahran after presenting the awards.

This year's festivities were also attended by three European students who received travel grants from Essilor International. Joelle Bouldoukian from France, and Catherine Wallace and Susan Harvey from Great Britain received the grants for their winning research papers submitted for the Essilor International Student Grant Competition.

CIBA Introduces Lens Care Kits for Allergy Sufferers

CIBA Vision Corporation introduced two new value-added soft contact lens care kits designed specifically for patients with allergies. The AOSEPT® and Quick CARE™ Allergy Kits include starter-sized lens care products and over-the-counter allergy relief products and coupons. The allergy kits, distributed only through eye care professionals, will be available in mid-April in time for the spring allergy season.

"Research indicates that more than 75 percent of contact lens wearers who suffer from allergies report discomfort with contact lens wear," said Frans Mahieu, director of professional marketing, Lens Care, CIBA Vision. "Our AOSEPT® and Quick CARE™ Lens Care Systems provide efficacious and non-irritating formulations that help to increase contact lens comfort for patients with allergies."

"Our five-minute Quick CARE™ System gives patients the added flexibility to refresh lenses at any time during the day to remove irritants and make lenses more comfortable," Mahieu said. "No other lens care system provides this advantage - fully cleaned and disinfected lenses in just five minutes."

For more information about the AOSEPT® and Quick CARE™ Allergy Kits and in-office materials, eye care professionals should contact their CIBA Vision sales representative or call the CIBA Vision Lens Care Hotline at (800) 303-7822.

Bausch & Lomb Awards AOCLE Grants

Bausch & Lomb announced that two schools of optometry have been selected to receive the Competing for the Future grant. This year's grant recipients are the **Southern California College of Optometry** and **the University of Missouri-St. Louis School of Optometry.**

The grant program represents a multi-faceted cooperative initiative between Bausch & Lomb and the Association of Optometric Contact Lens Educators (AOCLE) and is designed to enhance the contact lens clinical experience of students. In addition to the $10,000 grant, supplementary consulting support is provided by James A. Belasco, Ph.D., world renowned expert on organizational change.

"Bausch & Lomb is committed to helping optometry students prepare for the realities of clinical practice," said William T. Reindel, O.D., director of professional market development for Bausch & Lomb's personal products division. "In order to compete in the future, students need to develop skills that will help them meet the demands of contact lens customers. The Competing for the Future grant program provided the AOCLE with support to create a link for their students between the academic experience of today and the clinical realities of tomorrow."

Varilux Appoints Associate Marketing Managers

Varilux announced the addition of two new associate laboratory marketing managers who will help direct the promotional activities of authorized distributors and administer the distributor co-op program.

Karon Carpentieri and Mary Richmond-Emmons, both senior Varilux sales consultants, will provide laboratories with hands-on assistance and ideas in order to create effective customized marketing programs. Carpentieri will be responsible for distributors on the east coast while Richmond-Emmons will assist those west of the Mississippi River.

"Both Karon and Mary will be valuable resources to our authorized distributors by aiding in the coordination, timing and implementation of a wide variety of marketing programs and issues," said Ron Barnes, laboratory marketing manager. "We are excited at the ideas and organizational talents that they have to offer."

Wesley-Jessen Program Approved by AOSA

Wesley-Jessen's "Finding the Practice of Your Dreams" program, which is designed to help third and fourth year optometry students find careers in private practice, has been approved by the American Optometric Student Association (AOSA).

The lecture series and program materials were developed by St. Louis practitioner David B. Seibel, O.D., who has studied the pathfinding techniques of top performing recent graduates and established doctors.

Dr. Seibel has presented the program at all schools and colleges of optometry in North America. The program's 28-page workbook addresses decision-making processes about practice characteristics and location and also details how students can evaluate a practice, market themselves and prepare for job interviews.

Corning Expands Low Vision Services

In an effort to raise awareness among eye care professionals concerning the growing need for low vision services, Corning Medical Optics is expanding its educational services and product promotions for low vision.

The company has created a 12-minute video that details the age-related eye conditions that bring on the need for low vision care, as well as the types of low vision products that help patients see better. The video is designed to be an in-office resource for patients to view.

Corning has developed a low vision educational packet for both professionals and patients, and practitioners can also obtain a practice reference guide that includes case reports related to low vision needs.

"Estimates are that the low vision market includes about 44 million people in the United States," said Nancy Crawford, product manager. "The size of the market will increase as America's population continues to age," Crawford continued, "and low vision can be a significant niche for practitioners if they are educated about the market and the types of products available."

Bausch & Lomb Sponsors Optometry Forum

Bausch & Lomb recently sponsored a forum at the Southern Educational Congress of Optometry during which eye care professionals learned that they must plan and implement strategic measures to manage change if they are to maintain a viable practice in the future.

Citing examples of his experience with companies such as Coca Cola, At&T, and Ford, James Belasco, Ph.D., led participants through strategies to successfully navigate the forces of change that face today's eye care professional who must straddle the dual roles of health care provider and business owner.

According the Dr. Belasco, there are three critical forces of changes across all categories of business, including health care: 1) rising expectations and increasing sophistication among both consumers of health care and payers; 2) changing nature of competition; 3) and time compression.

Dr. Belasco encouraged practitioners to develop a new understanding about patients and how changes in their sophistication, and their expectations, affect them as health care consumers in general, and as customers of an eye care practice.

VOLK's SuperZoom 78/90 Offers Variable Magnification

The original patented zoom lens from VOLK offers selectively variable magnification from 78D to 90D, while you're doing your slit lamp fundus examination according to VOLK's customer service department. SuperZoom's powerglide magnification changer provides smooth and precise magnification adjustment, and with VOLK's high refractive index glass optical design, superior image clarity and enhanced fundus detail combine to provide improved diagnosis and reduced examination time.

Barbara Taylor Bradford Is Marcolin's New Fantasy Face

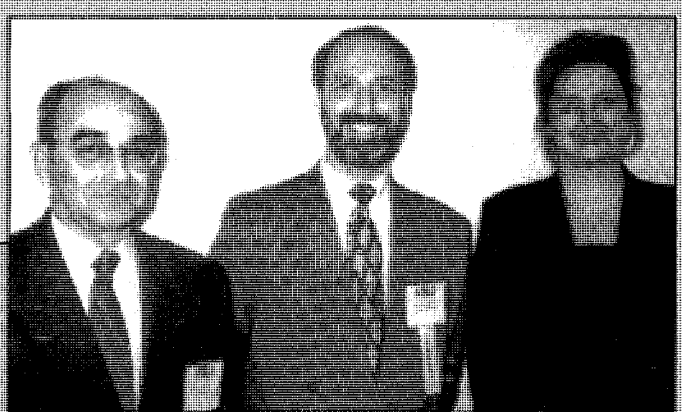
Marcolin's Fantasy Campaign launches one of the world's most glamorous and successful British authors, Barbara Taylor Bradford, as its new Fantasy Face. Ms. Bradford was selected to be the new Fantasy Face as a result of Marchon's extensive market research. According to research, the Fantasy customer is more mature, prefers a larger eye size and feels the popular "preppy" styles make her look old. The Fantasy woman wants to look pretty and views eyewear as a fashion accessory. She enjoys accessorizing and wants eyewear that fits into her lifestyle. Ms. Taylor Bradford is a mature, beautiful woman who represents the perfect Fantasy Woman.

Marcolin's Fantasy collection represents the very essence of beauty and quality. Femininity is what distinguishes this collection and makes it the perfect choice for women who prefer a softer feminine, flattering frame shape in a beautiful color with intricate detailing that makes it look and feel like a piece of jewelry. The beautiful new Fantasy campaign visually translates the soft, feminine appeal of the collection through soft, sophisticated photography featuring Barbara Taylor Bradford wearing Fantasy Style 7132.

Ophthalmic Optics Forum

Ophthalmic optics educators gathered February 16-18 at the Lansdowne Conference Center in Lansdowne, Virginia, to develop a plan to enhance the role of optics in the schools and colleges of optometry. The forum was sponsored by ASCO with primary support from Varilux Corporation. Other support came from Sola Optical, Transitions Optical and the Vision Council of America. Pictured at the meeting are:

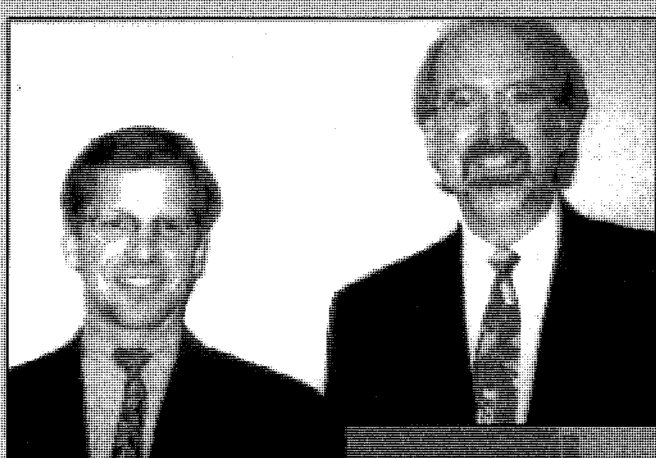
Dr. George Lee, University of California-Berkeley, chats with Dr. Ralph Chou, University of Waterloo;



Dr. Marc Alexandre, director of medical relations worldwide for Essilor, Inc., Dr. Rod Tahran, vice president for professional relations and clinical affairs at Varilux and Ms. Danne Ventura, manager, professional services, Varilux.

Dr. Marc Alexandre presents an update on optics in Europe.

Dr. Michael Morris, Sola Optical, demonstrates to Joe Bruneni, Southern California College of Optometry, the state-of-the-art technology that enabled the working groups to display their recommendations as slides in the general session. The computers were available courtesy of Sola Optical.



Dr. Michael Morris of Sola Optical and Dr. James Sheedy, the University of California-Berkeley (and recently appointed director of professional development for Sola Optical), program chair.

Participants meet in general session

What is the Role of Glasses in Optometry?

James E. Sheedy, O.D., Ph.D.

Introduction

The profession of optometry developed extensively from the refractive examination and the provision of glasses to our patients. Our traditional operating premise has been to provide "one stop care." The provision of glasses to our patients has been, and continues to be, central to the care that we provide.

Our profession has significantly altered its emphasis and its interest away from the provision of glasses. This change is seen in a comparison of the 1904 and 1993 definitions by the American Optometric Association (Table 1). Lenses are clearly mentioned in the 1904 definition, but not in the most recent definition.

In practice, optometrists today expend much more effort in patient examination than in spectacle design. Optometrists have largely relegated their dispensary operations to their employees. Many optometrists have also relegated lens design decisions such as multifocal design, progressive addition lens selection, aspheric single vision lenses, UV protection, sunglasses, polarizing lenses, tints, and anti-reflection coatings to staff.

Ophthalmic optics occupies secondary status within the schools and colleges of optometry. Usually the examining clinical faculty are not involved in lens decisions made in the dispensary. Dispensing decisions are usually made without benefit of optometric faculty supervision. Very little research is performed on ophthalmic lenses. Most readers of this article could readily name more nationally recognized faculty in the areas of contact lenses, low vision, binocular vision, or ocular disease. Very few continuing education courses are provided in ophthalmic optics. The American Academy of Optometry has changed its "Optics and Refraction" section to "Primary Care." Optometric education is providing neither scientific nor academic leadership in ophthalmic optics.

Of course, this shift of interest away from glasses has been in large part fueled by the drives for DPA and TPA privileges. The more dynamic and interesting topics — within our educational institutions, at educational conferences, and in professional organizational efforts — have, with few exceptions, been related to ocular disease. Another element that has played a strong role in our neglect of glasses is that we have not directly addressed nor learned to comfortably live with the following fact: *Glasses are both a health care appliance and a fashion item.* For years optometry has fought to be recognized as a health care profession and not as a merchant. Glasses have become highly commercialized and therefore we have professionally distanced ourselves from them.

Are Glasses Important to Optometry?

The main reason people visit an optometrist is to get a pair of glasses - or at least to start that process. This fact alone (for which, surprisingly, I could not find survey verification) should make our profession want to be expert in this area and take a leadership role in the study of ophthalmic optics.

There is a large need for glasses - 60% of the U.S. population requires ophthalmic correction and 93 million U.S. citizens (36%) purchased eye wear in 1994. Also, as shown in Tables 2 and 3, glasses provide the largest part of the income of optometrists, and optometrists have a large share of the ophthalmic products market. The 61% and 28% figures for independent and OD practitioners, respectively, have been steady the last few years. The MD component has been growing at the expense of the optician component of the independent market.

Another way to put glasses into perspective is to look at the size of the ophthalmic market (Table 4). The annual sales of glasses clearly exceeds income from primary eye care examinations. Figure 1 shows that the ophthalmic industry is steadily growing. It is likely that the ophthalmic industry will continue to grow given that the positive influences (post WW2 baby boomers are presbyopic, more managed care, more sunglasses, more product options, more occupational visual demands, and increased marketing to cosmetic appeals) will outweigh the negative influence of refractive surgery.

It is clear that glasses are important to the profession of optometry. Glasses are the main reason that patients come to see us. Glasses are the major thera-

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Dr. Sheedy's paper was originally presented to the Ophthalmic Optics Educators Forum on February 16, 1996. Dr. Sheedy served as program chair for the forum.

Table 1
Definitions Published by the American Optometric Association

1904 Optometry - "The science which treats of the physiology of the functions of vision and the physical effect thereon by lenses."

1993 "Doctors of optometry are independent primary health care providers who examine, diagnose, treat and manage diseases and disorders of the visual system, the eye and associated structures as well as diagnose related systemic conditions."

peutic device that we use in treatment. And glasses are the major source of income for our profession.

What is the Role of Optometry in the Ophthalmic Optics Industry?

The ophthalmic industry is going to thrive with or without leadership from optometry. The afore-mentioned tables and figures above show that the eyeglass industry continues to perform well. However, the ophthalmic industry has several needs which optometric education is uniquely qualified to meet.

Table 2
Independent Optometric Practice - Relative Gross Income

48.5%	prescription spectacle dispensing
27.4%	exams/professional fees
18.9%	contact lens dispensing
3.6%	plano sunglasses

First of all, the industry would benefit from a good scientific data base to support the health care aspects of glasses. The contact lens industry, by comparison, has a large scientific literature base — most of it has been cooperatively developed between the contact lens industry and academic institutions. This has not happened in the spectacle lens industry. The industry will be stronger in the long run if there is a good scientific basis for lens design and its effects upon human vision.

Table 3
Market Segment for U.S. Ophthalmic Products

61%	Independent ophthalmic practitioners
	OD - 28%
	optician - 18%
	MD - 15%
34%	chains
5%	HMOs/hospitals

There is almost no modern scientific literature to support the spectacle lens industry. This is not for lack of things to study. We need research to show whether anti-reflection coatings improve vision or whether pink-tinted lenses provide comfort under fluorescent lights. The list of possible (and needed) research is long: the relationships of progressive addition lens optics to patient performance or comfort, wearer studies on efficacy of coatings, center of ocular rotation data, distribution of reading distances in the population, distribution of viewing heights and distances of computer users, determining what lens adaptation is, effects of scratches upon contrast sensitivity, how to select the right PAL design based upon patient characteristics or visual needs, effects of lens design on eye movement patterns, effects of lens design on posture, effects of lens design upon falls in the elderly, patient sensitivity to field distortion, etc. Answers to these questions would result in better products and better lens selections for our patients.

Both the ophthalmic industry and the profession of optometry would benefit from a better scientific basis for spectacle lenses. It would result in better products, stronger academic programs and more discussion in journals, trade press and continuing education programs. It would also result in more practitioner interest.

Another need of the ophthalmic industry is for educated dispensers of their products. With better educated optometrists and more attention to the optical selections of their patients, we can provide for better visual corrections for the numerous visual requirements of our patients, and the ophthalmic industry can sell more product and product options. It is surprising that we have only a 6% usage of anti-reflection coatings in this country, whereas the use is between 50-75% in many other major developed countries. Better vision is provided with AR coatings - we should be providing it more often.

We should also be providing more progressive addition lenses. Even though studies show an 85% preference for PALs over bifocals, we only prescribe 31% (of multifocals) in this country - a figure that is low by comparison to other major developed countries. Similar arguments can be made for aspheric lenses and new lens materials. Well designed lenses for special purposes such as for computer users have languished in the marketplace because nobody prescribes them - even though they provide superior vision to traditional lenses. Both our patients and the ophthalmic industry would benefit from better educated optometrists and more practitioner interest in ophthalmic optics.

Table 4
Size of Ophthalmic Market ($ billions)

$13.2	frames, lenses and contact lenses
	50% spectacle lenses and treatments
	36% frames and sunglasses
	14% contact lenses
$4.3	primary eye exams
$2.2	plano sunglasses

More research and academic attention to the field of ophthalmic optics would also result in the development of graduate programs and residencies in this area. Graduates of such programs are important for the development of stronger ties between optometric education and the ophthalmic industry. One reason why so few optometrists are in the spectacle lens industry (look at the contact lens industry for comparison) is that there are no programs to give advanced training in this area.

The ophthalmic optics industry would benefit significantly from a better scientific and academic basis for its products and also from better educated and motivated dispensers. Nobody is currently taking non-proprietary scientific/academic leadership in ophthalmic optics. Optometric education is in the best position to provide this leadership.

Summary

Now that TPA privileges have been largely acquired by optometry, it is time to re-evaluate the reasons why our patients come to see us. Glasses are a major part of optometry, and industry trends show that they will continue to be a major part of optometry. Under managed care systems, it will be increasingly advantageous to provide a health care product which exists outside the institutional reimbursement schedules. It is time that we stop denying glasses - we should embrace them as both a cosmetic and a health care product.

There is a strong basis for a symbiotic relationship between optometric education and the ophthalmic optics industry. Industry needs to become better acquainted with optometry, and optometry needs to show that it cares about glasses.

The academic leadership of ophthalmic optics is there for the taking.

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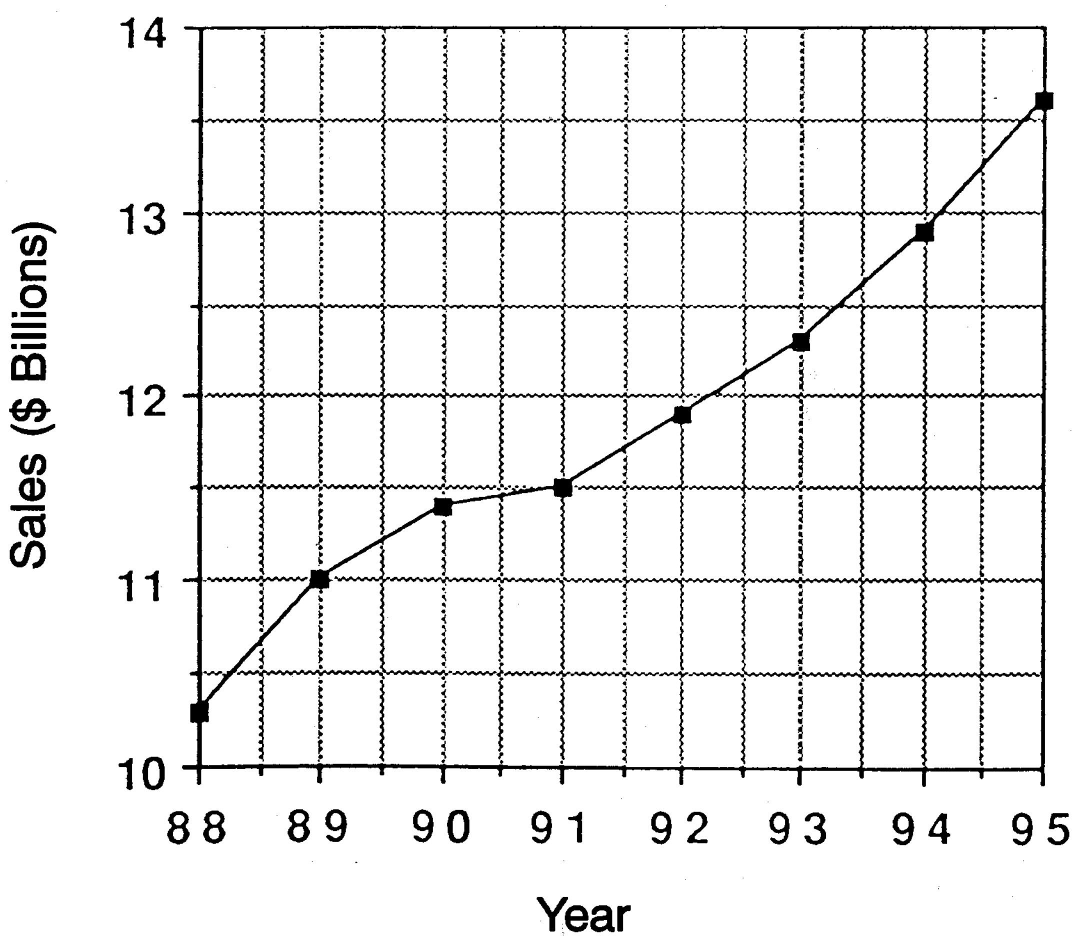
Figure 1
Growth of the Ophthalmic Industry (Annual Sales in $ Billions)



Faculty Development Programs for Optometric Educators

Jimmy H. Elam, O.D., M.S.

Abstract

Schools of optometry in the United States have the responsibility of preparing students to enter a profession that is experiencing an expanding scope of practice and level of responsibility. That obligation requires faculty members to acquire new knowledge and skills for both didactic courses and clinical instruction. Faculty development, therefore, has become central for the attainment of optometry school educational objectives. Faculty development may be in the form of individual initiatives, formal development programs, or organizational change. Programs addressing an assortment of spheres of faculty development at Southern College of Optometry are reviewed.

Key Words: *faculty development, optometric education, development programs, higher education*

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Sustaining and advancing faculty knowledge and skills are enduring issues in higher education.[1] Optometric educators have been challenged to provide students with the essential skills and abilities to practice a profession which is constantly being redefined by legislative action, technological advances and changes in healthcare delivery and reimbursement.[2] An institution of higher education's most important ingredient for teaching is its faculty, because it is only by faculty organization, leadership and action that the educational program will succeed and evolve for the future.[3]

If the faculty perform such an important function for their respective institutions, how do they learn to teach and acquire other relevant skills? Medical school faculties reported experience as a learner to be the biggest single determinate of a faculty member's overall teaching style while reflection upon teaching experiences served as a second source.[4]

While healthcare teachers may learn predominately from experience, there are more methodical ways of learning about teaching, cognition and learning and research in education. The purpose of this paper is to characterize different types of faculty development programs and report programs initiated at Southern College of Optometry (SCO) in response to the College's educational mission. Faculty development programs may be divided into: 1) individual initiatives, 2) participation in faculty development programs, and 3) organizational change efforts.[2]

Individual Initiatives

Reflection and Teaching Scripts

Schools of optometry characteristically contain individual faculty members in both basic science and clinical areas that have had several years of clinical practice. These faculty members bring personal reflection on past experiences as an important tool for incorporating learning experiences from previous professional practice into student teaching and communication, as well as research. One method of developing a teaching repertory is to create a journal about teaching experiences that includes such things as questions raised, experiments tried, and conclusions reached. Reflection on action, over time, creates insights into teaching practices.[5] It also may help produce scripts around prototypical events of patient care for instructional use by a professor.[6] Teaching scripts prove useful for instant instructional purposes.

Self-Directed Learning

Several self-directed learning techniques have been suggested that may be utilized by healthcare educators, and they include:[4]

1. Extending personal knowledge by writing and conducting research about teachin;
2. Critically observing a colleague teaching for 15 minutes a week to learn their teaching scripts and methods;
3. Soliciting feedback from learners in an active way such as asking them to write down what they have learned that day; and
4. Discussions with colleagues and students to increase the awareness of perspectives and assumptions about teaching and learning.

Formal Faculty Development Programs

Mentor Programs

Mentor programs offer new faculty members assistance from more experienced colleagues.[4] One model suggests that, initially, a mentor's influence should be directed to the establishment of new faculty expectations, to providing conceptual framework and to offering close supervision.[7] Later, help is offered only when requested and emphasizes reflection and clarification.

Teaching Rounds

It has been proposed that the use of teaching rounds aids in faculty development. Likewise, a teaching study group of faculty members presenting problematic teaching cases for discussion by the group, similar to traditional case-oriented clinical teaching rounds, can be helpful.[4] Participants in the discussion seek to improve or develop their teaching knowledge and skills for particular teaching scenarios.

Workshops

Workshops have been utilized for faculty members for a variety of purposes, including the enhancement of teaching, research and clinical skills. Workshops can be highly focused, intense, fast and efficient.[8] To optimize their effectiveness, a faculty needs assessment for developing the topic usually proves to be beneficial. Mandated workshops tend to be less productive than those in which the individual learner has a previously defined learning objective. One study, conducted after a group of medical educators had taken a workshop on teacher-training, found students felt that instructors' teaching styles changed from predominantly lectures before the workshop toward interactive discussions after it.[9]

Advanced Education

A faculty member may pursue an advanced degree to improve teaching effectiveness. However, advanced education may also be for retraining for a new faculty member or administrative assignments or to broaden career opportunities in general.[10]

A review of the 1993-94 college catalog of Southern College of Optometry reveals several faculty members who obtained graduate degrees after obtaining their optometric professional degree, the Doctor of Optometry (O.D.), or other advanced degree. The postgraduate degrees represent an assortment of study areas and include the following degrees: 7 Master of Education (M.Ed.), 2 Master of Art (M.A.), 6 Master of Science (M.S.), 1 Master of Public Administration (M.P.A.), 3 Doctor of Philosophy (Ph.D.) and 1 Doctor of Jurisprudence (J.D.). Fourteen other faculty had attended postgraduate residency or fellowship programs.[11] An inspection of the Bulletin of the University of Missouri-St. Louis, School of Optometry demonstrates a similar grouping of postgraduate degrees.[12]

Sabbaticals

A sabbatical is an approved leave for a faculty member from their current institution to pursue faculty development. The development may include special studies, writing, research, clinical training or other activity. For example, an optometry faculty member describes writing a textbook during his sabbatical.[13]

For a well-planned faculty development program to be successful, initiative on the part of the faculty and administration is critical.

Organizational Change Efforts

The individual institution's internal environment must be taken into account when considering individual and collective faculty development, and each institution is different.[14] For a well-planned faculty development program to be successful, initiative on the part of the faculty and administration is critical. Support may include faculty member release time, incentives for promotion, and salary increases. Administrative support must be perceived as positive by the faculty, but responsibility must be shared by individual faculty members.[2]

The Association of Schools and Colleges of Optometry (ASCO) and the American Optometric Association (AOA) sponsored a series of conferences to develop a strategic plan for optometric education called the Summit on Optometric Education Conferences between April 1992 and November 1993.[15] It was recognized that an optometric curriculum in the future will demand a new and fundamentally different teaching strategy from faculty members than in the past.[16] Implementation of new teaching strategies will undoubtedly be dependent on faculty development and hiring new faculty possessing those skills.

Specific Programs

In 1989 SCO made a commitment to expand its faculty development by having programs during time periods when students would not normally be on campus. Spring break and the days when students were taking National Board examinations have been periods in which faculty participated in formal college-sponsored faculty development programs. A synopsis of programs through 1994 include the following (D. H. Poorman, personal communication, February 1994):

1. Small workshops for discussion and development of ideas:
   A. Teaching for the learner
   B. Diverging teaching strategies in a lecture
   C. Learning qualities necessary to succeed in the college's curriculum
   D. Feedback on intangible aspects of patient care
   F. Faculty promotion of student recruitment
   G. Faculty recruitment of the faculty
   H. Academic word processing
2. Lectures attended by all faculty:
   A. A dentistry overview
   B. Financial planning for retirement
   C. HIV Overview
   D. Various visual therapy topics
   E. Merit, promotion in academic rank, and faculty recruitment
   F. The profession of pharmacy
   G. Contact lenses prescribing and fitting updates
   H. Refractive surgery.
   I. A glaucoma treatment update, mandated for all practicing optometrists by the Tennessee State Board of Optometry.

An analysis of faculty development program topics at SCO reveals several general categories being addressed. They include:

1. Teaching skills and relating abilities;
2. Optometric clinical skills for clinical faculty; and
3. Information and cognizance of other healthcare professions.

Conclusions

Faculty development is central to the main academic mission of institutions of higher learning, that is, to teach. Perhaps faculty and institutional vitality and academic mission are interrelated concepts.[17] Faculty development, as an individual initiative or as part of an institution's formal agenda, is significant for both the development of an individual faculty member's scholastic skills and the institution's academic environment.

Faculty development programs may be created for a variety of purposes. SCO has employed programs to enhance teaching abilities, update or augment clinical skills, broaden faculty knowledge of other health professions and bolster research interests.

Optometric faculty are in the distinctive position of having to acquire pedological skills to lead a profession into areas of responsibility that are changing with legislative action. For instance, in 1971, there were no state statutes giving optometrists pharmacological privileges. Currently, all 50 states have optometric diagnostic pharmacological agent legislation and 46 have optometric therapeutic pharmacological agent legislation. Furthermore, optometrists have gained diagnostic and treatment parity with other healthcare providers in Medicare and other programs.

Perhaps an optimal time for optometric educators to acquire teaching skills is to take educational courses while in graduate school. This would require restructuring of some graduate school curricula. As pointed out previously, optometric faculty receive graduate training in a variety of academic departments, not just physiological optics departments in optometry schools.

There is a paucity in the literature concerning optometric faculty development; it is an area that appears to be inviting research. Optometric education would probably benefit from a comprehensive approach to faculty development through which new methods of evaluation and diagnosis can be developed. We also need to introduce new technology and curricula and explore new approaches to instructional improvement.[18]

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Problem-Based Teaching in a Didactic Curriculum — A Hybrid Approach

Stephen G. Whittaker, Ph.D.
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Abstract

Optometric and medical education involve two types of curricula, the didactic approach and the problem-based approach. We combined features of didactic and problem-based methods into a hybrid approach. This article describes important course procedures that have evolved after eight years. Successful didactic teaching requires topical organization and careful delivery of information, usually in the form of series of lectures and/or reading assignments. We assigned topic-organized readings and lectured on a few, more difficult, subjects. Successful problem-based methods require the design and presentation of a sequence of problems. Problems are organized so that students learn portions of the required content, building a knowledge base as they solve the succession of problems. Advocates argue that with the problem-based approach, students not only learn the required course content, but they also develop the independent learning and creative problem solving skills that are necessary to maintain their clinical abilities. With a problem-based approach, cases usually are presented and discussed in tutorials. We used a computer patient simulator to present the cases to each student outside the class. Initially, cases were discussed in lecture and eventually in tutorials. Following implementation of the hybrid approach, we found substantial improvements in objective measures of student performance. Following implementation of tutorials, additional improvement was noted. In surveys, students reported an increase in independent learning activities.

Key Words: problem-based teaching, self-directed learning, clinical reasoning skills

Introduction

Excellence in the practice of optometry not only requires that our graduates demonstrate mastery of a body of knowledge and clinical techniques at the time of graduation. Continuing excellence several years after graduation requires that practitioners are able 1) to recognize when they do not have the knowledge or technical skills to manage a clinical problem; 2) to learn new material and develop new skills on their own; and 3) to take the intellectual leap from the common and routine to solve the unique problems that sporadically occur in the clinic. In the words of those who advocate a problem-based curricula1, continuing excellence requires that our graduates are capable of self-directed learning and clinical reasoning skills.

Several medical and optometry schools have been developing problem-based curricula to teach students self-directed learning and clinical reasoning skills.[1,2,3,4,5] Problem-based curricula are organized around a succession of problems that are presented to students. Students develop self-directed learning skills because the process of solving the problems requires that students recognize learning issues, independently research these issues and apply this newly acquired knowledge to the solution of problems. Students develop clinical reasoning skills, both differential diagnosis and creative problem solving, by attempting to solve clinical problems. The problem-based approach applies a basic educational premise advocated by Dewey in 1929[6] which, today, has achieved the status of a truism: the most effective method to learn how to do something is to practice doing it.

Often heralded as a new approach to medical education, problem-based teaching is a variant of the Socratic method, a method that dates back to ancient Greece. Rather than lecturing, a teacher using the Socratic Method presents the student with a succession of questions (and problems) that guide the students to discovery of knowledge or insight.

Problem-based teaching methods differ fundamentally from more conventional subject-based or didactic teaching methods. The key to successful didactic teaching is the careful organization and delivery of information. The instructor organizes the information topically. The key to successful application of the Socratic or problem-based method is the design and presentation of problems. The instructor organizes the problems to lead students to learn the information content on their own, in response to self-initiated questions.

To illustrate the different approaches, consider two curricula for teaching the management of amblyopia. In a didactic curriculum the information is organized topically. Instructors might deliver a sequence of lectures, starting with the classification of amblyopia, followed by diagnosis, then theories of amblyopia and, finally, management of each type of amblyopia. Only at the end of the lecture sequence are students able to manage cases.

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Portions of this paper were presented at the American Academy of Optometry meeting (1995) and the Health Sciences Library Consortium meeting in Philadelphia (1996).

In a problem-based curriculum, the instructor selects and organizes this same information into resource materials, reference books and class notes. Students scan these resources and learn bits of information from each topic to solve specific problems. In their quest for a diagnosis and treatment plan, the students gather and learn information necessary to manage one type of amblyopia at a time until the students solve cases with all of the different types of amblyopia. If a problem-based approach is successful, then the students develop independent learning and creative problem solving skills as they learn the factual content of the course.

The initial advocates of a problem-based medical curriculum have suggested a complete curricular overhaul, starting in the first year of medical school,[4,5] an approach that was impractical for us. We sought to implement important features of the problem-based approach without overall curricular modification,3 allowing a more incremental implementation of the problem-based approach. This paper is the fourth in a series that describes our implementation of problem-based teaching in a didactic curriculum.[3,7] Our implementation included a combination of didactic and problem-based teaching strategies. What follows is an eight-year follow-up to our initial implementation. We will describe our current procedures and discuss procedures that have been successful and those that have not.

A Brief History of Our Course Sequence

Normal and Abnormal Binocular Function (NABF) is a 3-course sequence, NABF I, II and III. For each 10-week quarter, the schedule includes 2.5 hours of lecture (150 students per instructor) and 2 hours of laboratory (initially 40 students per 2 instructors) per week. The course is taught in the 3rd year while students are in primary care clinical rotations but prior to binocular vision and pediatric rotations. This report discusses procedures applied to NABF II and NABF III from 1988 to the present.

Since binocular problems tend to be quite variable in manifestation, and somewhat unique to each patient, we aspired to teach students how to manage often idiosyncratic binocular problems. These clinical problem-solving skills are most intensively and completely taught during students' binocular/pediatric clinical rotation. By the end of this rotation, students have been required to demonstrate differential diagnostic and problem solving skills necessary for primary care. Our concern was that prior to this rotation, students were not adequately prepared. They had difficulty pulling together and integrating an apparently fragmented understanding of diagnostic tests and therapeutic alternatives into an overall diagnostic approach to binocular problems. We sought to improve the preparation of our students in our didactic courses.

Our first step was to integrate lectures on basic science with information on clinical management. We reasoned that students who understood the theoretical basis of clinical practice would be able to generalize from familiar to novel clinical problems, an expectation that was not confirmed by test results. At the end of this course, we administered a written exam that emphasized integration and application of information to solution of clinical cases. On previous exams, we asked completely independent questions usually using examples previously discussed in class. The newer exam included presentation of partial clinical information on several cases followed by related questions requiring identification of necessary diagnostic procedures, an accurate differential diagnosis, interpretation of test results, understanding of underlying etiology, and accurate determination of treatment plan. The cases were similar but never identical to cases presented previously in the course. The examination scoring has been criterion-based, based on mastery of specific skills and knowledge, and is not normalized relative to class performance. In 1987 when the course followed a traditional lecture format, the results of this exam were disappointing. The median and modal test scores were C's, with 43% of the class scoring D or F, and thus requiring remediation (Fig. 1).

In undertaking subsequent revisions in the course, our primary objectives were to 1) increase final exam performance so that over 80% of the class achieved mastery of the material (B or higher), 2) decrease D or F grades to under 5%, and 3) find that 80% of the class reported independent learning.

We sought to gradually introduce a problem-based approach, combining it with our didactic approach, creating the hybrid that we will discuss below. Our new course design did not initially require additional staffing to reduce class size.[3] In 1990, when we administered a final examination that was comparable to the 1987 exam, performance had improved substantially, indicating an improvement in clinical problem-solving skills as well as mastery of the basic material. The median grade was a B, with 8% of the class with D or F grades (Fig. 1). Although we did not control for fluctuations in overall class performance, or differences in exams, a comparable result has been repeated in similar exams. For example, in 1994 the median and modal grade was still B, with approximately 14% of the class earning D and F grades.

Although we did not control for differences in overall ability of the classes or differences in the exams, the result has been repeated in subsequent exams.

Instructional Objectives

Our list of very specific competencies is several pages long. What follows are general categories of these competencies.

For management of patients with amblyopia and strabismus, the student shall:

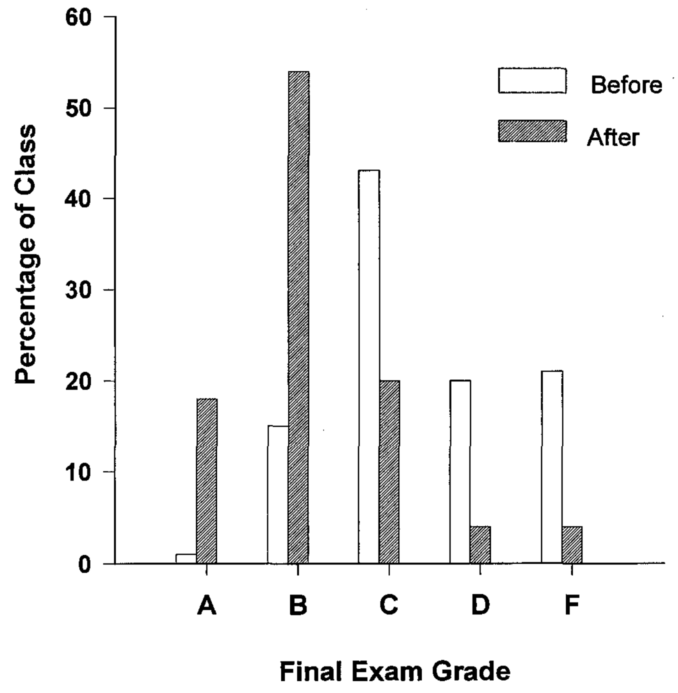
- identify history questions and diagnostic procedures that are necessary and important for the differential diagnosis of each type of strabismus and amblyopia
- interpret diagnostic procedures
- understand principles underlying these diagnostic procedures
- differentially diagnose various types of amblyopia and strabismus
- identify inconsistent history and examination findings
- understand prevailing theories of amblyopia, strabismus and associated sensory anomalies
- develop alternative treatment plans and estimate their success probability.

Additional, rather modest, self-directed learning and problem solving objectives include:

- find and learn unassigned information from written resources in response to clinical problems
- differentially diagnose and develop appropriate management plans for novel clinical cases.

Figure 1.

Before and After Hybrid Approach



The grade distribution of the final exam before (1987) and after (1990) implementation of the hybrid teaching approach. Before implementation, a traditional lecture (didactic) approach was taken. After implementation, the approach was a combined didactic and problem-based approach. The final exams were comparable but different forms (described in the text) that placed a heavy emphasis on differential diagnosis.

The Hybrid (Didactic and Problem-Based) Approach

Information Resources

— Published Notes

In the year prior to implementing the problem-based approach, course lectures were transcribed and figures and illustrations stored on a computer. We then revised and published these notes as a customized textbook. In revising the material, we deleted or condensed material, eliminating about 10% of the total factual content of the course, to allow additional time for the students to develop self-directed learning and problem solving skills. Since they are stored digitally, we can easily revise these notes each year and print a textbook tailored to the course. By adding animation and graphics, we intend to convert some of this material to multimedia computer presentations. One set of course notes for NABFI has now been published in print form as a textbook.[8] Supplementary reading and another textbook are also assigned. We take both a didactic and problem-based approach to entice students to learn these materials.

For the didactic approach, we organized the reference material topically. Each week, topics are assigned, and practice questions are provided. Students are quizzed on the assigned materials each week (discussed below) and the quiz questions are discussed immediately following the quiz. Since the students learn topically organized materials, we consider this a didactic mode of presentation. Students are teaching themselves, although not as "self-directed" learning, since the instructor directs the learning process by providing study questions and by assigning readings that contain the answers.

For the problem-based approach, we also assign clinical problems each week as simulated patients. Although the clinical problems are selected to emphasize application of the most recently assigned material, the discussion of cases is often unrelated to recently assigned reading. Solution of these clinical problems requires that students review previous material (including material from previous courses) and select, learn and apply material not yet assigned. In other words, solving the clinical problems encourages "self-directed" learning. The problems are designed to cover specific "learning issues.[4] A learning issue describes the skills or knowledge that students must acquire to achieve solutions to the problems. All of the learning issues from all cases are combined to cover the entire course content. Thus, our NABF course employs both instructor-directed and self-directed learning of the written materials.

— Occasional Lectures

By popular demand, we have returned a few lectures on more difficult material to the schedule. The content of the lectures is redundant with the written materials but the illustrations and form of presentation differs from the written material.

Presentation of Clinical Problems

— Design Criteria for the Method Used to Present Clinical Problems

The key to successful application of a problem-based curriculum is in the design and presentation of the problems. One cannot implement a problem-based curriculum without some means for the teacher to develop and present problems easily. Traditionally, problems are presented by tutors in class using printed materials[4] or computers. The method used to present problems must meet several requirements. Requirements suggested by Barrows[4] include:

1. The simulated problem must be presented so that every student would actively participate in the solution.
2. Students must decide what information is necessary to solve the problem and the students are able to perform these diagnostic actions

in any order. Students cannot retract actions. This requirement would invalidate paper summaries of cases and computer simulations that access action through a succession of menus (most commercially available computer patient simulators).
3. Students are immediately presented an outcome following choice of the diagnostic action. The outcome is a representation of the information in a form that is realistic and typical of the actual outcome in a real patient encounter.

In addition to the requirements suggested by Barrows, we required the following:

4. The instructor must be able to easily author and revise a simulated problem. Unfortunately, computer patient simulations often include pre-designed cases that cannot be customized by teachers[9,10] Although pre-designed simulations such as Budd's cover test simulator, OSP2[11], have been indispensable tools to teach specific diagnostic procedures, these simulators are not suitable for presenting clinical problems for a problem-based curriculum.
5. The student is able to suspend a simulation at any time to think, ask a question or look something up and then return to where he/she left the simulation.
6. The simulator should NOT provide the student with didactic feedback as to the correctness or incorrectness of an action. If a simulator provides feedback, it should be in a form typically encountered in the clinic (for example, the patient becomes angry, the condition worsens).
7. The simulator should not allow actions that are physically impossible (for example, a corrected VA before a patient has been refracted, accommodation testing after cycloplege) but, otherwise, allow the student to err by performing actions in an incorrect order.

In traditional problem-based curricula the instructors design problems and reveal the problem within tutorial sessions —in response to students' questions and actions. The tutor can meet all of these criteria by presenting the information to a small number of students in a tutorial. Since the time scheduled for tutorials and recitations was limited in our course, we developed two methods to present these simulated problems outside of class. These methods met all of the above criteria.

Problem-Based Teacher: A Computer Patient Simulator

The first attempt to assign simulated patient problems took the form of a P4, a pack of several hundred cards.[7] On the front of the cards was the name of an action (for example, uncorrected distance line visual acuity). On the back was an outcome printed as text (20/20 OD, 20/20 OS) or an illustration or photograph. Students performed an examination by finding the appropriate action card, and recording the outcome until the problem is solved. We since have developed a computer simulator. Problem Based Teacher (PBT)[12] is a rather straightforward flat-file database written in Visual Basic for DOS for our specific needs and resources. Rumsey at University of Houston College of Optometry[13] has independently developed a patient simulator that also meets the above criteria. We will describe PBT that has evolved over eight years of use.

The important features of PBT are as follows:

- *Locating actions* Students may select from among several hundred actions by first choosing the action category (Interview, Examination, Special Test, Consultation) and typing key terms or root words. If more than one action includes the key terms, several actions are listed (limited to 10) and the student selects one from this list.
- *Displaying outcomes.* Outcomes are displayed as text. The simulator can also invoke external programs that display images, or other simulators. For example, when a student selects cover testing or pupil testing, PBT invokes OSP2, a cover and pupil test simulator. The student performs the test to collect the information. In other cases, images might be presented such as visual fields, or the patient's subjective report of the results of Worth 4-dot, and vertical prism tests.
- *Prerequisites* Usually students may perform actions in any order. However, instructors can require prior actions, for example, tests with refractive correction will not display an outcome until either a subjective or objective refraction has been performed.
- *Evaluation.* Performance can be evaluated statistically (described below). In addition, students can type comments including the diagnosis and treatment plan. We currently record logs of student actions and comments in secured directories on the library local area network. Using auxiliary software, instructors can quickly evaluate student performance on this network.
- *Ease of Authoring.* The cases can be created and modified using a word processor.
- *Random Presentation of Cases.* Students are assigned a *case set.* Within the case set are a number of specific cases, usually three. The simulator randomly assigns one of these cases. When the first case is finished, if the student chooses to do another, the simulator randomly assigns a remaining case.

Assigning Problems

Students are assigned a different case set each week. The simulated patients may be *examined* on any of several PC-compatible computers[a] available in our computer learning center, located in the library and open from 8 AM to midnight every day. Each case set includes three specific cases. The case is randomly assigned to each student. All three cases are discussed immediately following a due date.

Assigning one or more cases per week is a marked departure from the presentation of cases in more typical problem-based curricula where several classes may be devoted to the discussion of one case[5] In conventional problem-based curricula, each case involves several learning issues. Each learning issue requires significant preparation and study by the students. Our course is in the third year of the optometry program when students have completed most of a didactic basic science and clinical curriculum and are concurrently managing patients in the clinic. Thus, students are familiar with most of the examination procedures. Each case may introduce one or two substantively new learning issues and require review of several others.

Assigning only one case per week to the entire class was unsatisfactory. Students often work cooperatively on cases. If two students worked on the same case, the weaker student, we felt, did not work independently. One of three unknown cases was randomly assigned to each student. Although different in detail and in the ancillary learning issues raised, all cases assigned in a given week involve the same major learning issues. With three cases, two cooperative learners are more likely to have different cases and thus will still work more independently on their own case.

Discussion of Problems

— Large Group Discussions

Because of staffing limitations, we attempted several strategies for discussing assigned cases in large groups [3,14] including 1) large group student discussions where an instructor calls on individual students to answer questions, 2) breaking the large class into student focus groups of varying sizes to work on specific problems, and 3) allowing students various degrees of control over the organization and flow of discussion. In all of these discussion formats, students presented and discussed solutions to the entire class.

Students frequently complained about these large group discussions and class attendance dwindled. The most frequent complaints included a feeling of intimidation being called upon to present to a large class; dissatisfaction with the disorganized, free flowing discussion; and unhappiness with the pace of the classes. Even with the implementation of these different formats between 1990 and 1994, final exam performance did not change substantially. We have abandoned this format.

An alternative was lecture presentation of solutions to the weekly cases with some volunteer student interaction and discussion. Students still voluntarily raised questions and disputed points, but the lecturer controlled the pace and flow of discussion. The students, having just grappled with the problems being discussed during the previous week, appeared more attentive than during conventional lecture, but this class format still did not result in the desired outcome.

We feel that after having put forth a significant effort to solve a problem, students need some individualized recognition and critique of the attempted solution. We hypothesized that instituting tutorials would encourage students to take more care in completing assigned cases; as a result, there would be an overall improvement in final exam performance.

Table 1
Comparison of Recitations and Tutorials Where Cases Were Discussed

Recitation before 1995	Tutorial during 1995
Lecturer evaluated cases on computer for entire class	Tutor evaluated cases for their own tutorial students
20 students per recitation leader	13 students per tutor
Recitation leaders often taught different students each week	A tutor taught the same students each week
Students not evaluated for participation in discussions	Students evaluated for participation in discussion

— Recitation Sessions and Tutorials

Prior to 1994, of the 10 laboratories in NABF III, five were recitation sessions. During a recitation session, the 40 students were divided into groups of 10 who were assigned a list of questions and problems relative to each case. One instructor floated between the two groups monitoring progress and insuring that each problem was solved and question answered.

In 1995, we increased staffing of our laboratory from two to three, divided the approximately 40 students into three tutorial groups of 12 - 14 students. Tutors worked with the same group of students for 10 weeks. Even though students were required to attempt only one case prior to class, all students were required to discuss all three cases during the later discussion period. Instructors evaluated each student's performance on the simulated case before class and their class participation. This encouraged students to carefully attend to discussions of all cases. The procedural differences between recitation and tutorials are summarized in Table 1.

Evaluating Students

— Weekly Quizzes

Following a question and answer period where students could ask about assigned readings, a 10-question, 20-minute quiz was given during a lecture period. The questions were selected from assigned readings and previous case simulations. Answers were presented and discussed immediately following the quiz. The average quiz score was calculated as a median of five quizzes because, unlike a mean, a missed quiz (scored as 0) would not necessarily affect the median.

— Computer Simulation

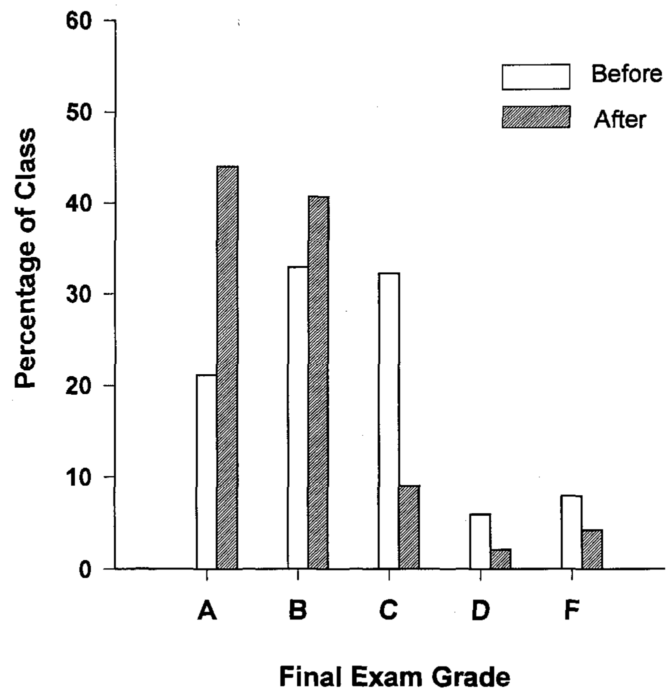
Instructors evaluated the efficiency of a student's examination of the simulated patient and their written diagnosis and treatment plan. Students were instructed to conduct "problem oriented examinations," taking only actions that were necessary to diagnose, develop a management plan, and solve any other aspects of the problem presented by the patient.

We found that evaluating student performance on clinical simulations was an incentive to encourage the students to exert a careful and serious effort to solve the problem but because students often consulted with one another during these examinations, performance could not be used as valid measures of their individual skills. Thus they were graded on a pass-fail basis. If students attempted two cases, they would be credited a pass even if both cases failed to meet our pass criteria. Since students were not given feedback until after the assignment was due, less confident students were encouraged to attempt two cases.

We feel the weakest feature of our simulator is in the evaluation. Our simulator provided no feedback other

Figure 2.

Before and After Tutorials



The grade distribution of the final exam before (1994) and after (1995) implementation of the tutorials. Before implementation cases were discussed in lecture or in recitation sessions (see Table 1). After implementation, cases were discussed in tutorials of approximately 13 students.

than statistical summaries when the case was completed. We feel that a simulator should provide continuous feedback as to accumulated time spent in the exam based on average time to perform the actions (a cost measure). A simulator should present a patient a statistical summary of whether all necessary actions were taken. We tried and quickly abandoned providing feedback during the simulation about the necessity of an action, diagnosis or treatment after each action. Students became preoccupied with the feedback (e.g., whether one action was really necessary or not) rather than clinical learning issues that should have been raised by the case. Feedback during the simulation stifled creativity and exploration of different diagnostic strategies as such feedback implied that there was only one correct approach. Feedback is best provided during tutorials by a cajole, smile, raised eyebrow, question, frown or words of encouragement from a caring human rather than a machine.

— Examinations

A problem that we have not solved to our satisfaction is the development of an objective evaluation of each student's clinical problem-solving and self-directed learning skills. We feel that, ideally, we should evaluate a student's individual and completely independent performance with a simulated patient. In 1988 and 1989 we attempted to perform the final examination on computers but, given the limited number of available computers, we found this impracticable. We have returned to written examinations for objective evaluation.

Results Following Implementation of Tutorials

Since implementing NABF changes in 1988, the highest final exam performance to date followed a recent change in the format of the recitation to tutorial sessions (Fig. 2). Between 1994 and 1995, there were no other substantive changes in the course format. In 1995, the median exam performance was 88, with 85% of the class achieving mastery (B or A). Still 6.2% of the class had D and F level performance.

In 1995 we conducted a survey of class participants, and 113 of 146 registered students responded. In this survey, 78% agreed that "I looked up information and taught myself more in this course than other courses"; only 8% disagreed and 14% were neutral. In this same survey, 84% reported that the cases helped them understand and integrate material for the course. These results suggest that students were engaged in independent learning and problem solving. We achieved one initial objective; over 80% of the class achieved mastery of the course content. We were close to achieving our other two objectives, 80% involvement in independent learning activities and less than a 5% failure rate.

Ironically, student surveys have usually indicated ambivalence with the course. The exception was that soon after our implementation of the computer cases (1990), the student evaluation results (112 of 150 responding) were more positive than more recently. During this transition period, 88% of the students preferred the course format over the lecture approach and 99% reported that the case simulations were valuable learning tools. However, only 65% reported independent learning. Since this time several things have changed. The novelty of our methods has worn off. By the time students begin NABF III, simulators have been used in three previous courses. These courses use a problem-based format similar to our own. Today, students begin using other computer simulators and instructional programs in their first year. Moreover, we have more stringent criteria for passing assigned cases. In our most recent survey, when asked to rate the course relative to other courses, only 4% reported strong preference for our course. Most students, 42%, were neutral; 33% rated the course better and 21% worse than other courses. These same overall ratings were comparable to the course evaluation in 1994, leading us to conclude that the tutorials did not improve overall student attitudes toward the course. This ambivalence could be partly attributable to the extra time required of students by our approach; 35% reported that the course demanded more time than available. When asked whether they preferred ``to have material presented in lecture" over``reading material and using class time to discuss problems and cases," 52% preferred lecture, and 16% preferred the problem-oriented approach; the remainder, 31%, were neutral.

Conclusions

The NABF course sequence includes both didactic and problem-based approaches. Since we combined these two approaches from the first implementation, we cannot tease apart the quantitative effect of each approach on the final outcome. However, we can conclude that when these two approaches were combined, performance on our final examination improved substantially over performance in 1987 following a traditional lecture approach. Under our current course design, the conscientious student will review the information content of the course twice, once as part of assigned weekly readings (didactic approach) and once as part of the process of solving a simulated case (problem-based approach). Students who attend all of the lectures will encounter the important and more difficult information three times. The sheer redundancy of exposure to course content alone could account for much of the improvement in final exam performance from 1987. Since mastery-level (B or higher) final exam performance does require developed problem-solving skills, students were more involved in independent learning and problem-solving activities than when we used a lecture format only. Considering final exam performance and survey results, we conclude that the problem-solving skills of our students improved as a result of our combined approach. This improvement, we suspect, resulted from practice solving 20- 45 simulated cases over the three course sequence. It is notable that, although the assigned case simulations required approximately 30-45 minutes per week outside of class, in our 1995 survey 84% of the respondents still felt that this time spent was worthwhile.

Considering most recent final exam performance, we have concluded tutorials are necessary for the most effective problem-based learning —well worth the cost of the additional staff member. The computer simulator reduced the tutorial class time necessary to implement the problem-based approach. By presenting problems to each student before the tutorials, the computer simulator encouraged students to confront all learning issues, to think about the problems and to formulate questions and look up important information on their own before the tutorial. Class time was spent on the solution and relevant learning issues.

Although adding the problem-based course format results in more effective learning of material and development of problem solving skills, more students still prefer the lecture format. We, therefore, needed to balance these two approaches. The major advantage of the combined didactic and problem-based approach is that it is flexible. The instructors can easily adjust the course requirements and orient the course toward either a didactic or problem-based approach depending on available resources, the overall curriculum and the needs and capabilities of our students. Shortly after implementation of our innovations, students expressed discomfort and many were not prepared for a problem-based approach. With our course structure, we easily returned to a more topical or didactic approach by adding lectures to the schedule and by decreasing the difficulty of the cases.

We anticipate that as the overall curriculum becomes more problem-oriented, the students will become more comfortable with this approach, and we can easily return to a purer strain of problem-oriented education. Thus, by combining the essence of the problem-oriented and didactic approaches, we have created a hybrid that can easily adapt to a constantly changing curricular environment.

Footnotes

a. In early implementation, we found that five computers were (barely) sufficient for each assigned case per week for 150 students.

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Ethics in the Optometric Curriculum

D. Leonard Werner, O.D.

The fall 1993 issue of Optometric Education contained an article by Dr. Werner entitled, "Teaching Ethics in the Schools and Colleges of Optometry," The article was based on a survey that indicated a need for a coordinated effort among the schools to develop a curriculum model for optometry relating to the teaching of ethics. In order to stimulate ongoing discussion in this important area, Optometric Education will occasionally publish papers that develop this theme.

Why Teach Ethics in Optometry?

The teacher of ethics is often placed in a defensive posture. The public rightfully expects doctors to practice ethically, and many patients are quick to recall examples of the reported ethical abuses of doctors. Whether the world is more immoral or not is debatable, but the media reports frequent examples of inappropriate behaviors by persons throughout society.

Some educators still question whether there is a need for an ethics course since it takes valuable time away from learning other subject matter. They suggest that resolving ethical dilemmas is simply "doing the right thing," forgetting that the "right thing" varies in different professions and in different cultures.

When introducing the topic of ethics to students, I mention that research in medical education reports that students enter medical school with a high moral/ethical profile which diminishes throughout the school years, and continues to be eroded during residencies.[1,2,3] This research suggests that the "system" takes young people and apparently changes them, and not necessarily for the better.

A legitimate goal in teaching ethics is to sensitize students so that they can retain the ethical foundation they received from their families, schools, religions and communities. The ethical reasoning that becomes ingrained as students are learning patient care is expected to remain throughout their professional lives. Obviously, we can not accurately assess this effect any more than we can prove the correlation between the teaching of anatomy and the scientific quality of a doctor's practice.[4]

Contemporary optometric practice faces different ethical dilemmas than those of the past. The doctor/patient relationship is potentially compromised by a third party payer in today's system. The evolution of standards of care and the imposition of the closed panel and other aspects of managed care significantly affect traditional aspects of medical care. In addition, optometric practitioners are interacting with other disciplines, all of whom have an ethics education.[5]

What is it that we can expect to attain with an ethics curriculum in optometry? Clearly, we are not educating bioethicists; but we can:

- give students the tools to make ethical decisions when appropriate
- help students to be more sensitive to ethical issues in their lives and in their patient care
- help students to be more sensitive to ethical issues in society as consistent with future community leaders.

How Do We Teach Ethics?

Ethics can be taught, but it must have the same disciplined approach used with other courses in the curriculum, namely appropriate goals and objectives. While there are several pedagogical techniques to teach ethics, the method of choice is the **case-based Socratic approach,** preferably in small group sessions. A positive aspect of this case-based approach is that it dispels students' previous negative association of ethics education with pious sermons.

The case study approach, when used appropriately, does not trivialize the material; rather, it allows for the presentation of scenarios that are relevant to the audience's framework, and this process should be part of an educational continuum.

Thus, the case studies for first year students relate to fellow student or faculty behaviors, those for third year students are clinically oriented, and those for practitioners are appropriate for that group. The audience in this setting should participate in the process, and the facilitator should be skilled at generating debate and discussion while introducing theories and other structural components into the process.[6]

The teaching of ethics was not always done in this manner. In the years before 1970, it was assumed that medical students would absorb ethics by working closely with an ethical mentor. Four percent of the medical schools taught ethics in 1972. This number has increased so that now

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every medical school has an ethics curriculum.[7] Dental school accreditation now requires the teaching of ethics.[8] Optometry is playing "catch-up."[9]

Early medical school lecture courses emphasized the theories of ethics and the process of making ethical decisions. They have largely been replaced by courses emphasizing the resolution of ethical dilemmas utilizing ethical decision-making techniques. The humanistic elements of care and caring are featured in this more contemporary approach.

An Ad hoc Committee of Optometric Ethics Educators met in 1993 and developed the Curriculum Guidelines for the Teaching of Ethics and Professionalism in Optometry. The guidelines state that "the major content areas of professionalism and ethics are interrelated. Ethics is the route through which professionalism becomes understandable, relevant, and practical." The guidelines recommended the following content outline:

I. The Profession
   A. Definition and characteristics of a profession
   B. The history of the optometric profession
   C. Legal issues
   D. Optometric professional organizations
II. Ethical Reasoning
   A. Critical thinking
   B. Ethical theories and principles
III. Ethics and Professionalism in Health Care
   A. Codes of ethics
   B. Professionalism and organized optometry

These guidelines were the core of an expanded ethics curriculum delineated at the last meeting of the optometric ethics educators held in February 1996.* A report of that meeting will appear in a future "Ethics Update."

* The meetings of the optometric ethics educators were partially supported by a grant from CIBA Vision Care.

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ASCO Meetings Calendar 1996

June 1996

11th - Student Affairs Officers Workshop (Sparks, Nevada)
20th - Executive Committee (Portland, Oregon)
20th - 21st Annual Meeting (Portland, Oregon)
21st - Annual Luncheon (Portland, Oregon)
23rd - Sustaining Member Advisory Committee Breakfast (Portland, Oregon)

AUGUST 1996

9th-11th - Residency Education Conference (Lansdowne Conference Resort, Leesburg, Virginia)

OCTOBER 1996

4th-6th - Clinic Directors SIG Workshop (Philadelphia, Pennsylvania)

NOVEMBER 1996

1st - Executive Committee Meeting (Fullerton, California)
2nd - Board of Directors Meeting (Fullerton, California)

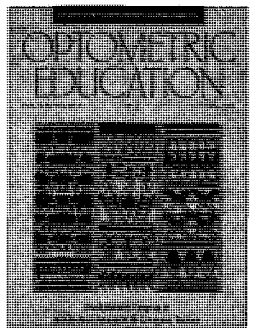
DECEMBER 1996

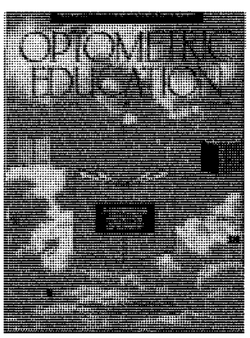
6th - AAO/ASCO Workshop: "Clinical Teaching Techniques and Student Evaluation Techniques" (Orlando, Florida)

* Standing and ad hoc committees meet by conference call throughout the year.

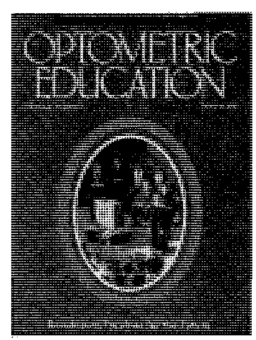
Annual Index — Volume 21

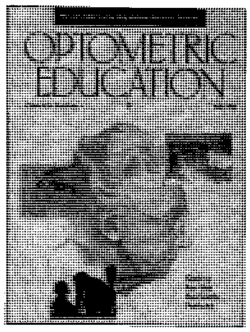
Author Index

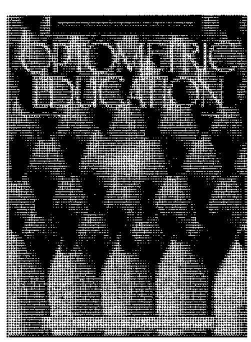


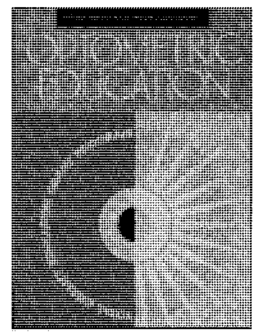


Subject Index









Resources in Review

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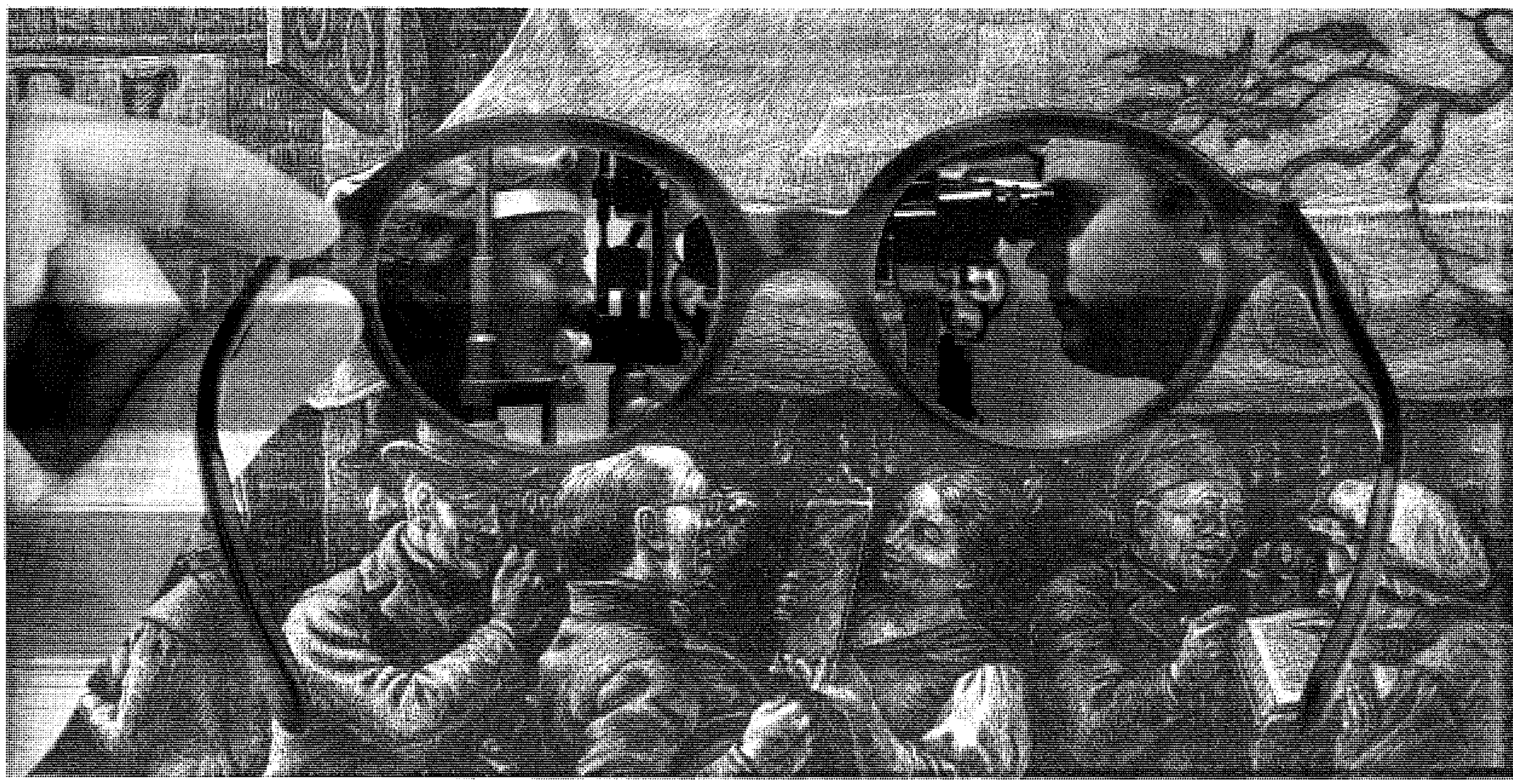

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