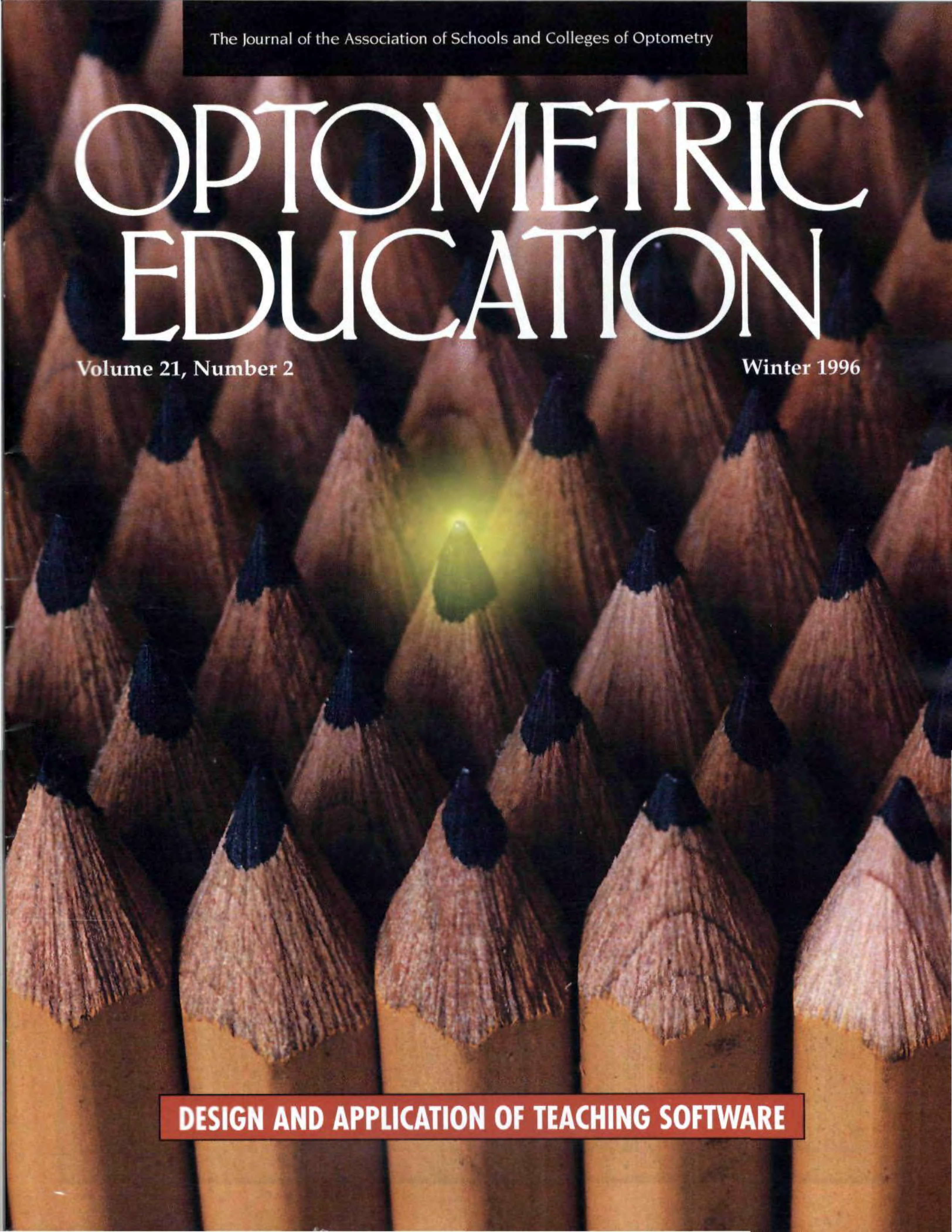
The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION

Volume 21, Number 2

Winter 1996



DESIGN AND APPLICATION OF TEACHING SOFTWARE

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OPTOMETRIC EDUCATION

ISSN 0098-6917

VOL. 21
NO. 2

WINTER
1996

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ARTICLES

COMMUNICATIONS

DEPARTMENTS

OPTOMETRIC EDUCATION is published by the Association of Schools and Colleges of Optometry (ASCO). **Managing Editor:** Patricia Coe O'Rourke. **Editorial Assistant:** Rebecca M. Defibaugh. **Art Director:** Dan Hildt, Graphics in General. Business and editorial offices are located at 6110 Executive Boulevard, Suite 690, Rockville, MD 20852 (301) 231-5944. **Subscriptions:** JOE is published quarterly and distributed at no charge to dues-paying members of ASCO. Individual subscriptions are available at $20.00 per year, $25.00 per year to foreign subscribers. Postage paid for a non-profit, tax-exempt organization at Rockville, MD. Advertising rates are available upon request. OPTOMETRIC EDUCATION disclaims responsibility for opinions expressed by the authors. Article copies, 16mm microfilm, 35mm microfilm and 105mm microfiche are available through University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

GUEST

EDITORIAL

Computers and Information Technology In Medical Education

Joel W. Goldwein, M.D.

Nearly 50 years ago, the University of Pennsylvania, in conjunction with the U. S. War Department, announced the development of ENIAC (Electronic Numeric Integrator and Computor), the world's first electronic digital computer. Legend has it that the lights of Philadelphia dimmed when ENIAC's 1,700 vacuum tubes were switched on. In reality, this did not occur, but ENIAC's introduction did signal an important change by blazing the way for modern computing. The subsequent use of computers in medicine and medical education is but one of the technological advances which followed. It is, therefore, fitting that this issue of ASCO's journal publishes two important articles on the use of information technology in optometric education.

After ENIAC, the practical use of early electronic computers was slow in coming. This was, in part, due to their high cost, large size and limited capacity. However, it was also due to the significant need to develop useful applications and interfaces with the people who were to use such systems. Advances in technology, including development of modern semiconductor materials, addressed the most critical of the technological issues, with the decades of the 1970s and 1980s seeing the introduction of the desk-top personal computer. These machines have matured quickly from the status of technical curiosities to their current status as essential tools of our society. In particular, hospitals, medical schools and doctors' offices haved moved beyond simply using word processing and spread sheet programs and are using expanded computer and information technology at a growing rate.

Nevertheless, the apparent value of information-based technology to medicine and medical education continues to be limited by the relatively small number of specific applications and information exchange capabilities that are available. The major barrier to exchange of information has traditionally been the lack of a reliable and effective network capable of linking computers together regardless of location. In 1969, a U. S. Department of Defense network called ARAPANET (Advanced Research Projects Agency Network) linked four "super computers" together. By the early 1980s, fewer than 1000 computers were connected by this developing network. This model, however, eventually served as the foundation of the Internet that now links more than 50 million computers, thus becoming the de facto standard of worldwide computer networking. The result has been an explosion of the information highway with larger amounts of important data having a much wider and faster dissemination.

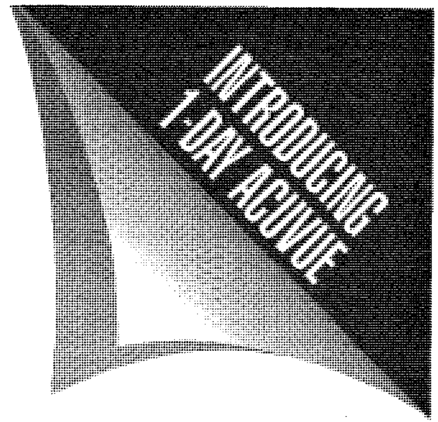
A dilemma still remains for the health care sector, however, in dealing with the information technology explosion. A 1994 U.S. Interagency Task Force on Information Infrastructure stated that "the health care sector has lagged far behind other sectors of our economy in applying information and communication technologies." Clearly, this conclusion is supported by medical education's apparent persistence in accessing and presenting most material in more conventional didactic venues.

The impact of the Internet and other information technology upon health care practitioners, educators and consumers is now only beginning to be felt. And while there is no doubt that these resources will ultimately influence the development of better informed professionals, it is up to the medical educational community to make it happen. We can only do this by embracing technological change and adapting it to educate future generations of health care providers.

The importance of this need cannot be underestimated. Information technologies not only provide us with content to be assimilated, but they also fundamentally alter the ways in which we learn and garner information that we need, both as students and throughout our careers. We can no longer educate physicians just for today. We must endeavor to develop "on-line" practitioners who are capable of using technology to become stronger clinicians.

My experience in developing the University of Pennsylvania's cancer education resource called OncoLink (http://www/oncolink.upenn.edu) has helped to change my attitudes toward my practice and my role as a medical educator. I suspect we all have similar contributions to make, and there is no doubt that we all will benefit substantially when our professional expertise, learning programs, and other information-based technological innovations are shared as widely as possible.

Dr. Goldwein is associate professor and director of pediatric radiation oncology at the University of Pennsylvania Medical Center. He is a co-developer of the Oncolink on-line service.



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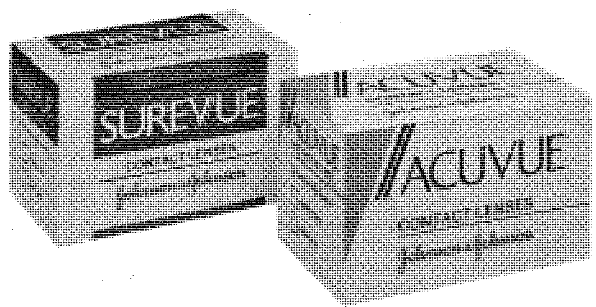

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Letters to the Editor

I want to congratulate you for devoting the fall 1995 issue of *Optometric Education* to "Caring for the Geriatric Patient."

Being one of the first recipients of a federal grant for developing gerontological content in the optometric curriculum during 1979-80, it is gratifying to see some progress in geriatric education for optometrists. However, it does not even scratch the surface compared to the increase in the aging population during that period. The article by Mancil et.al. clearly states that no progress has been made in vision and aging-related research over the past decade. It is imperative that additional resources be devoted and outside research funding be sought to expand research in this neglected area. It is also interesting to note that although most of the schools have gerontological content in their curriculum, only 50% offer any student training through nursing home and homebound programs.

Drs. Freed and Kirstein have identified the need for homebound eye care and have started a program at SUNY. At the Pennsylvania College of Optometry (PCO), we have had the nursing home and homebound eye care program in our curriculum for over 15 years. One reason for lack of interest has been due to the scarcity in educational material on this topic. Recently a manual for eye care in nursing homes has been published and is available through the PCO bookstore. This type of information helps educators and practitioners in initiating eye care services in non-traditional settings.

Drs. Freed and Kirstein have stated that homebound patients are twice as likely to report difficulty in reading regular print. The single most important factor responsible for this is inadequate lighting for reading. I am sure that these authors' experience is similar to ours, that while overall illumination in these homes is relatively poor, the illumination at reading levels is even worse. Even the best of the table lamps fail to illuminate reading materials for these bed-bound patients. A simple shining of a pen light on the reading card improves near acuity of two lines or better. I urge those who provide home eye care to prescribe a reading lamp before prescribing a new pair of reading glasses.

There are other issues and concerns, and I hope that ASCO convenes a meeting of the faculty involved in education and training for care of non-ambulatory patients.

Satya B. Verma, O.D.
Director, Community Eye Care Service
Pennsylvania College of Optometry

COMMENTARY

Interprofessional Strategies for Optometric Training — A Model for the Future

Raymond I. Myers, O.D.

The current debate about health care reform is driven by a complex mixture of political, economic, professional and societal pressures. The effects of these pressures are felt most acutely in health care market forces, but they will also gradually affect the formation of public policy concerning the delivery of health care and the education of health care providers.

In this debate, optometry has the advantage of its position as a primary care profession, a position which is enhanced by our ever-widening scope of practice. Now, the question is posed of how the optometric education community ought to respond to these pressures for change in a manner that will enable our profession to advance and maintain the care we deliver.

While it might be tempting to use our current advantages to pursue a totally autonomous practice position, my own experiences with interdisciplinary eyecare lead me to believe that a collaborative approach is more appropriate.[1] It is well known that optometry and ophthalmology, working together, each at its highest level of training, can form strong partnerships for the effective delivery of modern eye care. It is the premise of this editorial that similar collaboration in the educational arena will bear additional fruit. Optometric education must play a key role in the continuing development of a model for the interdisciplinary clinical training of optometrists for the future of eye care delivery.

Dr. Myers is associate clinical professor at the University of Missouri-St. Louis School of Optometry. He was previously with the LSU Eye Center in New Orleans, Washington University in St. Louis and Moorfields Eye Hospital in London.

While this view may seem politically unrealistic to some, it seems to me that there are many current interdisciplinary practice opportunities that exemplify such a model, thereby facilitating its continuing logical development. Ultimately the reward of developing such a model would be the firmer establishment of optometry as the principal gatekeeper of eye care.

To ensure the most appropriate development of such a model, the Association of Schools and Colleges of Optometry should take affirmative steps to develop clinical training opportunities of all types, especially those with an ophthalmological partnership. Such joint practice programs are also educational opportunities and offer the chance for greater transfer of clinical skills. More importantly, they also expand the access to patient care training experiences beyond those traditionally available in optometric educational institutions. By taking advantage of these additional interprofessional training opportunities, we will be able to enhance the development of a cooperative model for the future of our training programs.

Optometric clinical training will also be advanced through the naturally occurring evolution of our residency training programs. Currently running just above 10% of our graduating class size, residency program opportunities are gradually expanding, with the greatest expansion potential in hospitals and multidisciplinary practice centers. Our experience with the Veterans Administration, which has had a truly significant impact upon the advancement of clinical practice and training capabilities, supports this concept.

An expanded emphasis upon residency training will have the added advantage of assisting our educational institutions in balancing their budgets and in holding the line against the future costs of clinical training. Medicare clinic revenues in teaching hospitals produce supplemental payments from the federal government which averaged $80,000 per resident in 1992. While this sort of direct subsidy may be changed or reduced, the current national interest in underwriting the training of primary care providers will tend to maintain at least some level of continuing support. Optometric education's leadership must work to ensure that optometric residency training is included in any funding structure that might evolve.

However, optometric education must also be prepared to develop future opportunities. In this case, health care cost-containment is our potential ally by encouraging the development of optometric residency programs in hospitals where previously ophthalmological residencies may have been the rule. This concept was recognized by APA President James Leadingham in 1992[2].

Fortunately, many of the most influential forces of change will naturally tend to bring optometry and ophthalmology together in ways that recognize each profession's true scope of practice. Within optometric education, there is a great opportunity both to lead and to flourish from a cooperative mode of care and training for future optometrists.

References

1. Myers RI. Interprofessional strategies for optometry and ophthalmology in the future, Optometry & Visual Science 1995. 72(1):42-44.
2. Leadingham J. Speech before the American Academy of Ophthalmology AOA News 1993 32(10):1.

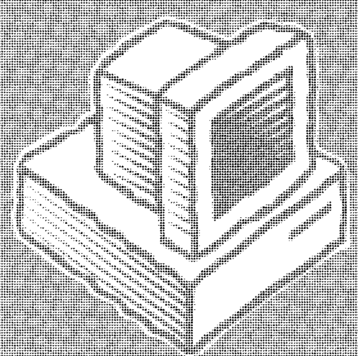
Computer Software Reviews

Human Anatomy, University of Florida, College of Medicine, Gold Standard Multimedia, Inc., 1995, $195.

Human Anatomy on CD-ROM was developed at the University of Florida College of Medicine to facilitate the study of gross anatomy outside the confines of the laboratory. Originally the program was a Macintosh-driven videodisc system utilizing two monitors, one for images and one for text. The development of the CD-ROM version has allowed both images and descriptive text to be combined on a single screen. One CD contains both the Macintosh and Windows versions of the program. An institutional version with instructor tools for end-user modification is also available at an increased cost.

The CD contains a total of 44 dissection laboratories divided among the following anatomical regions: back and spinal cord, upper extremity, lower extremity, thorax, head and neck, abdomen, pelvis and perineum. The user can select a particular region of the body for study by clicking on that area of the figure displayed on the title screen. Included in most of the laboratories is an overview of the laboratory objectives, an osteology section, step-by-step dissection procedures and a list of summary terms from the dissection laboratory. The program points out where to make incisions for dissection, demonstrates procedures such as muscle reflection and presents images of the structures under study.

More than 6000 photographic images of cadavers in various stages of dissection are available for viewing. The images are presented in still-frame or image sequences. The accompanying descriptive text includes "hot" text, which consists of items highlighted by different colors that can be clicked on to display a particular structure, such as a nerve in the arm. The "hot" text can also be utilized to display an anatomical drawing corresponding to the cadaver image or to navigate to a related screen for more information. A reference box is displayed on the screen which either provides references to commonly-used atlases for further study or contains helpful comments. The option to add notes to a laboratory to be stored for later retrieval is also available.



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fax (904) 373-7124

In addition to the dissection laboratories, the CD contains an evaluation mode consisting of 4700 questions. The student is able to choose a body region from which to be tested as well as the method of examination. The options available include either a graded multiple choice exam or a "flashcard" method in which student answers are not recorded. The graded exam posts the number and percentage of questions answered correctly and provides the option to review the missed questions.

I found Human Anatomy on CD-ROM to be an excellent study aid. The laboratories are very good. Of particular interest to optometric educators is the nice coverage of the head and neck, including the eye and orbit. The images are of high quality, and the option to enlarge the image from approximately one-quarter screen size to full screen size is a very nice feature. The presence of an orientation icon on the screen corresponding to the area of the cadaver being viewed is also helpful in maintaining perspective. I especially liked the self-assessment mode with feedback in the form of a graded exam. This is an excellent tool for the student to use in testing his or her recall of the material.

After spending only a few minutes browsing through the concise user's manual, I was able to navigate through the various features of the program with ease. One drawback I noted was the inability to access a few of the figures that were highlighted in the "hot" text. However, this is not serious enough to prevent me from recommending the program. The CD can be used for lecture demonstration, as an overview prior to laboratory dissection and for individual self-paced study outside the laboratory. I would recommend it highly as an adjunct to any human anatomy course.

Reviewer: Dr. Kippi D. Wyatt
Northeastern State University
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.

Vistakon Announces Awards To Optometry Students

Nineteen optometry graduates received the "Vistakon Award of Excellence in Contact Lens Patient Care." Each recipient received a check for $1,000 and a commemorative plaque.

To qualify, winners had to demonstrate a strong command of academic knowledge, but more importantly, they had to apply that knowledge in a manner consistent with the highest standards of professional patient care.

The 1995 award recipients were: **Aurora Axin, O.D., State College of Optometry, State University of New York; Richard Bell, O.D., The Ohio State University College of Optometry; Jeannine Brake, O.D., Ferris State University College of Optometry; Benoit Dallaire, O.D., University of Montreal School of Optometry; Yamira Emir Moyett, O.D., Inter American University of Puerto Rico School of Optometry; Amir Cukierman, O.D., Nova Southeastern University College of Optometry; Sally A. Donaldson, O.D., The New England College of Optometry; Kim Y. Eng, O.D., Pacific University College of Optometry; Selena Friesen, O.D., University of Waterloo School of Optometry; Carolyn Celeste Gibson, O.D., University of Missouri -St. Louis School of Optometry; Denise Graessley, O.D., University of California, Berkeley School of Optometry; Angelo Marino, O.D., Illinois College of Optometry; Madine Maki, O.D., Southern College of Optometry; Jessica Lynn Reininger, O.D., Pennsylvania College of Optometry; Roula F. Shahin, O.D., College of Optometry University of Houston; Jill Smith, O.D., Indiana University School of Optometry; R. Michelle Welch, O.D., Northeastern State University College of Optometry; Nathan Whitaker, O.D., The University of Alabama at Birmingham School of Optometry; and Grace K.S. Wong, O.D., Southern California College of Optometry.**

"We are proud to recognize these new Doctors of Optometry," said George W. Mertz, O.D., director of academic affairs at Vistakon. "They not only managed to persevere through four years of demanding training to earn their degrees, but in the process, they performed at a level which distinguished them among their peers as the best in this category. We salute them for the fine example they set for the profession of optometry."

Varilux to Sponsor Optometry Student Grant Awards

Varilux Corporation invites students to participate in the 1995-1996 Varilux Student Grant Award Program. Third and fourth year optometry students may submit case reports on patients fit with Varilux lenses to the clinical staff at their school. The clinical staff will select one recipient based on the following criteria: Dispensing Skills, Application of Varilux Lenses to Patient Needs, Analysis of the Case(s), Analysis of Lens Design and Lens Performance (Optional/Extra). Reports should include patient's old and new Rx, occupation, hobbies, and any other pertinent information. Personal information on student must include name, address, phone number, and social security number. Maximum length of report is 2,000 words. ENTRIES MUST BE POSTMARKED BY APRIL 1, 1996.

The student who has the winning case report at each school will receive $500 plus entry into national judging. The national award winner and faculty advisor will each receive an all-expense paid trip for two to the AOA Congress meeting to be held June 21-25, 1996 in Portland, Oregon.

For further information, contact Dr. Rodney L. Tahran, vice president of professional relations and clinical affairs or Danne Ventura, manager of professional relations, at 477 Commerce Boulevard, Oldsmar, FL 34677 or call 800-BEST-PAL, ext. 7170 or 7369, respectively.

CIBA Vision and Alcon Join Efforts

CIBA Vision Corporation announced the addition of Alcon's OPTI-ZYME® Enzymatic Cleaner to all AOSEPT® and QuickCARE™ lens care kits, including starter kits and monthly and quarterly supply kits. OPTI-ZYME® tablets will be phased in with QuickCARE beginning in November 1995 and with AOSEPT in December.

"We're very pleased to partner with Alcon to provide eye care professionals with a valuable addition to our lens care kits," said Frans Mahieu, senior marketing manager, CIBA Vision. "OPTI-ZYME's triphasic action helps to remove proteins, lipids and mucins, and is compatible with both the AOSEPT and QuickCARE lens care systems. And now that our QuickCARE kits have an enzymatic cleaner, it is a more viable option for conventional lens patients."

For more information, eye care professionals can contact their CIBA Vision sales representatives or call customer service at (800) 241-5999.

Wesley-Jessen's Student Program Approved by AOA

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

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, sponsored and funded by Wesley-Jessen, at all U.S. schools and colleges of optometry.

Bausch & Lomb Grant Helps Create New Curriculum

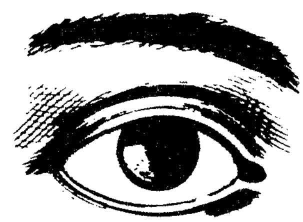
At the annual meeting of the Association of Optometric Contact Lens Educators (AOCLE), **The New England College of Optometry (NEWENCO)** shared the results of a new curriculum module it initiated using a $10,000 *Competing for the Future* grant.

"NEWENCO was awarded the initial grant because its proposal demonstrated a clear plan of action and was designed to enhance the clinical experience of students and their patients," said William T. Reindel, O.D., director of professional market development for Bausch & Lomb's Personal Products Division. "Education is an important focus at B&L. We remain committed to fostering enhanced education at the school level as well as for practicing professionals. After all, the students' future is our future," he said.

"All students need a real world application, a sense of what is going on in today's contact lens practice. Our main objective was to create a program that would increase our graduates' confidence as they enter into practice," said Ron Watanabe, O.D., explaining why he and colleague Paul White, O.D., applied for the grant on behalf of NEWENCO. "The professional environment continues to change as eye care becomes more competitive and patients become more selective. As educators, we need to keep pace with the dynamics of health care practice," he said.

The Bausch & Lomb grant enabled NEWENCO to initiate a multi-tiered program involving third- and fourth-year optometry students. "Overall, the program has been successful, resulting in enthusiastic and positive feedback from the students involved in the new curriculum," said Dr. Watanabe. "The practice visitation and communication skills aspects of the program inspired students to be more motivated to learn practice realities."

The NEWENCO program and its results will be shared with the clinic chiefs of all the North American schools of optometry, via a learning module that will be distributed in the near future.



CIBA Vision Lenses Now Available In Visitint®

CIBA Vision announced that Focus® (vifilcon A) soft contact trial lenses are now available in Visitint®. Kits containing the visibility-tinted trial lenses are now offered in 8.6 mm and 8.9 mm base curves and in powers ranging from -0.50 D through -6.00 D in 0.25 D steps.

"Our patented center visibility tint makes Focus lenses easy to handle, which is especially important to new contact lens wearers," says Martha Bonneville, senior marketing manager, CIBA Vision. "We have added Visitinted Focus to our trial lens offerings to ensure that we are providing this important benefit to eye care professional and patients."

For additional information about Focus Visitint trial lenses, eye care professionals should contact their CIBA Vision sales representative or call CIBA Vision customer service at (800) 241-5999.

Vistakon Re-pledges Support for Fellowship Program

The American Optometric Foundation (AOF) announced that Vistakon has joined with the AOF for the third consecutive year to support the Ezell Fellowship award program in 1995-96. The Ezell Fellowship Program funds research efforts in vision science. Vistakon has contributed $10,000 to the program each of the past two years.

"The work of the Foundation is contingent on major supporters such as Vistakon. Both of our organizations have recognized that the profession, and ultimately the public, benefits from the research results of emerging and established investigators," said Bert C. Corwin, O.D., AOF president. "It is rewarding to see the profession and the ophthalmic industry working together to support research in the vision sciences."

Varilux Sponsors National Panel On Bifocal Conversion

The latest breakthrough studies on patient preference of progressive addition lenses over traditional multifocals have pushed the issues of conversion to the forefront of the multifocal industry. Twelve of the nation's top optometrists and opticians convened in Chicago to discuss the transformation of the multifocal market and the importance of bifocal conversion.

One panel included optometrists **Paul Feinberg,** Waterford, MI; **Kevin Katz,** Galveston, TX; **Carl Melnik,** Granada Hills, CA; **Ronald Poulin,** Camden, NY; **Tex Smith,** Citrus Heights, CA; and **Jim Studebaker,** Eaglewood, OH.

Each panelist presented a topic for round table discussion. Discourse ranged from breaking patient screening barriers to presentation for PALs and the financial effect of bifocal conversion.

"Too many doctors have a fear of fitting progressive addition lenses, particularly on bifocal patients," said panelist Dr. Paul Feinberg. "Once the doctors understand how to do it, they find they really have nothing to fear. This recent study by Boroyan and colleagues proves it . . . what more evidence could you need?"

Design and Application of Teaching Software

Glenn G. Hammack, O.D.

Abstract

Software has been developed for interactive, self-paced instruction using commonly-used personal computers. HyperCard® stacks have been written, all using a common screen interface, and are being utilized in curriculum courses at the University of Alabama School of Optometry. The common interface has these features: forward navigation, reverse navigation, search navigation, awareness instructions, the information presentation area, and exit of the software. Instructional delivery of course material is done using text and graphics. Interactive questions are placed into the software at occasional points to allow students to self assess their retention of the material. Printouts of course material are easily produced for handouts, and contain all text and graphics from the screens. The software is being used by one instructor in a multi-instructor lecture/lab course, and in a semi-problem based learning course. A survey evaluation comparing this instructional modality to other methods was completed by students. The software-based instructional session scored better than a traditional handout-and-slide/overhead session to a statistically significant level. The software session scored comparably to a lecture session using slides, computer graphics, and video.

KEYWORDS: Computer-assisted education, teaching software, evaluation, HyperCard software, Macintosh Computers

Background

Applications of computers in education have held promise since the advent of the computer into common usage. Early applications used custom written software on mainframe computers at large institutions and met with limited success[1]. The personal microcomputer and its subsequent adoption into the educational setting for word processing, financial, and statistical applications set the stage for further development in the area of computer-based instruction. Early applications brought out several early promising features of computer-based education: interactivity, simulation, evaluation, and user tracking[2]. Their success, however, was limited due the difficult nature of authoring teaching materials (basically computer programming) and the scarcity of resources to make the materials widely available to students [3,4].

The development of the optical videodisc offered photorealistic still and motion images along with sound to computer-based education[5]. Videodiscs for teaching applications flourished, but successful use of these was limited due to costly and very specific hardware and software requirements for widespread implementation[6].

In both cases, implementation difficulties prevented the widespread use of very well developed instructional tools. In spite of these drawbacks, the efficacy of computer-based instruction continues to be documented [7,8,9,10,11]. A promise for future applications of computer-based education lies in the new generation of reasonably priced personal computers and software. Personal computers are now increasingly used by students through institutionally-maintained computer laboratories, and many students are acquiring their own to supplement their education.

This increasing availability of student personal computing can be used to improve the implementation of computer-based education, as long as computer-based instructional tools can be written with a commonality of computing performance in mind. Software for computer-based instruction is often written to showcase special features and hardware of new computers which are not available on more basic models. This limits usage as most computers available to students (or purchased by them) are not equipped with the special and costly features designed into the teaching software. This is the primary consideration in our design for software for interactive, self-paced instruction. The software is designed to run on limited specification machines which are more available to students.

The Software

Apple Macintosh HyperCard® software is a combination database, graphics, and programming tool designed as a general utility program for home and business use. A version of HyperCard® is provided with every Macintosh sold. Much in the same way that a word processing program such as WordPerfect 5.1® or Microsoft Word® uses computer files separate from themselves to store documents, HyperCard® stores program information in separate files called stacks. These stacks can be written by users, and distributed without licensing constraints. They can be used on any Apple Macintosh® which retains the HyperCard® software installed on it when manufactured.

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Table 1 contains a listing of topics for which HyperCard® stacks have been written, all using a common screen interface, and all being utilized in curriculum courses at the University of Alabama School of Optometry.

Software Features -

Graphic User Interface

The HyperCard® program runs on the Apple Macintosh®, which inherently has a graphical user interface (sometimes referred to as a GUI), where computer programs and files are represented by named icons and graphics on the screen. The Apple Macintosh® environment, Microsoft Windows®, and IBM's OS/2® are all graphic user interfaces.

Navigation Controls and Basic Interface

Figure 1 shows the basic user interface for the HyperCard® stacks, which is common to each screen which the student uses. The screen has six features which are important: forward and reverse navigation, search navigation, awareness instructions, an information presentation area, and exiting the software.

Forward and Reverse Navigation

Forward and reverse navigation is the ability to move from one screen of information to the next, or prior. At the lower right and left corners of each screen are controls labeled above by the words "Go On" and "Go Back." These control "page turning" of the information.

Search Navigation

Search navigation is the ability to move from screen to screen of information which contains a typed-in keyword. When the "Find" button used, a box appears into which text is typed for a keyword search. Search navigation allows topic specific reviews of the instructional material.

Awareness Instructions

In the lower left central area of each screen is an area where general instructions appear. The purpose of this area is to advise and guide the novice user for successful use of the software.

The Information Presentation Area

The majority of the screen is occupied by the large information presentation area, where any combination of text, graphics, and questions can be organized. For large amounts of information, this area can be scrolled.

TABLE 1.
Listing of UAB Authored Stacks, by course and title

Clinical Evaluation of the Visual System

1. Introduction to Teaching Software
2. Case History
3. Presbyopia 1 - Correction Basics
4. Presbyopia 2 - Clinical Methods
5. Biomicroscopy 1 - Basics of the Instrument
6. Biomicroscopy 2 - Clinical Methods
7. Autorefractors and Autokeratometers
8. Automated Perimetry

Environmental Vision

1. Week 2 - Obtaining Information, the Task Analysis Method
2. Week 3 - Focal Distance, Functional Field Issues
3. Week 4 - Functional Field, Illuminance and Contrast Issues 1
4. Week 5 - Contrast Issues 2
5. Week 6 - Task Analysis Wrapup: Binocularity, Efficiency, Hazards
6. Week 7 - Threats and Natural Protection
7. Week 8 - Protection Modalities and Recommendations
8. Week 9 - Special Tasks Prescribing

Software Instructional Delivery

Use of Text and Graphics

Instructional delivery is done using text and graphics, either drawn or scanned. Figure 2 shows an example of an instructional screen comprised of text only. This text is typed in by the software author. The software does automatic word wrap and the size and characteristics (normal, bolded, underlined, italicized, superscript, and subscript) of the text can be modified.

FIGURE 1:
New Stack Screen, Navigation Controls Only

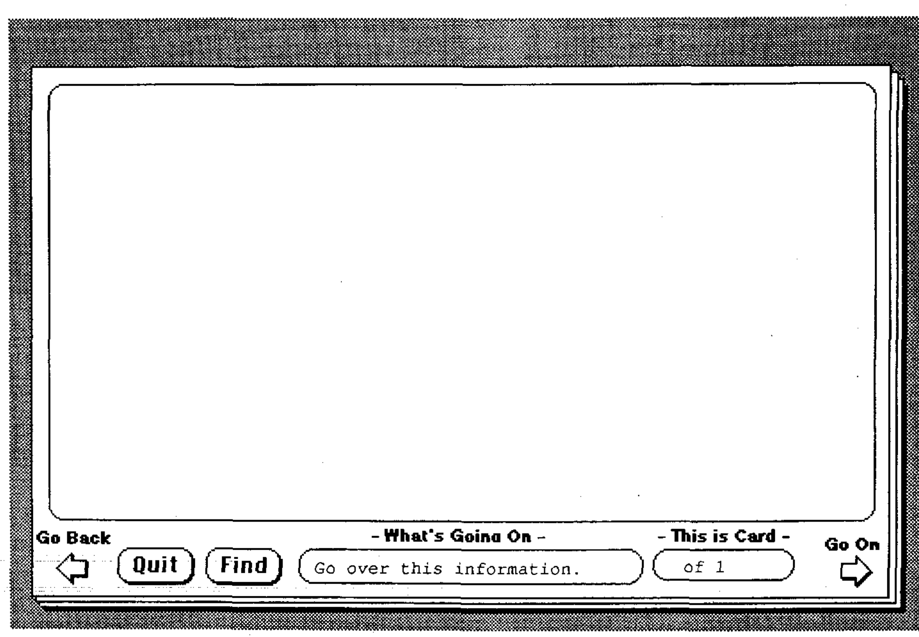


TABLE 2.
Results of Student Survey

Individual Ratings - (higher percentage indicates higher agreement)

Survey Question	Multi-mode	Software	Traditional
Handouts informative and valuable...	0.94	0.92	0.81
Classroom visuals clear and understandable...	0.90	0.90	0.85
Information organized and pertinent...	0.92	0.90	0.88
I was able to learn the information ...	0.92	0.90	0.83
I would like to see future lectures like this...	0.98	0.94	0.90
Overall (grouping of all areas)...	0.93	0.92	0.85

Summary - Student's T-statistic*:

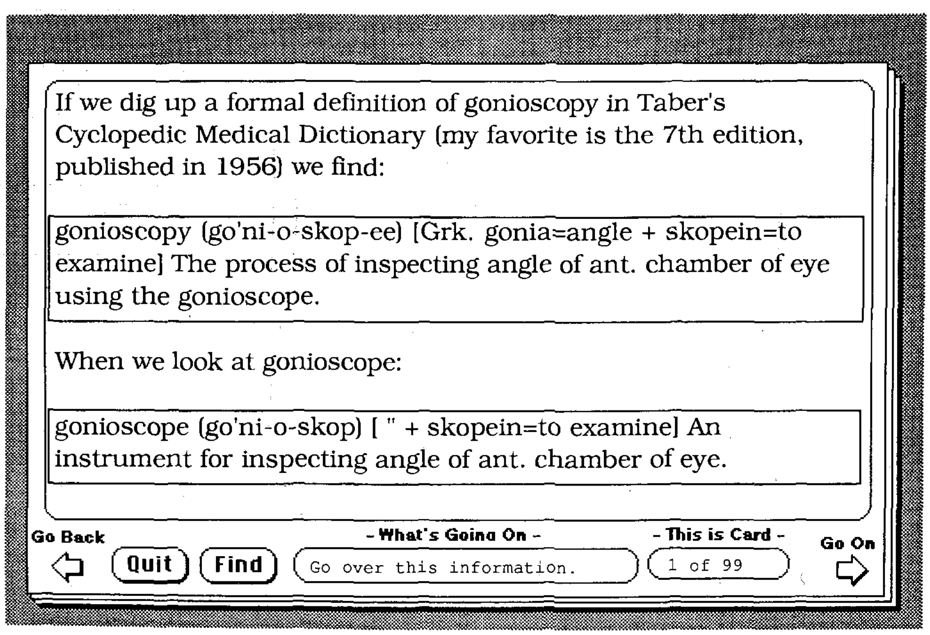
Survey Question	Multi-mode vs. Software	Multi-mode vs. Traditional	Software vs. vs. Traditional
Handouts informative and valuable...	0.292	0.034	0.088
Classroom visuals clear and understandable...	0.500	0.219	0.137
Information organized and pertinent...	0.292	0.169	0.336
I was able to learn the information ...	0.292	0.048	0.109
I would like to see future lectures like this...	0.218	0.083	0.083
Overall (grouping of all areas)...	0.114	0.001	0.004

Drawn graphics are created by the software author (or a computer illustrator) by the use of drawing tools. Figure 3 shows an instructional screen which uses drawn graphics. Graphics can also be scanned in using document scanners. Figure 4 shows an instructional screen which contains scanned graphics.

Use of Interactive Question Screens

Multiple choice, true-false, or similar response questions can be included in the programs. These screens allow students to self-assess their retention of the material. Figure 5 shows a sample interactive question screen, titled in most cases as a "Self-Assessment." These interactive question screens can provide feedback at various levels, ranging from simple correct-incorrect responses to automatically providing review of the screens which pertain to the question asked. Both figures 5 and 6 show sample self-assessment question screens.

FIGURE 2:
Instructional Screen Of Text Only



Printouts of Instructional Materials

The HyperCard® software package has provision for providing laser printouts. Figure 6 shows a sample stack printout. The answers to the question screens are not provided on the printouts.

Application of the Software in UAB's Curriculum

Usage in a Multi-Instructor Lecture/Lab Course

Clinical Evaluation of the Visual System (a.k.a. CEVS) is a three academic quarter course track given in the first and second professional years at UAB which covers basic optometric clinical skills and procedures. This course is taught by four instructors, with each instructor responsible for different topics within the course track. One of the four instructors uses instructional software as the primary media for instruction; others use traditional lecture techniques. Printouts of the instructional software for a particular topic are provided to the students prior to the class meeting on that topic. During the class meeting, the software is used as the primary lecture resource in a lecture room equipped with a computer and classroom projection equipment, and the software lesson is reviewed by the class guided by the instructor. The software is also available for additional review on student access computers located around the building, and is provided free for students to use on their own computers. In this class, software is used primarily by students as test preparation or by students who were absent on the class meeting day.

Each week's software program is designed to take approximately one hour for the student to review,

Usage in a Semi-Problem-Based Single Instructor Course

Environmental Vision is a single academic quarter course given in the spring of the third professional year which covers occupational task analysis, ocular hazards, protection methodologies, standards, and special task prescribing. This course is organized into weekly one-hour class sessions over ten weeks. The first class session is spent reviewing the syllabus of the course, which includes the class expectations: self-study, biweekly evaluation by short answer quiz, and attendance at class sessions. Also at the first class, the usage and availability of teaching software is reviewed. Software has been written containing the instructional materials for weeks 2 through 9. The material for each week is divided into distinct software assignments, labeled by the week. Each week's software program is designed to take approximately one hour for the student to review, either alone or in small groups. The software is available 24 hours a day on student access machines around the optometry building (5 machines) or can be used on computers in the adjacent health sciences library (5 machines). Students may also obtain copies of the software at no charge to run on machines they may have. This has proven adequate for our class size of 40 students.

Students are expected to review the instructional software before coming to class. In the class sessions, questions on the software contents are addressed, and then clinical cases applying the ideas presented in the software are reviewed. The short answer quizzes are based upon the clinical cases.

The course design is intended to offer the student the chance for application of the information covered in

FIGURE 3.
Instructional Screen Of Text And Drawn Graphics

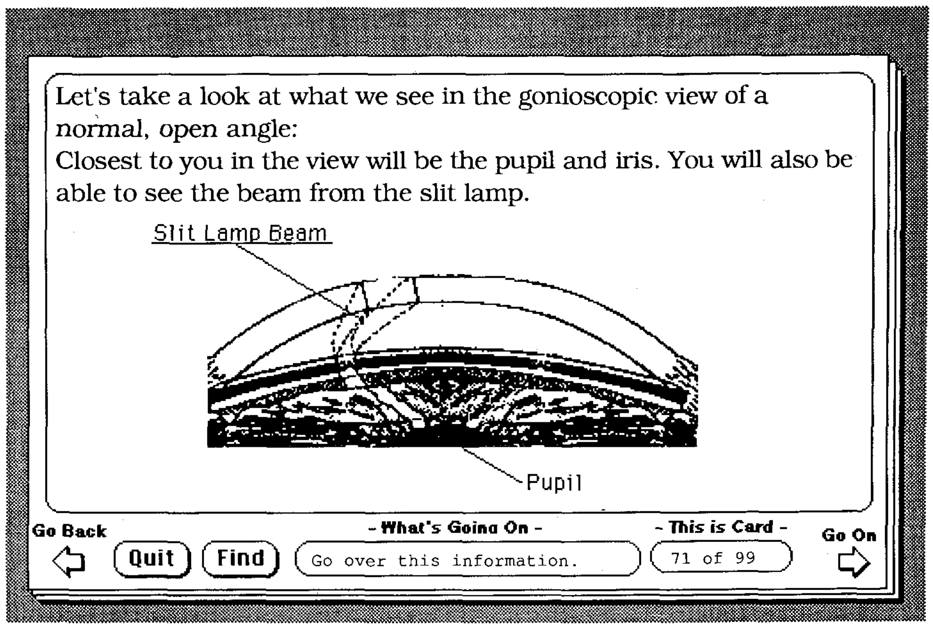
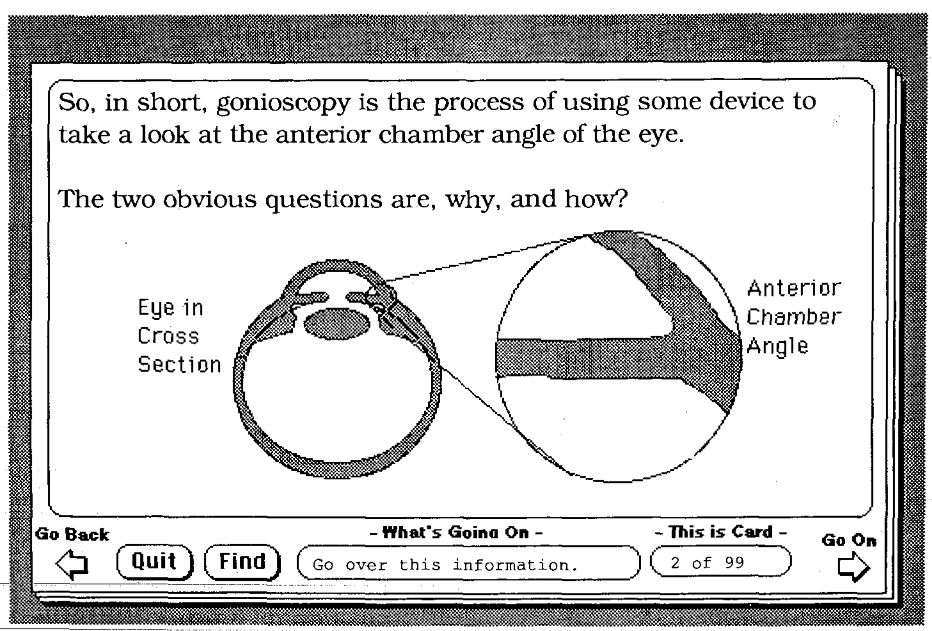


FIGURE 4.
Instructional Screen Of Text And Scanned Graphics



the instructional materials, rather than simple retention. Using class meeting times for case review allows this application as well as peer feedback as to the correctness of actions taken. This use of the teaching software for the delivery of the instructional material as self-study frees class time for higher levels of applying the material.

FIGURE 5.
Sample Self-assessment Screen

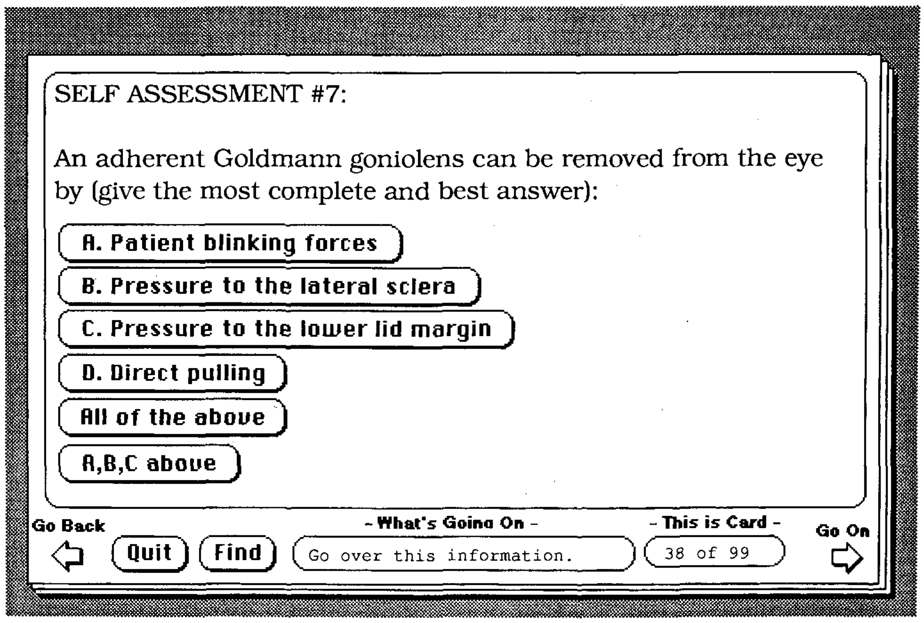
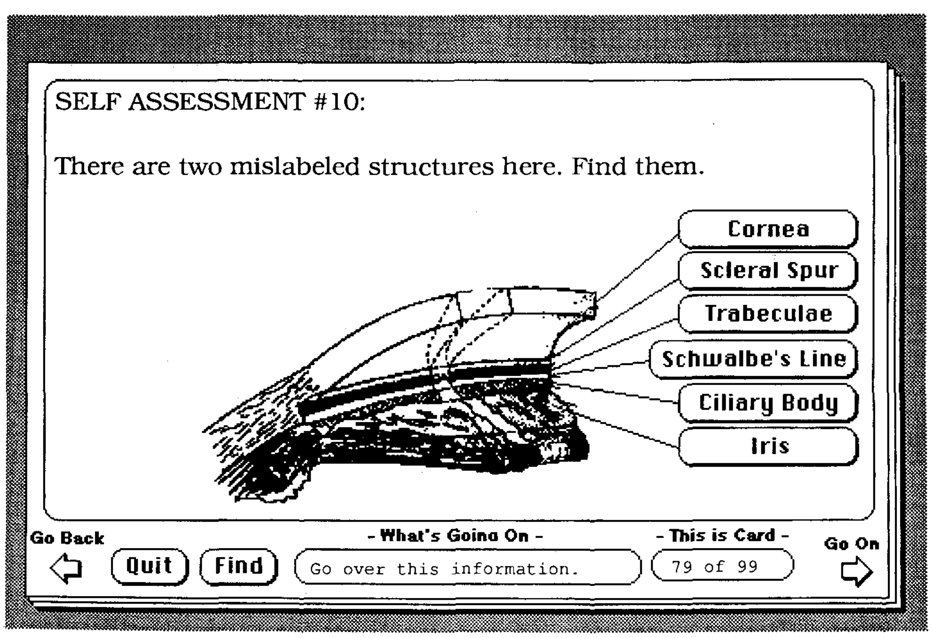


FIGURE 6.
Sample Self-assessment Screen



Evaluation of Student Impressions on Teaching Software Use

Multi-Instructor Lecture/Lab Course -Instructor Ratings

The use of teaching software in the multi-instructor lecture/lab course has been rated well by students. At the conclusion of each term, UAB students are asked to complete a course evaluation for each course taught. This evaluation is anonymous and surveys the student's ratings of course content, delivery and examinations, and also allows for commentary narrative on each form. The instructor using the teaching software has been comparatively rated equal or superior to other instructors (who use traditional methods) in content, clarity, and presentation indices tracked by these evaluations. Positive comments on the evaluation forms have included liking the completeness of the handouts, and the ability to review the complete contents of lectures at other times. Negative comments have not been encountered on the evaluations.

Multi-Instructor Lecture/Lab Course - Survey Evaluation

Survey Design

A survey was conducted which asked the students in the multi-instructor class to rate certain areas of three lectures, all delivered by the same instructor. First of the lectures was a well-developed, labor-intensive session using slides, overheads, computer graphics, handouts, videotape, and live demonstration. Second of the lectures was a session using the computer software as the classroom visuals with a software printout as the handout. Third was a lecture developed along the lines of traditional lectures in the course, using an outline-form handout and overhead projector diagram visuals. Handouts were similar in design in the traditional and multi-mode lectures, and were based on handouts developed by previous instructors. Students were asked to rate each lecture in five areas, stating their level of agreement or disagreement to five statements. The statements were:

1. The handouts were informative and valuable.
2. The classroom visuals were clear and understandable.
3. The information was well-organized and pertinent.
4. I was able to learn the information well from the presentation and the handout.
5. I would like to see future lectures done in this format.

Survey Results

The results of the survey are seen in Table 2. Grouping the five area questions all as positive indicators, the software session and the labor-intensive multi-modality session both scored higher than the traditional lecture to a statistically significant level (Student's T-statistic, $p<.005$)

In the specific individual areas of (a) handouts being informative and valuable and (b) the student feeling they were able to learn the information, the labor-intensive multi-modality session scored higher than the traditional session to a statistically significant level (Student's T-statistic, $p=.03$ and $p=.05$, respectively). In all other specific areas, the software session and the labor-intensive multi-modality sessions scored higher than the traditional session, but not to a statistically significant level.

■

Instructional software continues to show promise as a powerful adjunct to the educational process.

Semi-Problem-Based Single Instructor Course - Instructor Ratings

The use of teaching software in the semi-problem-based single instructor course has been similar. Again, instructor evaluation by students has rated the instructor using teaching software equal or superior to prior instructors of the course who used traditional methods. Survey form comments again included a preference for reviewing the instructional material when convenient for them, as well as considering the self-assessment questions very useful.

Discussion

The use of computer software for instruction has been attempted at many levels using many models of implementation. Although not considered here, many factors stand against the use of computers in instruction, including (but not limited to) accessibility problems in large class size schools, inefficiency compared to traditional lecture methods in many applications, student and faculty computer unfamiliarity, and perceptions of "replacing" the human instructor through automation.

As the computer becomes a more familiar instrument in the academic setting, creative developments are occurring where instructional software continues to show promise as a powerful adjunct to the educational process. As with the 35mm slide and the ½-inch VHS videotape, adoption of an instructional technology will occur as useful and convenient applications are developed. The design and implementations described here are not meant to be specific recommendations, but are instead offered as a description of what has worked in a contemporary optometric curriculum application.

Conclusion

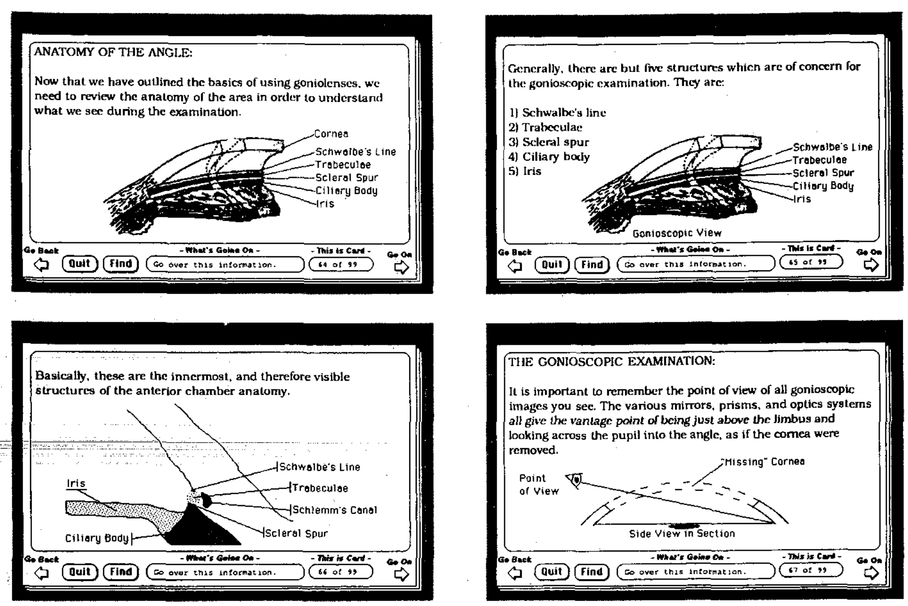
Computer software for interactive, self-paced instruction has been developed that has been implemented into portions of the curriculum at the University of Alabama at Birmingham. Students being taught using this software score this learning experience as highly as being taught from a well-developed, labor-intensive multi-modality lecture, and score it higher than being taught by traditional handout/slide lecture methods.

References

1. Caldwell R. Computers and computer courseware: New directions for helping children learn. Journal of Children in Contemporary Society 1981; 14(1):55-71.1
2. Berman J. Feasability of incorporating alternative teaching methods into clinical clerkships. Teaching and Learning in Medicine 1990; 2(2):98-103.
3. Cohen P, Dacanay LS. Computer-based instruction on health professions education: A meta-analysis of outcomes. Evaluation and the Health Professions 1992; 15(3):259-81.
4. Gjerde CL, Xakellis GC, Schuldt SS. Medical student evaluation of self-selected learning modules. Family Medicine 1993; 25(7):452-5.
5. Hammack GG. The computer controlled videodisc: A new technology in optometric education. Journal of Optometric Education 1985; 10(4):8-11.
6. Xakellis GC, Gjerde C. Evaluation by second-year medical students of their computer-aided instruction. Academic Medicine 1990; 65(1):23-6.
7. Gathany NC. Putting life into computer-based training: The creation of an epidemiologic case study. Educational Technology 1994; 34(6):44-47.
8. Hooper JA, Bronzino JD, Noyes NT, Taylor D. EquipTeach: a computer-aided instruction to teach users how to operate specific medical equipment. Biomedical Instrumentation & Technology 1993; 27(5):394-9.
9. Macura RT, Macura KJ, Toro VE, Binet EF, Trueblood JH, Ji K. Computerized case-based instructional system for computed tomography and magnetic resonance imaging of brain tumors. Investigative Radiology 1994; 29(4):497-506.
10. Schwartz W. Using the computer-assisted medical problem solving (CAMPS) system to identify student's problem-solving difficulties. Academic Medicine 1992; 67(9):568-71.
11. Tunget CL. Evaluation of DILearn: An interactive computer-assisted learning program for drug information. American Journal of Pharmaceutical Education 1993; 57(4):340-3.

FIGURE 7.
Sample Stack (partial) Printout Page

Page 9 of Gonioscopy



Stackware for Computer-Assisted Optics Instruction

William F. Long, Ph.D., O.D.

Introduction

Computer-assisted instruction (CAI), sometimes called computer-aided or computer-based instruction, is defined as "the use of the computer as an instructional tool[1]." CAI software is conventionally broken down into tutorials, drills, simulations, games, and tests[1, 2, 3, 4] though in practice a given piece of software may incorporate several different methodologies.

CAI offers several potential advantages over traditional instructional methods. Computers are infinitely patient, provide immediate feedback, and give individual attention[2, 5]. The student using well written CAI becomes an active participant in the learning process, and interacting and competing with the computer can give strong motivation to learning[1]. Most important, CAI can free teachers for more "human" tasks such as helping students directly[6].

Abstract

Forty one new Hypercard™ stacks have been developed to help teach physical optics and photometry. The stacks give tutorial information, quizzes, and problems, emphasizing topics of ophthalmic interest. The stacks have been used within and as an adjunct to lectures, and optometry students have found them easy to use and helpful.

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CAI was first attempted on a large scale with mainframe computers and terminals in the '60s[4]. Microcomputers democratized computers in the late '70s, making CAI feasible in ordinary classrooms[1,6]. But despite these hardware improvements, early predictions of a computer-education revolution have still not been fulfilled[6]. This has been due in part to insufficient distribution of hardware, but a more significant problem has been the shortage of good software[2]. Even when available, commercial software often neglects interactivity, individualized pacing, and other desirable features. Moreover commercial software may not precisely meet the needs of a particular curriculum.

This is especially true in a small, unique discipline like optometry. CAI software developed for the physical, psychological, biological, and other clinical sciences may have emphases inappropriate for optometry students. As result, a number of faculty at optometry schools have developed educational software especially for their students, at least two of which have been described in the pages of this journal[8, 9, 10, 11]. This paper describes CAI software developed at the University of Missouri-St. Louis School of Optometry to help teach two subjects in optics—photometry and physical optics.

The Macintosh Computer™ and Hypercard™

The earliest versions of the photometry and physical optics software were written between 1984 and 1989 for the Apple IIe computer[12, 18]. The Apple IIe had good graphics capabilities; a simple, well documented programing language, Applesoft BASIC; and, most important, was readily available on campus. In the last two years the software has been completely rewritten for the Macintosh computer. The Macintosh offers a number of advantages over the Apple IIe and other computers of that generation, including a better integration of graphics and text; mouse control; a preferred interface in CAI[2]; and ongoing Apple support.

The programs were written using Hypercard™ 2.0, an authoring system in which program screens are analogized to a stack of "cards". Consequently, Hypercard programs are commonly referred to as "stacks". Users can enter data into fields on each card, or use the mouse to click on "buttons" which initiate various kinds of action. The actions of buttons and other card features are programmed in "scripts" using a high level programming language called Hypertalk™. Hypercard has its own system for creating graphics, or they may be imported from other applications.

Hypercard may be thought of as the Macintosh analogue of Applesoft BASIC: like BASIC, Hypercard comes bundled with every machine; is well documented[14, 15, 16]; and in wide use. It may be the easiest way to create educational software for the MacintoshII. The chief disadvantages of Hypercard are that it is often slow in execution and that it's difficult to protect Hypercard Stacks from tampering. When implemented on the previous generation of Macintoshes, Hypercard screens were somewhat small, and color and gray scale illustrations were impossible to show. But, as has been pointed out , the limited screen presentation area encourages conciseness, a "leanness" of text and graphics which has been shown to facilitate learning[2, 9, 17]. Color may enhance learning somewhat, but is less powerful than other techniques such as animation which are available in Hypercard[2]. Gray scales may be simulated with dithering (see figure 3), although in general simple drawings are better teaching tools[2].

Physical Optics and Photometry Stacks

The physical optics and photometry stacks were written to support material in a three-credit course on these topics. The stacks were conceived as a one-stop information source so that a student with little prior familiarity with the subjects could use them without the help of ancillary materials. The main target audience is optometry students, so topics of ophthalmic interest have been emphasized. Students having a modest familiarity with the Macintosh can boot the stacks and find in them all the instructions necessary for their use, an essential of good CAI software[2]. Screens look like familiar objects and button functions are intuitive, e.g. clicking on a turned down page corner moves the user to the next card, clicking on an eraser clears the screen. The basic screen design is kept constant through a given segment of the lesson to avoid distractions[2]. Screens in corresponding photometry and physical optics units are the same. A student is free to terminate a lesson at any time[2]. The stacks are set up to be fully compatible with the earlier black and white Macintoshes like the Macintosh Plus, Macintosh SE, and Macintosh Classic which are ubiquitous on the UM-St. Louis campus. Version 2.0 or later of Hypercard must be installed on the Startup Disk of the computer and the most common fonts—Chicago, Geneva, Courier, Palatino, and Symbol—must be in the System Folder.

The student launching the set of stacks first encounters a home card designed to look like the first page of a (very well organized) student notebook (figure 1). As the directions explain, a topic can be chosen with a click of the mouse. The student can then decide whether to read background text, test his grasp of the material with a multiple choice quiz, or practice working numerical problems by clicking on the appropriate index tab. The first card of the text, quiz, and problem stacks includes instruction for their use (figure 2).

Text stack screens look, appropriately, like a textbook. Students can page back and forth through an entire "book" by clicking on the page corners, or leap to a particular topic by clicking on a heading in the table of contents. But this is a sort of "pop-up" book whose pages contain not only text but the animations, simulations, hypertext, and overlays uniquely pos-

FIGURE 1.
Students using the Physical Optics or Photometry stacks start with a screen that looks like a student's notebook.

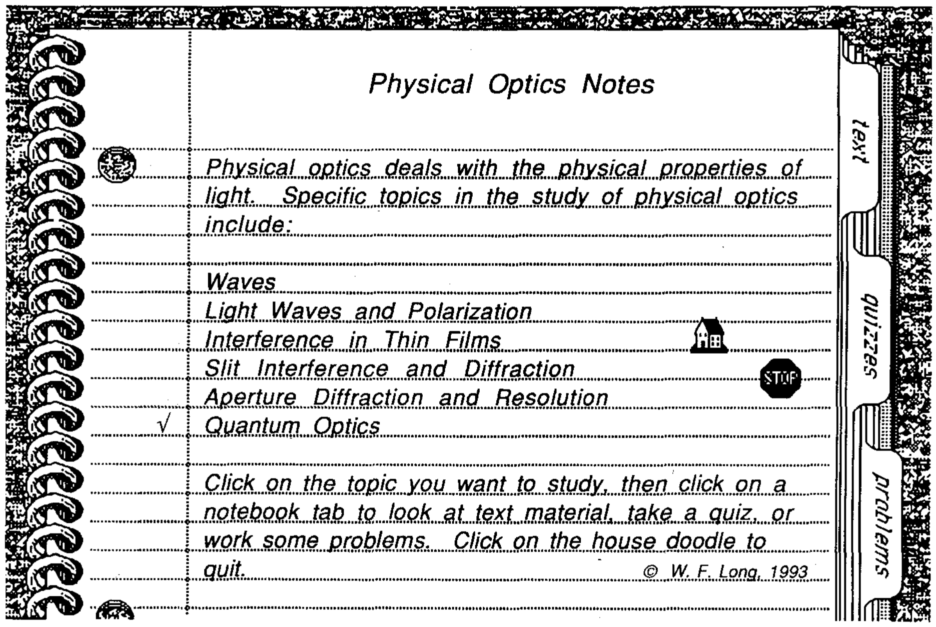
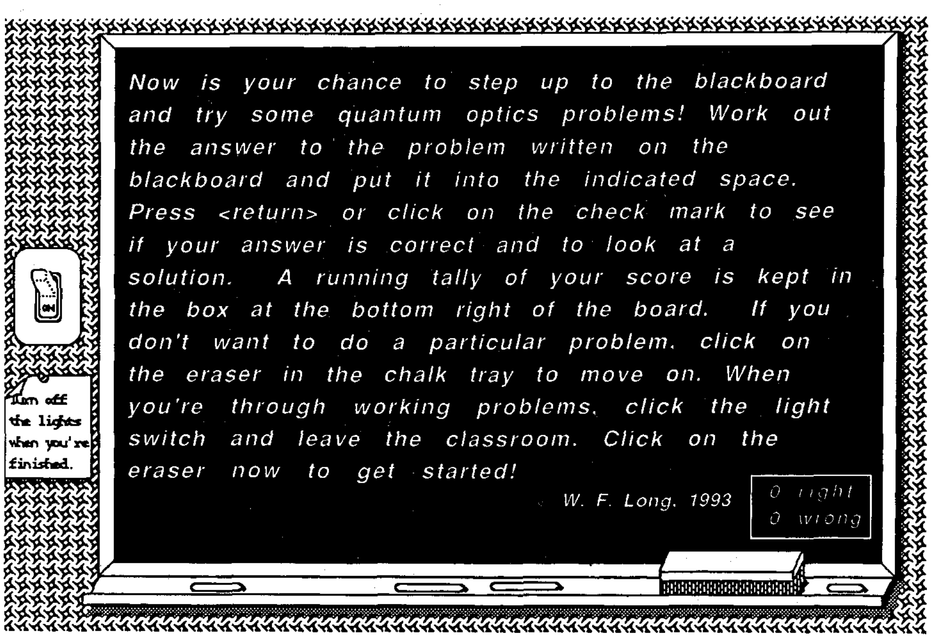


FIGURE 2.
An instruction card at the beginning of each stack explains its use.



sible with computers (figure 3).

Quiz stacks are designed to look like the kind of typewritten and mimeographed tests commonplace a decade or two ago. After an introductory card, the student is given ten questions chosen randomly from those in the stack. Answers are chosen with a click of the mouse. The student is told whether the answer is right or wrong and a detailed explanation, with graphics as appropriate, provides the all-important feedback[2] (figure 4). At the end of the quiz the student receives a score and letter grade. The student can then repeat the quiz (with a somewhat different set of questions) or go back to the home card with a click of the mouse.

Problem stacks simulate the experience of working a numerical problem at the blackboard-but with non-judgmental feedback from the computer substituting for the fearsome instructor. Problems are generated by shells which use a random number generator to produce varied, but physically plausible values of input variables; to select units; and, sometimes, to alter wording slightly. Students can type answers in from the keyboard and then hit the **<return>** key to see if they got the item right. If one of several types of anticipated numerical errors is made, the mistake is pointed out and the student encouraged to try again. Once an answer has been processed, the student is given feedback which includes a detailed numerical solution, with appropriate graphics. A running score is kept at the bottom right of the screen. Students may choose to skip a particular problem by simply clicking on the eraser, or to leave the stack at any time by clicking on the light switch.

FIGURE 3.
In addition to written information, Text stacks show animations and simulations like the variable camera aperture.

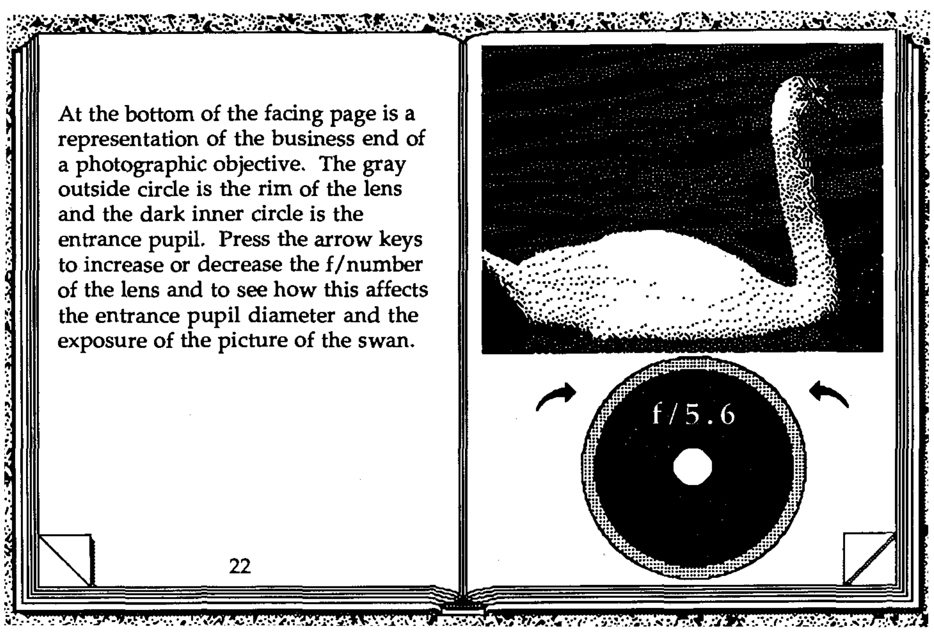
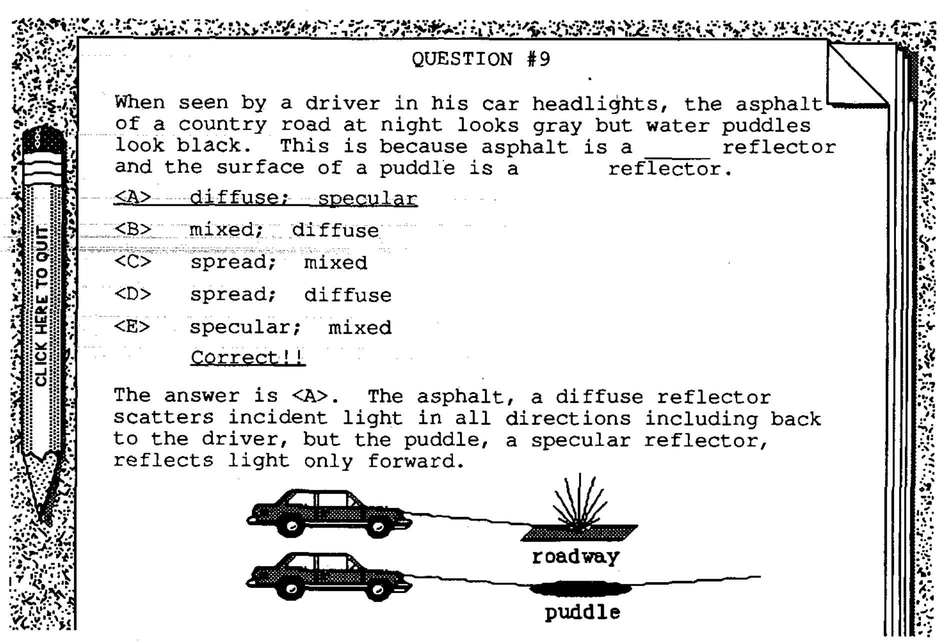


FIGURE 4.
After a student has clicked on an answer, the Quiz stack gives the correct answer with an explanation.



Use of Stacks

The Physical Optics Stacks and Photometry Stacks were originally conceived as a supplement to a conventional lecture course. To that end the stacks were placed on a computer in the UM-St. Louis Health Sciences Library, and floppy disk copies were placed on reserve in the Health Sciences Library to be checked out for use in nearby campus computer laboratories. (More recently, the stacks have been placed on a server from which students may download them to a Macintosh in any of the computer laboratories on campus.) With an LCD set-up or the facilities of the UM-St. Louis advanced technology classrooms, it was possible to project the Macintosh screens as the basis for lectures. Projections of the stacks were used instead of slides and overheads in the Physical Optics and Photometry course.

While designed for that course, stack material has had applicability at several places in the curriculum. The stacks were used in lectures in the Ocular Photography course, the

Visual Performance course and the graduate Visual Optics course.

Student Responses

Students gave useful feedback throughout the development of the stacks and their Applesoft predecessors. Students detected typos, program glitches, and occasionally recommended improvements in program flow.

At the end of winter semester, 1994, I distributed a questionnaire in the Physical Optics and Photometry course to learn about students' experience with CAI. Thirty-three of the forty students enrolled in the course responded. All but one of the students had previous experience with computers, but only three of the students claimed even moderate previous CAI experience. Nonetheless, the great majority of students found the stacks "very easy" (14 students) or "reasonably easy" (18 students) to use with one student finding them "somewhat difficult."

Thirteen students, about a third of the class, preferred using the stacks by themselves. Surprisingly, 16 students, almost half the class, preferred working with a partner, the pairs presumably interacting as described by Alessi and Trollip[2]. Four students liked working with groups of three or more.

Students were asked to rank order the learning resources of the course. The Hypercard Stacks were rated the most useful resource, the textbook the least useful, with the lectures, instructor's handout, and laboratories tied in the middle. These results should be interpreted cautiously, however, since so many factors influence students' opinions of what's important and since there is, in any case, no statistical significance difference among the ratings. Nonetheless, they do show that students readily accepted a learning aid that was more or less novel to most of them.

The three types of stacks-text, quiz, problems-were rated as being about equally useful, on average. Individuals tended to rate either text or problems first, with the quizzes the usual second choice.

Conclusion

The Macintosh computer with its emphasis on graphics, and a intuitive operating system has proved to be a good medium for computer-assisted instruction in the UM-St. Louis School of Optometry. Using the Hypercard authoring environment a variety of physical optics and photometry instructional modules have been created for the Macintosh.

It seems clear after a decade of experience that optometry students react positively to such computer-assisted instruction in optics. Despite limited previous experience with computers and computer-assisted instruction, students readily accepted the Hypercard stacks as instruction aids and adapted the computer materials to their own learning styles.

References

1. Lockard J, Abrams PD, Many WA. Microcomputers for educators. Boston: Little, Brown, and Co., 1987 .
2. Alessi SM, Trollip SR. Computer-based instruction, second edition. Englewood Cliffs: Prentice Hall, 1991 .
3. Chambers JA, Sprecher JW. Computer-assisted instruction. Englewood Cliffs: Prentice Hall, 1983; 4.
4. Dennis JR, Kansky RJ. Instructional Computing. Glenview: Scott foresman and Company, 1984.
5. Swartz TF, Shuller SM, Chernow FB. Educator's complete guide to computers. West Nyack: Parker Publishing Company, 1984; 203-204(a).
6. Underwood JDM, Underwood G. Computers and learning. Oxford: Basil Blackwell, 1990.
7. Bitter GG. Microcomputers in Education Today. Watsonville: Mitchell Publishing, 1989; 243.
8. Levine L. A neural sciences computer-assisted learning package. Journal of Optom Educ 1990 Spring; 15(3) 84-92.
9. Baro JA, Lehmkuhle S, Sesma MA. InSight™: a series of interactive experiments and demonstrations in vision science for the Macintosh™ computer. Journal of Optom Educ 1991 Winter; 16(3) 82-87.
10. Levine L. Integrating graphics and speech. Journal of Optom Educ 1991 Winter; 17(2)48-53.
11. Baro JA, Lehmkuhle S. Design and pedagogical issues in the development of the InSight series of instructional software. Journal of Optom Educ 1993 Summer; 18(2) 107-110.
12. Long WF. Introduction to Photometry. Compress (1989).
13. Long WF. Slit Interference and Diffraction. Compress (1990).
14. Goodman, D. The complete HyperCard 2.0 handbook. New York: Bantam Books, 1990.
15. Winkler D, Kamins S. Hypertalk 2.0: the book. New York: Bantam Books, 1990.
16. Hypercard script language guide. Santa Clara: Apple Computer, Inc., 1989.
17. Reder LM, Anderson JR. A comparison of texts and their summaries: Memorial consequences. Journal of Verbal Learning and Verbal Behavior 1980; 19 121-134.

Acknowledgments

This work was supported, in part, by a grant from the University of Missouri-St. Louis Chancellor's office.

Financial and Human Resources for Support of Optometric Residencies

John F. Amos, O.D., M.S.
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Irwin B. Suchoff, O.D., D.O.S.

Abstract

All the schools and colleges of optometry in the United States and Puerto Rico were surveyed to determine the financial and personnel resources committed to residency programs. Twelve institutions responded to the survey. The results show that there is an average of about four programs per institution with 1.7 residents per program. Stipend support averaged $19,797 per resident per year. Fifty-eight percent of the responding institutions reported that they contribute to a health care plan for residents while 42% reported that they provide travel expenses. There is an average of 1.1 FTE of total personnel support per resident; of that, 0.79 FTE is faculty support. There are some differences between public and private institutions and between programs that are sponsored by the school or college and those sponsored by affiliated institutions.

KEY WORDS: Financial resources, human resources, institutional resources, optometric residency education

Introduction

Optometry residency education has experienced significant growth since its inception in the 1970s. These programs have had, and continue to have, a significant impact on the optometric educational enterprise. Their importance is likely to continue to grow.[1]

While there have been some studies published on the reasons graduates of optometry schools enter residency programs and their satisfaction with the program they have completed,[2,3] to our knowledge, there have been no published reports regarding the allocation of fiscal and human resources to optometric residencies. Such information is necessary for data-driven decision making and the planning for future optometric residency programs both at the institutional and national levels.

Methods

A three-page survey† was developed and mailed to all the schools and colleges of optometry in the continental United States and Puerto Rico. We requested that the survey be completed by the director of residencies or the individual responsible for the administration of all sponsored or affiliated residency programs. This person was asked to provide the information directly or to send the appropriate table to the supervisor or coordinator of each individual residency program for completion. All these tables were to be collected and incorporated into a single copy of the survey so each institution returned only one complete survey. Responses were collected from December 15, 1993 to February 1, 1994.

The letter accompanying the survey explained that this information would be collected, analyzed and used for future publication. A cover letter from Dr. Jerald Strickland, chair of the Clinical Affairs Committee of the Association of Schools and Colleges of Optometry, encouraging schools and colleges to participate in this study also accompanied the survey.

The survey was designed to gather the following information on financial and personnel commitments: *For each school or college* the survey asked whether there is a director of residency programs, the time commitment of the director (full-time, part-time) to the institution, the FTE commitment of the director to manage the residency programs, and whether the director also supervises a particular residency program.

For each program the survey asked for the accreditation status, the number of positions, the salary, the dollar value of any health care benefits, support for travel, and any other benefits.

For each program the survey asked for estimates of the FTE assignments to program supervision or coordination, clinical supervision, conference or lecture participation of other faculty; para-optometric support; and secretarial support. These were broken down by full-time and part-time appointments.

The survey distinguished between two types of programs: those sponsored and, consequently, completely

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supported by the school or college (SC-sponsored); and those sponsored by another institution that provides the major share of financial and personnel support but is affiliated with the school or college (AI-sponsored). All of the previously mentioned information was requested for each of the programs in these two categories.

Results

Twelve institutions responded to the survey. One institution indicated that its school-sponsored post-doctoral clinical training program was done within the context of a graduate program and an academic degree was earned. The data for that program were not included in the analysis of the SC-sponsored programs. Of the twelve respondents, four were private institutions and eight were public; the respective response rates for these two classifications of institutions were 57% and 89%.

Ten institutions reported that the residency director was a full-time faculty member and one reported a part-time faculty member. The average FTE devoted to directorship positions was 0.17 with a range of 0.10-0.50. Seven of the eleven directors also supervised a specific residency.

Table 1 shows the number of residency programs (e.g., Primary Care, Contact Lens, etc.) per responding institution categorized by the two sponsor categories and by the type of institution. The AI-sponsored programs affiliated with private institutions occur at more than twice the rate of SC-sponsored programs in private institutions. In public institutions the rates of SC- and AI-sponsored programs are almost the same. Overall, there are between four and five residency programs per institution with only a small difference between the public and private institutions.

Table 2 shows the number of residency positions per responding institution categorized by type of sponsor and type of institution. The fifty-one programs have a combined total of 86 positions, 67% of which are accredited. The overall ratio of positions to institutions was 7.2 which corresponds to a ratio of 1.6 positions per individual program. As shown in the last column of Table 2, overall the AI-sponsored programs had two more positions per respondent than did the SC-sponsored programs. The ratio of AI-sponsored to SC-sponsored programs is 3.8 for private institutions and 1.1 for public institutions.

Table 3 shows that the average annual stipend per resident ranged from $16,369 to $21,044 when categorized by type of sponsor and type of institution. There is about an 8% difference between the SC-sponsored and AI-sponsored programs and about a 10% difference between the public and private institutions.

Seven of the twelve institutions responding indicated that they contributed to an individual health care plan; all but two of these require a contribution by the residents. One

TABLE 1.
Number of residency programs per responding institution by type of sponsorship and type of institution.

Sponsor	*Private Only*	*Public Only*	*Both Public and Private*
SC	1.25	2.29	1.91
AI	2.75	2.38	2.50
Sum of SC and AI	4.00	4.67	4.41

TABLE 2.
Number of residency positions per respondent broken down by sponsor, type of institution, and accreditation status.

Sponsor	*Private Only*	*Public Only*	*Both Public and Private*
SC	1.8	3.0	2.6
AI	7.0	3.4	4.6
Sum of SC and AI	8.8	6.4	7.2

TABLE 3.
Average stipend per position broken down by type of sponsor and type of institution.

Sponsor	*Private Only*	*Public Only*	*Both Public and Private*
SC	$19,410	$21,119	$20,712
AI	$18,119	$19,757	$19,157
Both SC and AI	$18,523	$20,380	$19,797

TABLE 4.
Average amount contributed by sponsor and resident to individual and family health benefits.

Contributor	*Individual Plan*	*Family Plan*
Sponsor	$1,839	$2,473
Resident	$276	$774

TABLE 5.
Mean of total FTE for all full-time and part-time personnel and the mean FTE per residency position by residency sponsor.

Sponsor	*Mean Total FTE*	*Mean FTE per Position*
SC	1.3	0.9
AI	2.2	1.2
Total	1.8	1.1

TABLE 6.
Breakdown of the percent of affiliated programs located in different sites.

Type of Site	*Percent of Positions*
VA Medical Center	54%
Co-management Center	24%
Did not Indicate Site	14%
Other	5%
Urban Health Center	2%

TABLE 7.
Percentage of positions and percentage of total stipend expenditures by type of residency program.

Hospital Based	22.1%	21.2%
Ocular Disease	20.9%	19.9%
Primary Care	18.6%	19.7%
Pediatric/Vision Therapy	10.5%	11.8%
Contact Lenses	9.3%	9.4%
Geriatric	9.3%	9.2%
Rehabilitation/Low Vision	9.3%	8.8%
Total	100.0%	100.0%

respondent indicated that there was an individual plan with no contribution from the institution. Five institutions contributed to a family health care plan and three of these required a resident contribution. Two additional institutions apparently had family plans to which they did not contribute. Table 4 shows the averages of these contributions.

Five institutions reported that they provide support for travel between the institution and the site of the residency. Nine report supplying money for travel to meetings; the average travel allowance was $646.

Table 5 shows the mean total FTE and the mean FTE per residency position categorized by sponsor. These calculations include both faculty and support staff involved in program supervision, clinical supervision, conferences/lectures, and para-optometric and secretarial support. Overall, there is a commitment of a little more than one person per resident. The overall mean faculty commitment to that total is 0.79 FTE per resident.

The results presented thus far show that optometry has come to rely heavily on sites located in affiliated institutions for the training of its residents. As shown in Table 6, Department of Veterans Affairs (DVA) Medical Centers comprise the majority of these sites. A consequence of this is that the emphasis in residency programs is on hospital-based practice and ocular disease as shown in Table 7.

Discussion

The results of this survey present a picture of the financial and human resources committed to optometric residency programs as of late 1993 and early 1994 based on a sample of twelve of the seventeen schools and colleges of optometry in the United States and Puerto Rico. These schools reported a total of 51 programs with 86 positions for averages of 4.2 programs per school, 1.7 positions per program, and 7.2 positions per institution. If these numbers are representative of all the schools, it can be estimated that the total number of residency positions in the 16 schools in the continental United States at the time of the survey was about 115 and that these were distributed among an estimated 67 different programs. This means that roughly 10% of the graduating class each year can access a residency position.

Based on the percentages shown in Table 7, about 57% of the available positions were in programs that might be called traditionally optometric like primary care, contact lenses, and pediatrics. The remaining 43% could be found in hospital-based and ocular disease programs. This distribution is likely the result of two interrelated factors. The changing scope of practice has caused the profession to seek sites for training in ocular disease and the Department of Veterans Affairs, the present major sponsor of residency programs, has a mission in education. The incorporation of optometric residency programs is therefore consonant with its mission. The result has been a steady growth in numbers over the past two decades.[45]

The major financial resource requirement for residents is the stipend. Most of the institutions provided some type of health care coverage and travel funds for educational purposes for programs they sponsor. Based on the values shown in Table 3 and Table 4, these benefits amount to about 10-12% of the stipend.

The results shown in Table 5 suggest a personnel commitment equivalent to about 1.1 full-time person per resident on the average. This is a high ratio but not unreasonable given the breakdown of activities incorporated into that estimate—as iterated above, this 1.1 FTE is the composite of faculty involved in program supervision, direct clinical teaching, and seminars and lectures; it also includes para-optometric and secretarial staff support. The faculty portion of the 1.1 FTE accounts for 0.79 FTE per resident. Given that there is a low number of residents per program (1.7), it would require only 1.3 FTE per program. It is likely that this FTE is distributed among a number of faculty in most specialty areas. These numbers are not out of line with those derived for post graduate medical education by Valberg, Gonyea, et al.[6]

Although one can make some assumptions and extrapolate from the results presented here to come up with an estimate of the total cost to the profession of training its residents, the outcome is likely to be in error. More sophisticated methods that take into account all aspects of an institution's programs need to be used. Furthermore, the total estimated cost can only be truly calculated by finding the difference between the costs of training and the income (and other benefits) derived from the patient care, teaching and research services provided by residents. Indeed, many of the benefits are immeasurable since residents have provided the schools and colleges with well-prepared clinical faculty who will continue to contribute to the further education of the profession.[7]

References

1. Suchoff IB, Barker FM, Urbeck, JL. The optometric residency accreditation process—planning for the future. J Optom Educ 1995; 20:46-49
2. Bartlett JD, Amos JF, Woolley T. Evaluation of motivating factors for selecting optometric residency education. J Am Optom Assoc 1992; 63:131-134.
3. Heiberger MH, Mozlin R. Vision training residency: An outcome study. J Optom Educ 1989; 14:74-79.
4. Selvin GJ. Developing ideal student and residency programs. J Optom Educ 1993; 18: 57-58.
5. Messer TI. The status of optometric residency programs at the department of veterans affairs health care facilities. J Optom Educ 1994; 20: 54-56.
6. Valber LS, Gonyea MA, Sinclair DG, Wade J. Planning the future academic medical center. Ontario, Canadian Medical Association 1994
7. Barresi BJ, Heiberger MH. Expanding community based residency training for optometry. J Optom Educ 1995; 20: 57-59.

† Available from the corresponding author on request

ASCO Meetings Calender

1996

February 1996

16th-18th - Optics Faculty Forum (Lansdowne Conference Resort, Leesburg, VA)

March 1996

2nd - Executive Committee (Atlanta Marriott Marquis, Atlanta, GA)
15th - Board of Directors Meeting (Lansdowne Conference Resort, Leesburg, VA)
15th-17th - Critical Issues Seminar (Lansdowne Conference Resort, Leesburg, VA)

June 1996

11th - Student Affairs Officers Workshop (Sparks, Nevada)
19th - Executive Committee (Portland, Oregon)
20th - 21st Annual Meeting (Portland, Oregon)
21st - Annual Luncheon (Portland, Oregon)
23rd - Sustaining Member Advisory Committee Breakfast (Portland, Oregon)

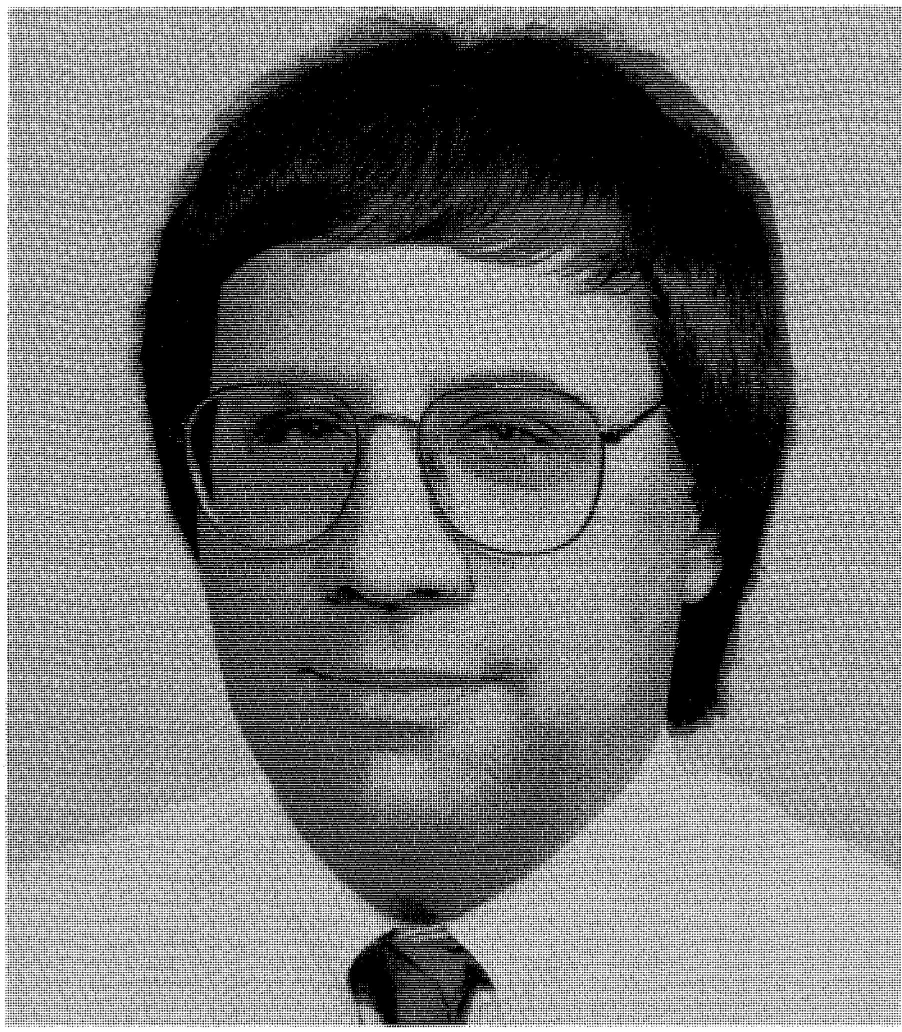
August 1996

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

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

Teaching Tutorial

Kenneth J. Ciuffreda, O.D., Ph.D.



Profile

Education: *B.A., Biology, 1969, Seton Hall University*

O.D., 1973, Massachusetts College of Optometry (renamed the New England College of Optometry in 1976)

Ph.D., 1977, Physiological Optics, University of California Berkeley

Teaching Experience: *Clinical, laboratory and didactic teaching at the University California-Berkeley School of Optometry; the University Alabama at Birmingham School of Optometry; and the State College of Optometry, SUNY, since 1979*

Teaching Focus: *Courses in general optometry, normal binocular vision, amblyopia. Clinics in the diagnosis and treatment of abnormal eye movements*

As life-long students, we have all had the experience of completing a course and feeling that the instructor was especially good, or, hopefully in only rare instances, was especially bad. When questioned as to why this might be the case, the response can range from several very specific reasons to vague and difficult-to-verbalize ideas.

The characteristics of the so-called "good teacher"[1] have been well-defined and well-researched (see Table 1). Similarly, there are definite characteristics that are not associated with a good teacher[2] (see Table 2). These characteristics can serve as a starting point for a self-assessment checklist if an instructor is sincere and honest in the attempt to improve his or her teaching ability. One's teaching ability and, in turn, teaching effectiveness, **can** be enhanced, at least to some extent, by **all** of us.

A prior assumption is that the instructor already has the basic knowledge in the respective specialty areas. Without this knowledge, one cannot be a good teacher, as the basic information and related concepts to be imparted are lacking. On the other hand, I have seen and heard lecturers, including Nobel laureates, who are acknowledged experts in their area, deliver disappointing talks. This is truly a pity, as such individuals have tremendous knowledge and insight to share with everyone.

A mistake that some teachers make is lecture "information overload." This is true for both clinicians and researchers, particularly in the early phase of their teaching careers. Due to their vast and relatively newly-acquired knowledge (plus youthful enthusiasm and exuberance), the novice instructor frequently finds it difficult to differentiate between what **they** know (especially the fine details, latest results, etc.), what the **students** need to know, and what the students can be expected either to know or

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Dr. Ciuffreda is chair of the Department of Vision Sciences and Distinguished Teaching Professor at the SUNY State College of Optometry. His thoughts are based on the introductory remarks of an in-house teaching manual, Teaching Skills Manual in Optometry, conceived by former SUNY vice-president and dean Dr. Barry J. Barresi, and co-edited by Dr. Ciuffreda and Drs. Irwin Suchoff and John Picarelli, faculty at SUNY College of Optometry.

learn given their background and realistic time constraints.

This leads to the important concept of "less may be more." The question is: Should the teacher attempt to provide tremendous detail concerning **every** topic of a specific area, or should he or she plan to select only specific topics and concepts that are **critical** to know and understand an area, together with sufficient basic facts, details, equations, dates, names, etc. Unfortunately, the inexperienced teacher frequently opts for the former. The student is then bombarded with hundreds of facts, slides, tables, dates, etc., to memorize without necessarily being provided the basic conceptual framework upon which these facts can be meaningful.

What good are the facts without the basic concepts? For example, when I was planning a recently published book on eye movements, which was conceived and developed as a textbook for the optometry student, such thinking was critical. For each chapter involving a different eye movement system, I posed the question, "What are the 6 to 10 key concepts that the intended audience (i.e., the optometry students) **must** know?" Thus the book was meant to be neither comprehensive nor encyclopedic in nature, but was rather meant to serve as an appropriate introductory level text with emphasis on basic concepts, with sufficient details and related clinical examples to reinforce and enhance learning. The outcome was satisfactory, at least to me. Its long-term impact on optometric education and patient care, however, will take several years to assess.

Another challenge in teaching is the demand of the faculty for additional lecture hours. Certain instructors always seem to need more time for a variety of seemingly good reasons: the area is expanding so rapidly; there isn't a single book that covers this specific course perfectly; students are clamoring for more exposure to the topic, etc. The easy solution is to provide more time. However, as department chair over the past seven years, this has become my last, rather than initial solution.

The expansion of the optometric curriculum has encouraged me to pose the following questions to the instructor: Are you teaching the material as efficiently as possible? Can you justify the extra time? Have all other avenues been exhausted? A demand for additional lecture hours thus becomes a reality only after careful thought and appropriate responses.

However, there are numerous relatively simple ways in which to be more efficient and perhaps even more effective without any additional time allotment. For example, some teachers spend enormous amounts of time and energy drawing detailed diagrams on the blackboard that frequently never result in clear and comprehensible information. Furthermore, the students spend most of their time copying the diagram and not listening to the instructor. A photocopy of some of these diagrams, tables, slides, etc. — handed out either prior to or at the beginning of the lecture — could easily remedy the problem and save valuable lecture time. The student would then be able to listen more critically and take appropriate and full notes directly on the photocopy as the instructor describes and discusses the figure, table, graph, etc.

TABLE 1
Characteristics of a Good Teacher

- Knowledge of Content
- Clarity
- Preparation and Organization
- Enthusiasm
- Ability to Stimulate Thought and Interest

TABLE 2
The Seven Deadly Sins of Teaching

- Arrogance
- Dullness
- Rigidity
- Insensitivity
- Vanity
- Self-Indulgence
- Hypocrisy

Some of the material might also be available when compiled from several books, chapters, original reports, etc. If not, perhaps the instructor can develop an appropriate set of materials specific for his or her course, or selected topics within it, as a class handout placed in the library and used as needed. Some material might also be available in professional instructional slides, videos, or CD ROM. The instructor should not feel obligated to teach everything in the classroom. Teaching only begins in the classroom. Self-learning, or discovery-learning, is a valuable lifelong tool to develop and to use both for one's professional and personal growth.

Lastly, there is the notion of "teaching as an **interactive** process." Can one imagine Socrates reading his teachings while his disciples sat back passively (or even missed some of the sessions) and had a scribe take detailed notes for subsequent editing and group distribution! His "question and answer" style provides a wonderful forum, especially for small seminars. However, it can be extended, to some extent, to the larger classroom as a component of the general lecture format. The elderly professor in the now defunct law school television drama series, "The Paper Chase," immediately comes to mind, although one would hope to use this teaching style without committing any of the "seven deadly sins of teaching"! Teaching at all levels is really a dialogue, a conversation, an oral communication and not a monologue as it unfortunately becomes in many cases.

In conclusion, assessment of one's teaching ability, as well as the assessment of the related course materials, is an ongoing process. It does not cease when one is given tenure, receives a teaching award, or simply reaches middle age. Both self-assessment and peer-based assessment, while at times sensitive issues (one does not enjoy being made aware of his or her shortcomings), are necessary for one's development, growth, and maturity during the entire academic career.

Learning for both the student, and the teacher-as-student, is a life-long process of discovery that should be cherished on every possible occasion.

References

1. Weimer M. Improving your classroom teaching. Newbury Park, CA: Sage Publications, 1993.
2. Eble KE. The craft of teaching (2nd ed.) San Francisco: Jossey-Bass, 1988.

Hepatitis B Vaccination Requirements of Optometry Students

October 1995 Update

Institution	*TPA Legislation*	*First Patient Contact (which training year)*	*Mandatory Hepatitis B Vaccination (which training year)*	*Cost Coverage*
University of Alabama at Birmingham School of Optometry	Yes	2nd	Yes - 1st	Student
University of California, Berkeley School of Optometry	No	2nd	Yes - 1st	Student
Ferris State University College of Optometry	Yes	2nd	Yes - 2nd	Provided at cost to stud.
University of Houston College of Optometry	Yes	2nd	Yes - 1st	Student
Illinois College of Optometry	Yes	2nd	Yes - 1st	College
Indiana University School of Optometry	Yes	2nd	Yes - 2nd	Student
InterAmerican Univ. of Puerto Rico School of Optometry	N/A	2nd	Yes - entrance requirement	Student
University of Missouri - St. Louis	Yes	2nd	No*	N/A
University of MontrealN/A School of Optometry	N/A	No	N/A	
New England College of Optometry	No	2nd	Yes - entrance requirement	Student
State University of New York State College of Optometry	Yes	2nd	Yes - 2nd	Student Ins. or College
Northeastern State University College of Optometry	Yes	1st	Yes - 3rd	Provided at cost to stud.
The Ohio State University College of Optometry	Yes	2nd	Yes - 3rd	Student
Pacific University College of Optometry	Yes	2nd	Yes - 2nd	Provided at cost to stud.
Pennsylvania College of Optometry	No	2nd	Yes - 1st	Student
Nova Southeastern University Health Professions Division	Yes	2nd	Yes - 2nd	College
Southern California College of Optometry	No	1st	No*	N/A
Southern College of Optometry	Yes	1st	Yes - 1st	College
University of Waterloo School of Optometry	N/A	3rd	Yes - 3rd	Student

* recommended

Note: This table originally appeared in the summer 1995 issue (Vol 20,4,116) of *Optometric Education* in the article, "Requirements for Hepatitis B Vaccinations Among Optometry Students" by Norma K. Bowyer, O.D., M.P.A., M.S.; Cheryl A. Engels, O.D.; and Heidi L. Frank, O.D. Letters from a number of schools (fall 1995 Letters to the Editor) indicated that their information had changed since the authors had done their research. It is obvious from this update that immunization and infectious control policies are an area that is rapidly changing. Results of the updated survey show that nearly 85% of the schools and colleges are mandating Hepatitis B vaccinations as a requirement for students.

The majority of the programs (14) reported the second year of training as the year students first have patient contact; the majority of the institutions likewise require completion of the Hepatitis B vaccination series either in the first or second year of training. Two institutions require documentation for initial acceptance into their programs.

At most institutions, students are required to cover the expense of the vaccination with some institutions providing the vaccine to the students at cost.

ABSTRACTS

Computer-assisted Instruction in Emergency Ophthalmological Care. Lonwe B, Heijl A. Acta Ophthalmologica 71(3):289-95, June 1993.

This paper presents the results of using computer-assisted instruction (CAI) to enhance the education of medical students in the area of emergency ophthalmological care. Traditionally, medical students receive a two-month-long, half time course in ophthalmology. This project was designed to determine whether student knowledge in this area could be enhanced through the presentation of 12 simulated patients, illustrating 20 emergency conditions, in a HyperCard format.

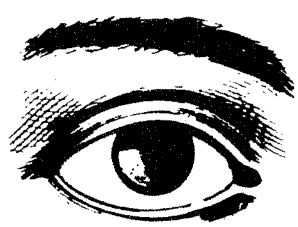
Each student was informed as to the type of health care setting in which he or she was practicing, and the distance to the nearest eye specialist. A patient history and clinical findings were presented and the students could then choose among several alternatives, e.g., further history, further examine tion, specific therapeutic measures, or referral. The symptoms and signs of the patient changed according to the management, allowing the students to see how their choices affected the simulated patients. In addition, at the end of each case, the student was referred to a source for more detailed information on the conditions.

The effectiveness of the CAI was tested by having each student take an examination which covered the areas of emergency ophthalmological care. Test questions were not directly related to the cases presented in the CAI, but were "designed to test the students' general ability to make diagnostic and therapeutic decisions necessary to manage" the acute ophthalmic conditions presented in the CAI cases.

The results showed that students having experience with CAI, which covered a specific section of subject matter, scored significantly higher than students who had not had CAI over that subject matter, but who had participated in CAI over different subject matter. This difference was seen whether the students had been presented with most of the material in a lecture format prior to the CAI or after the CAI.

The authors conclude that CAI can enhance, and perhaps replace, parts of conventional teaching in emergency ophthalmological care. They found the HyperCard format desirable and easy to use, especially since it allowed the use of color illustrations.

Reviewer: Dr. Roger L. Boltz
University of Houston College of Optometry



Stress, Coping and Well-being among Third-year Medical Students. Mosley Jr TH, Perrin SG, Neral SM, Dubbert PM, Grothues CA, Pinto BM, Academic Medicine 69(9):765-767, 1994.

As noted by the authors, the stressful environment of medical school has previously been report ed to have negative effects on a student's well-being and academic performance. In this study, stress, coping ability, depression and somatic distress were evaluated by standardized tests in 69 third-year medical students in the psychiatry clerkship at the University of Mississippi School of Medicine. This was done to determine the effect of coping on the well-being of these students. The coping strategies evaluated included four engagement strategies: problem solving, cognitive restructuring, social support, and emotional expression as well as four disengagement strategies: problem avoidance, wishful thinking, social withdrawal and self-criticism.

Results indicated that 23% of the students reported clinically significant levels of depression, and 57% reported high levels of somatic complaints relative to a normative student population. The students who reported the highest levels of stress also experienced the highest levels of depression and physical complaints. However, the students' use of coping techniques had a significant effect on the reported depression. Those students who used engagement strategies had significantly less depression than would be expected by the stress reported, while those who used disengagement strategies reported more depression than expected.

One must be careful in generalizing from this study which was limited to psychiatry students at a specific time of academic career, but these results suggest that training students in coping skills could be useful in decreasing the effects of the stress commonly encountered in professional school and professional practice.

Reviewer: Dr. Nada J. Lingel
Pacific University College of Optometry

The Medical Council of Canada's Key Features Project: A More Valid Written Examination of Clinical Decision-Making Skills. Page, G, Bordage G, Academic Medicine 70(2):104-110, 1995.

There have been a number of studies that do not support the use of Patient Management Problems (PMPs) to assess clinical decision making (CDM) skills. As one author observed, "they take too long to find out too little." In addition, recent research on CDM skills supports the view that such skills are contingent upon the effective manipulation of those few elements of the problem that are critical to its successful resolution. These issues led the Medical Council of Canada to commission a six-year research and development project to create a new written examination for the Canadian Qualifying Examination in medicine. In 1992, the new examination was given for the first time, and the former technique using PMPs was abandoned. This article presents the project design and an overview of the research study results under taken to answer the important questions of reliability and validity.

Three pilot tests provided the research results. Key feature problems were given in test booklets to groups of graduating medical students at different Canadian medical schools. Questions were presented in two major formats: 1) short menu —15 to 20 items, and 2) write in. Problem formats could consist of questions requiring only a single answer or questions requiring multiple answers. Multiple answer questions would be mixed requiring both short menu and write-ins. Clearly, in any new test the research required must examine the face and content validity of test, format and scoring system effects;test length and reliability; and the determinants of performance. A special challenge was the efficient marking of write-in answers. Standard setting for correct answers was another difficult process that had to be undertaken.

The authors' conclusions were positive toward the new key features type of examination. The test will consist of numerous problems drawn from a defined domain of problems for which a newly graduated student is accountable. Each problem will consist of a variety of questions that will be answered from a short menu or by write-in. The write-in answer is most often used for questions of diagnosis and management. Long menu lists, latent image responses, and questions with single answers will be eliminated. The use of write-in answers, scored by a special computer program, represents a major departure from the multiple choice format so frequently used in health professional education in the U.S.

This article is the first of a series of reports on this new method of testing decision-making skills, especially for licensing purposes. These results should be closely followed by the NBEO which only recently has introduced PMPs to its Part III examination. The new Canadian test should likewise spark some interest among optometric educators who should always be on the look-out for innovative ways of teaching and measuring clinical decision making skills.

Reviewer: Dr. Lester E. Janoff
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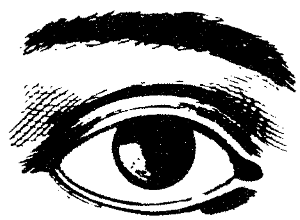

Teaching Ophthalmology to Primary Care Physicians. Stern G. Archives of Ophthalmology 113: 722-724, 1995.

The Association of University Professors of Ophthalmology (AUPO) has published a Policy Statement suggesting minimum levels of competence expected of general physicians when dealing with ophthalmologic problems. These competencies include ability to take visual acuity, evaluate a red eye, evaluate a traumatized eye, detect strabismus and abnormal eye movements, detect abnormal pupillary responses, perform direct ophthalmoscopy to detect abnormalities of the optic nerve and fundus, and initiate management and/or referral for detected or suspected abnormalities of the eye and visual system. This article contains the results of a survey of 135 residency programs in family practice, internal medicine, and pediatrics (71 responding) regarding the preparation of residents in these fields to operate as "gatekeepers" for ophthalmological problems.

Of the family practice residency programs, 100% felt they met the criterion competencies listed above (it is part of their accreditation requirements). However, the program directors of 33.3% of internal medicine residencies and 13% of pediatric residencies believe their graduates do not meet these standards. Most program directors feel that fewer than half of their entering residents meet AUPO standards, i.e., were not taught them in medical school.

The program directors, especially in internal medicine and pediatrics, felt that time for additional training in ophthalmology and other subspecialties should be incorporated into their residencies and that they were willing to do so. Suggested methods of education involved subspecialty rotations during medical school and residency, and lectures by ophthalmologists and primary care physicians.

The article concludes that the current system of educating primary care physicians is doing a poor job preparing them to fulfill the roll as gatekeepers and that enhanced training is warranted, preferably beginning in medical school. Curricula need to be developed, as well as methods of assessment.

Reviewer: Dr. Roger Boltz
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MEDLINE Training for Medical Students Integrated into the Clinical Curriculum. Schwartz D, Schwartz S. Medical Education 29, 1995.

The purpose of this study was to analyze the use of MEDLINE by medical students during their third-year clinical clerkship in pediatrics. MEDLINE is a data base comprised of journal article abstracts from approximately 3600 medial and other health related journals and is available either "on line" or on CD ROM. The students were first given a brief lecture and laboratory on the use of MEDLINE and then followed longitudinally with questionnaires to determine their perceptions of the value and ease of using MEDLINE. According to the authors, the results indicated that when medical students have free and unlimited access to MEDLINE, they used it frequently, found it easy to use and determined it to be of value in the learning process. They also felt that having a formal presentation on the system was helpful. One area pointed out by the authors which was not addressed in the study was an assessment of the quality of the searches performed by the students. Specifically, did the students miss references that were important to the search and did their searches take them to an excessive number of irrelevant references?

The results of this study are important to optometric education in that we, like medical schools, are faced with a crowded curriculum and necessity to foster the concept of life-long learning in our students. The use of MEDLINE as a self-directed learning tool and as a life-long learning skill is extremely important and should not only be encouraged but taught as well. The schools and colleges of optometry should all utilize their librarian or other qualified person to teach the basics of on-line searches as well as how to access other information resources.

Reviewer: Dr. James E. Paramore
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The Group Case Presentation: Learning Communication and Writing Skills in a Collaborative Effort.

Greenberg, L. Med Teacher (16)4: 363-367, 1994.

This paper describes the use of group case presentations by medical students in a pediatric clerkship. The students worked together in groups of 3-4 as a team in preparing the case abstract and oral presentation. This article reports that this was successful with the concerns that experienced educators have observed with group presentations, e.g., some presentations lacked continuity, and some individuals did more work than others.

Overall the quality of the group sessions was excellent, the experience was a valuable teaching exercise and the teaching of synthesis and interpretation of information was enhanced. We have used this approach in our courses and found it to be excellent in encouraging critical thinking, interpersonal skills, and collaborative learning.

Reviewer: Dr. Robert N. Kleinstein
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A Program for Documenting Competency during Surgical Residency.

Luchette F, Hassett JM, Seibel R, Booth F McL, Hoover E. Med Teacher 16(4): 333-340, 1994.

Credentialing is a growing concern for training programs as well as providers. This article represents the first attempt to describe documentation of surgical procedure competency during residency training. The authors previously reported the direct relationship between total clinical exposure and cognitive knowledge base.

Each surgical unit at SUNY Buffalo decided on what procedures to credential, what mechanism of certification to use, criteria for privileges, level of experience needed for independent activity, a mechanism for ensuring compliance, the pace of development of privileges, and a mechanism for reporting clinical experiences. The authors developed a database management system for following the above criteria. Progress is reviewed during residency meetings. Deficiencies are identified and remediation is undertaken. Striking to me was that surgical residents are considered certified in venipuncture and subcutaneous injection after only one supervised procedure.

The program design described here doubles as a quality assurance program for graduate surgical education. It could easily serve as a template for credentialing of other practitioners or those in training. In fact, schools and colleges of optometry perform this hierarchy certification during training at the present time. It is possible that this format will be undertaken as a broader certifying instrument/strategy to meet challenges of the future.

This article would make interesting reading for those involved in promulgating QA programs as well as anyone interested in competency training within optometric education. With credentialing being a significant component of managed care ("rape the provider") programs, the information in this article would make an interesting comparison for those seeking privileges in that context.

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