PCO MINORITY RECRUITMENT PROGRAM

Winter 1987
Volume 12, Number 3

JOURNAL OF OPTOMETRIC EDUCATION

Association of Schools and Colleges of Optometry

The Association of Schools and Colleges of Optometry (ASCO) represents the professional programs of optometric education in the United States and Canada. ASCO is a non-profit, tax-exempt professional educational association with national headquarters in Washington, D.C.

ISSN 0098-6917

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DEPARTMENTS

About the cover—

Top— *Denise Clayton, PCO class of 1988, examines a patient at the College's Eye Institute as Resident Joseph Carillo, O.D. observes. Third year students receive extensive clinical training at The Eye Institute prior to embarking upon externships in "real world" settings during their fourth year.*

Right— *In 1985, the National Optometric Association recognized PCO for its "outstanding contributions given toward minority students in advancement of their optometric careers." National Optometric Student Association President Gayle Daniels, PCO class of 1988, displays award with Robert Horne, PCO Director of Minority Affairs.*

Left— *Robert Horn (fourth from left), Director of Minority Student Affairs at the Pennsylvania College of Optometry, has recruited and counseled students for the last ten years, increasing minority enrollment from four to 13 percent, and retention to 97%.*

Cover photography by David Bennett

The **JOURNAL OF OPTOMETRIC EDUCATION** is published by the Association of Schools and Colleges of Optometry (ASCO). **Managing Editor:** Patricia Coe O'Rourke. **Art Director:** Dan Hildt, Graphics in General. Business and editorial offices are located at 6110 Executive Boulevard, Suite 514, 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 $15.00 per year, $20.00 per year to foreign subscribers. Postage paid for a non-profit, tax-exempt organization at Washington, D.C. Advertising rates are available upon request. *The Journal of Optometric Education* disclaims responsibility for opinions expressed by the authors.

EDITORIAL

National Institutes of Health 1887-1987

This year marks the 100th anniversary of the establishment of the National Institutes of Health. From very humble beginnings, at the Public Health Service Hospital, Staten Island, New York, under the direction of Dr. Joseph Kinyoun, a physician and bacteriologist, has grown the most renowned center for biomedical research in the world located at Bethesda, Maryland.

The NIH has produced, through intramural and extramural research support and training, some of the country's outstanding and world recognized biomedical investigators, Public Health Service Surgeons General, epitomized by Dr. Luther Terry and a number of Nobel laureates. It has, even in highly political and bureaucratic Washington, retained its professionalism and absolute commitment to excellence.

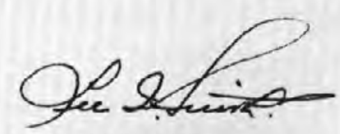
Support for the expansion and growth of NIH by presidents, Congress and the public has been earned by outstanding professional contributions to the health and well-being of the American people. I can think of no undertaking with public funds that has contributed more to the public good.

I first toured the then fledgling NIH as a Navy Corpsman in 1946. Later, at the University of Pittsburgh, I was an NIH Research Fellow, benefiting as a newly developing research scientist through a program sponsored by the NIH. Finally, an opportunity presented itself for me to be assigned to the NIH as an investigator for a period of years. As many do, I considered it an utmost privilege. Therefore, I have personally benefited and more importantly watched the growth and evolution of what is now the NIH. As NIH enters its second 100 years, its competency and the educated concerns of the Congress ensure its continued growth and development.

For those of us in the vision care field, the formation of the National Eye Institute in 1969 represented a true milestone. While certainly not celebrating its 100th anniversary, NEI has, nonetheless, contributed significantly to the knowledge of vision function, blindness and diseases of the visual system. Through its efforts, it has provided training opportunities for young developing investigators and funded established institutions to assure greater achievements. Ten of the 15 schools and colleges of optometry are involved in vision research and are recipients of grants from NEI, currently totaling more than five million dollars. NEI also has established a "National Plan," which has given direction, coordination and much needed incentive to research programs and for imaginative approaches to solutions for the unsolved problems of vision and vision care.

To Dr. Karl Kupfer and his able staff, we extend our best wishes on this anniversary and our support and encouragement for even greater achievements in coming years. The obstacles facing the National Institutes of Health and the National Eye Institute are many but the optometric profession is confident that NEI is equal to the challenge.

HAPPY BIRTHDAY and a hearty "Job well done!"



Lee W. Smith, M.P.H.
Executive Director

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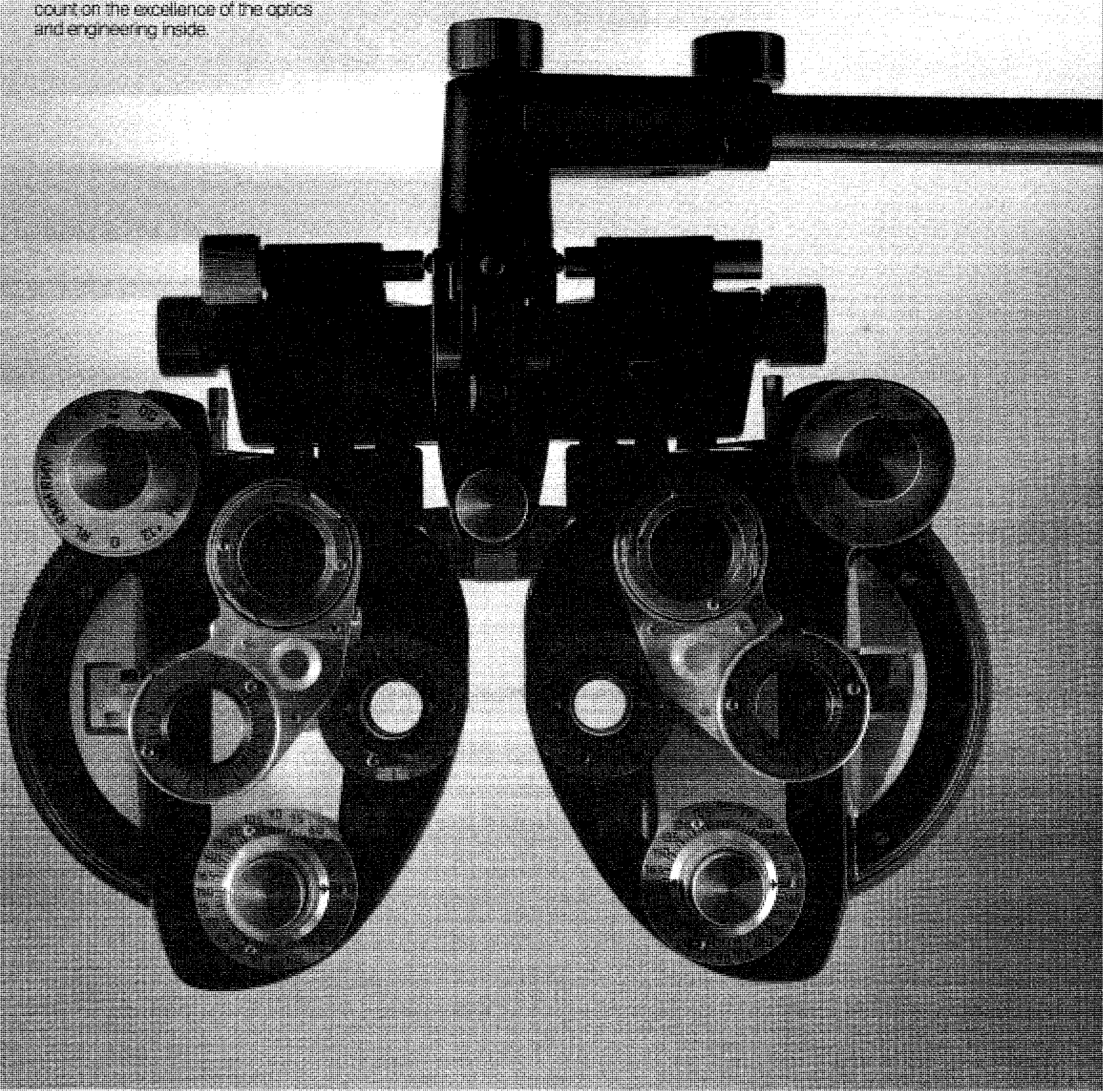

ASCO NEWSMAKERS

NEWENCO Dedicates Learning and Patient Care Center

The New England College of Optometry recently dedicated its new learning and patient care facility, The Boston Optometric Center. The new site combines the comprehensive services provided through its clinics, the Boston Eye Clinic and the Specialty Clinics, into a single learning and patient case management facility.

Among the honored guests was Boston City Commissioner of Health and Hospitals, Lewis W. Pollack, who accepted a symbolic key on behalf of Mayor Raymond Flynn. Representatives from the College included Lester Brackley, O.D., Chairman of the Board, Sylvio Dupuis, O.D., President and Lester Janoff, O.D., BOC Director. Other special guests included Maurice Saval, O.D., Board of Trustees, Chairman Emeritus, and Edith Hochstadt, whose deceased husband Otto served for many years as Chairman of the College's Board of Trustees.

The new center combines the many services that the clinics have been providing to patients of the greater Boston area. The center will continue to provide primary eye care and special services such as pediatrics, eye care for learning disabled children and vision services for the hearing impaired and physically or emotionally handicapped through its Woody Brown Clinic. □

Participating in the ribbon cutting ceremony for the Boston Optometric Center, the New England College of Optometry's new learning and patient care facility are: (left to right) Sylvio Dupuis, O.D., President of the College; Mrs. Edith Hochstadt, Corporator; Lester Brackley, O.D., Chairman of the Board; Maurice Saval, Trustee; Lewis W. Pollack, Boston City Commissioner of Health and Hospitals; and Lester Janoff, O.D., Director of the Center.

(continued on page 94)

SUSTAINING MEMBER NEWS

Sustaining Members support ASCO initiatives on behalf of the optometric education community. 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.

90D BIO® Lens Developed by Volk Optical

Volk Optical/Tech Optics, Inc. has developed the unique Volk 90D BIO® lens for slit lamp biomicroscopy of the eye. With the patient seated in the normal fashion, the lens is hand held in front of the patient's eye while the observer views a magnified aerial image of the fundus through the slit lamp biomicroscope.

Dr. David Volk, founder of Volk Optical, states the 90D BIO® lens is the first of its kind, and that the two aspheric surfaces utilized have been mathematically and optically integrated for perfect imaging.

Volk is the first to introduce DOUBLE ASPHERIC lenses for indirect ophthalmoscopy to the optometric profession and is the only manufacturer of the patented double aspheric lenses. □

Bausch & Lomb Introduces New Student Awards

Bausch & Lomb's Professional Products Division has introduced a new optometric student awards program for 1987. Bausch & Lomb's "Commitment to Education" will include the "Excellence in Academic Achievement Award," the "Contact with the Future Educational Travel Grant" and the "Practice Initiation Award."

The "Excellence in Academic Achievement Award" will be presented to the third year student who combines a high grade point average with exceptional accomplishments in the area of contact lenses. The recipient will be awarded a $1,000 educational scholarship. The "Excellence in Academic Achievement Award" winner also will receive the "Contact with the Future Educational Travel Grant." This grant includes an all-expense paid trip to the National Research Symposium on Contact Lenses sponsored by Bausch & Lomb. Washington, D.C. will be the site for the National Research Symposium in August, 1987.

The fourth year optometric student will be eligible for the "Practice Initiation Award." A Bausch & Lomb keratometer will be given to the student who submits the most innovative paper entitled "The First Six Months." This paper will discuss the most important activities in the first six months of practice.

Each of the U.S. optometric schools will be eligible for the awards in 1987. Judging for both the third and fourth year student awards will be conducted by the faculty or their designated awards committee.

For more information on Bausch & Lomb's "Commitment to Education" contact David A. Reischer, Director of Professional Services, 1400 N. Goodman Street, Rochester, NY 14692. □

Vision-Ease Offers Semi-Finished Bicentric Glass Lens

A semi-finished Bicentric/Slab-Off glass lens is now available from Vision-Ease. The glass lens, designed to correct vertical imbalance at the reading point, places the equalizing prism over the entire lower field of one lens to correct the difference of refraction in the two eyes. Vision-Ease now offers to calculate the required amount of vertical imbalance correction and to supply the semi-finished glass bicentric for laboratory Rx surfacing. The increasing popularity of inner ocular lens (IOL) implants prompted Vision-Ease to develop the semi-finished Bicentric/Slab-Off.

"Our research indicates that 95% of patients undergoing cataract surgery will have an inner ocular lens implant," explained Product Manager Roy Hinkemeyer. "The surgery commonly results in vertical imbalance at the near point, and this problem can be corrected with Bicentric/Slab-Off lenses," Hinkemeyer said. The 68 mm and 71 mm lens blanks fit most fashion frames, but special sizes are available on request. The bicentric comes in all seg styles and colors. Vision-Ease, worldwide manufacturer of optical lenses, has distribution centers throughout the United States and Canada with manufacturing facilities in St. Cloud and Minneapolis, Minn. and Fort Lauderdale, Fla. □

Soflens® Enzymatic Cleaner Now Indicated for Use with Polycon® Gas Permeable Lenses

Allergan Pharmaceuticals, Inc., announced that SOFLENS® ENZYMATIC Contact Lens Cleaner is now indicated for use for removal of bound protein deposits from Polycon® gas permeable contact lenses.

SOFLENS ENZYMATIC Contact Lens Cleaner was proven safe and effective for use with Polycon gas permeable lenses during a six-month clinical study involving 243 patients. As part of the regular care regimen to remove bound protein deposits, the lenses were soaked weekly for 2 to 4 hours in the enzymatic solution prepared with distilled water. Cleaning with LC-65® Daily Contact Lens Cleaner and disinfecting with Wet-N-Soak™ Wetting and Soaking Solution followed the enzymatic soaking cycle.

Adding SOFLENS ENZYMATIC Contact Lens Cleaner to the existing team of Wet-N-Soak and LC-65 creates the only gas perm care system available that cleans, disinfects, wets and effectively removes protein deposits from Polycon gas permeable lenses. □

Paragon Announces Professional Education Series

The series of seminars sponsored by Paragon Optical Inc. will focus on "Rigid Gas Permeable Contact Lenses & Extended Wear." Topics will include fitting techniques, trouble-shooting, extended wear follow up procedures & patient compliance/management. Seminars will be presented in the following cities:

January 9, 1987, Miami, FL
Fountainebleau Hotel, 7-8:30 p.m.

January 16, 1987, Las Vegas, NV
Riviera Hotel, 6:15-7:30 p.m.

January 28, 1987, Los Angeles, CA
Airport Hilton, 6-7:30 p.m.

January 29, 1987, Irvine, CA
Newport Beach Marriott, 6-7:30 p.m.

January 29, 1987, St. Paul, MN
Hyatt Regency, 6:30-8:00 p.m.

February 6, 1987, Kansas City, MO
Hyatt Regency, 9:30-11:00 a.m.

February 19, 1987, Atlanta, GA
Hilton Hotel, 8:00-9:00 a.m.

March 5, 1987, Dallas, TX
Sheraton Park Center, 6:00-7:30 p.m.

March 12, 1987, Chicago, IL
Marriott O'Hare, 6:30-8:00 p.m.

March 24, 1987, Seattle, WA
Westin (Downtown), 6:00-7:30 p.m.

March 31, 1987, New York City
Parker Meridien Hotel, 6:15-7:30 p.m.
□

The Minority Recruitment Program at the Pennsylvania College of Optometry

Karen Cohen

Sandra Locklear's graduation this spring from the Pennsylvania College of Optometry will be very special. The North Carolina coed will be the first Lumbee Indian woman to become an optometrist and very possibly the only member of her extended family to earn a doctorate. She also will serve as a symbol of the success of PCO's minority recruitment and retention program.

From the moment PCO became aware of Locklear's interest in optometry, she said, the College supported her through the academic and social challenges of professional school.

The fruits of PCO's efforts to add to the nation's tiny pool of about 400 minority optometrists who serve minority youth as role models and often serve minority communities as practitioners are impressive. Since 1975 minority applications to the College have increased from 4 to 20 percent of all applications (figs. 1 and 2), and minority enrollment in the first year class has increased from 7 to 12.7 percent (fig. 3).

In 1976, approximately ten of the College's 500 students were of minority background. Today 77—or 13 percent—of its 590 students are of black, Hispanic, American Indian, Asian or Disadvantaged American White (DAW) background (fig. 4). More than 30 percent of the nation's black optometry students are enrolled at PCO—more than at any other optometry school. PCO's progress in recruiting and retaining minority students, in fact, prompted the National Optometric Association (NOA), an organization formed to mainstream minorities into the optometric community, to name the College 1985 School of the Year for Outstanding Contributions to Minority Students.

Karen Cohen, M.A., is a reporter and freelance writer in the Philadelphia area.

PCO's formal commitment to increase minority enrollment began in 1970 when it became a charter member of the Philadelphia Center for Health Careers, an organization of health care institutions which provided programs to recruit, enroll and retain minority students. PCO also made recruitment missions to colleges with predominantly minority student populations and arranged visits from minority applicants and potential applicants to minority optometrists.

Minority applications rose from three in 1970 to ten in 1975, but the increase was less than expected and the retention rate was poor. It soon became clear that PCO needed a retention program in order to significantly increase the minority enrollment.

The College then applied for federal grants on behalf of minority students. When grants were received in 1976, John J. Crozier, O.D., dean of student affairs and grant project director, hired Robert E. Horne as director of minority student affairs. A Department of Health and Human Services Health Careers Opportunity Grant presently helps fund the College's minority student services.

"I get a lot of the credit, but (minority affairs) is a whole ball game," Horne said. "It's about commitment and sensitivity. In order to have a successful program for minority students you must have a total commitment, especially by the people in our Student Affairs Office."

Recruitment

That commitment begins with recruitment. "Our admissions staff tries to look for good minority students when we're out recruiting," said Elizabeth A. Cochran, Director of Admissions. "We try to treat all applicants alike, but if a minority student identifies himself to us, we make sure he is aware of our office of minority affairs, our summer enrichment program and the need for minorities in optometry." Furthermore, Cochran said, "Bob Horne works closely with minority applicants to ensure they put their best feet forward in the admissions process." After their admissions interview, Horne usually conducts their exit interviews, sessions designed to address remaining questions or concerns of the candidate.

As an ex-officio member of the admissions committee, Horne may provide input on any student and, therefore, he might become an advocate for a minority student. "In evaluating applications to find promising students who will do well in practice," Cochran said, "the committee works very closely with Horne."

Horne and other members of the Office of Student Affairs speak to students and advisors at colleges with substantial minority populations and at state career workshops. Most of these efforts take place in states with contractual arrangements for reducing the fee for their residents who attend PCO.

Educating students and advisors about the optometric profession is a major task of recruitment. Although the situation has improved over the last decade, Horne said, "Most people don't have any real idea of what optometry is. They think of oculists and opticians." The rule for both minority and other science students interested in health professions is "medical school or bust," he said.

Many minority students considering optometry research the profession without significant help from undergraduate advisors. Third year student Maria Casas, for example, said she "recruited herself" by writing to various optometry schools when her advisor couldn't help her; so did PCO alumna Pamela Ellis, O.D., who in 1984, became Spellman College's first graduate to become an optometrist.

When advisors are versed in optometry, recruitment is facilitated, Horne said. "Students really go where advisors recommend, in most cases." Second year student Derrick Artis, for example, credited Dr. Arthur Seidenberg, his advisor at Virginia Commonwealth University, with furthering his interest in optometry. "Seidenberg had visited PCO . . . and was very enthusiastic about the profession," Artis said. Similarly, freshman student Shveta Shah's advisor at Albright College, Dr. Bell, immediately interested her in a three-week "Optometry Learning Experience" in which Albright students visit PCO to learn about optometry and the College. One year after this, Shah enrolled at PCO.

Needless to say, personal contact with PCO staff members also facilitates recruitment. Shah first became interested in optometry when Cochran showed a videotape about the profession at Albright; Artis said his interest in the field was catalyzed by Horne, whom he met three times during his undergraduate career. "By then I was so saturated with Bob Horne and PCO, I had no choice but to enter," he said. Locklear, too, said Horne turned her sights toward PCO, by encouraging her to apply there when she doubted her ability to succeed on the Optometry College Admissions Test and keeping in touch with her during the anxiety-laden days following her interview. "I felt like I had a friend at PCO," she said.

Minority students also recruit each other, Horne said. "If they say they're happy, other minority students will come." That was the case for second year student Craig Carter, who said the positive feedback from PCO's minority students was an important factor in his decision to apply there.

Literature PCO sends out helps potential students sense the College's interest in them. Locklear said she was impressed with the wealth of printed information enclosed with her application forms and was particularly pleased to learn about the College's National Optometric Student Association (NOSA) and its North Carolina club. Carter, too, appreciated the packets of information

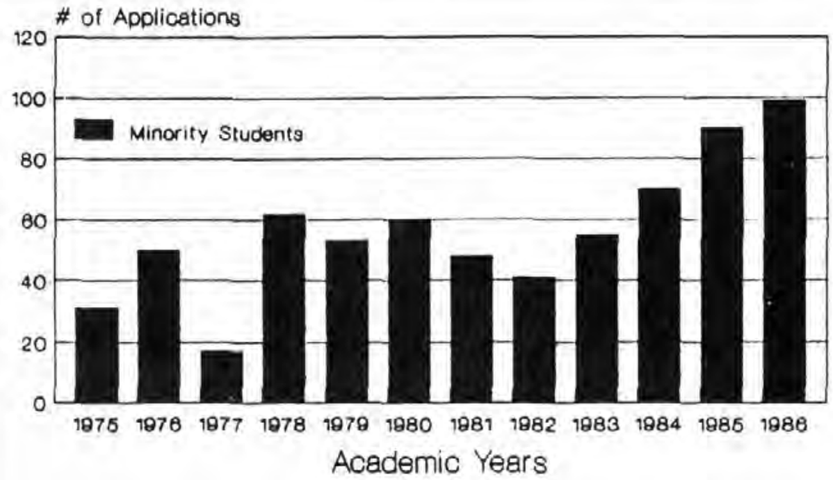

FIGURE 1.
Minority Applications
PCO

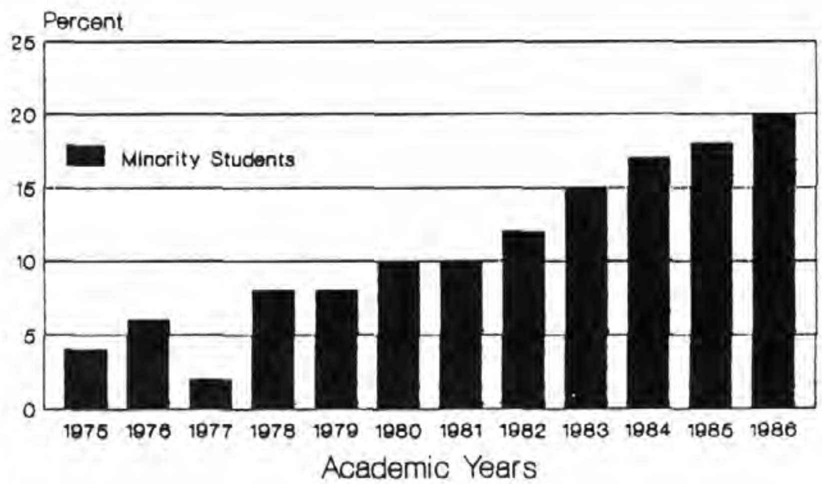

FIGURE 2.
Minority Applications as a Percent
of Total Applications

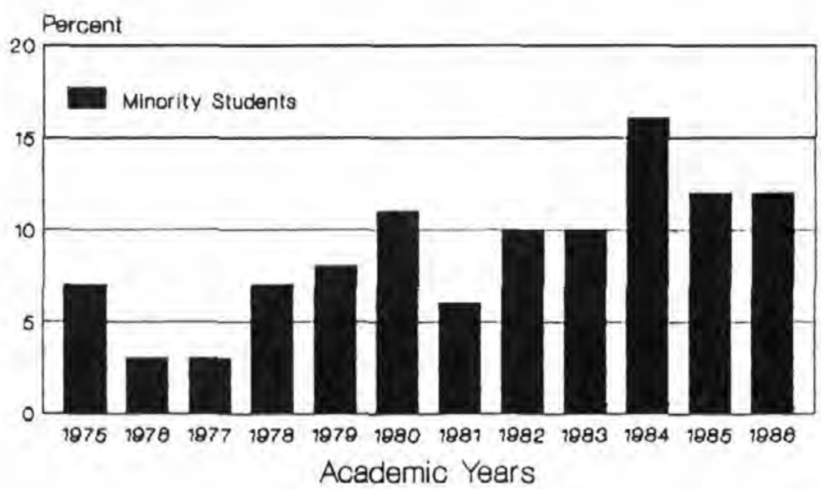

FIGURE 3.
Minority Student Enrollment
PCO 1st Year

he received—from the financial aid and housing offices, for example. "Once I showed interest (in PCO), interest was shown in me," he said.

"Minority students go through every process at the institution. The best program for them would be one that's sensitive to the needs of each student (minority or other)," Horne said.

Financial Aid

That sensitivity facilitates the work of financial aid personnel on behalf of minority students.

"My experience is that many students, both minority and non-minority, require personal assistance to deal with formalized systems like financial aid," said Lawrence H. McClure, Director of Financial Aid. "Unfortunately, with at least 85 percent of all students requiring financial aid, the crush of paperwork limits counseling time."

PCO's Financial Aid Office attempts to develop programs and procedures which take care of the majority of students and provide personal counseling and assistance to those students who require individual attention.

McClure states, "We try to streamline paperwork for the students without actually doing it for them. In this way, we are preparing students for similar tasks later on, like applying for a mortgage or developing personal and business budgets. It's a middle ground between a paper-oriented and a counseling-oriented approach," he said.

The approach works. "I've never known a student who couldn't matriculate and graduate for lack of financial resources," McClure said.

Summer Enrichment Program

Minority students accepted at PCO are invited to participate at no cost in the College's Summer Enrichment Program, a six-week program of mini-courses occurring immediately before the first year begins. The keystone of the College's retention program, it is intended to help a student make the adjustment from undergraduate to professional school in a non-threatening environment.

"I thought the program was really great, especially in helping me adapt to a new social environment," said Locklear, who, as a member of an Indian tribe of only 45,000 people, said she could easily have felt like a minority-within-a-minority at PCO. Locklear especially appreciates the way the program helped acquaint her with her classmates. "Those friends are still a common bond," she said.

The program was an academic boon as well, Locklear said. "It helped me focus on what needed to be done, manage my time, and learn about optics and other areas I was not introduced to before . . . ," she said.

The academic part of the program is a preview of the first year course work presented, whenever possible, by the professors who will teach those courses during the academic year. Since mid-terms, finals and practicals are virtually the only measures of academic success during the first and second years at PCO, the program emphasizes study and examination—but without the pressure of grades.

Students' test-taking skills and proficiency in the summer subjects are evaluated the first day and academic survival sessions are held to help develop note-taking, study and test-taking skills.

Craig Carter, who worked full-time as a probation officer during his undergraduate years and never took more than two or three science courses at once, called the program a godsend. "It helped me immediately concentrate on taking courses," he said.

Black	**41**
Hispanic	**13**
American Indian	**2**
Asian	**19**
DAW	**2**

FIGURE 4.
PCO Enrollment
1986-87

Dr. Pamela Ellis said the program was important in reducing the sense of alienation that she believes can prevent a minority student from succeeding in professional school. "I felt I wasn't going to be the only minority student . . . and I was glad to see a black person (Horne) in a position of authority at the school. I knew that any possible problems would be addressed."

Last year, a black student, Derrick Artis, worked in the summer program. Among other responsibilities, he talked to students when they needed encouragement. "Having recently made the transition from undergraduate to professional school himself, he gave students a different perspective than I could," Horne said.

Like Artis, other enrichment program participants become so well acclimated to the College, they emerge as student leaders, Horne said. In the last six years a majority of PCO's class, student council and NOSA officers were former members of the summer enrichment program.

The only major complaint Horne has heard about the summer program, he said, is that only 30 students are allowed to take it.

"It can't be offered to everyone and have the kind of impact we're looking for, so we must make some professional judgments (about participation)," Horne said. "Minority students need the program motivationally and/or academically. Because of the critical shortage of minority practitioners, we must do all we can to make sure these students get through."

Horne also points out that the summer program, like all services at the College, is available to non-minority students. Although minority students are enrolled first, approximately 50 percent of the participants are white students who, for academic or other reasons, can benefit from the program. Those students must pay their travel and living expenses, but tuition is paid by PCO.

Other College services aiding retention are its tutoring program, study skills and stress workshops and supplementary tutoring and peer support offered by the NOSA.

The retention program has yielded impressive results. Minority retention has averaged 97 percent each year since 1976. PCO produced 63 minority ODs in the last nine years; 16 more are expected to graduate in May 1987.

Looking to the Future

PCO hopes to increase minority enrollment to 15 percent of the student body by 1990, increase the percentage of minority students graduating in four years and help minority students more easily understand how to finance their education and minimize debt.

Alvin Cuff, O.D., a Philadelphia practitioner in close touch with PCO's NOSA and a past vice-president of the NOA, said he also would like to see black people on the College's faculty and Board of Trustees. Although black optometrists serve as preceptors, none are full-time staff members, and a black trustee was appointed several years ago, but he died a short time later.

Nonetheless, Cuff praised the College's program in minority affairs. "PCO has made a lot of strides in recruiting and retaining minority students, and much of the success is due to the work of Bob Horne," he said. □

NEI REPORT

In this centennial year (October, 1986-October, 1987) of the National Institutes of Health, the Journal of Optometric Education salutes the National Eye Institute by a brief summary of its history, goals and accomplishments.

Introduction

The National Eye Institute was created on August 16, 1969, by Public Law 90-489. The legislation establishing the NEI authorizes the NEI "to plan for research and training especially against the main causes of blindness and visual function." The NEI conducts, fosters and supports basic and applied research related to the cause, natural history, prevention, diagnosis and treatment of disorders of the eye and visual system as well as investigations in related fields, through:

- research performed in its intramural laboratories and clinic;
- a program of research grants, individual and institutional research training awards, career development awards, core grants, and contracts to public and private research institutions and organizations;
- a program of grants for public and private nonprofit vision research facilities;
- cooperation and collaboration with professional, commercial, voluntary and philanthropic organizations concerned with vision research and training, disease prevention and health promotion, and the special health problems of the visually impaired and disabled and the blind;
- the collection and dissemination of information on ongoing research and findings in these areas;
- cooperation and collaboration with domestic and international organizations in programs and projects for the worldwide prevention of blindness.

In 1973 the National Advisory Eye Council asked a few leaders in the various scientific disciplines related to vision research to survey their fields of expertise and to summarize the state-of-knowledge, to identify areas which warranted more exploration and elucidation, and to outline the most important research needs and opportunities over the succeeding five years. The result of their efforts was published in Vision Research Program Planning, a two-volume set covering the years 1976-1979, which was followed by a series of program plans published by the Council.

The most recent of these, *Vision Research—A National Plan: 1983-1987,* is the most comprehensive and detailed. It consists of nine books, one for each of the five NEI programs which present an assessment of the current NEI program as well as numerous specific recommendations for program development over the succeeding five years. In this effort more than 350 scientists, representing all major areas of vision research, helped refine and improve the NEI program planning system and provided scientific guidance on the setting of research priorities.

For each NEI program, the National Plan: describes significant diseases and disorders, including their public health impact and the research disciplines that the program addresses; defines program goals and objectives; surveys current support by the NEI and other organizations; reviews recent program and research accomplishments; describes current relevant research needs, opportunities, and approaches; and makes specific recommendations concerning program development.

The report defines several program priorities and projects of resource requirements for each major area of vision research that the NEI supports. In addition, the plan discusses how NEI-supported vision research projects relate to the following health science areas: disease prevention, diabetes, nutrition, aging, toxicology, genetics, immunology, epidemiology, neurobiology, molecular biology, noninvasive research and diagnostic techniques, refractive errors, and the use of animals in vision research.

In the summer of 1986, the Council published an evaluation of the 1983 plan, including a discussion of significant recent accomplishments, the status of ongoing research activities in terms of how well they have fulfilled the plan's recommendations and revised priorities for the next two years.

All vision research conducted and supported by the NEI is classified into five major programs that encompass a full spectrum of basic and applied research on a large number of eye and visual disorders which are the most important causes of visual deprivation and blindness in the United States. The five programs are: retinal and choroidal diseases; corneal diseases; cataract; glaucoma; and strabismus, amblyopia and visual processing. Because of the importance of the broad topic of irreversible visual impairment and its rehabilitation, special consideration has been given in the National Plans to this subject. Each of the five programs is further divided into subprograms, which generally focus on specific ocular and visual system diseases or disease processes, normal ocular functions, tissues or systems.

Planning Principles

The National Advisory Council developed several general planning principles during its initial planning activities in 1975 which still guide the process today. Among the most important are:

- The NIH investigator-initiated research project grant (RO1) must be relied upon as the primary mechanism of NEI research support. In 1985, RO1s accounted for 88.4% of NEI's extramural budget.
- The program planning process must be prospective and continuous and its outcome should be communicated rapidly to the scientific community and the general public. Successful implementation of NEI program plans depends heavily upon wide dissemination and knowledge of the contents of these plans.

Implementation Guidelines

The NEI abides by the following guidelines in implementing its national plans:

- Continue to fund first all proposals for research projects that are judged to be of the highest scientific quality by NIH study sections and other initial NIH peer review groups.
- Emphasize that research which is judged the most relevant to the prevention, diagnosis and treatment of blinding and visually disabling disorders.
- Stress basic biological and applied clinical research on problems related to the most common causes of blindness and visual disability.
- When research involves laboratory animals, favor the utilization of species for which both scientific opportunity and technical feasibility permit the greatest amount of generalization to the human condition.

(For further information on NEI programs, contact the National Eye Institute's Department of Public Information (301) 496-5248.)

Team Teaching Optometry

David A. Heath, O.D.
Nancy Carlson, O.D.
Daniel Kurtz, Ph.D., O.D.

Introduction

At the New England College of Optometry the curriculum has been undergoing substantial reevaluation and reorganization over the past several years. Every educational program needs to be reviewed on a periodic basis. The results of an honest curriculum review may range from minor sequencing changes to radical revisions. Often, when problems are found to exist, changes are made in the organization of the curriculum, but rarely are teaching models evaluated and modified to ensure that those being used are the most effective for attaining educational goals and objectives.

One curriculum area recently revised at the new England College was the first year optometry sequence. This part of the curriculum is extraordinarily expansive in terms of the range of topical areas and the multiplicity of levels at which students are expected to become proficient. We are simultaneously trying to develop the students' repertoire of examination techniques, establish their knowledge base and facilitate the development of their analytical skills. In an attempt to meet the challenge of teaching the first year optometry course, both the course organization and the teaching model have been revised. The course

"THE TEAM"

now uses a "Team Teaching" approach.

Teaching Models

Before discussing the actual changes that have occurred, it is helpful to review three basic teaching models that are available. These models are: 1) Individual, 2) Multiple Lecturers and 3) Team Teaching.

Individual. A course taught by one individual is the most frequently used arrangement in optometry colleges. From an organizational perspective, it is the simplest model. There is a minimal need for interfaculty coordination and the instructor is autonomous with the ability to exercise academic freedom in the fullest sense. With little need for coordination, faculty members may use their time in course development, thus making it a very efficient teaching model. Localization of responsibility is also an advantage of the individual model. All members of the college community (student, faculty and administration) know with whom the responsibility for the success or failure of the individually taught course rests. As with any model, disadvantages exist as well. These may include instructor isolation and course stagnation. If the course requires a wide range of knowledge, the instructor may not be an "expert" in all areas of responsibility. In addition, the student has no choice of faculty as a learning resource. If a student/faculty conflict exists the student has no alternative.

Multiple Lecturers. In a course with multiple lecturers, there is one instructor in charge who coordinates the course. The coordinator is responsible for knowledge of and development of the course theme. As in the individual course, responsibility is still largely assigned to one person. There are several advantages to the multiple lecturer model. By using a variety of lecturers, each topical area may be covered by the individual most qualified to teach that area. This arrangement also allows students to be exposed to a variety of instructors. The disadvantages of the multiple lecturer model usually arise from coordination issues. In this model lecturers are generally assigned an area. Rarely do they have an awareness of the material being taught by other lecturers or the overall course goals and objectives. As a result, there may be repetition, contradiction, and poor quality control. This creates a need for coordination which consumes a significant amount of time and energy. In general, the multiple lecturers model seems to work well when applied to more advanced course work, where "expertise" is more essential and when each lecturer's area of responsibility is very clearly defined.

"Team members can learn new teaching techniques from one another and receive continual peer evaluation at the same time."

Team Teaching. The Team Teaching Model, if fully implemented, involves all team members in all aspects of the course. This begins with the establishment of course philosophy, goals and objectives and continues with the development of course materials and the teaching of these materials at all levels (lectures and laboratories). Unlike the multiple lecturers model, team members are knowledgable of the complete course and of one another's activities. While responsibility for the educational integrity of the course is shared, even a team taught course requires a "coordinator" to assure administrative order and a sense of cohesiveness.

There are a number of potential advantages to team teaching. Team members may be assigned areas in which they are most knowledeable to provide a certain level of expertise. For each assigned topical area, a team member has primary responsibility for the development of lectures, assignments and labs. This guarantees consistency for each topical area at all levels. The use of a team also provides several role models for students while allowing for an expanded faculty resource pool. For consultation, there exists someone for everybody. The use of several faculty members may facilitate course development, while providing for faculty development as well. Team members can learn new teaching techniques from one another and receive continual peer evaluation at the same time. As with the individual and multiple lecturers models, there are potential disadvantages inherent in team teaching as well. These include a strong need for administrative coordination and interfaculty communication. With the use of a team rather than a single individual, there is an increased possibility of contradiction as well as diffusion of responsibility.

Team teaching is by no means a new concept.[1] Originally, team teaching was implemented in primary and secondary schools in the late fifties.[2] Since that time this educational model has been widely implemented in colleges at the undergraduate level[1,3] and schools of nursing.[4,5,6] A review of the literature, however, revealed little documentation of the use of this model in professional programs.

Having reviewed three models of teaching, the question can be asked, "Which is the most appropriate model for teaching the first year optometry sequence?" To answer this question the curriculum demands must be analyzed relative to the available resources.

Which Model?

As previously noted, the range of topics to be covered in a basic optometry course is wide and must be taught at several levels. Most first year optometry courses require both lectures and laboratories for the practice of techniques. As a result, this course requires significant materials development. In addition to general course materials and lecture outlines, laboratory manuals and laboratory exercises must be created. Class size also needs to be taken into consideration. Although class size has little bearing on the materials that need to be developed, it does impact faculty time demands in terms of the number of laboratory sections required and the

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This paper was originally presented at the December 1985 meeting of American Academy of Optometry.

evaluation of assignments and exams. With the exception of a small class, the demands of teaching first year optometry are too great for a single instructor. This is more apparent if it is agreed that it is desirable to have the instructor of first year optometry involved in other segments of the curriculum to increase the awareness of the relationship of the optometry sequence to the rest of the curriculum. For example, it is helpful to have the instructor teach in clinic to evaluate the effectiveness of the course in training the student.

The inability of one professor to meet the demands of the first year optometry curriculum is recognized by most colleges of optometry. However, rather than consider an alternative to the "one teacher-one course" arrangement, such as team teaching, most colleges create more courses. The typical arrangement (according to college catalogues) has the optometry sequence consisting of two courses: one, a theory of optometry course and the other, a methods or procedures course (Fig. 1). The procedures course may be subdivided into a lecture and a laboratory. With this set-up, a student may have as many as three different instructors teaching material that covers the same topical areas but at different levels of application. This was in fact the arrangement at the New England College of Optometry for the eight years preceding the change to the team teaching model and it was fraught with problems.

Since each course (each level) was individually taught and organizationally autonomous, little coordination of materials and sequencing occurred. This led to communication breakdown, overlaps, omissions, contradictions and student confusion. As coordination difficulties arose, it was decided that the two courses would be combined into a single course. Implicit in this decision was the recognition that for early students of optometry, coordination and consistency of materials taught at all levels is of primary importance. With this recognition, and the realization that the teaching load was too great for one person, the team teaching model was adopted.

The Team

To discuss the organization of the team taught course it is necessary to differentiate between the educational organization and the administrative organization.

Educational Organization. The implementation of Team Teaching began with the appointment of one faculty member as "course coordinator." The course coordinator, in conjunction with the administration, then selected the other members of the team. In this case, there were two other faculty for a total of three team members. The first task of the team was to develop the course philosophy, goals and objectives, and outline. In doing so a common goal was developed and well understood by all involved. Once the course was defined, the topical areas to be covered were divided equitably among the three team members. Topics were assigned to the member most knowledgeable and interested in that area and these areas became the primary responsibility of the team member.

It is important to emphasize that the work was divided by topic rather than by level of application. For each topical area the team member is responsible for developing and teaching the material necessary for all levels of instruction (Fig. 2). This includes lectures, lecture outlines, homework assignments, procedures for the laboratory manual, exercises to be completed in laboratory and the exam questions that evaluate a given topical area. By using this format absolute consistency within each area is assured. To emphasize this point, each team member is required to teach both lectures and labs; participation at all levels is a must.

This organizational scheme raises the possibility of coordination problems between topic areas rather than between levels of application. Several practices were put into place to protect against such a coordination breakdown. Each team member is responsible for reviewing and providing feedback on materials developed by other members, for attending other lectures whenever possible (the coordinator attends all lectures) and for administering and evaluating all the homework and lab exercises of a portion of the class. These three activities maintain clear communication and familiarity with the entire course for each team member. Each team member is responsible for being able to answer questions regarding all topical areas.

In addition to the three central team members, the team also includes laboratory instructors. There are two instructors for each lab section of approximately 18 students. One instructor is always one of the three core members of the team and the other assists, participating only in the laboratory section

OPTOMETRIC THEORY ·	LECTURE	KNOWLEDGE ANALYSIS
OPTOMETRIC METHODS ·	LECTURE	KNOWLEDGE TECHNIQUE
·	LABORATORY	TECHNIQUE

Figure 1
Traditionally the optometry sequence had been divided according to level of knowledge.

TOPICAL AREA TASKS

LECTURES
LECTURE OUTLINES
HOMEWORK ASSIGNMENTS
PROCEDURES FOR LAB MANUAL
LABORATORY EXERCISES
EXAMINATION QUESTIONS

Figure 2
Each team member is responsible for specific topical areas at all levels of application.

of the course. The laboratory instructors, however, are considered active team members and are encouraged to review and provide feedback on all materials developed. Lab instructors are also responsible for evaluating student homework and lab exercises.

Administrative Organization. Unlike the educational organization where responsibilities are divided equitably, administrative organization is by necessity a hierarchy. In this capacity the "course coordinator" is responsible for scheduling and associated paperwork, communication of administrative policy with the students, preparation of the budget and purchases for the laboratory, monitoring of laboratory maintenance and supervision of associated personnel. This is in addition to the responsibilities of being a team member. The coordinator is also responsible for administrative coordination of the team personnel, including the three central team members and the laboratory instructors. This is easily accomplished through periodic meetings.

Table 1
STUDENT SURVEY AND RESULTS

Part I

1. I am ______ of continuing the Team Teaching approach used for Optometric Theory and Methods rather than using a single instructor.

a. completely favorable	61%
b. favorable with reservations	35%
c. indifferent	2%
d. generally unfavorable	2%
e. completely unfavorable	0%

2. The variation in course instructors, with different styles of presentation and different personality dynamics, ______ my learning experience.

a. greatly facilitated	20%
b. somewhat facilitated	63%
c. made no difference on	8%
d. somewhat inhibited	8%
e. greatly inhibited	0%

3. Which of the following is most descriptive of the first year Optometric Theory and Methods course?

a. Three instructors working closely together to maintain a continuity of course material	69%
b. Three instructors working in a loosely coordinated fashion.	14%
c. Three instructors working independently, teaching their section of the course.	16%

Part II
DESCRIPTORS—RATINGS RESULTS

	T 1	2	E 3	4	I 5	X
1. Effective Teaching	6	17	18	6	—	2.51
2. Well Organized	5	8	23	9	2	3.09
3. Material is Cohesive	6	5	26	9	1	2.89
4. Interesting	11	29	7	—	—	1.91
5. Dynamic	13	22	8	2	—	1.93
6. Responsive to Students	11	13	19	2	2	2.26
7. Used Visual Aids	8	9	30	—	—	2.47
8. Used Handouts	15	8	24	—	—	2.19
9. Instructor(s) Energetic	9	15	21	2	—	2.34
10. Instructor(s) Concerned	8	9	27	3	—	2.64
11. Topics Clearly Covered	8	14	21	2	—	2.38
12. Stimulated Student Enthusiasm	8	17	18	2	—	2.31
13. Clarity of Presentation	4	11	23	6	2	2.80

Above is a survey designed to evaluate student opinion of the Team Teaching Model. Part I evaluated the course itself. Part II compared team teaching to individually taught courses. Students rated descriptors on a 1-5 scale where 1 is most descriptive of team teaching, 5 of individually taught courses and 3 equally so.

By requiring a coordinator, flow of information to and from other faculty and administrators is centralized. A strong system of coordination also makes certain everything is done when it needs to be done.

Program Evaluation

The first year of team teaching the optometry course was very productive, educational and, we believe, successful. In this time period, a complete procedures manual was written, as well as approximately thirty homework assignments and laboratory exercises. It is our feeling that the level and quality of faculty productivity was enhanced by working with one another.

In an attempt to elicit student evaluations, a survey was designed that was given to the class when they returned in the fall to begin their second year (Table 1). Of eighty-two students, forty-nine responded to the survey. The survey was divided into two sections. The first addressed student opinion of the course as a team taught course. The second section compared their perceptions of team taught versus individually taught courses.

To elicit opinions of the course itself, we used three multiple choice questions. Question one asked if the student was in favor of continuing the team teaching of the course. Ninety-six percent of respondents were either completely favorable or favorable with reservations while only two percent were unfavorable (one respondent). When asked about the effect of multiple instructors upon their learning experience, eighty-three percent felt the arrangement somewhat facilitated or greatly facilitated learning. Question three addressed the critical issue of coördination and how closely the team members appeared to be working together. Sixty-nine percent responded "closely," fourteen percent "loosely" and sixteen percent felt we worked independently of one another. Although the results for question three could have been more positive, the results in general are very supportive of the course and its team teaching format.

The second part of the survey asked students to decide whether certain descriptors were more indicative of their general experience with team teaching, individually taught courses or equally so. Two important patterns emerged. One, where the descriptor reflected the issue of coordination and organization, (2, 3, and 13), the two models were rated equally. This is extremely important as coordination is so critical to the success or failure of team teaching. The second pattern is related to the general energy level of the course. Descriptors four, five, nine and twelve, (Interesting, Dynamic, Instructors Energetic, and Able to Stimulate Student Enthusiasm), were clearly considered to be more descriptive of team teaching. Obviously, the more enthusiasm a student has for a course, the stronger the learning experience. It is important to note that these ratings may well be affected by the course subject or the team members. However, the results do show favorable student opinion towards the implementation of the team teaching model.

Making Team Teaching Work

Implementing a successful team taught course requires an organization and a team capable of eliciting the advantages inherent in the model and minimizing the occurrence of the disadvantages. The first precondition for success, as already noted, is the presence of a strong coordinator. First year optometry students need organized and cohesive courses. Anything less will lead to confusion and decreased learning.

The second precondition for success lies in the selection of the team members. Team members must be able to suppress their egos, accept constructive criticism and demonstrate flexibility. If a team member is not prepared to function as a team and enjoy his/her role, the entire effort can be sabotaged. For a team to function well, mutual respect and equal participation is necessary. Finally, for a successful course the team must be in agreement as to the course philosophy, goal and objectives. A team taught course won't succeed if a common purpose doesn't exist.

Summary

Team teaching is an educational model which can be successfully applied to teaching first year optometry. While preconditions for success do exist, if organized properly a team taught course may be advantageous and enjoyable for students and faculty alike. The most prominent advantage for the student is the consistency in and integrity of topical areas. This lack of an arbitrary division between theory and procedures eliminates integration difficulties and provides conceptual continuity.

We would encourage educators to examine their teaching models and consider team teaching as an alternative. If done well the results can be very positive. ☐

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ASCO Sponsors Conference on Patient Management Problems, Clinical Skills Assessment

Representatives from 14 schools and colleges of optometry gathered in Bethesda, Maryland, October 23-26, for a "Patient Management Problem/Clinical Skills" conference sponsored by the Association of Schools and Colleges of Optometry and conducted by the National Board of Examiners in Optometry.

The conference was designed to explore the potential of new methods to improve students' clinical problem solving and to develop standardized approaches for assessing the clinical data gathering ability of students. The first conference topic was based on the growing understanding among the academic institutions of the value of clinical simulations, known as Patient Management Problems (PMPs), which are paper-and-pencil exercises designed and constructed to allow assessment and measurement of clinical problem-solving skills. The new Patient Care Examination, to be administered by the National Board for the first time in 1989 as part of its entry-level examinations, will be comprised of PMPs. It is therefore of great importance that faculty and students have experience with the new test format.

The second conference topic was chosen to provide participants an understanding of the issues involved in standardizing clinical skills assessment, and the key considerations needed when assessing clinical skills competency at various levels of the academic program.

The keynote address—"Review of the Evaluation of Clinical Competence"—was delivered by Edwin F. Rosinski, Ed.D., director of the office of medical education and professor of medical education, University of California, San Francisco.

Conference chairman, Norman E. Wallis, Ph.D., O.D., executive director of the National Board of Examiners in Optometry, moderated a session in which conference participants summarized their institutional experiences with forms of PMPs. Leon J. Gross, Ph.D., director of examination services at the National Board, presented an optometric PMP model after which participants met in workshops to take a fully developed PMP and to discuss the experience. In subsequent workshops, participants met to develop PMPs from clinical cases brought to the conference. The feedback from the workshops following these exercises was that the PMP had great potential as a teaching tool, and extensive use for teaching purposes would eventually help students feel comfortable using it for tests.

Frederick D. Burg, M.D., associate dean of academic programs at the University of Pennsylvania School of Medicine and professor of pediatrics at the Children's Hospital of Philadelphia, highlighted the second half of the meeting by his dinner speech, "Evaluation of Clinical Competency: It is Your Responsibility." Dr. Gross led a discussion of new concepts and techniques for evaluating clinical skills. Participants were then able to use standardized rating scales to assess the clinical skills of students videotaped while performing various clinical procedures.

In closing, conference chairman Wallis invited participants to assist the National Board in its project to develop standardized approaches to clinical skills assessment for use by state boards, on behalf of the International Association of Boards of Examiners in Optometry.

National Board of Examiners executive director Norman E. Wallis moderated the conference.

Dr. Robert Duckman, SUNY and Dr. Neal Nyman, PCO, compared notes during a meeting break.

Meeting participants used rating scales to assess clinical skills of students

Computer Aided Instruction—Anomalies of Binocular Vision

Ruth E. Manny, O.D., Ph.D.
M. Dwayne Yeager, O.D.

Introduction

Selecting the appropriate diagnostic tests and integrating the information gleaned from these tests into a diagnosis of the patient's condition is a skill which must be learned by all competent health care providers. Most optometry students appear to gain these skills late in their professional education when the classroom instruction is reinforced with repeated clinical experiences. Anomalies of binocular vision, however, appear to be particularly difficult for the average optometry student to integrate and master. Perhaps this difficulty is the result of limited clinical encounters with patients manifesting binocular anomalies combined with the great variety and combinations of motor and sensory anomalies presenting in this population.

Computer aided instruction (CAI) offers a method of increasing both the number and variety of patients to which students are exposed through simulation. Nursing,[1,2] dental,[3] medical,[4-6] and optometry[7-10] schools have begun to use computer aided instruction in their curricula and Metz and Hartman[11] have reported the successful application of CAI to strabismus instruction in a medical setting.

In an effort to improve the skills of optometry students in the diagnosis of anomalies of binocular vision, we have expanded the ideas presented by Metz and Hartman[11] and developed a pair of programs entitled, *Strabismus Diagnosis.* Unlike the program described by Metz and Hartman which contains only 10 fixed cases, *Strabismus Diagnosis* allows the instructor to create any number of cases using the instructor's program, *Patient X.* This flexibility resembles that found in the program OpDoc, a CAI program developed at Indiana University,[7] and allows the instructor to tailor the cases to a particular course and/or the students' greatest areas of difficulty. Once the cases are created using the instructor's program, they are stored as separate files on disks which may then be accessed by the student using the program, *Diagnosis.* The program *Diagnosis* allows the student to review cases created by the instructor and for each case, formulate the diagnosis of the anomaly and its related conditions. Both programs are written in *Basic* with a few assembly language subroutines and can be run on the Commodore 64 computer, or the Commodore 128, operating in the 64 mode.

To demonstrate how the pair of programs are used, a case of convergence insufficiency will be created using the instructor's program, *Patient X.* The student program, *Diagnosis,* will then be described using the convergence insufficiency example. More detailed information about the programs and complete documentation is available upon written request.

The Programs

I. The instructor's program—
Patient X

Once the instructor's program, *Patient X,* is loaded from floppy disk into the computer's memory, the menu shown in Figure 1 is displayed on the computer monitor. Since we wish to

```
1..........................Edit/review present case
2..............................Load or save a case
3.................................Create a new case
4.......................Input aid for exam findings
5.......................Print-out of current case
6.......................End Program
```

FIGURE 1.
The main menu for the instructor's program, PATIENT X, illustrating the 6 options which are available.

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create a new case, option 3 is selected. To create a new case the instructor must provide information in the following six different categories when prompted by the computer:

1. correct diagnosis
2. incorrect diagnosis
3. true related conditions
4. false related conditions
5. history
6. examination findings

The first information which must be provided is the correct diagnosis. The computer displays the instructions shown in Figure 2A immediately after option 3 is selected from the main menu (shown in Figure 1). The correct diagnosis may contain up to 10 statements, each statement containing a maximum of 80 characters. For the case of convergence insufficiency, the following words and phrases are entered to constitute the correct diagnosis:

—4 pd exophoria at distance
—constant
—alternating
—periodic
—15 pd exotropia at near
—convergence insufficiency

The computer then displays the message shown in Figure 2B. Up to 10 lines each with a maximum of 80 characters per line may be entered to comprise the incorrect diagnoses. The incorrect diagnoses will be randomly mixed with the correct diagnosis each time the student program (*Diagnosis*) loads the case for review. Hence, the incorrect diagnoses serve as distractors much like the incorrect answers on a multiple choice test. The following eight items are entered as distractors for the case of convergence insufficiency.

—unilateral
—intermittent
—15 pd exophoria at near
—4 pd right exotropia at distance

A.

```
You may now enter up to 10 words
or phrases comprising the correct
diagnosis... use less than eighty
characters... enter 'end' to quit

Enter correct diagnosis statement #1
?←
```

B.

```
You may now enter up to 10 words or
phrases comprising the incorrect
diagnosis.... use less than eighty
characters.... enter 'end' to quit

Enter incorrect diagnosis statement #1
?←
```

C.

```
You may now enter up to 10 related
conditions to fully classify the dx
(each less than eighty characters)
press (return) after each statement
 ..... enter 'end' to quit .....

Enter true related condition #1
?←
```

D.

```
You may now enter up to 10 incorrect
related conditions to classify a dx
(each less than eighty characters)
press (return) after each statement
 ..... enter 'end' to quit .....

Enter false related condition #1
?←
```

E.

```
You may now enter up to 20 relevant
statements (each less than eighty
characters) comprising the ocular
history.... enter 'end' to quit....
press (return) after each statement

1 ?←
```

F.

```
Enter examination findings

Distance line visual acuity

Enter [unaided] visual acuity for [O.D.]
?←

Enter [aided] visual acuity for [O.D.]
?←

Enter [unaided] visual acuity for [O.S.]
?←

Enter [aided] visual acuity for [O.S.]
?←

Additional acuity measurements [y/n] ?←

Enter additional V.A. for [O.D.]

Enter additional V.A. for [O.S.]
```

G.

```
Enter refractive findings

Enter BVA refraction for [O.D.]
?←

Enter BVA refraction for [O.S.]
```

H.

```
You may now enter up to 20 relevant
examination procedures and findings
(each less than eighty characters)
press (return) after each statement.
(see input aid for additional info.)
........enter 'end' to quit........

Enter exam #1 and it's findings
?←
```

FIGURE 2.
The right column (A-E) displays the instructions as they appear on the computer screen used to enter the correct diagnosis (A), incorrect diagnosis distractors (B), true related conditions (C), false related conditions (D) and the history (E). The left column (F-H) shows the program's prompts to enter the examination findings. The distance line visual acuity, unaided and aided, (F) and the refractive error (G) must be entered. The additional V.A. for O.D. and O.S. appear only if the instructor answers yes to the question shown above: additional acuity measures [Y/N]? The additional examination findings (H), while usually necessary, are optional. The instructions contained within the rectangles appear in reverse contrast for greater legibility.

—15 pd right esotropia at near
—4 pd right esotropia at distance
—convergence excess
—divergence excess

After entering the incorrect diagnoses distractors, the computer prompts the instructor for the true related conditions as illustrated in Figure 2C. The true related conditions may contain up to 10 lines, each line with a maximum of 80 characters. These related conditions complement and complete the diagnosis. The related conditions for the convergence insufficiency case are:

—low AC/A ratio
—normal retinal correspondence
—V pattern exotropia
—alternate suppression at near
—positive family history
—myopia

The fourth section which must be entered to create the case is the false related conditions. These false related conditions, like the incorrect diagnoses, will be randomly mixed with the true related conditions to serve as distractors. The student must select the true conditions from a list containing both the true and false related conditions. There may be up to 10 statements comprising the false related conditions, each statement containing up to a maximum of 80 characters. Figure 2D displays the computer's prompt for this section and the false conditions are listed below:

—hyperopia
—eccentric fixation
—amblyopia
—abnormal retinal correspondence
—A pattern exotropia
—V pattern esotropia
—normal AC/A
—high AC/A

The next category which is needed to construct the case is the case history. Figure 2E illustrates the instructions given by the computer for this category. The history may contain up to 20 statements. Each statement may have a maximum of 80 characters. Following are the statements which contain the relevant history for the case of convergence insufficiency.

—7 year old white male
—attends public school; in the second grade
—school performance is satisfactory
—referred from school screening; reduced distance VA
—child's first eye examination
—no diseases, surgery or injury to the child's eyes
—child's father has one eye that turns out when he "ties one on"
—mother wears Rx for distance

```
CURRENT MODE
 File Load

Enter patient name <less than 40
characters>? <-
```

FIGURE 3.
The prompt given to the student to load a case from disk into the computer's memory while using the student program DIAGNOSIS. For greater legibility, the information contained in the rectangle appears in reverse contrast when displayed on the monitor.

```
(1)  Review the case
(2)  Enter the diagnosis
(3)  Determine the related conditions
(4)  End the program

     Your Choice (1-4)
```

FIGURE 4.
The menu illustrating the four options available in the student program, DIAGNOSIS, as it appears on the computer monitor. The information contained in the rectangle appears in reverse contrast.

```
              HISTORY

|- 7 year old white male
|- attends public school; in the
   second grade
|- school performance is satisfactory
|- referred from school screening;
   reduced distance VA
|- child's first eye examination
|- no diseases, surgery or injury to
   the child's eyes
|- child's father has one eye that
   turns out when he 'ties one on'
|- mother wears Rx for distance
|- no significant family health
   history
|- no family history of eye disease

            Press any key
```

FIGURE 5.
The case history for Bob Brown as it appears on the computer monitor when the student reviews the case. The words appearing in the rectangles are displayed in reverse contrast. The prompt on the left marks the beginning of each new statement.

```
Line acuity: [O.D.]   [O.S.]  (distance)

[Unaided VA]   20/60   20/50
[Aided VA]     20/20   20/20

          REFRACTION
          O.D. -- O.S.

  -1.75  -0.25 x 180   -1.25 D.S.

          [Press any key]
```

FIGURE 6.

The distance unaided and aided line acuity and refractive data as they would appear on the computer monitor to the student reviewing the case. The information contained inside the rectangles appears in reverse contrast.

```
        [Some of the exam findings]

⊢ CT @D w BVA-cover OD, no movement
  of OS; uncover OD, OD moves in 4 pd
⊢ CT @D w BVA-cover OS, no movement
  of OD; uncover OS, OS moves in 4 pd
⊢ CT @N w BVA-cover OD, OS moves in
  15 pd; uncover OD, no movement of
  OD or OS
⊢ CT @N w BVA-cover OS, OD moves in
  15 pd; uncover OS, no movement of
  OS or OD
⊢ Pd is 60 mm
⊢ Subjective angle @N w BVA equals
  15 pd BI
⊢ near point of convergence is 35 cm
⊢ ocular health is unremarkable

          [Press any key]
```

FIGURE 7.

The examination findings for Bob Brown which were not flagged as relevant or irrelevant when the case was created. The mark to the left indicates the beginning of an examination result. The words appearing in the rectangles are displayed in reverse contrast.

```
1   stereoacuity @D
2   angle @N in up and down gaze
3   visuscopy
4   worth 4 dot @N
5   worth 4 dot @D
6   cycloplegic refraction
7   Slosson Oral Reading Test (SORT)

Enter the number of the test you feel
is necessary to make the correct
diagnosis or enter (c) to continue.
```

FIGURE 8.

The names of the tests which were flagged as either irrelevant or relevant when the case was created. This appears on the monitor for the student to review only if they respond negatively to the question: Do you have enough information to make the diagnosis?

—no significant family health history
—no family history of eye disease

The last area which must be entered to create a case is the examination findings. The examination findings are divided into 4 major sections: 1) unaided distance line visual acuity of the right and left eye, 2) aided distance line visual acuity of the right and left eye, 3) the refractive error of the right and left eye, and 4) additional examination findings. The first three areas, unaided visual acuity, aided visual acuity, and the refractive error must be supplied. Figure 2F displays the prompts for the acuity entries and Figure 2G shows the display used to enter the refractive data. For the case of convergence insufficiency the following findings are entered:

Visual Acuities:

Unaided Visual Acuity O.D.	20/60
Aided Visual Acuity O.D.	20/20
Unaided Visual Acuity O.S.	20/50
Aided Visual Acuity O.S.	20/20

Refraction:
O.D. -1.75 -0.25 x 180
O.S. -1.25 D.S.

Note in Figure 2F there is a prompt for additional measures of visual acuity. Additional acuity measures may be relevant in cases of amblyopia or strabismus where pinhole, single letter, or near acuity may be useful to include in the case.

Following these three required entries, 20 additional examination findings may be entered. Each finding may contain a maximum of 80 characters. The case may be made more challenging by flagging certain of these examination findings as relevant (i.e. they are required for making the correct diagnosis). In addition, several findings which are not required to make the diagnosis may also be specified. When the student reviews the case using the student program, *Diagnosis*, only those findings which have not been flagged as either relevant or irrelevant, are displayed. If the student feels there is not enough information to make a diagnosis s/he may select those tests s/he feels are necessary to determine the diagnosis from a list containing both the relevant and irrelevant tests. When a relevant test is selected, the results of the test are given and added to the rest of the examination findings. If the student requests result from an unnecessary test they are informed of their mistake and their efficiency score is decreased. Similarly, failure to request information from tests which have been flagged as relevant will decrease the efficiency score and also may lead to an incorrect

```
----- Diagnostic choices -----
Enter your choice or 0=stop or -1=edit


 1   periodic
 2   15 pd right esotropia at near
 3   convergence excess
 4   constant
 5   4 pd right esotropia at distance
 6   4 pd exophoria at distance
 7   intermittent
 8   divergence excess
 9   unilateral
10   convergence insufficiency
11   alternating
12   15 pd exophoria at near
13   4 pd right exotropia at distance
14   15 pd exotropia at near

?←
```

FIGURE 9.
This display appears on the monitor when option 2 is selected from the menu of the student program. The display contains both the correct diagnoses and the incorrect diagnoses distractors. The list will be randomly mixed each time the student program is run. The heading at the top appears in reverse contrast on the monitor.

```
------Related conditions------
Enter your choice or 0=stop or -1=edit


 1   normal AC/A
 2   myopia
 3   alternate suppression at near
 4   hyperopia
 5   low AC/A
 6   eccentric fixation
 7   amblyopia
 8   normal retinal correspondence
 9   V pattern exotropia
10   positive family history
11   abnormal retinal correspondence
12   high AC/A
13   A pattern exotropia
14   V pattern esotropia

?←
```

FIGURE 10.
This display appears on the monitor when option 3 is selected from the menu of the student program. The display contains both the true related conditions and the false conditions which serve as distractors. The list is randomly mixed each time the program is run. The heading at the top appears in reverse contrast.

diagnosis. Figure 2H displays the computer's instructions for entering this last section of the examination findings. The examination findings for the convergence insufficiency case are listed below:

—CT @D w BVA-cover OD, no movement of OS; uncover OD, OD moves in 4 pd

—CT @D w BVA-cover OS, no movement of OD; uncover OS, OS moves in 4 pd

—CT @N w BVA-cover OD, OS moves in 15 pd; uncover OD, no movement of OD or OS

—CT @N w BVA-cover OS, OD moves in 15 pd; uncover OS, no movement of OS or OD

—PD is 60 mm

—subjective angle @N w BVA equals 15 pd BI

—near point of convergence is 35 cm

—ocular health is unremarkable

—stereoacuity @D * 1 min

—angle @N in up and down gaze * up gaze 25 pd; down gaze 8 pd

—visuscopy † central fixation OD & OS

—Worth 4 dot @N * alternates between 2 red dots and 3 green dots

—Worth 4 dot @D † 4 dots

—cycloplegic refraction L OD -1.50 -0.25 x 180; OS -1.00 DS

—Slosson Oral Reading Test (SORT) † grade 2.5

Note the format of the last seven findings. These findings have been flagged as either relevant (by placing a * after the test name, followed by the results) or irrelevant (by placing a † after the test name) and will not be displayed with the first eight findings by the student program, *Diagnosis,* until the student requests additional information. At that time only the portion of the statement in front of the * (relevant) or † (irrelevant) will be displayed. Then the student will select those tests s/he feels are necessary to determine the diagnosis.

Now that the case is complete it must be stored on floppy disk for access by the student program. The program will ask the instructor to supply a filename less than 40 characters so the case can be called by the student program, *Diagnosis*. Each case must have a unique filename. If a filename is selected that is already on the disk, the computer will ask the instructor to replace the one currently on disk with the one created in the computer memory. If the instructor answers "yes," the old case is lost. If the instructor wants to keep both cases, s/he should simply answer "no" and supply a different filename when again prompted by the computer. "Bob

Brown" will be the name given to the case of convergence insufficiency.

After the case has been saved, the computer returns to the main menu shown in Figure 1. The instructor may select option 1 to edit or review the case just created or a case that exists on disk under a different filename. If the instructor wishes to review a different case it must be loaded from disk using option 2. Option 5 may be used to obtain a print out (hard copy) of the case for the files. To exit the instructor's program, the user should select option 6.

II. Student Program—*Diagnosis*

Diagnosis is the second program of the pair of programs constituting the *Strabismus Diagnosis* package. *Diagnosis* is used by the student to review the cases created by the instructor as described above. Once the program, *Diagnosis,* is loaded into the computer's memory from floppy disk, the computer requests the student to enter his/her name. After entering the name, the instructions shown in Figure 3 appear on the monitor. The student must type in the name of a patient which is the filename given to the case by the instructor when the case was created and saved on disk using the instructor's program, *Patient X.* To recall the case created above, the student would enter BOB BROWN (return). The student could be given a list of different cases to review and make a diagnosis or different students could be given different cases which were created to drill specific areas of difficulty. The case of convergence insufficiency created above will be used to describe how the student interacts with the program to make the diagnosis.

Once the filename is entered and the case has been properly formatted by the computer for the student program, the menu shown in Figure 4 is displayed. Option 1 is selected to review the case. The case history is presented first. Figure 5 illustrates how Bob Brown's history will appear to the student using the program. Following the history, the unaided and aided line visual acuity are displayed along with the refraction as shown in Figure 6. If additional visual acuity measures had been included when the case was created they would appear at the bottom following the refractive data.

After inspection of the acuities and refractive data the examination findings which were not flagged as relevant or irrelevant are displayed. For Bob Brown's case the examination findings would appear as shown in Figure 7. Since certain tests were flagged as relevant and irrelevant, the computer will ask the student if there is enough information to make the diagnosis. If the student's reply is negative, only the names of the tests which were flagged will be displayed as shown in Figure 8. To obtain the results of a particular test the student selects the appropriate number. If the test was relevant, the results are displayed and added to the previous examination findings; if the test was not necessary to make the diagnosis, the student is informed of the error. When satisfied that there is enough information to complete the diagnosis, the student exits from the review mode and returns to the menu (Figure 4) by touching "c" (return). By selecting option 1 from the menu, the student may review the case again prior to making the diagnosis.

Selecting option 2 (enter the diagnosis) from the menu will result in the display shown in Figure 9. The student constructs the diagnosis from the list as instructed by the computer. When satisfied with the diagnosis, the student exits to the menu by entering an "0." Before returning to the menu, the student's diagnosis score is displayed. The case may be reviewed again to improve the student's understanding of the case if the score is less than perfect.

Selecting option 3 from the menu will result in the display shown in Figure 10. Again the student must construct the related conditions from the choices given. After exiting to the main menu, the student's related condition score is computed and displayed. The student may again review the case if the score is less than perfect.

To exit the program, option 4 is selected from the menu. Upon exiting from the program three scores are displayed: 1) the examination efficiency which reflects the student's ability to identify only those tests relevant to the diagnosis; 2) the diagnosis score; and 3) the related condition score. In addition to the scores, the student's diagnosis and related conditions are displayed on the terminal along with the correct diagnosis and related conditions. The case name, student's name and scores may be printed out and turned in by the student.

Discussion

The case construction requires a moderate investment of time on the part of the instructor. However, the time investment is outweighed by the flexibility the program has to offer. This flexibility allows the instructor to create and adapt cases specific to their course and their students' needs. For example, in the case of BOB BROWN, the term "periodic squint" may not be the desired or preferred terminology used to describe a strabismus which is present only at one fixation distance and not another. Since the instructor creates the case, s/he is not restricted to the preferences or idiosyncrasies of others and is free to use whatever is appropriate for the application.

The time needed to create a case could also be reduced by sharing cases with colleagues at the same institution or at other institutions. Editing existing cases to meet specific needs would require much less time than creating a new case. In addition, the program could be adapted easily to help the student integrate information in other areas such as contact lenses or pathology. While experience with the program is, at present, limited, initial results have been quite positive.

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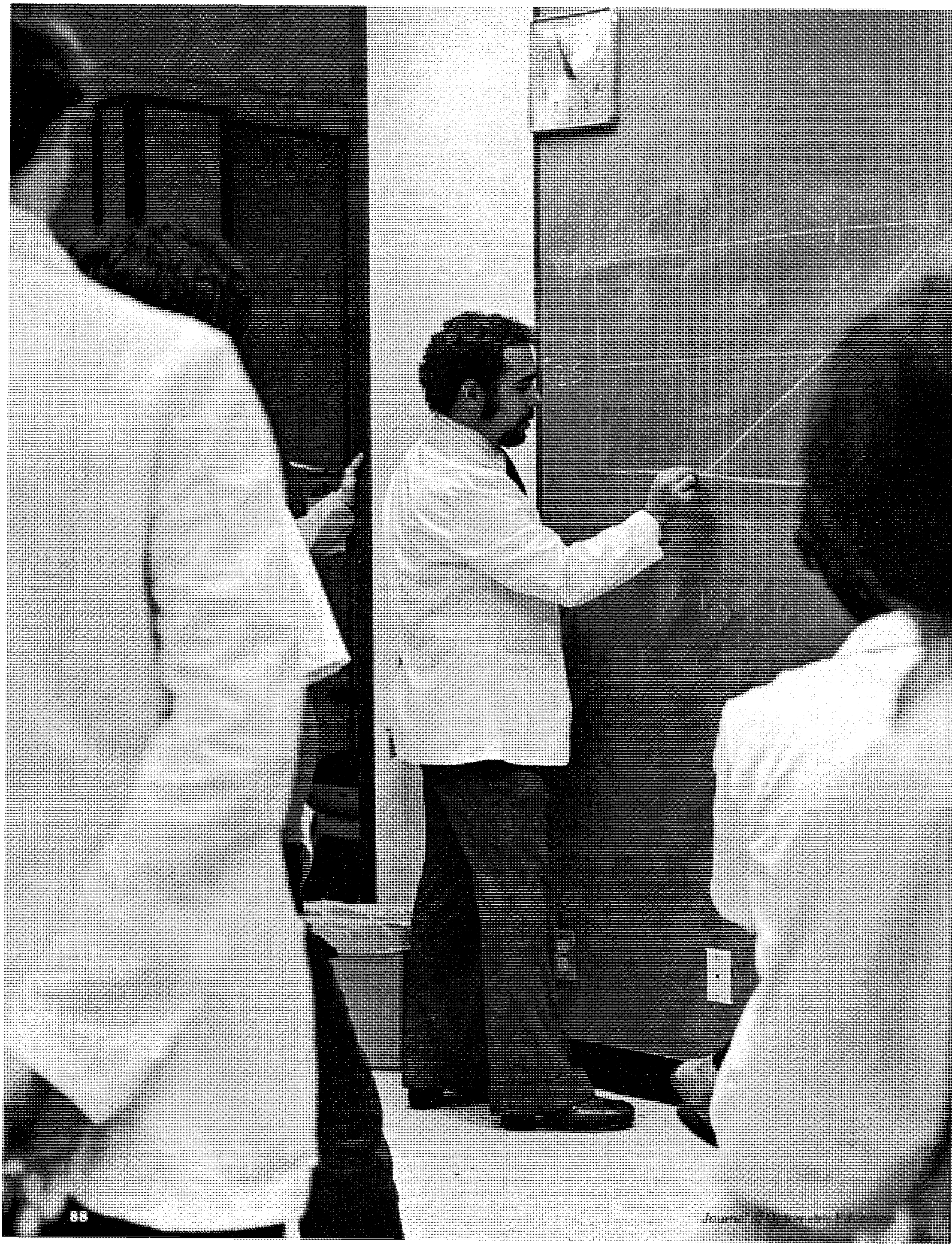
Acknowledgements

The authors wish to thank Jerry Strickland and Karen D. Fern for their helpful comments on earlier drafts of this manuscript, Karla Rumsey for reviewing the program and making suggestions to improve the ease of use, and Corlette Collins for her assistance with the figures. ☐



An Instructional Design for the Optometric Teacher

Irving L. Dunsky, M.S., O.D.

Introduction

One of the most effective ways to pursue learning is to instruct others. Several authors have previously discussed this well accepted, but seemingly ignored principle.[1,2] The principle's relevance to optometrics can be explored together with the instructional responsibilities and competencies practitioners should possess in order to be effective instructors.

"Instruction" is chiefly considered in a limited manner—the lecture situation in which the instructor dominates passive students. This preoccupation centers on the transfer of specific information from teacher to student.

Active teacher, passive student is a distortion of the instructional process as used here, and this traditional manner of educating has been refuted by more recent scholars. Instead of thinking in terms of the specific actions by teachers, education should be approached in terms of outcomes expected—the competencies students should acquire.

Education is not the teacher's presentation of a lecture, the conducting of a seminar or the organization of a laboratory. It is rather the success of students measured in outcomes such as the ocular pathology syndromes students recognize, the problems they solve or their skills in establishing effective patient relationships. The key issue in instruction is that it effects changes in students.

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A New Design for Instruction

It is impossible to provide quality instruction without having taken the following steps:

- Competencies students are expected to have or acquire must be identified or defined.
- Students' performance level prior to instruction must be determined. The nature and extent of the students' existing capabilities and deficiencies must be known.
- A set of plans must be formulated that can reasonably be expected to provide the abilities students lack.
- Methods must be available, or designed, to determine when students have successfully reached the intended goals of instruction.

These are the components of a new instructional design to be presented below.

If optometric practitioners or students who will graduate from optometric programs are to be instructors, they must become equipped to become teachers. Merely wanting to be a teacher is not enough. The best of good intentions, if sustained only by intuition, leads to indifferent or ineffective outcomes.

Intuition is being replaced by initial inquiry and research. Students are getting instructional experiences that couple the biological sciences with clinical experiences. They learn to view basic science and clinical experiences as complementary, rather than the former being an obstacle course between them and the latter.

The fundamental issue in providing a quality educational program is the soundness of the overall design. Formulating realistic goals and creating experiences consistent with those goals are the primary steps in educational planning, and they demand skilled teachers.

The intent of instruction is to produce change in students. Students should be able to do things they couldn't do before —whether solving a diagnostic problem, interpreting a research report, or informing patients that they have cataracts. If students can already do it, the instruction is unnecessary.

This generalization is often misunderstood. The question is frequently asked, "What's this emphasis on doing? Don't we often just want students to know, believe or appreciate certain things?" The answer is that what they know is determined by what they do. Knowledge is verified by demonstrations of the questions a person can answer, the decisions a person can render, or the problems a person can solve.

Steps in the Instructional Design

The first step in instructional design is to determine purposes—the specific outcomes to be achieved. This step identifies optometry career demands, defines the competencies required to meet those demands and transposes the competencies into understandable program goals (see Figure 1). The primary instructor competency is the ability to define appropriate goals for the instructional units.

The second instructional step is to select strategies for achieving the goals. Two considerations are involved.

- Instructional techniques must be related to expected student outcomes. Lecture technique isn't the appropriate strategy for helping students learn to manage ocular emergencies; seminar discussions aren't the best method for teaching effective patient interview skills.

• The instructional level must suit the students being served. There is clearly no point in presenting a beginning series on elementary chemistry to a group of students who are chemistry graduates, or in having students go on unsupervised school screenings as their first school of optometry experience.

Instructor competencies required for selecting teaching strategies also divide into two parts.

• Teachers need familiarity with the span of available instructional strategies, together with their advantages and disadvantages.

Matching instructional level to the student level requires the ability to assess the relevant student competencies. These evaluation skills are essentially the same as the ability to evaluate instructional outcomes.

The third step in the instructioal process is to deliver the instruction. The delivery demands still another subset of skills. It demands a set of interpersonal communicative skills not necessarily available to all who proclaim themselves teachers. Different skills are, of course, demanded by different instructional approaches.

The fourth and final step in the instructional process is to evaluate its effects. For any but the briefest instruction, measures of the effects during the instructional sequence are necessary. Students need progress information, and the instructor needs this feedback to adjust the focus, pace and style of instruction.[1,2] Since initial instructional plans are unlikely to be perfect for all

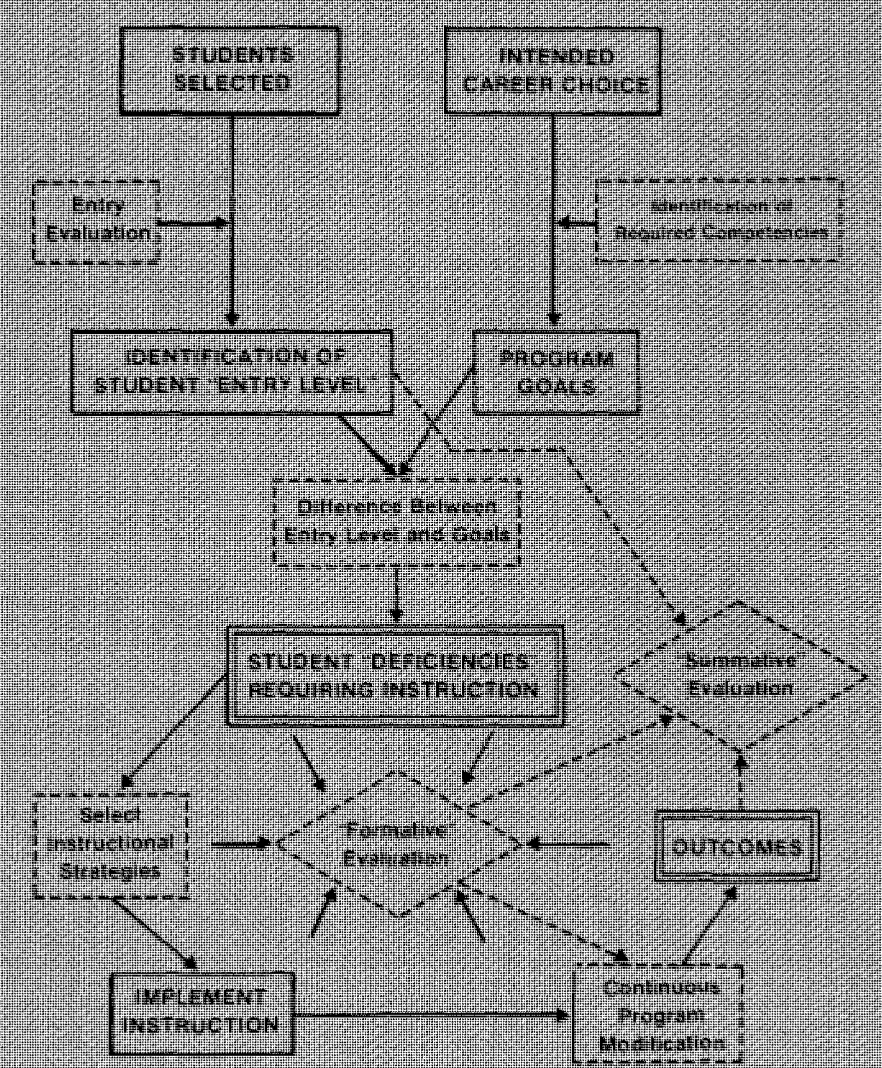

FIGURE 1
The Optometric Instructional Process

students throughout the entire program, "in-flight corrections" based on periodic tests need to be made.

Given the four instructional steps, the optometric instructor or practitioner is well advised to concentrate on the first two: instructional design, and selecting strategies for achieving the goals set. A delineation of the two will be presented here since it is believed their stage-setting properties provide both direction and mood for effective optometric teaching. Some appreciation for the entire instructional process can be gained by examples of how to implement its design and by strategies for meeting objectives.

Implementing the Instructional Design

Picture the following situation. You are responsible for designing a program of student instruction and your only constraint is time. How do you decide what to include? How do you motivate faculty colleagues to agree with these decisions, knowing lack of faculty consensus may lead to an inefficient program? Should the program include non-subject-matter concerns such as student initiative or responsibility?

As Figure 1 indicates, instructional program goals stem from the requirements of the career for which students are preparing. Goals suggested by current practice must be modified according to the best available judgment about the requirements of an optometric practice in the future.

Much has been written about the importance of setting not only general goals, but also highly specific instructional objectives.[3] While there have been some contrary views,[4] the predominant emphasis has been on the need for "behavioral objectives"—the abilities students are expected to demonstrate as the result of instruction, stated as descriptions of the actual behaviors students will display.

Unfortunately both the purpose and method of such specifications often have been misunderstood. Objectives are needed that describe performance. An objective should describe an overt competency appropriate for an optometrist, or a prior level of achievement that enables the subsequent development of such competencies.

A meaningful objective would be: "Optometry students will be able to gather sufficient data from any patient they interview to effectively describe that patient's health status." This objective describes, or suggests, a specific set of behaviors. It is not meaningful, however, to have an objective which states: "Students will appreciate the importance of a health-status exam." No behavior is suggested and fulfilling this objective is neither observable nor measurable.

Optometric teachers must ask themselves, "How will I know that a student *appreciates* the importance of the health-status exam?" We are concerned with the behavior. Does the student's appreciation lead to observable acts involved in actually collecting and recording health-status data on patients?

Written specific objectives are an expression of the general intentions for the overall instructional effort. The overall intention in schools and colleges of optometry is to produce optometrists who are at least moderately competent. A description of the tasks they should be able to perform, such as the steps they should take in problem solving,[5] is one set of terminal objectives for the optometry school's total program.

Most terminal objectives are too complex to be fully achieved in a single instructional step. Instead, a sequential learning experience should be derived from a set of interrelated steps. Among the many necessary steps in gathering data for an effective vision and ocular exam are: 1) conducting a systematic interview, 2) knowing disease processes, and 3) performing a systematic vision and ocular exam. Each is an "enabling" objective toward the desired terminal objective.

Problems arise when exclusively "enabling" objectives are treated as if they were terminal objectives. This confusion is true for much of the preclinical sciences content, but it is a trap when formulating parts of a clinical curriculum. A behavioral objective is, "Optometric students will be able to describe and interrelate the processes of glycolysis and gluconeogenesis." This is an enabling, not a terminal, objective. It is meant to facilitate students' comprehension of procedures for real patients with real health problems. If students are led to believe their description of these biochemical processes is an end in itself, there is serious risk these concepts will be rejected as just so much more esoterica, irrelevant to optometrists. The terminal objectives toward which this enabling objective relates must remain in the forefront of thinking of both teachers and students.

In writing actual objectives, it is best to begin at a general rather than specific level. Among the highest level goals in a school of optometry might be assuring that all students can effectively gather data from patients; pursue their own continuing education; and establish trust-based relationships with patients. If optometric faculty agree on such general goals, all subsequent goals and specific objectives should be evaluated by how they support or detract from these goals.

Writing Specific Objectives

Clearly, specific objectives can be written only after priority decisions have been made, and they should meet the following criteria:

- Clarity—sufficiently clear so someone familiar with the instructional area could describe in some detail the optometric student's expected performance relative to the objective.
- Specificity—sufficient detail to remove any ambiguity about requirements for satisfactory completion of a unit or sequence.
- Relevance—optometric practitioners from a variety of areas should agree each objective is relevant to optometric care and practice.

Objectives specify what the learner is expected to be able to do, either alone or as a result of instruction, not what the optometric instructor is supposed to do (Figure 2). The instructor's responsibilities are determined by the goals and by the interaction of the goals with the student and patient abilities prior to instruction, (see Figure 1). The next step in the instructional process is determining the instructional strategies most appropriate for a given situation.

Instruction is a complex process involving many elements each of which contributes to or detracts from the quality of student learning. Planning instruction involves choosing among these elements those most appropriate for the resources available, the students involved and the objectives to be achieved. Three general factors and nine elements of instruction will be considered here (see Figure 3).

Instructional Settings

Optometric instruction has been viewed in a rather restricted fashion. "Lectures," "seminars," "laboratories" or "clinics," describe settings of instruction rather than the process that should occur. In practice, the implementation of these instructional forms differs widely.[6]

"Lectures" can be non-stop, didactic monologues, or richly illustrated with a variety of demonstrations, or characterized more by a question and answer exchange. Similarly "seminars" can range

Student Education

1. All students will be able to measure the brachial artery blood pressure to an accuracy within five percent of that determined by their instructor, using an office sphygmomanometer.

2. All students will demonstrate their ability to ask questions appropriately adapted to the vocabulary level of the patient they are interviewing, as determined by the patient's comfort and comprehension.

3. Students will be committed to pursuing their own education, as demonstrated by their independent learning about problems presented by their patients.

Patient Education

1. Any newly identified glaucoma patient who requires para-sympathomimetics should have, or be helped to acquire, the manual control to self-administer his or her own medication.

2. Parents of children about to undergo vision therapy should understand the reasons for therapy, the procedures that will be undertaken, and the likely outcomes.

FIGURE 2
Appropriate Objectives for Students and Patients

from an active small group to the uninterrupted formal presentation.

It is necessary to make a basic instructional decision about the "setting." The "classroom" setting includes a wide range of possibilities, but common among them is that verbal exchange is the primary learning vehicle. The "classroom" is the primary setting for optometric-based education with the source of instruction being either a teacher or instructional materials used for self-study.

The "laboratory" setting is a university-based modality which migrated into optometric education and usually involves procedures, techniques and instrumentation as the major channels for learning.

The "clinic" setting implies instruction in providing patient care. It may be bedside, in an outpatient clinic, the office of a health provider, in a patient's home or wherever care might be provided.

Dimensions

"Dimensions" and "Tactics" include some of the variables affecting the quality of instruction in the three settings (see Figure 3). Each of the "dimensions" is a continuum of possibilities, all three of which are in operation simultaneously. "Guidance" by the optometric instructor can range from almost none (independent study), to considerable (classical lecture or "cookbook" type lab). Instructor guidance should vary according to the characteristics and progress of students.

The second dimension is the student "activity" level—the extent students are engaged in their own learning during instruction. In lecture situations, for example, the student level of engagement will vary according to the way they deal with an inherently passive situation. The student may be somewhat active, reflecting on what is being heard, examining it and responding internally. Typically, however, optometric lectures are low on the student activity dimension while most optometric clinical experiences are high.

The third dimension is the degree of "reality" of student activities—the extent to which they relate to students' future responsibilities. The lecture mode—listening, writing, trying to commit to memory—has virtually no relation to caring for patients, which for most is to be their area of responsibility. Situations that do have a relationship to caring for patients cause students to think through problems.

In the interaction of the three dimensions, lectures are high in terms of "guidance," low in terms of "activity," and low in terms of "reality." Laboratories are often high in student "activity." The more initiative students are given in optometric labs, the lower they are in "guidance." If students follow an explicit set of detailed instructions, the laboratory is very high in "guidance." Some are low in "reality" if the arts being practiced in the lab don't relate directly to optometric careers. The clinic situation tends to be high in "reality," high in student "activity" and can be low in the "guidance" dimension.

No automatic formula determines if a type of instruction is necessarily "good" or "bad" based on its position in the dimension matrix. A low-reality lab exercise can effectively fulfill some objectives on which subsequent high-reality instruction will be based.

As optometric instructors' understanding of these dimensions is enlarged, they become more critical in design and organization of the teaching they offer by answering such questions as: How am I influencing the context of the instruction I am providing? Am I exerting too much or too little influence? Am I giving students enough or too much independence? Am I shaping their experience to make it appropriately real? Is it genuinely related to what they need for their careers? If not, are there good reasons why it is not? Do I keep them passive observers or active participants?

Tactics

Tactic is another important factor in selecting and designing an optometric instructional strategy. One of the acts most characteristic of traditional optometric education is "telling," and it isn't confined to a lecture room. At times "telling" is exactly the right tactic, but it shouldn't be used just because it happens to be easiest or most convenient.

"Showing" is another popular tactic. People often demonstrate how to do something, how to behave or even how to act as a person. Being a model in the actual optometric clinical setting is an important tactic of individual supervision.

Finally, the "critiquing" process dominates some optometric instructors' teaching activities. It is the opportunity for the teacher to witness—to see learners in action and to provide them with critical feedback on their strengths, their deficiencies, and areas needing improvement.

Optometric teachers in individual settings find use for all three tactics. The

SETTINGS	DIMENSIONS	TACTICS
Classroom	Guidance	Telling
Laboratory	Activity	Showing
Clinic	Reality	Critiquing

FIGURE 3
The Elements of Instructional Strategies

challenge is to determine when and how to use each strategy.

Selecting the Appropriate Tactic

"Telling" has the advantage of saving time and trouble and it can alert students to important issues. "Telling," when it occurs in a group setting, can be done inexpensively, although "telling" as an approach to individual instruction is expensive.

Disadvantages to "telling" include possible superficialty and confusion. There is an implication that the teller can perceive what the listener needs and is ready to receive, which is difficult even for one student at a time but almost impossible with the inherent diversity of a group. Optometric information is generally transmitted more effectively through non-telling modalities such as books, journals and self-instructional units. With these, the individual student can repeat difficult passages and skip superfluous or irrelevant passages.

Another major problem with "telling" is that it does not involve the student in action. "Telling" can prepare students for the action but, in fact, students are much more receptive to being told things after they have engaged in the action. Actually relating to patients and being confronted with visual or ocular problems leads students to want to be told things that will help them understand these problems. If told these same things in advance, the information seems irrelevant.

The act of "showing" can avoid serious problems of trial and error, which may be expensive or dangerous. It involves demonstration and provides an effective way for sharing objectives with students. Witnessing someone else doing an ocular history provides a model, a goal toward which students can set their sights.

The problem with showing is that this tactic tends to be used excessively or else not at all. Optometric students require a certain level of readiness before they can perceive the goals toward which they are expected to aspire. A beginning student witnessing a sophisticated optometric interview may not even perceive the critical elements in the process. Students must struggle with conducting an interview—must encounter the aggressive, the non-communicative or the overly talkative patient—before they recognize their teachers have previously developed methods to avoid these potential difficulties. "Showing" is a tactic requiring careful planning of timing, setting and student readiness.

As a general rule, the "showing" tactic should be used only with individuals or small groups. Yet some optometric educators attempt to show a procedure to a class of 100 when only a few can see the demonstration. "Showing" becomes a small-group tactic which is used in a large-group setting because it is an inexpensive teaching method.

Although "showing" has certain advantages and is appropriate at times, it is not an end in itself. "Showing" students something does not complete the optometric faculty's instructional responsibility. If a procedure is worth "showing" it is likely worth doing and should be done by students.

TACTICS	ADVANTAGES	DISADVANTAGES
Telling	- saves time & trouble	- is superficial or confusing
	- is inexpensive because group oriented.	- Ultimately students must actually do.
Showing	- Avoids serious problems.	- is small group oriented.
	- Gives goals for students.	- Ultimately students must actually do.
Critiquing	- Lets students actually do.	-is expensive because individual oriented.
	- Gives fresh feedback.	

FIGURE 4
Selected Advantages and Disadvantages of Key Tactics of Instruction

"Critiquing" is the last tactic considered and its potential advantages are multiple. As swimming is the only way to learn to swim, the only way to learn to be an optometrist is to work at doing those things optometrists do in providing health care. The essence of "critiquing" is not the critiquing itself but rather that student being critiqued is performing tasks from which learning derives.

The other major advantage of "critiquing" is the instant feedback received by students. An optometric student who is observed while conducting an interview but who doesn't discuss it with the instructor until the next day has lost a substantial proportion of the critique's value. The instantaneous feedback characterizing well-done critiquing places this tactic among the most powerful of instructional modes.

Critiquing is an individual-oriented process because that is the way learning takes place. Although this method seems to require many teachers, thus adding to its expense, it has no substitute.

Selecting an instructional strategy most appropriate for students, the current objective and the available resources is a decision worth careful thought. At the very least, the most appropriate setting must be selected and designed, a balance struck among the three dimensions noted and the most desirable tactic utilized. □

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Members of the National Post Graduate Clinical Education Curriculum Committee are: Dr. Victor Malinovsky, College of Optometry, Ferris State College; Dr. Dennis Siemsen, Illinois College of Optometry; Dr. Neil A. Pence, School of Optometry, Indiana University; Dr. Sidney Wittenberg, School of Optometry, Inter American University; Dr. Depew M. Chauncey, New England College of Optometry; Dr. Willis Clem Maples, College of Optometry, Northeastern State University; Dr. Robert C. Jacobs, College of Optometry, Pacific University; Dr. Susan O'Leszewski, Pennsylvania College of Optometry; Dr. Morris Berman, Southern California College of Optometry; Dr. Jim Robbins, Southern College of Optometry; Dr. Joel Waldstreicher, State College of Optometry, State University of New York; Dr. J. Boyd Eskridge, School of Optometry, University of Alabama at Birmingham; Dr. Darrell Carter, School of Optometry, University of California at Berkeley; Dr. Gerald A. Franzel, School of Optometry, University of Missouri; and Carolyn Troeger, College of Optometry, University of Houston.

APHA Publishes Standards for Health Services for Correctional Institutions

The American Public Health Association has recently published the second edition of *Standards for Health Services in Correctional Institutions*. The Association's efforts to provide a basic set of acceptable standards in delivering correctional health services began in 1976 and this second edition represents a significant broadening of the Association's commitment to this area.

This edition includes, for the first time, a section on standards for vision care in correctional institutions. Drs. Diane Walters and Harris Nussenblatt, members of the Vision Care Section of APHA, worked with the Jails and Prison Task Force to develop a set of recommendations to insure that vision care needs of inmates were met.

The standards recommend that vision services, including the correction of refractive error, be provided all inmates. Criteria are recommended for satisfactory compliance, including the establishment of vision screening services, and the need for qualified personnel and appropriate equipment when delivering services. In addition, the standards specify that appropriate eyewear, based on occupational and educational needs, be provided to all inmates requiring correction or protection from eye hazards.

Standards for Health Services in Correctional Institutions, Second Edition, is available for purchase from the American Public Health Association, 1015 15th St., NW, Washington, DC 20005.

IAB Initiates Task Force

At their annual meeting two years ago, the International Association of Boards of Examiners in Optometry (IAB) initiated a task force to study the feasibility of developing and delivering nationally a formal course of instruction in post graduate clinical optometry. Subsequently, the American Optometric Association (AOA) and the Association of Schools and Colleges of Optometry (ASCO) added representatives. The joint task force submitted their report to the parent organizations last year.

Among the task force recommendations was the creation of an administrative organization comprised of representatives of IAB, AOA, and ASCO; and the establishment of a curriculum planning committee made up of representatives from all U.S. optometry schools. These two groups were created and held their initial meetings in Fort Worth, Texas, October 2-5, 1986.

Alcon Laboratories made arrangements for the meetings and hosted both groups for a luncheon and a tour of the William C. Conner Research Center.

The Council on Post Graduate Clinical Education—the administrative group—is made up of two representatives of each parent organization and one member-at-large. Drs. John Robinson and Peter Liane are IAB appointees; Drs. James Boucher and Edward Elliott represent AOA; Drs. Allan Freid and Thomas Lewis were named by ASCO; and Dr. William Baldwin serves as member-at-large.

Members of the Council on Post Graduate Clinical Education and Members of the National Curriculum Committee took time out from their joint meeting in Fort Worth, Texas, to visit the William C. Conner Research Center at Alcon Laboratories. Shown with Dr. Ed Dorsey (far left) are members of the National Curriculum Committee from five of the 13 schools represented. They are Drs. (left to right): Jim Robbins, Southern College of Optometry, Memphis; Sid Wittenberg, Inter American University, San Juan, PR; Carolyn Troeger, University of Houston College of Optometry, Houston; Darrell Carter, University of California College of Optometry; Neil Pence, Indiana University School of Optometry.

RESOURCE REVIEWS

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

Recognizing Patterns of Ocular Childhood Diseases, L.B. Nelson, M.D.; G.B. Brown, M.D.; J.J. Arentsen, M.D., Slack, Inc., Thorofare, New Jersey, 1985, 187 pp., 192 photos, 6 color plates, hard-bound, $49.50.

The survey of childhood ocular disorders was written for the practicing clinician. Its format is designed for ready reference. The chapters are divided into disorders affecting specific ocular structures such as cornea, eyelids, iris, lens, retina, and strabismus. Each disorder is concisely outlined with respect to ophthalmic and systemic manifestations, etiology, heredity, management, and references on one page, with photographs useful for identification and recognition of the condition on the opposite page.

As a survey, this text is designed to assist the practitioner in making on-the-spot clinical decisions. By necessity, this format allows for only very terse descriptions. If the clinician desires more complete coverage of the disorders, the provided references will facilitate the pursuit.

Several of the disorders, such as cryptophthalmos, and anklyoblepheron, are unlikely to ever be present for diagnosis or treatment in an optometric office. However, the listing of entities is quite extensive, and most would be of practical interest to the optometrist. All conditions are clearly identified, and summarized in a way that the clinician who works with children will find very useful.

Guest Reviewer:
Richard London, M.A., O.D.
University of California
School of Optometry

The Fundus Periphery, Pierre Bec, Maurice Rovault, Jean-Louis Arne and Cristiane Treprat with 14 contributors, translated by Frederick C. Blodi, Masson, New York, 1985, 437 pp., illus., 38 pp. of color plates, hard-bound, $99.95.

When learning to examine the peripheral retina, students are frequently surprised by the diversity of anatomical and pathological features that are to be discovered. A well written textbook can be an important aid to the learning process. *The Fundus Periphery* is such a text. Written in 1980 in the French language, this book was recently translated and published in English by Frederick C. Blodi, M.D.

It is a thorough treatise on the subject and opens with an informative basic discussion on anatomy, embryology, examination techniques and normal fundal appearance. Subsequent sections cover vitreo-retinal degenerations such as lattice, cystoid and the like in brief synopsis form. Etiology, pathogenesis is discussed both clinically and histopathologically. Ophthalmoscopic findings are discussed along with prognosis and management. Each section is supported with many black and white retinal photos, histology slide photos and autopsy specimen pictures. These are well supplemented by 38 pages of color plates showing beautifully the lesions under discussion as they appear clinically.

The scope of the text includes vitreoretinal degenerations, inflammations, vasculopathies, blood dyscrasias, tumors, tapeto-retinal degenerations, congenital problems and myopia. *The Fundus Periphery* is well written and translated. It is easy to read and refer to. This reviewer enjoyed it very much indeed.

Ophthalmic Pathology—An Atlas and Textbook, 3rd ed., William H. Spencer, editor with R.L. Font, W.R. Green, E.L. Howes, F.A. Jakobiec and L.E. Zimmerman, W.B. Saunders, Phila., 1985, 2860 pp. in three volumes, illus., hardbound, $275.

"Ophthalmic Pathology" is a recently published revision of the classic text on the subject. Written on the basis of the many thousands of cases available at the Armed Forces Institute of Pathology (AFIP), Ophthalmic Pathology has always been a bible of ocular histopathology. The current revision is a major undertaking, significantly expanding this important reference standard in size from one to three volumes.

Volume 1 covers basic mechanisms of pathology including: inflammation, immunology, vasculopathy, neoplasia and neuropathy. This is followed by specific chapters on conjunctiva, cornea, sclera, lens and glaucoma. Volumes 2 & 3 present vitreous, retina, uvea, lids, lacrimal system, optic nerve and orbit.

The text is replete with post-mortum photographs, histopathological tissue sections, clinical pictures and informative diagrams. Textual descriptions are succinct, to the point and well referenced. While the emphasis of the description is upon the cellular and subcellular origins of ocular diseases there is a very useful level of clinical correlation.

These features make this both an excellent academic course text and clinical reference source. "Ophthalmic Pathology" is classified by this reviewer as a "must have" source in the study of eye disease.

Primary Care of Glaucoma, Volume V, Louis J. Catania and Thomas L. Lewis, Eds., with four contributors, Primary Eyecare Educational Services, Dresher, PA, 1986. 244 pp. ringbound notebook with 80 color 35mm slides and four one-hour audio tapes. $158.00 (student discount 20%).

Like previous volumes on other subjects, *Primary Care of Glaucoma,* is a well documented slide tape program for self-paced learning by the established practitioner or by the advanced student. The program is divided into four major parts: examination, fields & pharmacology, diagnosis & management and advanced considerations. Each part is accompanied by a separate 60 minute audio tape which is synchronized with corresponding 35mm color slides and ring-bound notes on the subjects at hand. A pre-test and post-test is given with each of the four major sections.

Early sections deal with the latest theories of glaucoma etiology and examination technique. Automated and manual field testing are discussed in detail. Finally medical glaucoma management is presented in a stepwise manner, adding therapeutic options as the case becomes more complex. Ultimately, glaucoma surgery is presented in sufficient detail to enable the primary care practitioner to intelligently discuss each option with their patients.

The slide-tape-outline format can be an effective means of educational supplement for the busy practitioner with a few hours each week to devote to self-improvement. This particular volume is loaded with detail which will ensure such time is well spent.

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