Basic Science Educator

A Publication of the Basic Science Education Forum

Vol.6, No.2 Summer, 1996

MESSAGE FROM THE EXECUTIVE DIRECTOR

It is evening as I begin to write this *Message...* in a hotel room over 6,000 miles from home, my mind reflecting on the events of this day. Sevastopol Ukraine has left a lasting and unexpected impression, and one which I believe has relevance for all of us in the Basic Science Education Forum (BSEF) and our AAMC:GEA affiliated Special Interest Group (SIG). It concerns communication.

My friend and colleague from the Crimean Medical Institute was raised in this historic city on the Black Sea, and as a young boy often played among the ruins of an ancient Greek settlement. Today we walked there, past marble columns into what may have once been the Forum; the true Greek Forum (predating the Romans), where thoughts and opinions were freely spoken and openly debated. The tranquility and power of that setting reminded me that despite the sophisticated technology towards which *our* Forum is headed, communication from antiquity has, and always will remain, a private exercise between individuals. Technology today allows us to catapult massive amounts of information to the far side of the Globe within minutes; and because of this, ideas and opinions will increasingly be shaped and enhanced by the individual cultures of the world. The BSEF enters this arena as a means by which faculty from all cultures may be heard.

We therefore dedicate this issue of the *Basic Science Educator* to the art and technology of communication; from innovative ideas such as the teaching of Physiology using the World Wide Web (p 10), to considerations of improperly using the communications of others (p 17). In his commentary (p 8) Steve Abrahamson provides us with an excellent example of the miscommunication that occurs when words insidiously lose their original meaning, and our Editor-in-Chief discusses the danger of communication gaps amongst those who plan our curricula (p 13). Also in this issue in our continuing series on *International Perspectives* (p 22), we are pleased to communicate to our readers a report on the medical education system of Italy; Assaf Rudich *et al.* describe an innovative course created in Israel which brings medical and graduate students together (p *5);* and Reg Dennick from Nottingham, England raises a provocative question about the teaching of Biochemistry (p 3).

Since the last issue of this publication, the BSEF has been diligently working on communication activities, and we invite you to visit our web site at http://www.usd.edulBSEF to learn more. Our plans are well under way for the Third Biennial International BSEF Conference to be hosted by the Medical University of South Carolina in Charleston, SC on June 21-24, 1997 (see p 7). Significant progress has also been made toward the development of Regional BSEF Offices and the appointment of Regional BSEF Directors, one in each country where we have members. This is one reason I have been invited to visit medical universities and institutes this summer here in the Ukraine and Bulgaria. Once established, these Offices and our expanded system of Regional Directors will serve to unite all faculty together throughout the 76 countries currently involved with the BSEF (p 28) in a computerized Global Information Network (see p 20).

Yes, it is necessary that we continually search for new and more efficient means to share information and opportunities in basic science education. But even in the glittery midst of technology we do well to remember that true communication is still an event between individuals at the most human of levels. Today I walked among Greek ruins on the shore of the Black Sea with a man I would not have known had it not been for computer technology. He lives half a world away from where I live. His culture and his language are different from mine yet we are not so different inside; nor are his students, nor the physiology he teaches them. From mutual respect through *our* Forum came the effective communication which has developed into a permanent friendship. Such relations must continue to be the foundation of the BSEF's mission, and what we encourage among all those who struggle to determine the future of medical science education.

Vol.6, No.2 Summer, 1996

TABLE OF CONTENTS

ARTICLE

HOW MUCH BIOCHEMISTRY SHOULD A COMPETENT PHYSICIAN KNOW?

Reg Dennick, M. Med., Ph.D.
Lecturer in Medical education
The Medical School, University of Nottingham
Nottingham NG7 2UH, U.K.
TEL: +44 (0) 11-59-70-97-88; FAX: +44 *(0)11-59-70-99-22*
E-MAIL: reg.dennick@nottingham.ac.uk

THE PROBLEM

I will assume that biochemistry is a fundamental building block in the foundations of medical education and that not only is it required to understand many of the disciplines which underpin medicine but that a basic knowledge is required in clinical practice. However, it is right that we should ask ourselves a challenging question even if it is clearly a minefield where each word has to be stepped on carefully. How the question is answered will be influenced by assumptions that biochemical and medical educators have about the nature and function of biochemical knowledge. But the question is not just about "how much?", it is also about the quality, the context, and the utility of biochemical knowledge and the process by which it is acquired.

Medical students have acquired their biochemical knowledge in a variety of ways over the years. The "traditional" method was to teach it as a separate subject as part of a preclinical basic medical sciences course which included, for example, anatomy, physiology and pharmacology. "Integrated" courses attempted to combine biochemical studies with other preclinical disciplines so that the cardiovascular, respiratory and nervous "systems" could be taught. The relatively recent development of the "Problem-Based Learning" approach begins with clinical problems and scenarios and facilitates students in finding out appropriate and clinically relevant knowledge for themselves.

EVIDENCE

Unfortunately there have been no educational studies which have attempted to compare and evaluate the acquisition of biochemical knowledge via the three models described above. However a study by Clack (1994) on five cohorts of King's College medical graduates in the UK evaluated how well they perceived the various components of their undergraduate course had equipped them for medical practice. In particular they were asked to evaluate the level of factual content provided by a range of preclinical courses. The results are shown in Table 1. The most striking feature of this study is the large number (79.5%) of doctors who perceived that there was "too much" biochemistry in their "traditional" basic science course.

Clearly there is a perception that there is simply too much biochemistry taught in conventional medical courses. Furthermore doctors in the King's study commented that not only were they taught a "vast quantity" of detailed biochemistry with a "lack of clinical relevance" but that this led to excessive rote learning for examinations.

I recently attempted to replicate this study by a "straw poll" to two medical user groups on the Internet, namely PBLIST and DR-ED. In addition to a number of background questions physicians were asked to rate if they were taught "too much", "enough", or "not enough" of the following basic medical sciences. Twenty-three medically qualified people responded. They had been qualified on average for 20 years and 87% had attended a "traditional" medical school. The results are shown in Table 2. Once again, on this much more limited survey, it is apparent that respondents (57%) feel that too much biochemistry is taught in medical courses.

EXPLANATION

As mentioned earlier, the quality, the context and the relevance of this knowledge are important factors influencing students and doctors perceptions.

Table 1: Level of factual content in preclinical course (n=3 17)

Subject	Too Little (%)	About Right (%)	Too Much (%)
Anatomy	4.1	74.4	21.5
Behavioral Science	29.4	65.5	5.1
Biochemistry	0.0	20.5	79.5
Biometry & Statistics	26.9	67.4	5.7
Pharmacology	15.5	81.7	2.8
Physiology	7.6	83.0	9.5

Table 2: Internet survey of basic medical sciences teaching (n=23)

Subject	Not enough (%)	Enough (%)	Too much (%)
Anatomy	0	65	35
Behavioral Science	57	30	13
Biochemistry	0	43	57
Epidemiology	78	22	0
Immunology	52	43	5
Microbiology	13	65	22
Pharmacology	13	65	22
Physiology	22	74	4
Statistics	74	26	0

A possible explanation for these results therefore is that detailed factual biochemical knowledge taught out of clinical context will be perceived as irrelevant and "too much". So although we can identify a large population of physicians who claim they were taught too much biochemistry it is probable that in "traditional" medical schools they were also taught **it** out of context.

Current educational thinking suggests that students will learn more effectively if the knowledge and skills acquired are embedded and contextualised in relevant real-life, problem-based situations. Learners build up meanings brick by brick, attaching one concept to another, making connections between concepts, integrating larger conceptual structures and seeing patterns and relationships between concepts. If new knowledge can be successfully integrated, connected and associated with existing knowledge by being relevant, well timed and contextualised then the student's mental representation expands and deepens leading to "deep level" learning. Such knowledge is more likely to be utilized in applications to new situations and is more useful in solving real problems.

However, if new information cannot be integrated, because it is not relevant, or because it is given at the wrong time the only way it can be retained is by memorization. This type of learning is known as superficial or "surface level" learning and is of limited value in problem-solving. Its acquisition can be tested by recall type examinations, but because it is not completely integrated with existing knowledge it is more likely to be forgotten.

ANSWER

The answer to this problem clearly is to reduce and define the "core" of biochemical knowledge and skills and teach it in an active and student-centered way with emphasis on clinical relevance.

DEFINING A CORE

There is certainly a core of biochemical knowledge that underpins the basic medical sciences and which needs to be learned for an adequate understanding of these disciplines. At the same time it is necessary to look at what biochemistry the practicing clinician needs to know and work backwards to construct an appropriate clinically relevant curriculum. This implies that clinical biochemists and metabolic physicians should be more involved in defining the medical biochemical curriculum. Basic biochemistry learning needs clinical relevance but clinical studies should also be associated with relevant biochemistry. Hence, there needs to be a "bottom-up" and a "top-down" approach to defining the "core".

NEW WAYS OF TEACHING

Biochemistry needs to be taught from a clinically relevant and contextualised perspective which encourages deep learning. There are many different ways in which this can be achieved. Problem-Based Learning is one approach, but even if not all medical schools adopt this model it is clear that within conventional and integrated medical schools there are many opportunities to reduce didactic teacher-centered learning and replace it with more active, student-centered, clinically relevant teaching.

REFERENCE

Clack, G.B., 1994. Medical Graduates Evaluate the Effectiveness of Their Education. *Medical Education* 28: 418-431

STRAIGHT OUT OF THE FORTUNE COOKIE JAR ….

"The road to success is always under construction"

Anonymous

'4

INNOVATIONS IN BASIC SCIENCE TEACHING AND LEARNING
ASSOCIATE EDITOR: Thomas M. Devlin, Ph.D.
Professor Emeritus, Department of Biochemistry
MCP.Hahnemann School of Medicine
Allegheny University
Broad & Vine Streets, Philadelphia, PA 19102-1192
TEL: (+) 1-215-762-7947
E-MAIL: devlint@hal.hahnemann.edu

A BASIC SCIENCE-CLINICAL INTEGRATIVE COURSE FOR SENIOR MEDICAL AND GRADUATE STUDENTS

Assaf Rudich, MD, Ilana Harman-Boehm, MD, Shimon Glick, MD and Nava Bashan, PhD.
Faculty of Health Sciences
Ben-Gurion University of the Negev
Beer-Sheva 84105, Israel
TEL: (+) 972-7-400-821; FAX: (+) 972-7-400-821
E-MAIL: rudich@bgumail.bgu.ac.il

The widening gap between advances in basic biology and their relevance to the clinical application presents a challenge for medical educators. As investigation methods in basic sciences complicate, and with the exponential growth of the knowledge base, clinicians find difficulties in applying scientific advances to the treatment of actual disease. This calls for the replacement of the traditional clinician-scientist with a multidisciplinary task force model. However, most basic scientists have little knowledge of pathobiology and clinical medicine, rendering them unprepared for this task. Thus, it is not surprising that many innovative programs in medical education deal with defining the role of basic science education for medical students, as well as exposing graduate students to biomedical research.

The Faculty of Health Sciences in Ben-Gurion University of the Negev in Beer-Sheva, Israel, has been innovative in its medical education concepts ever since its foundation by Professor Moshe Prywes in 1974. The need to integrate basic sciences education with the clinical sciences throughout the curriculum was a major target. However, until now we were successful mostly in introducing clinical studies to the "pre-clinical" years. The early clinical exposure of the students beginning in the first week of medical school has gained increasing acceptance over the years, but how and when to teach basic sciences during the "clinical years" remains an unresolved issue. Graduate students in the faculty of health sciences enter with a general biology background, but their exposure to pathobiology and clinical medicine during their graduate studies is limited. Consequently, only students
who participate in exclusive programs such as MD-PhD have the opportunity to "bridge the gaps", but they currently represent less than 5% of medical students in our institution. In this article we would like to report our experience in trying to implement a clinical - basic science integrative course for senior medical students and graduate students, aimed at addressing these issues.

We defined the following goals for the course: 1. it should demonstrate the interrelations between the basic and clinical sciences, and the ways by which this cross-talk promotes medical progress; 2. it should emphasize concepts rather than information; and 3. it should enable the implementation of individual and group self learning methods.

On the basis of these concepts, and taking into account our teaching resources, Diabetes Mellitus was chosen as the general topic of the course. Senior medical students are likely to have been exposed extensively to this common disease and are probably aware of significant questions concerning its pathophysiology and therapeutics. Graduate students are likely to find interest in a disease which combines extensive research efforts in various basic science disciplines. Furthermore, diabetes mellitus is an example of a disease whose treatment is very likely to improve dramatically over the next decade as a result of intensive multidisciplinary research.

This course was introduced simultaneously as an elective course for senior medical students and as a regular graduate student's course. Interestingly, among senior medical students this course was not chosen as a top priority elective course. We did not ascertain whether this was a result of student's perception of the importance of basic sciences, or to a tendency to choose a "practical", clinical elective related to future specialization plans. In contrast to the lack of response among most medical students, the course generated interest among many graduate students.

Approximately 40% of the applicants were medical students taking a year off clinical studies in order to complete an MSc degree. The basic structure of the course when planned as an elective course for senior medical students was a 2 week period, beginning with 1-2 days of overview lectures intended to introduce the main topics of

the course, which are major clinical questions in the treatment of diabetes, (why currently used methods of insulin treatment do not cure type I diabetes, what is the pathogenesis and future treatment of insulin resistance states, can type 1 diabetes be prevented and how, etc.). The next 6 days are dedicated mostly to self learning and preparation of the final projects: in this part of the course each pair of students receives a project assignment, consisting of a specific topic, names of two tutors - a basic scientist and a clinician, and references which include review article, original papers, as well as textbook references for refreshment of basic concepts. For example, one project assignment for the "type 1 prevention" question is "the role of a certain antigen in the pathogenesis of type 1 diabetes". The references enable the student to concentrate on basic immunological concepts (antigen presentation, T-cell activation, autoimmunity etc.), or more on the original articles, according to individual preferences and fields of interest. This "freedom" is limited by a minimum requirement of 3 original, basic science articles. The last two days are dedicated to oral presentations of the projects and panel discussions with the tutors. This original program was modified slightly into a semesterial course, which is described in detail in the Appendix 1.

Presently, we are unable to provide evaluation of the course as it was only launched in the spring 1996 semester, although feedback from both students and faculty are positive (Appendix 2). We hope that in the near future we will be able to implement a similarly designed course for joint participation by senior medical students and graduate students, perhaps as part
of a clinical clerkship. Undoubtedly, a combined effective learning experience shared by medical and graduate students could by itself promote interdisciplinary communication between clinicians and basic scientists. Moreover, the structure and basic concepts presented by this course could be extended to many other medical issues. We believe strongly that continuing basic science education for medical students should be based on well defined clinical problems using guided individual and group learning.

Appendix 1:
Course program (Semester version.)
First part: introductory lectures (2 hours each):
1. Why do currently used methods of insulin treatment not cure type 1 diabetes: lecture by a clinical diabetologist (MD).
2. Insulin resistance - clinical and biochemical perspectives: lecture by a clinical diabetologist (MD) with a clinical biochemist (PhD).
3. The pathogenic mechanisms for diabetic complications: lecture by a clinician.
4. The genetic basis for diabetes: lecture by a clinical geneticist (MD).
5. New modes of insulin delivery: lecture by a basic scientist (PhD).
6. Can type 1 diabetes be prevented: lecture by an immunologist (PhD).
Second part: individual projects:
Each student received a specific topic and a tutor, who supervised his/her progress over a 4 weeks period
Third part: oral presentations by participants. The course was summarized in 4 half day seminars, in which each student presented his project (30 mm. each), followed by closing lectures by tutors or guest lecturers.
Day 1: New modes of insulin delivery.
Day 2: Type 1 prevention.
Day 3: Insulin signaling and insulin resistance.
Day 4: New therapeutic modes for type 2 diabetes, and complications of diabetes.

Appendix 2:
Student (LS) perspective of the course: As a medical student in a year-off studying towards M.Sc., I participate in this course and I should say without exaggeration that it is one of the most interesting and advanced courses I've ever heard. The students had an opportunity to be exposed not only to multidisciplinary questions in diabetic research, but also to first line scientist from various academic centers in Israel. To my opinion this course will contribute greatly to medical students during their clinical studies as well as to graduate students.

STRAIGHT OUT OF THE FORTUNE COOKIE JAR …

If liberty means anything at all it means the right to tell people what they do not want to hear

George Orwell

INITIAL REPORT

THIRD BIENNIAL INTERNATIONAL BSEF CONFERENCE

Strategies for Teaching Medical Sciences in the 21st Century
June 21-24, 1997

THE HOST SCHOOL

In April of 1996, Roger Koment made the decision to accept the invitation of the Medical University of South Carolina to once again host this conference at the Hawthorn Suites Hotel in Charleston, South Carolina. Those who participated will remember that this was the site of the First Biennial Conference held in 1993. Gabriel Virella, M.D., Ph.D. will again be the Site Coordinator responsible for all logistical concerns of the conference. In addition, this year we have engaged the services of Ms. Sheilab Jewart, a Certified Meeting Planner from Windermere, Florida. We anticipate that registration, hotel accommodations, travel arrangements, and meeting setups will all be handled directly through her office, permitting the Program Committee to concentrate solely on developing program content.

THE PROGRAM COMMITTEE

Several individuals were considered to serve on the Program Committee for the 1997 conference, and in May of 1996, Roger and Gabe chose five individuals. Selection criteria included consideration of medical discipline, experience in medical education, previous involvement with the BSEF, and gender. An important component of curriculum is the integrated teaching of science and medicine, and we acknowledge this by including a practicing physician on our team. The committee is as follows:

Sandra Lee, Ph.D.	Biochemistry	Chicago Coll Osteopathic Med	Fax: (+) 1-708-971-6414
Charles Puglia Ph.D.	Pharmacology	Med Coll PA & Hahnemann Univ	Fax: (+) 1-215-843-6530
Michael Schmidt, Ph.D.	Microbiology	Medical Univ of South Carolina	Fax: (+) 1-803-792-2464
Jane Scott, Ph.D.	Anatomy	Wright State University	Fax: (+) 1-513-873-3391
Thomas Viggiano, M.D.	Internal Med	Mayo Clinic	Fax: (+) 1-507-284-5486

LOGISTICAL CONSIDERATIONS

A major strength contributing to the success of our previous Biennial Conferences was the intimate atmosphere created by limiting registration. Although understandably many will again be disappointed, we will continue this practice in 1997, this year accepting only the first 160 registrants. Furthermore, to encourage the greatest number of medical schools and countries to participate, registration will be limited to a maximum of 4 individuals from each school until May 15th, 1997. If openings remain, additional individuals from the same school – whose applications were submitted prior to May 15th – may be considered and will qualify for the early registration fee. The Registration Fee has not yet been determined, but as in prior years, will include the Conference Reception, all Breakfasts, Lunches, Refreshment Breaks, and a Social Event. The Social Event this year will be a Sunday evening Dinner Cruise on the Charleston Harbor.

A Preliminary Brochure describing conference sessions, call for Poster Abstracts, and containing materials for Early Registration should be mailed to all BSEF members on November 1, 1996. If you are interested in contributing to any aspect of this conference, please contact Roger Koment at the address listed on p^{3} 1.

ANNOUNCEMENT

NINTH ANNUAL MEETING BASIC SCIENCE EDUCATION SIG

November, 1996 **San Francisco, CA**

The Ninth Annual Meeting of the AAMC:GEA's National Basic Science Education Special Interest Group (SIG) will be held in San Francisco, California during the Annual AAMC Conference scheduled for November 6-12, 1996. The program topic this year will be *Copyright Issues for Medical Educators: Teaching Basic Science in the Electronic Age.* A panel of experts representing publishers, legal counsel, medical libraries, and faculty will address a series of prepared questions dealing with appropriate use of both hard copy and electronic media. Audience participation will be featured. For more information, contact Jim Swierkosz, Ph.D., St. Louis University School of Medicine, at Tel: (+) 1-314-577-8433; Fax: (+) 1-314-773-3403; E-Mail: swierkoszje@sluvca.slu.edu

COMMENTARY

WHEN IS A SCHOOL NOT A SCHOOL?

Stephen Abrahamson, Ph.D., Sc.D.
Professor Emeritus of Medical Education
University of Southern California School of Medicine
1975 Zonal Avenue
Los Angeles, CA 90033 U.S.A.
TEL: (+) *1-213-342-2372* FAX: (+) 1-213-342-2051

School: *a place or institution for teaching and learning: specif., (a) an institution for training and instruction in some special field, skill, etc.*

When one compares the medical school of 1995 with that of 1990, there is little difference. The same is true when comparing 1990 and 1985, and, indeed, in all such five-year comparisons, the differences are apparently inconsequential. However, when one compares the medical schools of 1995 and 1960, the differences are striking.

In 1960, a medical school fulfilled the definition above: a place for teaching medical students. Faculty members were employed to teach; the institution itself was designed and managed as a "place or institution for teaching and learning." In 1995, however, a medical school may no longer be a school at all. It has become something else, reminiscent of the childhood riddle: "When is a door not a door?"

When is a school not a school?

Answer: *when it is a research institution.*

The major purposes of a research institute are to discover new knowledge and to solve scientific problems through the development and application of basic sciences. While it is true that teaching may take place in such an institution, the purposes of the two (the school and the research institute) are not the same and may even be incompatible, since each has unique demands, requires a significant commitment of time, and expects appropriate talents, skills, and productivity from the faculty member.

Between 1960 and 1995, the sources of revenue for what we still call the medical school shifted from internal institutional money to primarily outside support. Well over half the operating budgets of basic-science departments is no longer institutional. Faculty members now spend less and less time on teaching medical students, and the school becomes less and less a place or institution for teaching and learning.

Interestingly enough, when one examines the time spent in teaching, even when combined with time spent on preparation for teaching and related activities for medical students-for only those faculty supported by the medical school-the teaching load is pitifully small. Few, if any, cost-accounting studies have been conducted, and to expose this condition is to risk ostracism at best and administrative hostility at worst. Middle managers in a medical school who are successful grantsmen and entrepreneurs (e.g., basic-science department chairs) do not tolerate criticism of a system that has rewarded them so well. Indeed, those who are successful in the system that has substituted the research-institute model for that of the school now control that system and guard their vested interests with zeal approaching ferocity.

When is a school not a school?

Answer: *When it is a tertiary-care hospital.*

As the basic support of medical schools has shifted from the university to outside funds, pressure to bring in more money has increased relentlessly. In the 1980s it became clear that health-care costs were rising and would continue to rise at a rate that exceeded the rate of inflation. Administrators of medical schools realized that performing high-cost procedures could bring a twofold return: money to support the medical school (and its parent university) and national prestige for pioneering work on the cutting edge of medicine.

To be successful in this arena, a school had to have physicians and surgeons capable of performing the procedures, and thus medical schools recruited and employed significant numbers of these highly talented and skilled practitioners and added them to the faculty. They do very little or no teaching of medical students, nor do they participate in the time-consuming activities associated with educational planning. They do, however, contribute to medical-school budget problems until revenues for the services catch up to the investment costs of adding them to the faculty.

The dominant force in the medical school, thus, began a shift from the basic-science entrepreneur to the clinical entrepreneur, all to the potential detriment of the education of medical students. Clinicians who are expected to bring in revenues to support themselves, the school, and the university do not spend time teaching medical students-it would be against their own best interests to do so.

When is a school not a school?

Answer: *When it is an HMO.*

Medical schools have learned that a tertiary-care facility cannot achieve and maintain the necessary flow of patients requiring the high-tech procedures without a sound primary-care referral system. This need has

resulted in the establishment of still one more set of operations that potentially compete with the basic educational mission of the medical school.

The ethics of medical practice dictate that the patient come first. Thus, a physician faculty member whose major assignment is providing primary care in an HMO can devote little time to teaching medical students. Furthermore, when physician faculty members in a medical-school HMO attempt to involve themselves in the undergraduate teaching program, their beepers usually interrupt.

The inability of these physicians to devote significant time to the educational needs of the school also presents another problem for medical education: the primary care physicians cannot influence the education and training of medical students. Curriculum-planning committees are appointed with an eye toward balance among basic scientists, clinical specialists, and primary care physicians. But when faculty members representing this last point of view are among the missing at meeting after meeting of the curriculum committee (not by their own choice but because of the nature of their practices) the result may be a curriculum too heavily weighted with irrelevant science content and/or with specialty training.

When is school not a school?

Answer: *When it is a medical school.*

Whether it is the basic scientist engaged in entrepreneurial research, or the clinical entrepreneur engaged in high-cost, cutting-edge procedures, or the clinician engaged in primary care in the HMO setting, the "teachers" in the medical school are less and less engaged in teaching. Students as individuals are no longer known to the faculty; many faculty physicians seldom even see the medical students; and the students are no longer receiving sufficient small-group or one-to-one instruction.

Those now responsible for the educational mission of the medical school - to teach medical students-are graduate students in basic sciences, fellows in clinical specialties, and residents and interns. In the basic sciences, small group instruction in seminars and teaching labs has all but disappeared, with whole-class lectures remaining the teaching method. In the clinical disciplines, supervision of medical students by faculty has all but disappeared, with over-worked house officers bearing the major burden of providing what should be the one-on-one teaching that is the hallmark of excellence in helping students learn clinical medicine.

But the grim story does not end there. Those responsible for educational planning are faculty members whose careers are not affected by their performances as teachers: basic-science faculty whose existence depends on their ability to get grants and conduct research; super-specialist faculty, whose existence depends on their performing complex, revenue-generating procedures; and primary-care physicians, whose existence depends on their building a sizeable and successful EMO.

The education mission of a medical school-teaching young people who wish to become physicians-has gone from being the sine qua non for the school to being at the bottom of the priority list. Those in positions of power and control in the medical schools have central interests and concerns in conflict with the demands of high-quality undergraduate medical education. Until they recognize and acknowledge the problem, however, American medical education can expect no remedial action, and the answer to the question "When is a school not a school" will remain "When it is a medical school."

References

1. Webster's New World Dictionary of the American Language. 2nd college ed. New Yo rk: William Collins + New World Publishing, 1976.
2. Abrahamson S. The dominance of research in staffing of medical schools: time for a change? Lancet, September 25, 1993:342:1586-8.

This article was reprinted with permission from the January 1996 issue of Academic Medicine

ANNOUNCEMENT

UPDATE: PROCEEDINGS of the SECOND BIENNIAL INTERNATIONAL BSEF CONFERENCE

In June of 1995, 205 individuals from 11 countries gathered in Lincolnshire Illinois for three days to consider the topic *Strategies for Integrating Clinical and Basic Sciences.* Seventy-one had presentation roles. The actual transcripts of plenary session presentations, audience commentary, and summaries of all workshops will soon be available for a nominal fee in a compiled and edited Proceedings document. These will cover the conference subdivisions of *Planning Content Integration, Implementing Content Integration,* and *Evaluating Content Integration,* as well as sessions which addressed *Innovations in Integrative Instruction* and *Strategies for Integrating Educational Processes.* Watch for further announcements. The development of these Proceedings is supported in part by an educational grant from Pharmacia & Upjohn Company.

COMPUTER APPLICATIONS IN BASIC SCIENCE EDUCATION

INTERIM EDITOR: Roger W. Koment, Ph.D., BSEF Executive Director

We have often had occasion to publish articles in the *Basic Science Educator* which described the development and/or use of innovative computer software for teaching the basic sciences. With this issue however, we more formally acknowledge the increasing importance of computer aided instruction and (distance) learning with the creation of a column dedicated to this theme. It is our purpose to present original articles concerning all aspects of *Computer Applications in Basic Science Education*, such as software development and applications, techniques for using computer generated images and graphics for lecturing, resources on the World Wide Web (WWW) and their appropriate (or inappropriate) use, computer applications in independent student study, etc.

In the following article, Dr. David Penney from Wayne State University School of Medicine describes in some detail his experiences in developing a closed system intranet resource for the teaching of Medical Physiology. He describes how human perceptions can present unexpected problems and how these may be overcome. He goes on to provide a 10 point checklist of potential problems to which many of us can relate, and a 7 point list of factors which encourage development of web-based instructional sites. As the capability for computerized communications, teaching, and distance learning becomes available to more medical faculty, it is necessary that we be aware of the issues involved, the problems to be expected and how they may be solved, and the various techniques for using electronic resources. That is the focus of this column and we invite submission of your articles that address electronic issues.

VIRTUAL CLASSROOM: AN EXPERIMENT IN WEB-BASED MEDICAL EDUCATION

David G. Penney, Ph.D.

Professor of Physiology
Wayne State University School of Medicine
Detroit, MI 48201
TEL: (+) 1-313- 577-1539 FAX: (+) 1-313-577-5494
E-Mail: dpenney@cmb.biosci.wayne.edu

Just a little over one year ago I began to be dimly aware of the World Wide Web, although I had used E-mail for years. With the help of a computer engineering student we decided to establish a website. Actually the site we established consisted of two web servers, one a Macintosh 8100/80 and the other a Pentium 90. The Medical School at that time had no other web presence, although there were several other web servers on "Main Campus".

To set the stage, Wayne State University (WSU) is an inner-city university of some 35,000 students, most of whom commute to classes. WSU is said to have the largest graduate program of any U.S. university. The medical school is the largest in the U.S., located at one site, with 260 students per year. The Detroit Medical Center (DMC), in which the School of Medicine (SOM) is located is one of the largest in the country, including five large hospitals. After writing a passable homepage for the SOM and establishing the usual links to other pages on campus and off, we asked ourselves whether this new medium might be used for medical education. There are a number of advantages to building web-based instructional sites: 1) ease of construction, *2)* capability for distance learning, 3) relatively inexpensive to set-up and maintain, 4) easy / quick to make corrections in content, 5) all the advantages of platform compatibility common to web, 6) all the advantages of linkages, save, print, etc. common to web, and 7) all the advantages of web with regard to multimedia.

Our first crude attempt in June, 1995 was to post some Medical Physiology pages, each of which consisted of an entire lecture, text, graphics and all. This was relatively easy to do, but made for dull reading and less than optimal flexibility and use of links. Shortly thereafter, in discussions with the Academic Dean, I asserted that the old problem of the widely varying quality of the faculty handouts to the students could be "fixed". By placing all the text into a common application - we settled on Microsoft Word - and redrawing the graphics in one application - here we settled on Claris MacDraw Pro - high quality notes with consistent formatting could be produced. Aside from the obvious reasons, better student evaluations which impacted my role as director of the course, etc. my ulterior motive in doing this was to have all the notes and materials in a common electronic form, so that development of a web-based teaching forum, the next phase, could be easily accomplished. We at first named our electronic forum "Virtual Medical School", but almost immediately changed it to "Virtual Classroom". While I would have preferred an unsecured site, various faculty demanded that it be closed to web users outside the DMC. Preventing the pirating of notes honed over the years was one reason stated. Another more difficult one was to prevent outsiders from seeing material "borrowed" from books and such, without permission or credit. A few faculty refused to participate for fear of discovery on this point, or because they did not want to spend the time citing their sources.

With the help of two half-time student assistants, the work of gathering, reformatting, redrawing, and printing the faculty notes for Medical Physiology began in August, 1995. HTML coding of the first part of the course (cardiovascular) began in late November. The first small version of Virtual

Classroom went "up" in mid-December. We decided that Virtual Classroom should also contain the faculty notes as Word files, i.e. word for word, graphic for graphic versions of the paper notes which could be downloaded to any Mac or PC running the current version of Microsoft Word.

Because I wanted my notes pages to be maximally readable and flexible in terms of links, text pages were brief - consisting of no more than 1 to 1-1/2 screen pages per page - and graphics were placed on separate pages. I also wanted to be able to use the pages in large and small group presentations in place of slides or overheads, by simply making a web connection or drawing off a local hard-drive. While this approach accomplishes these goals nicely, developing lectures in this way routinely involves the writing of 50 - 100 separate HTML files, and thus is very time-consuming.

Another method we have explored is a compromise between this approach and the one of placing a whole lecture in a page. These pages include 2-4 screen pages of text as well as the related graphics. Although less flexible, development of these pages require less than 1/3 the time to write. Nonetheless, the time expended is still many times that necessary to simply put "up" a Word file for downloading. Of course the Word files lack the links and other advantages inherent in the HTML realm.

I was astounded to discover that the biggest challenge to development of our instructional site was not technological, but rather people and the process of change itself. Faculty gave a multitude of reasons for not joining in, e.g. too busy, not enough time; will not get research grant; little career reward; not of proven value; no better or worse than lecture format; must have animation, sound, video, interactivity, virtual reality or won't do; too far ahead; students will not use / accept; don't want to learn HTML and web stuff; just a passing fad, new medium will pop up next year; must have security so the world can't rip off one's material.

The major general hindrances to the building of web-based instructional sites are the following: 1) lack of hardware and software, 2) lack of expertise *I* in-service training, 3) lack of adequate "network" at site, 4) faculty entrenchment protected turf, 5) lack of administrative encouragement reward to faculty, 6) lack of educational theory training by faculty, and 7) lack of vision and willingness for risk-taking by faculty and administration. At WSU there have been some additional problems such as: 1) fragmentation of the offices dealing with information technology, 2) history of control of the network by the business side of the administration, and 3) an older, conservative faculty.

On the other hand, the factors encouraging the building of web-based instructional sites are many: 1) an explosive development of the web, 2) the need for inexpensive, capable distance-learning tools, 3) the high cost of paper-publishing of faculty notes, 4) need for integration with development of student computer labs, 5) a decrease in research funding, 6) the drive by the LCME to add more information technology to medical curricula, and 7) a large cadre of older faculty without research grants.

Throughout the building of Virtual Classroom we have stressed that such sites must have certain characteristics if students are to use them: 1) Provide useful learning materials NOT FOUND ON PAPER!, 2) be readily accessible, 3) be easy to use, and 4) be enjoyable (fun?) to use. To date we have placed a number of different kinds of materials and capabilities in Virtual Classroom: 1) complete lectures (Chapters) from class, 2) clinical correlative problem-sets, 3) problem sets of all kinds, 4) question / answer forums, 5) schedules, 6) faculty profiles, 7) course policy & procedures, 8) sample examination questions, 9) accessory graphics, 10) references / reading materials, 11) links to other sites of information, 12) review modules, 13) useful learning materials not found elsewhere, 14) instant search capability to all learning materials. For the future, we hope to add additional materials and capabilities to Virtual Classroom such as: 1) development of full multimedia (video-sound) capability, 2) virtual reality, 3) interactivity, database manipulation, 4) wireless (radio, infrared) 'net' connections, 5) powerful palmtop (Newton-size) computers for every student / faculty, and 6) the addition of telephone, TV, etc. in one integrated system. Presently, Virtual Classroom contains approximately 85% of the teaching materials used in the three-month long medical physiology course taught to 260 Year I medical students. Materials for other courses are being rapidly added.

If you have not already taken a look at our medical instructional site, please do so. The URL is "http://www.phypc.med.wayne.edu". Since it is password protected, you will need the code, which changes every Monday morning. Simply E-mail me at "dpenney@cmb.biosci.wayne.edu" and I will provide the current ID and Password.

ANNOUNCEMENT

FOREIGN FACULTY FELLOWSHIP PROGRAM IN THE BASIC MEDICAL SCIENCES (FFFP)

Administered by the Educational Commission for Foreign Medical Graduates (ECFMG)

PROGRAM OBJECTIVES: To enable teachers of the basic medical sciences in medical schools abroad to teach and study in medical schools in the United States. Awards are intended to enhance the faculty scholar's knowledge and teaching skills in these sciences, and to stimulate international exchange of information in science and technology. The fellowships are ***not*** intended to support research programs or a formal curriculum leading to a degree.

PROGRAM EMPHASIS: Programs of six months' duration are provided for senior-level faculty who can benefit from programs with less emphasis on teaching and more exposure to administration and curriculum planning and implementation. Programs for junior to mid-level faculty are one year in length and are designed to enhance the faculty scholars' knowledge and teaching skills in the basic medical sciences. As the program emphasis for junior to mid-level faculty is on teaching of undergraduate medical students, such teaching must comprise at least 70% of their educational programs.

ELIGIBILITY: A candidate must: I) have not less than three years of teaching experience as a full-time faculty member in one or more of the basic medical sciences; 2) have a graduate or professional degree (at minimum an M.Sc. or the equivalent); 3) document proficiency in the English language, both written and spoken; 4) have a guaranteed faculty position to return to upon completion of the fellowship; 5) have endorsement of the home country institution for the proposed educational program, and permission for a leave of absence or sabbatical leave.

AWARD: The award provides round trip airfare, a stipend for living expenses, and health insurance.

PROGRAM DATES: Application materials for the 1997-98 FFFP program year will be after January 1, 1997. Awards will be announced in May, 1998.

CONTACT:

Magdalena Miranda, M.S.
Director, Program Planning and Development
Educational Commission for Foreign Medical Graduates
2401 Pennsylvania Avenue, N.W., Suite 475
Washington, D.C. 20037
Phone: (+) 1-202-293-9320 Fax: (+) 1-202-457-0751

ANNOUNCEMENT

PAMELA C. CHAMPE, Ph.D., RECEIVES THE ALPHA OMEGA AWARD FOR OUTSTANDING BASIC SCIENCE INSTRUCTOR

The Alpha-Omega-Alpha (A~2A) honor medical association awarded its 1995 Distinguished Teacher Award for Senior Faculty in the basic sciences to our fellow member Pamela C. Champe, Ph.D. Dr. Champe is a tenured Associate Professor of Medicine at the University of Medicine and Dentistry - Robert Wood Johnson Medical School where she serves as co-course director for Medical Biochemistry. She has played a key role in developing an Health Careers Training Program for underrepresented/minority students at UMDNJ and she is the editor of the highly successful Lippincott's Illustrated Reviews in Biochemistry and Pharmacology. The A~2A award is presented at the annual AAMC meeting and represents the highest accolade for a medical educator. The BSEF extends its congratulations to Dr. Champe for her well deserved award.

A JAUNDICED VIEW FROM THE EDITOR

THE DUMBING OF MEDICAL EDUCATION

Gabriel Virella, M.D., Ph.D.
Department of Microbiology and Immunology
Medical University of South Carolina
Charleston. SC 29425
TEL: (+) 1-803-792-4339 FAX: (+) 1-803-792-2464
E MAIL: virellag@musc.edu

In a recent interview published in the *Journal of Investigative Medicine* 1, Dr. Michael Brown, co-recipient with Dr. Joseph Goldstein of the 1985 Nobel Prize in Medicine for their work on cholesterol homeostasis, stated the following:

> "[..] *there is a very serious problem* [...] *in the relation between the basic science curriculum and the clinical curriculum. Along with the emphasis on primary care* [...] *has come this question of relevance of basic science. If we're going to train primary care physicians, then why does a primary care physician have to know how DNA replicates?* [...] *That's a valid question, and it's a difficult question, but it brings us to the danger that medical schools are going to evolve back to a pre-Flexner era, where the physicians are trained only in the practice of medicine* [...]. *if the basic scientists are considered irrelevant (in other words if the powers that run the medical school think that what the basic scientists are teaching is sort of irrelevant to the overall purpose), then there's going to be less and less emphasis on the basic science teaching.* [...] *The clinicians want to start teaching clinical medicine earlier and earlier in the curriculum, and so you run into serious problems."*

Indeed, teaching basic sciences has never been as challenging as it is now, on the threshold of the 21st Century. Besides the progressive erosion in the perception of the value of science education in the medical curriculum, the growth of science in general and of biomedical science in particular, presents another very serious challenge to those trying to teach basic science to medical students. The response of some, as clearly pointed out by Dr. Brown, has been to restrict the scope of basic science in medical curricula to what is immediately applicable to clinical medicine. This tendency finds a parallel in the misplaced efforts to rationalize secondary education which have resulted in the dumbing of curricula beyond recognition. Perhaps it is time to regroup in defense of science, recognizing that there are practical limits to what can be taught, but not apologizing for our love of science for science sake, and resisting as far as possible any tendencies that can result in the exclusion of non-utilitarian material.

The ever increasing data base, the high level of complexity of modern biology, the fast growth of some areas of knowledge, are problems that need to be dealt with in a rational fashion. It is our obligation to push the significance of basic science and to make sure it is not just used for window dressing. For the sake of argument, let's consider three examples of the need to pursue basic science issues in our curricula:

Example No. 1 - Conjugate vaccines. The impact of the conjugate *Haemophilus influenzae* vaccines in clinical medicine has been dramatic. After introduction of these vaccines in the U.S., *H. influenzae* meningitis has become a rarity. In one of my last turns of duty as a facilitator in a PBL-based curriculum, we had the opportunity to discuss a case of meningitis in an infant. Immunoprophylaxis was obviously an important learning issue, and it was also an excellent opportunity to discuss conjugate vaccines, which in turn are a great platform to introduce the concept of T dependent vs. T independent antigens. However, such gentle prodding to basic science issues is not easy when the facilitators are not experts and the textbooks used by the students are somewhat antiquated.

Example No. 2 - Transport-associated proteins. An in depth discussion of the role of these proteins in promoting the association of cell-synthesized peptides with MHC-I molecules would likely be classified as unnecessary esoterica by most multidisciplinary curriculum design groups. However, the repertoire of TAP proteins of a given individual may be a major factor determining whether the individual becomes tolerant or susceptible to autoimmune diseases, such as insulin-dependent diabetes mellitus, and whether intracellular infections are properly controlled by the immune system, as suggested by a special form of immunodeficiency in which TAP proteins are deficient and the presentation of peptides synthesized by intracellular organisms is significantly impaired.

Example No. 3 - Calcineurin and the activation of nuclear binding proteins. Again, the most likely response to non-experts to the relevance of including discussions on second signal cascades and nuclear binding proteins involved in T lymphocyte activation is one of hesitancy, if not outright negative. However, the mechanism of action of cyclosporine A is intimately associated with the inhibition of calcineurin, which in turn results in the inactivation of nuclear binding proteins, down regulation of IL-2 and other cytokine synthesis, etc.

These examples are obviously drawn from my areas of expertise, but analogous examples can be drawn from any specialty. What is common from these three examples is that it can be argued that physicians may be perfectly able to function without that knowledge. The obvious counterpoint is that all these concepts are intimately related to common situations in clinical practice. Should a physician be happy to immunize without knowing why one type of vaccine is superior to another? Should a physician be able to prescribe

potent immunosuppressant drugs based on generic information, such as cyclosporine will depress the immune response? It is admissible that a physician's understanding of the role of genetic factors in insulin-dependent diabetes mellitus may be limited to the concept that "diabetes has a strong genetic component"? I submit that although no one will ever be able to know all the relevant basic science facts and concepts underlying his or her practice of medicine, an effort needs to be made to teach as many of these mechanisms as possible and to make the medical student appreciate the importance of trying to understand such mechanisms, even when the significance is the pure intellectual satisfaction of understanding why something happens the way it happens.

The watering down of basic sciences is more acutely felt in curricula exclusively based on case-based teaching. The role of the basic scientist in many of these programs is that of a partner in a process in which they have had very little input. Clinical faculty have the predominant role in designing the cases on which the curriculum is based, and the general learning objectives are directly related from the nature of the cases. To compound the problem, the tendency to use facilitators that are not content experts limits the ability of the basic scientist to direct student learning at more than a superficial level. But even in the traditional curricula, the pressure to reduce course content is tremendous. Given the time constraints and the expanding database, cutting is inevitable. But cutting should be a very judicious process, targeting obsolete areas in favor of the new, emerging science – even if teaching the new emerging science is more challenging to teachers and students. Relevance for medical practice is an important factor in the equation, no question about it, but one needs to take a broad view of it, relevance may be seen from the point of view of the general education of a physician, not necessarily from the daily practice of a generalist. And future relevance (as difficult as it may be to foresee) is more significant than present relevance.

For the sake of medicine and of our students, it is essential that the basic scientist reaffirm their identity and defend the need to impart a solid basis of scientific knowledge in our future physicians. Science cannot become window dressing for a curriculum more concerned with tasks than with intellectual development and basic scientists cannot accept a role of junior partner in the educational process. We need to defend our case with solid and rational arguments. We need to give up quantity, but not quality. The alternative is to sanction the dumbing of medical education and collaborate in a process that we know is not right.

REFERENCE

I. The JIM Interview: Michael S. Brown, MD and Joseph L. Goldstein, MD. *J. Invest. Med.*, 44: 14, 1996.

ANNOUNCEMENT

ASSOCIATE EDITOR APPOINTED

The Editorial Board of the *Basic Science Educator* is pleased to announce the appointment of Michael G. Schmidt, Ph.D. as the new Associate Editor in charge of the column ***Computer Applications in Basic Science Education.*** Mike is a Microbiologist at the Medical University of South Carolina, in Charleston and an experienced devotee of computer technology. He begins his responsibilities on the Editorial Board as of July, 1996. The focus of this column, like Mike's expertise, ranges widely over such areas as reviews of new software for teaching medical sciences, the use of computer generated images and graphics for lecturing, integrating the use of computer instruction in traditional curricula, developing and using resources on the World Wide Web, etc. Discuss your creative ideas with Mike by phone: (+) l-803-792-9532, FAX: (+) 1-803-792-2464, or E-mail: schmidtm@musc.edu

SPECIAL FEATURE

THE MEDICAL EDUCATOR'S RESOURCE GUIDE

Roger W. Koment, Ph.D.
BSEF Executive Director

It is an indisputable fact that computers and computer telecommunications have forever changed the course of medicine and medical education. The way we as medical faculty conduct our daily work and the methods we use to teach our disciplines are continually influenced by advances in computer technology, and this influence will only increase with time. The recent advent of the World Wide Web (WWW) as a resource for supplementing course materials and promoting active student learning has opened an entirely new dimension of possibilities.

In keeping with the mission of both Basic Science Education Forum and our AAMC:GEA affiliated Special Interest Group, we begin a new feature with this issue of the *Basic Science Educator* dedicated to sharing pertinent addresses from the WWW. Such an address is referred to as a URL, or Uniform Resource Locator, and anyone who has done so knows that a huge amount of time is easily consumed by the activity of searching and evaluating such resources. Much duplication of effort can be avoided simply by sharing what each of us has found. We encourage submission of URLs deemed of value for the teaching of medical sciences, or in some other fashion of interest to medical faculty. These will be published in subsequent issues of the *Basic Science Educator* with contributors' names listed as below. (Please remember that URLs are case sensitive and should be entered exactly as written.)

The URL submissions which follow are credited to Michael Altman, M.D. (Northwestern University), W. Marshall Anderson, Ph.D. (Indiana University), Ms. Olga Artamonova (BSEF Eastern European Correspondent), Thomas Langworthy, Ph.D. (University of South Dakota), David Penney, Ph.D. (Wayne State University), and Roger Koment, Ph.D. (BSEF Executive Director). Send URLs with any comments for usage to Roger Koment, Ph.D., BSEF Executive Director at the address on page 31.

GENERAL

The Interactive Medical Student Lounge	http://falcon.cc.ukans.edu:80/~sween/
The Interactive Patient	http://medicus.marshall.edu/rnedicus.htm
The Medical Education Page	http://www.sconim. net/~greg/rned-ed
The PBList Home Page	http://ddsdx.uthscsa.edu/pblist./pblist.html
The Virtual Hospital	http://indy.radiology.uiowa.edu/VirtualHospital.html

ORGANIZATIONS

American Association for Advancement of Science	http://www.aaas.org
American Society for Microbiology	http://www.asmusa.org/
Association of American Medical Colleges	http://www.aamc.org/
Basic Science Education Forum	http://www.usd.edufBSEF
Centers for Disease Control & Prevention	http://www.cdc.gov/cdc.html
National Board of Medical Examiners	http://www.nbme.org
Society for Medical Decision Making	http://polaris.nemc.org/SMDM/
World Health Organization	http://www.who.ch/

NEWS and INFORMATION

Biomedicine and Health in the News	gopher://inform.uchc.edu:70/1 lgopherjoot%3A%SB_data04._dataO4Ol %SD
Chicago Tribune	http://www.chicago.tribune.com/
Chronicle of Higher Education	http://www.chronicle.merit.edu/.index.html
CNN Interactive	http://www.cnn.com
New York Times	http://www.nytimes.com/yr/mo/day/index
Wall Street Journal	http://www.wsj.com

JOURNALS ONLINE

AAAAS Science	http://science-rnag.aaas.org/science/home/index-alt.html
Emerging Infectious Diseases	http://www.cdc.gov/epo/mmwr/mmwr_oth.html
Morbidity & Mortality Weekly Reports	http://www.cdc.gov/epo/nimwr/mmwr.html

LIBRARIES

National Library of Medicine	http://www.nlm.nih.gov

ANATOMY

National Univ. of Singapore Histonet	http://.nus.sg/HIS/
Radiology	http://www.cc.emory.edu/ANATOMY/Radiology/Home.Page.MENU.HTML
The Heart Preview Gallery	http://sln2.fi.edu/biosci/preview/heartpreview.html
The Visible Human Project	http://www.nlm.nih.gov/research/visible/visible_human.html
The Whole Brain Atlas	http://www.med.harvard.edu/AANLIIB/home.html

BIOCHEMISTRY

Clinical Case Studies	http://horne.cc.umanitoba.cakblanch/
Medical Biochemistry	http://colossus.chem.indiana.edu

MICROBIOLOGY

CAl in Microbiology	http://rnonera.ncl.ac.uk/cal/cal.html
Cells Alive!	http://www.comet.chv.va.us/quill/
Medical Microbiology Course	http://midget.towson.edu/~wubah/medmicro/hpage.html
World Lecture Hall	http://www.utexas.edu/world/lecture/niic/

PATHOLOGY

General Pathology	http://www-medlib.rned.utah.edu/WebPath/GENERAL.html
Urbana Atlas of Pathology	http://rnonera.ncl.ac.uk/md/atlas.html

PHARMACOLOGY

Pharmaceutical Information Network	http://pharminfo.com/pin...hp.html
Pharm Web	http://sunsite.unc.edu/pwmirror/
Virtual Library: Pharmacy	http://d 136a- 1 .coventry.ac.uk/covuni/clincrse/pharmint.htm

TRAVEL

Currency Exchange Rates	http://www.olsen.ch/cgi-bin/exmenu/pathfinder
Languages for Travelers	http://pathfinder.com/@ @M3wDF1OFyQIAQN6y/Travel/language/index.html
Maps	http://pathfnder.com/@ @FTrMTGOkGAA~AQNyy/Travel/maps/index.html

TAKE A BREAK

Calvin and Hobbes Comics Gallery	http://eos.kub.nl:2080/calvinn_hobbes/
Sherlock Holmes	http://www.cs.cmu.edu/afs/andrew.cmu.edu/usr 1 8/mset/www/holrnes.html
Xena: Warrior Princess	http:/www.mca.com/tv/xena/

STRAIGHT OUT OF THE FORTUNE COOKIE JAR

"The human mind treats a new idea the way it treats a strange protein - it rejects it!"

P. Medawar

SOCIAL ISSUES IN THE BASIC SCIENCES

ASSOCIATE EDITOR: David L. Bolender, Ph.D.
Department of Cellular Biology and Anatomy
Medical College of Wisconsin, Milwaukee, WI 53226 TEL: (+) 1-414-456-8474 FAX: (+) 1-414-266-8496
E-MAIL: bolender@post.its.mcw.edu

Make Sure You Copy Right!

How often do you use copyrighted materials in your teaching? I know how I would answer this question, but to obtain a little broader prospective, I did a quick scan through the syllabi of our first and second year basic science courses. Not surprisingly, in numerous handouts I encountered a variety of drawings, diagrams, graphs, and tables which were most likely obtained from journals, books, atlases, etc. The majority of these probably fall under the "fair use" provision of the United States Copyright Act of 1976. Although not a common topic of discussion in the basic sciences, occasionally we encounter a news article or anecdote relating to copyright issues in education. Undoubtedly this will become more important to us as faculty as we increase our use of the Internet and World Wide Web for sharing information. For now, the best advice on copyright issues remains*: if in doubt, get permission in writing!*

As the newly appointed Associate Editor for *Social Issues in the Basic Sciences,* I would like to begin by focusing our attention on the important topic of copyright law as it pertains to medical faculty. Through articles in this and subsequent issues of the *Basic Science Educator,* we will review the basics of copyright law and attempt to provide guidelines for using copyrighted materials. Our first article was provided by Julie Gores, Librarian and Chair of the Internal Copyright Committee at the Medical College of Wisconsin, and Mary Blackwelder, Director of Libraries. This is followed by a guide, adapted from the United States Copyright Act of 1976, for classroom use of copyrighted materials which was developed for the faculty of the Medical College of Wisconsin.

Next time we will explore copyright issues and the Internet, and the use and misuse of computer software. If there are other topics regarding copyright issues that you would like to see addressed, please contact me.

INFORMATION ON COPYRIGHT FOR FACULTY, STAFF, & LIBRARIES

Julie C. Gores, M.L. S., I.L. L.
Reference Librarian
Mary Blackwelder
Director, MCW Libraries
Medical College of Wisconsin, Milwaukee, WI 53226
TEL: (+) 1-414-456-8310 E-MAIL: jgores @post.its.mcw.edu

The Copyright Act of 1976, *(PL94-553)* which became effective on January 1, 1978, has implications for individual, classroom and library photocopying activities, lending and borrowing of materials (interlibrary loan), and more recently, electronic databases, software and the Internet. The purpose of the law is to "promote the public welfare through the advancement of knowledge." The law also is intended to balance the rights of the author or copyright owner. While much of the law is definitive, some sections are open to interpretation.

It is important to note that the author and the copyright owner are not always one in the same. Many journal publishers require that ownership or "copyright" of a work authored by an individual be transferred to the publisher as a condition of publication. However, the copyright of the work itself remains in effect until 50 years after the death of the author, not the copyright owner. Of greatest interest to academic institutions is the provision of "fair use" found within section 107 of the copyright guidelines.

"Fair use" allows for reasonable use of a work without permission for specified purposes including scholarship, teaching, and research. These four factors determine "fair use":

- *purpose* and *character* of the use
- the nature of the work
- the *amount* and *substantiality* of sections used as it relates to the work as a whole.
- the *effect of the use* to the potential market or value of the work

Unfortunately, it is this most crucial section (107) of the Copyright Act which is left open to so much interpretation. Recent court rulings, such as the American Geophysical Union. et al. vs. Texaco. Inc have stirred further controversy on the issue of "fair use." Seventeen months after it began, the court finally ruled against the Texaco scientist who had made single copies of eight articles from journals to

A COPYRIGHT GUIDE: MULTIPLE COPIES FOR CLASSROOM USE

In the Copyright Act of 1976, Section 107 of H.R. 2223, establishes ***guidelines*** for teachers, librarians, and other educational instructors. The guidelines embody three standards: brevity, spontaneity, and cumulative effect. These guidelines are a minimum, and in special circumstances, may be exceeded under the rubric of fair use. The guidelines are as follows.

Copies may be made by the instructor provided that:

- multiple copies are not ever to exceed more than **one copy per pupil in a** course.
- copying shall not be used to **create, replace, or be substituted for** anthologies, compilations, lab manuals, course syllabi and other collective works.
- **no charge beyond the actual cost** of the copying is charged to the students.
- copying does not **substitute for the purchase** of books, periodicals, publisher reprints etc.
- copying **shall not be repeated** with respect to the same item by the same teacher from term to term.
- copying cannot be **directed by a higher authority.** (i.e. your boss, a CEO etc.)
- copying of, or from a work is not intended to be **"consumable"** in the course of studying or teaching. These include workbooks, exercises, standardized tests, test booklets, answer sheets etc.
- copying meets the test of **brevity** as defined below:
  - **a. Poetry:** A poem must be *2S0 words or less* and/or no longer than two pages. Only an *excerpt* of 250 words or less may be used for a longer poem.
  - b. **Prose**: An article, story or essay must be *less than 2,SOO words* or an *excerpt* of a longer work may not exceed *1,000 words* or be more than *10% of the actual work.*
  - c. **Illustration**: Only *one* chart, diagram, drawing, cartoon, or picture can be used *per book* or periodical issue.
  - d. **Special Work:** A unique or special work is *not to exceed 2,SOO words.* An excerpt of a work must not be longer than *two published pages and/or 10%* of that work.
- copying meets the test of **spontaneity** as defined below:
  The copying is at the *instance or inspiration of the individual teacher,* and the inspiration and decision to use the work and the moment of its use for maximum teaching effectiveness are so close in time that it would be unreasonable to expect a timely reply to a request for permission to use the material.
- copying meets the test of **cumulative effect** as defined below:
  a. The copying of the material *is for only one course* in the school.
  b. Not more than *one short poem, article, essay, story or two excerpts may be copied* from the **same author,** nor more than *three from the same collective work or periodical volume* during one class term.
  c. There shall *not be more than nine instances of such multiple copying* for one course during one class term.

which Texaco did subscribe. The court stated that "fair use" did not apply because the copied articles were intended for his personal "archival" files rather than for direct application to his research. The court also concluded that three of the four "fair use" factors had been violated because the scientist worked in a for-profit environment. The court found that only "the nature of the work" was within "fair use" guidelines. The court did not address the broader issue of whether similar photocopying in a nonprofit environment would fall within the "fair use" guidelines. It is important to note that in this case, Texaco was subscribing to all the journals in question. It was the "personal archiving" of the copies that tipped the scale against "fair use."

Photocopying by faculty in a non-profit institution is broken down into "single copying for teachers" and "multiple copies for classroom". A single copy may be made by, or for, a teacher for scholarly research, class preparation, or class instruction. These are the items that can be copied as defined by the guidelines: 1) a chapter from a book, 2) an article from a newspaper or periodical, 3) a short story, essay, or short work, 4) a chart, graph, diagram, drawing, cartoon or picture from a book, periodical, or newspaper. "Multiple copies for classroom" guidelines are more rigid and contain more requirements. One copy per pupil is allowed provided that: 1) the copying meets the test of brevity and spontaneity as so defined in section 107 of H.R. 2233, 2) the copying meets the cumulative effects test as so defined in section 107 of H.R. 2223, 3) each copy includes the notice of copyright (very often neglected by instructors). There are some prohibitions to the guidelines stated above. They, too, are explained in section 107 of H.R. 2223. The famous **"Kinkos" case** is an example of violation of the photocopying guidelines.

Nine publishers sued New York University, several of its faculty, and Kinkos for photocopying and selling anthologies of copyrighted course material. In this case, even thought it was for educational purposes, neither the faculty nor Kinkos sought permission from the copyright holders. The "amount and substantiality" of the copying had a negative effect on the market for the works. Instructors who fail to seek permission of a copyrighted work or create anthologies to avoid purchasing textbooks are clearly in violation of the law.

Libraries are also held accountable for copying as well as interlibrary loan activity. Section 108 of the Copyright Law clearly establishes these guidelines. Interlibrary loan may not borrow more than five photocopied articles/chapters

from any journal or book published within the last five years. Libraries must keep track of any "over copyright" activity that occurs during a calendar year. This usually is referred to as the "Rule of Five." When the library reaches this limit, the article can still be obtained through a copyright clearinghouse vendor. This vendor charges for the article service as well as publisher royalty fees. These transactions typically cost *$25-$30* to obtain, but copyright compliance is maintained. Interlibrary Loan is also required to keep a record of all transactions over a three year period.

Libraries are also responsible for posting a *Display Warning of Copyright* notice as required in section 108. These notices are to be prominently displayed near all copy machines, on each interlibrary loan form, and on all computers found within the library.

Recent copyright is sues concerning software, electronic databases, and the Internet are more complex and have yet to be specifically addressed by the law. The assumption of "fair use" should be applied to each. Computer software, while not legally defined, is assumed to have the same protection a "literary work" would have. Electronic format does not change the nature of the work relative to copyright. Once again, much is left to interpretation until definitive laws are passed.

Other issues involving audiovisual material, collection maintenance, reserves etc. also have copyright implications. Rest assured, the issue of copyright compliance will become more complex as new technologies and lawsuits are produced. Individuals and libraries are now, more than ever, held accountable for their actions.

ANNOUNCEMENT

1997 REGIONAL SIG MEETINGS

NORTHEAST
Washington, DC — March 13-15, 1997
For details on Basic Science Education SIG activity contact:
Penny Hansen, Ph.D. — TEL: (+) l-709-737-6446
phansen @kean.ucs.rnun.ca

CENTRAL
Detroit, MI — April 17-20, 1997
For details on Basic Science Education SIG activity contact:
Murray Saffran, Ph.D. — TEL: (+) l-419-381-4131
saffrnn@opus.mco.edu

SOUTHERN
Augusta, GA — March 20-23, 1997
For details on Basic Science Education SIG activity contact:
Gary Rosenfeld, Ph.D. — TEL: (+) l-713-792-5987
grosen @ farmrl .med.uth.tmc.edu

WESTERN
Tucson, AZ — April 3-5, 1997
For details on Basic Science Education SIG activity contact:
Bill Galey, Ph.D. — TEL: (+) l-505-277-2889
bgaley@medusa.uinm.edu

ARTICLE

ESTABLISHING A GLOBAL INFORMATION NETWORK FOR MEDICAL SCIENCE EDUCATION

Roger W. Koment, Ph.D.
BSEF Executive Director

Ever since the idea was formed to bring basic science faculty together to address issues in medical education, we have been searching for better and more efficient means to communicate. It began in 1988 within the Association of American Medical Colleges Group on Educational Affairs (AAMC:GEA), when a small number of individuals agreed to meet on an annual basis to discuss how proposed changes in curriculum would affect the basic sciences. Many of us had for years been experimenting within the courses we directed, and felt the need to learn from others by sharing the instructional techniques that resulted. In the beginning, we attracted individuals in the traditional preclinical disciplines of Anatomy, Behavioral Sciences, Biochemistry, Microbiology, Pathology, Pharmacology, and Physiology. Our designation within the AAMC:GEA became that of a Special Interest Group (SIG), and this component of our organization continues to fill a vital role within North American medical education. In 1990 we developed four Regional Chapters in North America, each headed by a Regional Director. Since that time these Chapters have held regular meetings and contributed significantly to the four Regional GEA~ conferences each spring. Annual and Regional meetings of the AAMC:GEA SIG on Basic Science Education thus became the first ongoing means of communication between our rapidly growing membership.

A second means of communication began in the summer of 1991 with the first issue of this semi annual publication, then titled *The Forum.* This vehicle also has matured with time (Table 1) and each issue now represents, on recent average, the scholarly contributions of 24 individuals per issue (Editors, Authors, and other Contributors). Through National and Regional meetings, distribution of a semi-annual publication, and expanding awareness throughout North America of the mission of this SIG, it did not take long before our membership grew to encompass individuals from every medical school within AAMC jurisdiction.

In 1993, the Basic Science Education Forum (BSEF) became fully operational as an autonomous group independent from the AAMC:GEA, yet parallel in all respects to the SIG from which it was spawned. This was our solution in response to requests from faculty in Europe and South America to permit those outside of AAMC-affiliated schools to officially join in our activities. Opportunities developed rapidly with the start in 1993 of the Biennial International Conferences, development of the MICRONET listserv on the Internet (1994), and most recently, the creation of our new site on the World Wide Web (WWW) http://www.usd.edufBSEF (1996). From the humble beginnings of a few idealistic individuals within a Special Interest Group, to our current status of over 2,000 men and women in 76 countries of the world (Figure 1), all members of both SIG and BSEF share a common desire. That is, to be informed and to lead their discipline into its optimal role in the training of medical students in the fundamental sciences of medicine.

But we have not stopped there! With expanding size comes an increased responsibility to provide the services most needed by our membership. This year has seen the beginning of our most ambitious project in communication to date. Since inception, computerized electronic mail (E-mail) has served as a vital technique to facilitate the work of the Executive Committee, conference Program Committees, and to expedite contact between individual members of both SIG and BSEF. Successful governance of our SIG depends upon continued electronic communication between the four Regional Directors in North America with the SIG Executive Director (RWK).

Table 1. The *Basic Science Educator*

ISSUE	PAGES	CONTRIBUTORS
Summer, 1991*	6	5
Winter, 1992*	7	10
Summer, 1992*	12	11
Winter, 1993*	17	14
Summer, 1993*	21	17
Winter, 1994	22	22
Summer, 1994	23	20
Winter, 1995	26	24
Winter, l996	27	24
Summer, 1996	31	28

∗ Originally titled *The Forum*

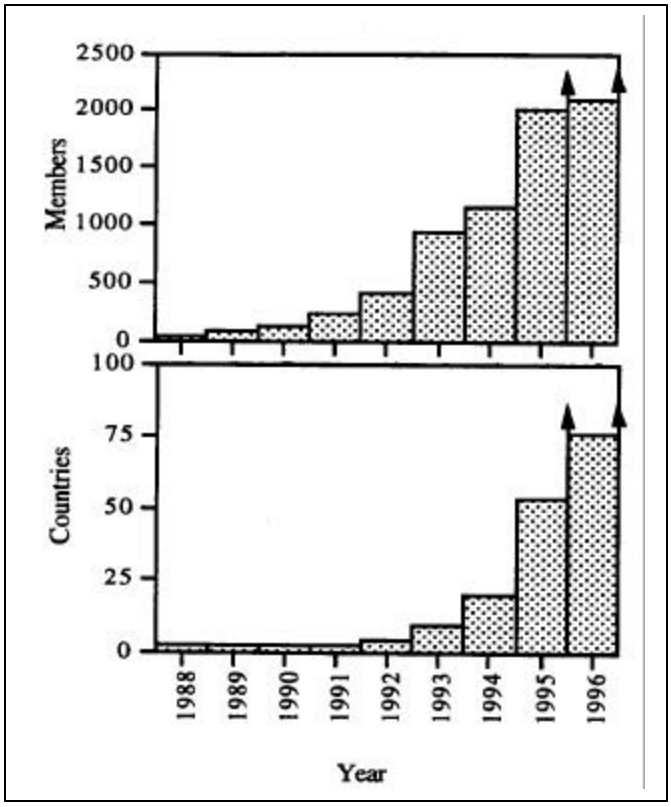

Figure 1. Combined Memberships in the AAMC:GEA Basic Science Education Special Interest Group and the Basic Science Education Forum.

What has been lacking is an analogous system for governance of the ESEF. From the data in Figure 1, we predict that membership will continue to increase around the world as word of the BSEF spreads. Yet with each country which joins, our governance and communication resources become more thinly stretched.

Therefore, the project we have begun is to establish a system of Regional BSEF Offices and Regional BSEF Directors, one in each country where we have members. These Regional Directors will have several responsibilities. Most importantly, each will participate as a communication access point, or "node", for his/her country on a Global Computer Network to facilitate the transfer of information. Initially this will be by computer lists but eventually by computer listserv or WWW technology. Ideas, opinions, experiments, collaborative and faculty exchange programs, and other opportunities will be regularly disseminated over this network from a variety of sources throughout the world. Regional Directors will further distribute this information (translated into the appropriate language) not only within their medical university, institute, or school, but to contacts in other medical institutions throughout the country. Likewise information from within any country may be sent to the Regional Director to be posted on this international network. A current Directory of BSEF members within the country will also be maintained by each Office, and Regional Directors will be encouraged to reach as many medical faculty as possible. Both locally obtained resources and those of the BSEF will be used to help individual Directors with regional activities, including the development of special projects in medical science education, regional or area conferences, faculty exchanges, publications, etc.

Our intent is to promote communication between all individuals charged with the task of preparing the next generation of physicians by providing access to this information network. Articles for the *Basic Science Educator* may be submitted to the Regional Office for translation into English and then forwarded directly to the Editor-in-Chief, or appropriate Associate Editor, for consideration of publication. We foresee that eventually our publication will be electronically transmitted twice each year to all Regional Directors for translation into the appropriate language(s), and, by printed copy or electronically, disseminated to every medical school within their country.

Ironically, some still fear computers and the dramatic changes they have brought to all human societies. But computers have accelerated communication among the peoples of this world, and have allowed an idea whose time has come to completely encircle the Globe in less than four years. The building of this unified system for disseminating ideas and opportunities in medical science education will help bring equality between nations and permit all voices to be heard. It will provide a substantial infrastructure for governing the Basic Science Education Forum and a benefit to all those who share our common task of creating physicians for the 21st Century.

STRAIGHT OUT OF THE FORTUNE COOKIE JAR

Some people make things happen,
Some watch things happen,
While others wonder what has happened!

Anonymous

INTERNATIONAL PERSPECTIVE

INTERIM EDITOR: Roger W. Koment, Ph.D., BSEF Executive Director

In our ongoing efforts to acquaint readers with how medicine, and especially the fundamental sciences of medicine, are taught around the world, we are pleased to feature the medical education system of Italy in this issue of the *Basic Science Educator*. We in the United States and Canada teaching in a 4 year undergraduate medical education system, should especially be attentive to the problems and solutions presented by our colleagues who teach in the much more common 6 year system and its variations. There is much we can learn. Student admissions procedures around the world do vary, and as noted for Italy, changes in policy can have significant effects on the resources available and outcome for students. We also may observe that many countries already devote a much smaller percentage of time to lectures (e.g. Italy = 33%) than does the average medical school in North America, rather having an increased emphasis on group and practical studies. This becomes of even greater interest when we realize average class sizes abroad are generally much greater than in North American medical schools. Despite class size differences, it is my personal bias that we in North America depend too heavily on multiple choice examinations and should look more closely at the European models for assessing student learning.

We are fortunate to have two distinguished authors contribute to this column. Both are faculty at the University di Torino (Turin) located in the northern part of Italy, and both maintain influential roles in the European system of medical education. A Geneticist and Biochemist by training, Professor Sergino Curtoni holds strong opinions regarding many issues in which the BSEF is involved. His personal influence is wide reaching, especially as the President of the Association of Medical Schools of Europe (AMSE). Professor Franco Cavallo is also deeply involved with many aspects of student training. Recently he was elected President of the Association of Schools of Public Health of the European Region (ASPHER). We welcome their contribution with its unreserved candor describing both successes and continuing problems.

ARTICLE

UNDERGRADUATE AND POSTGRADUATE TRAINING OF HEALTH PERSONNEL IN ITALY

Sergio Curtoni, M.D., Ph.D.* and Franco Cavallo, M.D., Ph.D. §

* Department of Genetics, Biology, and Clinical Chemistry
§ Department of Hygiene and Community Medicine
University of Torino
Torino 10126, Italy

*TEL: +39-11-670-66-68 FAX: +39-11-670-40-40
§TEL: *+39-11-670-65-56* FAX: *+39-11-670-65-5* l
§E-MAIL: fcavallo@golgi.molinette.unito.it

In Italy it is the responsibility of medical schools to train medical doctors, dentists, and specialists. How many for each category is determined by various mechanisms. The number of entering students is highly regulated, this being the responsibility of each school. Thus, the availability of teaching resources generally will determine the size of each entering class in Italian medical schools. The course of undergraduate medical training is 6 years.

The number of specialists trained in medical schools is determined by a joint decision of the Ministry of Health and the Ministry of University and Scientific Research, taking into account the current need of each specialty within the country. In accordance with the European Union rules, specialty training in Italy is now *4-5* years. Graduates accepted for specialty training are required to work on a full-time basis performing patient care duties in teaching hospitals, for which they receive a salary from the Ministry of Health.

For comparison, training for Dentistry requires 4 years. Programs for other health personnel (e.g. nurses, rehabilitation experts, logopedists, orthoptics, etc.), trained in the past by the National Health Service, have recently been assigned to University Medical Schools, generally with specific curricula of 3 years duration.

All training programs have a *numerus clausus* fixed by each medical school which determines the number of entrants based on the availability of instructors and of teaching facilities.

UNDERGRADUATE MEDICAL EDUCATION IN ITALY

Until the mid-eighties, the curricula of all Italian universities were ruled by a law established in 1938. In 1986 a new law called for a radical curriculum reform of the undergraduate program in medicine, and this new curriculum was implemented in 1988 at all medical schools.

After seven years of experience, some aspects of the new curriculum have recently been modified, and thins "further reformed" curriculum is being implemented in the 1996-97 academic year. The following data are drawn therefore from the experience of the originally reformed curriculum, while the rules to which we will refer, are those of the recently modified curriculum.

Number of students and graduates

Until 1988, Italy was one of the few European countries with free admission to medical schools; i.e., there was no *numerus clausus.* Originally, this was not a problem since

only students coming from the "Lyceum" could enter a University Medical School. Since Lyceum accounts only for a minority of all secondary school students, the number entering universities was reasonable. But in 1969 a new law allowed all students with a high school degree to be admitted to the university. As a consequence, during the seventies and eighties, an enormous number of students were admitted, and medical schools suffered an increasing and irreversible overload. This resulted in difficulties in teaching, particularly for bedside teaching which is essential in medical training. Another consequence was a high proportion of dropouts (more than 60%). Nevertheless, a high number of students were able to graduate, and the number of medical doctors rose in Italy to the highest level within the European Union (a doctor/population rate of 1:226 compared to an overall rate for the European Union of 1:302).

In 1988, the aforementioned reform of undergraduate medical studies was actually implemented, including also for the first time the task for each medical school to fix a *numerus clausus*. The student/population admission rate dropped remarkably thereafter to approximately 1:7,500 (overall European Union rate is l :9,200). Six years later, the student cohorts entering medical schools after that date demonstrated a normalization of the dropout rate; i.e. from 61% to ***25%.*** It seems likely, however, that this *25%* rate will decrease further in the coming years. The reduced number of students allowed for circumstances of better clinical training.

Unfortunately, the lower number of graduates will not decrease the overall number in the short term. Since the largest number of doctors graduated during the last 20 years, the present yearly graduation rate allows us to predict that the total number of doctors in Italy will continue to increase for at least the next twelve years.

Student selection for admission to medical school

Though each medical school may establish its own rules for student admissions, all schools have agreed to follow similar guidelines. Admission is
based upon candidate achievement, with the first part (20% to 30%) of the overall admission score being allocated to the High School final graduation score. The remainder depends upon the outcome of a specific admission examination. This examination is a multiple choice test covering the basic secondary school disciplines of Biology, Chemistry, Mathematics, and Physics. In some universities part of the test items are based on pure logic and reasoning. Each year a national commission established by the medical schools prepares a catalogue of several thousands of items, elaborated, reviewed and corrected by the individual schools. This catalogue is also of great help to many schools in preparing their own admission examination.

The ratio between candidates for medical schools and entering students is approximately 1:2.5, admittedly somewhat lower than the European Union average ratio of approximately 1:3.

Course length and teaching/learning hours

Once admitted, students begin a six year course of undergraduate medical training which is subdivided into 12 semesters: 5 pre-clinical and 7 clinical. The overall number of teaching/learning hours is 5,500 as requested by European Union directives. At present, a maximum number of 1,800 hours (33%) is allowed for formal teaching (lectures), and not less than 1,700 hours (31%) must be designated for practical and interactive activities, such as small group work and clinical practice. An obligatory internship requires approximately 800 hours (15%), and the remaining 1,200 hours (22%) are allowed for autonomous (independent) learning.

Traditionally, the teaching/learning program has been almost exclusively discipline-based, although recently, a strong impetus toward integration of disciplines has developed. It is certain this trend will continue and we expect to see even more integration planned for the future.

Clinical practice performed mostly during the last three years of the curriculum, is done only in the University hospitals. No involvement of the General Practitioners has been considered thus far.

Teaching/learning program -- Assessment

The number of examinations within the 6 year undergraduate training period must not exceed 36, although students must successfully pass them all. These are mainly discipline-based exams, but the developing trend toward integration encourages cross disciplinary questions. The majority of examinations are performed orally, although a small proportion are written (so-called "objective assessment"), and a small proportion include some assessment of the student's hands on clinical skills.

Quality assessment of the medical schools

A quality evaluation of the medical schools, particularly concerning teaching, has recently become part of national rules and will be implemented in the near future. This will be an internal evaluation, meaning it will be planned and performed by each medical school itself.

Student outcomes

As mentioned previously, the new undergraduate medical curriculum was implemented in 1988. Following completion of the sixth year, a nationwide inquiry attempted to establish the outcome of those students who had entered in 1988. The results are presented in Table 1

Table 1. Outcome for students admitted to Italian medical schools in 1988

Graduated within the 6th year	26%
Graduated in the summer of the 7th year	6%
Still in the medical school	40%
Transferred in other Italian medical schools	7%
Dropouts	21%
Total	100%

These data indicate that the percentage of students graduated immediately at the end of the sixth year seems very low, with the percentage of dropouts very high. However, these numbers are much better than those from previous years, and it seems quite likely these rates will "normalize" in the next few years.

BASIC SCIENCES IN THE UNDERGRADUATE MEDICAL CURRICULUM

a. Mandatory courses

In Italy, the basic sciences are taught during the first three years, or 6 semesters. In the recently modified curriculum, this will now require only 5 semesters.

Under present national rules, the following courses are mandatory: Physics, Statistics, Chemistry, Biochemistry, Biology, Genetics, Histology, Anatomy, Biophysics, Physiology, Pathophysiology, Microbiology, and Immunology. For several of the above-mentioned disciplines, only basic aspects are discussed during the first triennium. During the second triennium, they are again considered but from a more clinical point of view: Epidemiology, Medical Genetics, Clinical Biochemistry, Clinical Microbiology, and Clinical Immunology.

b. Non-lecture formats used in basic sciences courses

Beyond formal lectures, other teaching/learning activities in basic sciences in Italy include small group work for solving biological problems, computer-aided learning, and practical laboratory work. Although small group work is used in a relatively low proportion of medical schools, the use of computer-aided instruction is increasing continuously. Practical laboratory work is seen less, the reasons being a relatively low number of teachers in basic science disciplines and the lack of laboratory facilities for students.

The shortage of space and facilities for teaching activities other than formal lectures is a common problem all over Italy, and the reason lies in the last 25 years of history of Italian Universities. During that time and especially during the seventies and eighties, the huge increase in student admissions resulted in two major consequences. The first was that available space for practical activities became absolutely insufficient, the number of students being so high there was no hope to provide adequate facilities for all. The second reason was that the number of instructors became dramatically insufficient, and consequently a large number of new faculty were recruited into medical schools. Space previously used for student activities therefore had to be given to the new faculty as offices and research laboratories. This situation has recently improved however, with the new law permitting fewer numbers of annual entrants, and the slow but steady construction of new student facilities.

Dropout rate

Many students choose to quit medical training before the end of their program. The results of the national inquiry recorded in Table l allowed us to analyze the exact time when students left medical school. Table 2 shows the percentage of students leaving after each curricular year.

Table 2. Dropout rate during the medical curriculum

Year	Dropouts*
1st	9
2nd	5
3rd	4
4th	l
5th	l
6th	l

* Expressed as percent of the total number of students admitted to the first year

It is clear that the great majority of dropouts leave medical school during the pre-clinical years. This is not an unexpected finding since the preclinical triennium is often considered by students to be heavier than the subsequent one. In fact, a high proportion of medical students entering the clinical triennium had not yet completed all the exams required during the first three years. Still, quite a number of these students were able to graduate at the end of the sixth year. To do this required that they pass the current examinations (of year 4) while also preparing for, and passing, their remaining exams from the first triennium.

Taken together, Tables l and 2 demonstrate that while we have had success, some problems still remain within our system. Initially these problems were caused by excessive enrollment, but this has been corrected through our laws and reformed admissions procedures. However, the difficulty of learning the scientific disciplines presented in the *first* triennium remains a challenge for every medical student. As no law must compromise the necessity of a firm foundation in the sciences, we must find other answers to this problem of the heavy burden of training in the first years of medical school in Italy.

NEWS AND VIEWS FROM THE REGIONS

SOUTHERN REGION

GARY C. ROSENFELD, Ph.D.
DIRECTOR

For the second consecutive year the AAMC Southern Group on Educational Affairs (SGEA~) organized their annual spring meeting according to the suggestions and interests of their component regional Special Interest Groups (SIGs). For the first time, communications about the meeting with the approximately 150 members of the Southern Regional Chapter of the SIG on Basic Science Education (BSE-SIG) was conducted exclusively by E-mail using the recently constructed Southern Regional Chapter E-mail Database. (Those of you in the region who were not contacted should complete and return the form below.) Hosted by the University of Florida College of Medicine, the theme for the meeting was "Education: Can it Shape the Future of Health Care". A reflective, sobering and entertaining keynote lecture was delivered by University of Florida President Dr. John Lombardi on "Medical Education in the University Setting" followed over the course of two days by a number of very interesting discussion groups, panel sessions, workshops and poster sessions.

One recurring topic of this meeting was the integration of basic sciences into the clinical years of the medical school curriculum, a stated but generally unrealized goal of most medical educators. In this regard, the Southern Regional Chapter of the BSE-SIG hosted a session titled *Basic Science Education in the Clinical Years: Much Ado About Nothing?*, in which Dr. Joanne Moore (University of Oklahoma), Dr. Steve Nadeau (University of Florida), and I shared our ideas, experiences and frustrations. Members of the audience engaged in a lively debate, some arguing that the basic sciences are already an integral component of the medical student third and fourth year experiences, others arguing that they are not. As could have been anticipated, a consensus was not reached, but rather agreement that the dialogue should continue.

I would appreciate any suggestions concerning basic science issues to consider for next year's SGEA meeting at the Medical College of Georgia in Augusta, Thursday, March 20- Saturday, March 22, 1997. Please send these on the form below, as well as additions to our Southern Region E-mail database.

PLEASE RETURN TO: **Gary C. Rosenfeld, Ph.D.** FAX: 1-713-792-5911
E-MAIL: grosen@farmrl .med.uth.tmc.edu

Name/Degree: _____ Tel: _____
Title: _____ Fax: _____
Address: _____ E-mail: _____
_____
_____
_____

Suggestions/Topics for future Southern Region BSE- SIG meetings:

_____
_____
_____

NEWS AND VIEWS FROM THE REGIONS

CENTRAL REGION

MURRAY SAFFRAN, Ph.D.
DIRECTOR

The Central Region Chapter of the AAMC:GEA Special Interest Group on Basic Science Education met on April 18, 1996 in Chicago Illinois. This was during the annual CGEA~ conference which this year was hosted by Rush Medical College. Our topic was *Textbooks: Selection and Use.*

Audience consensus confirmed that textbooks as a study aid for students ranked absolutely last after note service, faculty handouts and even *last year's* note service! With that information as background, the discussion focused on the value of textbooks in general. It was agreed that although they can be used as reference sources, the rapid changes in many fields make obsolescence a continual problem; and most textbooks purchased in medical school are out-of-date when the new physician begins in actual practice.

If used as a study aid, should textbooks then be review or comprehensive? This generated much discussion from the audience with varying views expressed. Large detailed textbooks are least useful in the crowded schedule of medical students, whereas quick review books, while more popular with students, are seldom recommended by faculty. Students vote with their dollars and buy the books that serve them best, e.g. the Lippinncott illustrated texts in biochemistry and pharmacology. However, errors and omissions in such review books are often detected by faculty.

It was the opinion of many that content of basic science courses is dictated by perceptions of USMLE (United States Medical Licensing Examination) questions within each discipline. Although the format for the USMLE has changed, the anxiety that a course will omit essential information drives faculty to consider completeness as a virtue in recommending a textbook. Few contemporary texts accurately reflect the content of USMLE because that specific content is largely unknown. Therefore thins rationale for selection is outdated.

It was agreed that few basic science courses are designed around a specific textbook, as faculty are very individual in selection and depth of each topic covered. Therefore, no one textbook will be completely acceptable to all instructors, with it being noted that even some of the best sellers are deficient in clinical content. Changes in technology may soon alter the way textbooks are produced and used, and interactive and computerized formats will likely displace passive reading and study in the near future.

The discussion ended without a conclusion upon which all could agree, but airing opinions and realizing others held similar concerns was a useful end in itself.

We are always interested to learn of the topics you consider should be addressed during the Regional Chapter meetings. Please send your suggestions for future meetings to me on the following:

PLEASE RETURN TO: **Murray** Saffran, Ph.D FAX: 1-419-382-7395
E-mail: saffran@opus.mco.edu

Name/Degree: _____ Tel: _____
Title: _____ Fax: _____
Address: _____ E-mail: _____
_____
_____
_____

Suggestions/Topics for future Central Region BSE- SIG meetings:

_____
_____
_____

ARTICLE

RETHINKING FACULTY ROLES AND REWARDS: THE AMERICAN ASSOCIATION OF HIGHER EDUCATION APPROACH

Linda Z. Nieman, Ph.D.
Assistant Provost for Faculty Affairs
Medical College of Pennsylvania & Hahnemann University
Philadelphia, PA 19102
TEL: 1-215-762-8458 FAX: 1-215-762-6052
E-MAIL: neinian@medcolpa.edu

Public leaders have focused attention upon institutions of higher education and have asked some very hard questions about the outcomes produced by educational institutions. For example, do taxpayers and communities benefit enough to justify the monies spent on grants? How can we ensure that faculty work is tied to educating and benefiting our community? Should the tenure system remain in place? What will be the faculty roles of the future, and are we planning adequately for them?

These questions unsettle many basic science educators. However, the fact that the questions are asked challenges us to rethink faculty roles and rewards and then to seek a network of academic colleagues engaged in answering the same questions. Each year since 1992, the American Association of Higher Education (all institutions of higher education) has held a conference on faculty roles and rewards. It serves a setting for gathering constructive ideas and materials on faculty careers in an era of profound changes. Each conference is designed to assist participants gain a sense of the challenges that we face, to gather ideas and materials from institutions that are dealing with similar challenges and to gain momentum for planning some of the reforms in their home institutions.

Faculty and administrators are encouraged to attend AAHE as teams so that they can work together on projects when they return to their home institutions. Since 1993, a team of faculty (including the provost for two years) from the Medical College of Pennsylvania and then from the consolidated Medical College of Pennsylvania and Hahnemann University (MCPHU) has attended the conference. As a result, we gained the momentum and the materials to implement an institution-wide system of faculty professional development, to expand the meaning of scholarship within our tenure and promotion guidelines, and to introduce educators' portfolios and a system of faculty evaluation within several university departments.

The 1995 A~AHE conference had one session presented by Carol J. Bland, Ph.D. and Richard L. Holloway that was devoted to describing what the presenters called 'A Crisis of Mission: Faculty Roles and Rewards in an Era of Health Care Reform.(l) The session was later summarized in the AAHE publications, *Change.* The authors concluded that we now are investigating ways to manage change and stabilize their funding sources. These include (in) changes to the faculty rewards (including revising/ rewriting tenure and promotion policies so that they give greater recognition to teaching, clinical service, and community service; (ii) encouraging collective projects and funding sources; (iii) implementing faculty accountability and evaluation systems; (iv) and instituting sound business practices within departments.

The 1996 conference looked closely at practices already implemented in medical schools for responding to the "crisis". A workshop for 40 participants presented the Faculty Professional Development Program at The Medical College of Pennsylvania and Hahnemann University. In this program, unit leaders, including basic science chairs, meet with their faculty in an annual conference at which goals, ways of accomplishing faculty work, and methods of assessing success in accomplishing goals are discussed. A second session, "Rewarding Service in a Medical School Setting was Moderated by Dr. Linda Nieman (MCPHU). Richard Holloway (Medical College of Wisconsin) Mary Clark (Harvard University School of Medicine) James Farmer(University of Illinois at Urbana Champaign) participated as a panel, describing their institutions' methods of documenting and recognizing service activities. An AAHE publication, Making the Case for Public Service, includes documents useful in preparing and presenting professional service activities as scholarship. (2)

Aside from the sessions specifically designed for medical school faculty, there are numerous sessions at the AAHE conference on topics of continuing concern to all faculty in higher education such as honoring different forms of scholarship; organizing for collaboration and change; rethinking academic careers; gaining control of accountability; and faculty responsibility for public life; use of the educational portfolio and use of information technology within education.

From the end of World War II until the 1990's scholarly endeavors in higher education settings were associated primarily with doing research. Faculty who emphasized teaching were less likely to be promoted. Now, the expectations of basic science faculty entering the academic arena are changing drastically. It is important for basic science educators to understand the trends in higher education and to use the information for directing their own careers. The 1997 AAHE conference will have a special focus on tenure. It will be held in San Diego, California from January 16-19, 1997. Please contact Ms. Pamela Bender, the AAHE conference coordinator at 1-202-293-6440 for more information.

REFERENCES

1. Bland CJ, Holloway RL. A Crisis of Mission: Faculty Roles and Rewards in an Era of Health-Care Reform. Change. September/October 1995, 30-35

2. Lynton, EA. Making the Case for Professional Service. Washington, D.C.: American Association for Higher Education, 1995

BSEF GLOBAL Memberships

Membership in the Basic Science Education Forum currently represents faculty from medical schools geographically distributed throughout 76 countries of the world.

Argentina
Australia
Austria
Azerbaijan
Bahrain
Bulgaria
Bangladesh
Bolivia
Brazil
Canada
Chile
China
Colombia
Costa Rica
Croatia
Czech Republic
Denmark
Ecuador
Egypt
Finland
France
Georgia
Ghana
Germany
Hungary
India
Indonesia
Ireland
Israel
Italy
Japan
Jordan
Kenya
Korea
Lebanon
Macedonia
Malaysia
Mexico
Mozambique
Netherlands
New Zealand
Nicaragua
Nigeria
Norway
Pakistan
Panama
Philippines
Poland
Portugal
Romania
Russia
Saudi Arabia
Singapore
Slovakia
Slovenia
South Africa
Spain
Sri Lanka
Sudan
Sweden
Switzerland
Syria
Taiwan
Tanzania
Thailand
Tunisia
Turkey
Uganda
Ukraine
United Kingdom
United States
Venezuela
Vietnam
West Indies
Yugoslavia
Zimbabwe

§ As of July 1,1996

ANNOUNCEMENT

CALL FOR NOMINATIONS - ASSOCIATE EDITOR

After four years of exemplary work as Associate Editor of the section on ***Innovations in Basic Science Teaching and Learning,*** Dr. Thomas Devlin has asked to be relieved of those duties. The Editorial Board is, therefore, seeking nominations for his replacement. Responsibilities include developing and coordinating an overall plan for continuity of the column, soliciting and promoting articles and authors who have expertise in innovative basic science education, and working with authors to develop their contributions for publication. Associate Editors should be willing to serve in that capacity for at least two years. Please mail/fax/phone/e-mail nominations to Roger W. Koment, Ph.D., BSEF Executive Director, at the numbers listed on page 31. Self nominations are welcome.

ANNOUNCEMENT

The Central Regional Chapter of the Basic Science Education SIG has initiated a search for a new Regional SIG Convener. To begin this process, we are seeking nominations of potential candidates who have a demonstrated interest in both SIG and BSEF goals, and a willingness to provide leadership in the regional SIG chapter. All nominations will be considered by the Nominating Committee. Platforms and Biosketches of two candidates selected from the nominees will be presented in the Winter 1997 issue of the *Basic Science Educator*, along with a fax/mail return ballot. A Regional Convener:

- Organizes and directs all regional SIG programs
- Chaks the annual regional Basic Science Education SIG Chapter meeting
- Generates the Annual Regional Report to the AAMC:GEA Executive Committee *(published in the Basic Science Educator)*
- Represents the Basic Science Education SIG at regional GEA functions
- Advises the National SIG Convener in all matters
- Substitutes for the National SIG Convener if requested
- Encourages recruitment of additional regional SIG members
- Designs and conducts regional projects in basic science education as well as those in conjunction with the National SIG Convener

Nominations for Central Regional SIG Convener are welcomed from all our Readers, although nominees must 1) have agreed to be nominated, and 2) be at an AAMC-affiliated medical school in any of the following states and provinces: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin *II* Manitoba, Ontario, and Saskatchewan

==========

✂ Cut along dashed lines and mail

For Central Regional Convener, l wish to nominate:

NOMINEE NAME _____
ADDRESS _____
_____
_____
_____
Tel: _____
Fax: _____
E-mail: _____

YOUR NAME _____
ADDRESS _____
_____
_____
_____
Tel: _____
Fax: _____
E-mail: _____

Please mail or fax return this nomination form to:

Todd R. Olson, Ph.D.
Chair, Central Region Nominating Committee
Department of Anatomy & Structural Biology
Yeshiva University
Albert Einstein College of Medicine
Bronx, NY 10461-1602

Fax: 718-430-8997

(Tel: 718-430-2847)

E-MAIL: olson@aecom.yu.edu

Postmark Deadline: ***FEBRUARY 1, 1996***

ANNOUNCEMENT

The Western Regional Chapter of the Basic Science Education SIG has initiated a search for a new Regional SIG Convener. To begin this process, we are seeking nominations of potential candidates who have a demonstrated interest in both SIG and BSEF goals, and a willingness to provide leadership in the regional SIG chapter. All nominations will be considered by the Nominating Committee. Platforms and Biosketches of two candidates selected from the nominees will be presented in the Winter 1997 issue of the *Basic Science Educator*, along with a fax/mail return ballot. A Regional Convener:

- Organizes and directs all regional SIG programs
- Chaks the annual regional Basic Science Education SIG Chapter meeting
- Generates the Annual Regional Report to the AAMC:GEA Executive Committee *(published in the Basic Science Educator)*
- Represents the Basic Science Education SIG at regional GEA functions
- Advises the National SIG Convener in all matters
- Substitutes for the National SIG Convener if requested
- Encourages recruitment of additional regional SIG members
- Designs and conducts regional projects in basic science education as well as those in conjunction with the National SIG Convener

Nominations for Western Regional SIG Convener are welcomed from all our Readers, although nominees must 1) have agreed to be nominated, and 2) be at an AAMC-affiliated medical school in any of the following states and provinces: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming *II* Alberta and British Columbia

==========

✂ Cut along dashed lines and mail

For Western Regional Convener, l wish to nominate:

NOMINEE NAME _____
ADDRESS _____
_____
_____
_____
Tel: _____
Fax: _____
E-mail: _____

YOUR NAME _____
ADDRESS _____
_____
_____
_____
Tel: _____
Fax: _____
E-mail: _____

Please mail or fax return this nomination form to:

Denise Ferrier, Ph.D.
Chair, Western Region Nominating Committee
Department of Biochemistry
Allegheny University of Health Sciences
Medical College of Pennsylvania/Hahnemann SOM
2900 Queen Lane
Philadelphia, PA 19129

Fax: 215.843-8849

(Tel: 215-991-8292)

E-MAIL: ferrier@allegheny.edu

Postmark Deadline: *FEBRUARY 1, 1996*

BASIC SCIENCE EDUCATION FORUM

BASIC SCIENCE FACULTY PROMOTING UNITY IN MEDICAL EDUCATION

EXECUTIVE DIRECTOR
Roger Koment, Ph.D. Univ of South Dakota, Vermillion
FAX: (+) 1-605-677-6299 rkomeflt@sunbird.usd.edu

NORTHEAST REGIONAL DIRECTOR -- North America
Penny Hansen, Ph.D. Memorial Univ of Newfoundland, St John's
FAX:(+) 1-709-737-5190 phanscn@kcan.ucs.mun.ca

SOUTHERN REGIONAL DIRECTOR -- North America
Gary Rosenfeld, Ph.D. Univ Texas, Houston Medical School
FAX: (+) 1-713-792-5911 grosen@farmrl.med.uth.tmc.edu

CENTRAL REGIONAL DIRECTOR -- North America
Murray Saifran, Ph.D. Medical College of Ohio, Toledo
FAX: (+) 1-419-382-7395 nisaffran@magnum.mco.edu

WESTERN REGIONAL DIRECTOR – North America
William Galey, Ph.D. Univ of New Mexico, Albuquerque
FAX: (+) 1-505-277-8738 bgaley@medusa.unm.edu

***MICRONET* COMPUTER NETWORK**
James Swierkosz, Ph.D. St. Louis University, St. Louis
FAX: (+) 1-314-773-3403 swierkoszjc@sluvca.slu.edu

OUR PURPOSES :

- To be the voice of basic medical science education and educators, promoting medical education firmly grounded within the sciences
- To share current techniques and innovative ideas for teaching the sciences fundamental to the practice of medicine; through our semi-annual publication, the *BASIC SCIENCE EDUCATOR*, MICRONET Listserv on the Internet, and Biennial International Conferences on Strategies for Basic Science Education
- To speak for reasoned progress in the development of self-directed, lifelong learning skills through encouragement of faculty involvement in curricular affairs
- To address, and where possible, formulate consensus on issues in medical education which have direct impact on the basic sciences and basic science faculty, and work toward resolving these through interactions with appropriate organizations which can influence change in the academic medical community

The *BASIC SCIENCE EDUCATOR*

EDITOR-in-CHIEF
Gabriel Virella, M.D., Ph.D. Medical Univ of South Carolina
FAX: (+) 1-803-792-2464 virellag@musc.edu

ASSOCIATE EDITORS

INNOVATIONS In BASIC SCIENCE TEACHING and LEARNING
** *POSITION OPEN* **

THE EDUCATOR'S PORTFOLIO
Jay Menna, Ph.D. Univ of Arkansas, Little Rock
FAX: (+) 1-501-686-8160 jmenna@comdeanl.uazns.edu

INTERNATIONAL PERSPECTIVE
Roger Koment, Ph.D. Interim Associate Editor)

COMPUTER APPLICATIONS in BASIC SCIENCE EDUCATION
Michael Schmidt, Ph.D. Medical Univ of South Carolina
FAX: (+) 1-803-792-2464 schmidtm@musc.edu

SOCIAL ISSUES in the BASIC SCIENCES
David Bolender, Ph.D. Medical College of Wisconsin
FAX: (+) 1-414-266-8496 bolender@post.its.mcw.edu

==========

(,/) _____ If YOU received this by mail, you are in our Directory. Use for information updates.

(,/) _____ If you would like to be on our mailing list for future mailings, please return this form.

NAME _____
ADDRESS _____
_____
_____
_____

PHONE _____
FAX _____
E-MAIL _____

PLEASE RETURN TO:

Roger W. Koment, Ph.D.
BSEF Executive Director
Department of Microbiology
University of South Dakota
School of Medicine
Vermillion, SD *57069* U.S.A.
Tel: (+) 1-605-677-5174
FAX: (+) 1-605-677-6299
E-mail: rkoment@sunbird.usd.edu