

The Consortium of E-Learning in Geriatrics Instruction

Jorge G. Ruiz, MD,^{*†‡} Thomas A. Teasdale, DrPH,^{§||} Ihab Hajjar, MD,[¶]
Marianne Shaughnessy, PhD, CRNP,^{**} and Michael J. Mintzer, MD^{*†‡}

This paper describes the activities of the Consortium of E-Learning in Geriatrics Instruction (CELGI), a group dedicated to creating, using, and evaluating e-learning to enhance geriatrics education. E-learning provides a relatively new approach to addressing geriatrics educators' concerns, such as the shortage of professionals trained to care for older people, overcrowded medical curricula, the move to transfer teaching venues to community settings, and the switch to competency-based education models. However, this innovative education technology is facing a number of challenges as its use and influence grow, including proof of effectiveness and efficiency. CELGI was created in response to these challenges, with the goal of facilitating the development and portability of e-learning materials for geriatrics educators. Members represent medical and nursing schools, the Department of Veterans Affairs healthcare system, long-term care facilities, and other institutions that rely on continuing streams of quality health education. CELGI concentrates on providing a coordinated approach to formulating and adapting specifications, standards, and guidelines; developing education and training in e-learning competencies; developing e-learning products; evaluating the effect of e-learning materials; and disseminating these materials. The vision of consortium members is that e-learning for geriatric education will become the benchmark for valid and successful e-learning throughout medical education. *J Am Geriatr Soc* 55:458–463, 2007.

Key words: e-learning; geriatrics education; computer-assisted instruction

From the ^{*}Miller School of Medicine, University of Miami, Miami, Florida; [†]Geriatric Research, Education and Clinical Center, Veterans Affairs Medical Center, Miami, Florida; [‡]Stein Gerontological Institute, Miami, Florida; [§]College of Medicine, University of Oklahoma, Oklahoma City, Oklahoma; ^{||}Mental Illness Research, Education and Clinical Center, Veterans Affairs South Central Health Care Network, Oklahoma City, Oklahoma; [¶]Harvard Medical School, Boston, Massachusetts; ^{**}Geriatric Research, Education and Clinical Center, Veterans Affairs Medical Center, Baltimore, Maryland, and ^{**}School of Nursing, University of Maryland, Baltimore, Maryland.

Address correspondence to Jorge G. Ruiz, MD, FACP, Miami VAMC GRECC (11 GRC), 1201 NW 16 St, Miami, FL 33125. E-mail: jruiz2@med.miami.edu

DOI: 10.1111/j.1532-5415.2007.01095.x

Geriatrics educators face significant challenges in training healthcare professionals to deliver quality care to the burgeoning older population. Information technologies such as e-learning promise to make the work of medical educators in general, and of geriatrics educators in particular, more effective and efficient. E-learning uses Internet technologies to deliver a broad array of educational materials and training that enhances knowledge and performance.¹ Medical educators are increasingly using, creating, and evaluating e-learning to provide basic science and clinical instruction. This report describes how the Consortium of E-Learning in Geriatrics Instruction (CELGI) formulated a coordinated set of activities designed to address geriatrics educators' rationale and challenges in adopting e-learning. Specific responses by CELGI to several of these challenges, the consortium's current work, and the future role of CELGI and e-learning in geriatrics education are presented.

RATIONALE

Geriatrics professionals must consider a number of broad issues when working to deliver good-quality content for teaching and learning to healthcare professionals. First, although the number of older adults is increasing, there is a national shortage of healthcare professionals trained to meet the special needs of older adults.^{2,3} Although several national initiatives have been established to enhance the ability of nongeriatricians to teach geriatrics, resources are scarce for faculty development and the acquisition of additional faculty.

Second, undergraduate and graduate medical curricula are overcrowded, with many disciplines vying for additional time. Thus, gaining time to teach geriatrics is challenging. Third, geriatrics teaching emphasizes the move from tertiary medical centers to nontraditional educational settings, such as nursing homes, hospice, home care, and other community settings. This emphasis introduces important challenges to the distribution of instruction and educational content to faculty and trainees.

Fourth, the recent paradigm shift from a traditional, knowledge-based curriculum toward competency-based education requires greater accountability and efforts at assessment on the part of geriatrics faculty and thus additional time and resources to meet these new obligations.

The Liaison Committee on Medical Education, the Association of American Medical Colleges (AAMC), and the Accreditation Council for Graduate Medical Education have outlined requirements for assessing trainees' competencies. Geriatrics educators need efficient and effective approaches to help them meet these new challenges.

E-LEARNING IN GERIATRIC EDUCATION: OPPORTUNITIES AND CHALLENGES

E-learning offers geriatrics educators and trainees a range of opportunities to enhance teaching and learning in effective and efficient ways. E-learning is well suited to the learning needs of the post-*Sesame Street* generation: learners have more control over the course content, the learning sequence, the pace of learning, the time for learning, and often the media format, allowing them to adjust their individual experiences to meet their learning objectives.

In diverse medical education contexts, e-learning appears to be at least as effective as, if not better than, traditional instructor-led methods such as lectures.⁴ A review of more than a hundred articles in the e-learning literature revealed that e-learning is an efficient approach and resulted in knowledge gains that were comparable with other more-traditional educational methods.⁴ However, most research has compared e-learning with noncomputer instruction, which may not be ideal because of the lack of valid comparison groups.⁵ E-learning appears to be a pedagogically sound and more cost-effective approach to enhancing geriatrics education than can be achieved with traditional forms of learning.^{4,6}

E-learning can be a particularly efficient method of instruction, allowing students and faculty to make the most of their time. Students can use e-learning products on their own and in ways that target desired knowledge, two elements of adult learning theory. E-learning tools in clinical geriatrics offer media-rich self-instruction opportunities. For example, learners can review details of a physical assessment's scoring and interpretation from audio-visuals streamed on the Internet. Because of the presence of video and "clickable" links to relevant additional material, the potential to learn is greater than if print-based material alone was referenced. Moreover, the Web-stream to a personal computer makes it unnecessary to check a videotape out from a library, an obvious alternative to e-learning. This instant, repeatable, and media-rich access can free up curricular "face time" with faculty to focus on bedside teaching and role modeling. The systematic use of e-learning products designed to augment diverse clinical experiences can partially meet the challenge of developing effective instruction that is similar in content and quality across sites.⁶ In addition, computer networks such as the Internet and wireless devices are enhancing portability and facilitating the inclusion of distant faculty and trainees from different sites in a group activity. Moreover, e-learning technologies are currently used to capture learner interactions and facilitate competency evaluation through tracking and monitoring features, thereby improving the accountability of the learning process.

Nevertheless, e-learning presents substantial challenges. For faculty to fruitfully invest time in this endeavor and to minimize redundancy, academic institutions must ad-

dress at least four significant issues. First, e-learning design and development are expensive and require tremendous institutional effort and commitment. In addition to content experts, the initial investment required to develop e-learning includes an e-learning infrastructure, equipment, and a multidisciplinary team of programmers, multimedia specialists, instructional designers, and other technical personnel. All are necessary for the design, development, implementation, and deployment of the e-learning solution.

Second, geriatrics educators have few incentives to divert time from their clinical, research, and instructional activities to creating, using, and evaluating e-learning. For promotion, faculty must demonstrate academic scholarship, traditionally by publishing peer-reviewed articles in the principal journals of their specialties. To motivate and acknowledge clinician-educators, e-learning development must be accorded value as evidence of scholarship. Recently, the AAMC, at the request of the Council of Deans, developed a peer-review process for e-learning that specifically recognizes e-learning as scholarly products to be considered in faculty promotion and recognition.⁷ The AAMC's repository for e-learning materials, MedEdPortal, is piloting this system,⁷ and the Health Education Assets Library (HEAL) is using a similar system⁸

A third challenge is to develop and coordinate a comprehensive set of materials that cover all of the content and evaluation areas traditionally used by geriatrics educators. Educators in various institutions have developed an excess of curricular materials in certain areas and none in others. The Portal Of Geriatric Online Education (POGOe), is a Web-based educational clearinghouse for e-learning (and other) products in geriatrics, a source for all medical educators developing or seeking geriatric content to integrate into medical curricula to train diverse learners.⁹ A search in POGOe with the keyword "dementia" yielded 13 e-learning products, whereas "pressure ulcers" generated only one product.⁹ Furthermore, currently available e-learning materials lack coordination, guidelines, standards, and specifications. The result is a large number of e-learning materials of disparate quality and compatibility that, in sum, do not fully cover the field.

Fourth, although there is mounting evidence of the effectiveness and efficiency of e-learning, more research is necessary in this area, particularly in geriatric medical education.⁵ Developing short- and long-range evaluation strategies in tandem with product development would not only help demonstrate the effectiveness of these products, but would also indicate whether this form of education justifies the necessary money and resources when compared with more-traditional methods of instruction. Education evaluation science must progress to fully encompass e-learning modalities.

THE CONSORTIUM OF E-LEARNING IN GERIATRICS INSTRUCTION

No single institution can take on all these challenges. Small institutions cannot afford the staff and initial investment required to create and evaluate e-learning materials, yet these may be the ones most in need of e-learning to increase their faculty's ability to teach geriatrics. The CELGI was created in 2003, bringing together a cooperative group of

institutions, organizations, and faculty to begin to address the challenges and opportunities associated with the use of e-learning. Membership in this consortium consists of a multidisciplinary group of geriatrics educators in the fields of medicine, psychiatry, nursing, social work, and therapy, among others.

The Stein Gerontological Institute (SGI) spearheaded the development and implementation of the consortium. SGI, which had previously led a statewide effort in Florida to introduce technology into long-term care, had a track record of success in the formation, organization, and support of consortiums in healthcare education, including Florida's Teaching Nursing Home Program and the Florida Consortium of Geriatrics Medical Education. Thus, in 2004, SGI supported a series of meetings of geriatrics educators with expertise and interest in e-learning to discuss the formation of an e-learning consortium.

This group identified as their primary mission the development and portability of high-quality e-learning materials for gerontology and geriatrics professionals. CELGI membership now comprises an interdisciplinary group of geriatrics educators and technology experts from approximately 40 U.S. medical schools (MD and DO) and geriatric education centers; investigators and directors of education from Department of Veterans Affairs Geriatric Research, Education and Clinical Centers; academic gerontological nurse practitioners and educators; and geriatrics educators from Canada and Holland. Evidence of the spirit of collaboration between member institutions seeking to further the goal of supporting e-learning for geriatrics educators can be seen in the support of voluntary planning meetings and collaborative initiatives.

The Work of CELGI

CELGI members held discussion groups during 2004/05 to identify key areas requiring attention so that e-learning could be successfully incorporated into geriatric education. A national survey of geriatrics educators provided additional source material regarding development, use, and evaluation of e-learning.¹⁰ By 2005, membership consensus resulted in CELGI organizing around four initiatives:

- the design of e-learning specifications, standards, and guidelines or the adaptation of existing ones to geriatrics
- the development of a wide variety of e-learning products based on those specifications and guidelines
- the evaluation of these e-learning approaches through peer review and research
- the dissemination of these efforts to educators and the geriatrics community at large

CELGI's efforts to address each area are described below. In some instances, the work of individuals at member institutions is illustrative. In other instances, members at various institutions worked in collaboration.

Designing and Adapting Specifications, Standards, and Guidelines

Specifications, standards, and guidelines for the development of e-learning materials are necessary to ensure usability across all major institutions and information technology platforms. MedBiquitous¹¹ and International Virtual Med-

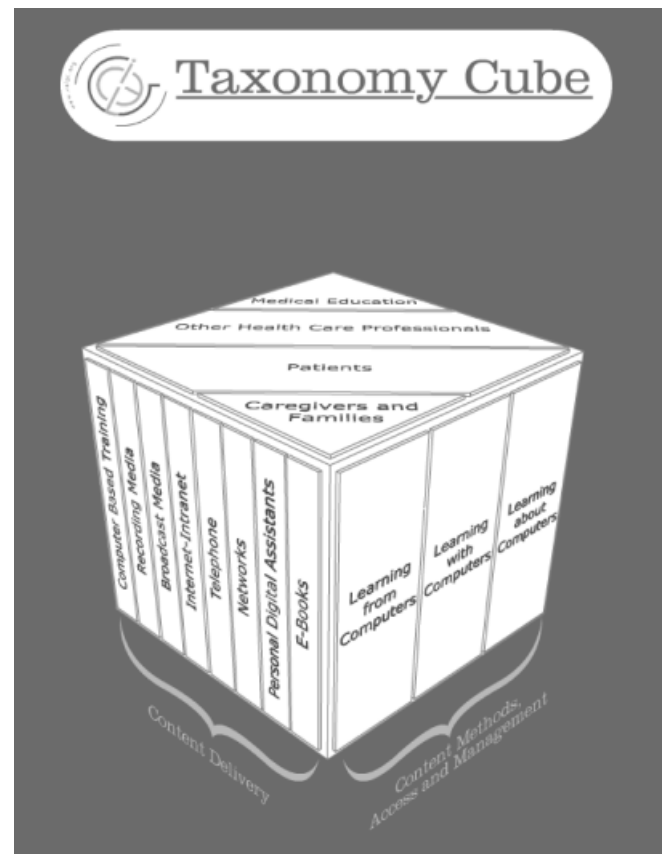


Figure 1. The Consortium of E-Learning in Geriatrics Instruction e-learning taxonomy cube.

ical School (IVIMEDS)¹² are commercial organizations involved in the process of formulating global specifications to guide the creation of standardized e-learning materials. CELGI members interacted with these organizations and promoted the specifications to address technical concerns related to interoperability and learning-management systems. Any medical educator creating e-learning materials can now adopt these specifications, although the specifications only establish an expected structure for e-learning tools that facilitates portability. Geriatrics educators must be actively involved in the selection of which pedagogical standards are targeted and in the detailing of how the product is to be used. Such information is often embedded in the computer code of e-learning products to clarify intended use, audiences, etc. In 2006, CELGI members developed a prototype taxonomy of e-learning materials and activities that facilitates the use, creation, and evaluation of e-learning materials in geriatrics.¹³ The CELGI Taxonomy Cube maps 24 methods of e-learning across three discrete categories germane to the technology (content methods, access and management, and delivery (Figure 1).

Preliminary steps to evaluate the reliability and validity of the taxonomy using a Delphi method are underway within a larger CELGI community. Once stable, the taxonomy will be formally tested in a broader user group.

Development of E-Learning Products

The costs associated with the creation of e-learning materials can be substantial and thus difficult for small geriatrics

programs to afford. A transparent and clearly defined process for the cooperative creation of e-learning content can make use of the expertise of individual institutions and foster collaborations to create high-quality e-learning materials. As part of this process, collaborating institutions prioritize their teaching and learning needs, thereby increasing the likelihood that the new e-learning materials will be integrated into existing curricula. Such integration by collaborating institutions opens the possibility of evaluating the educational effect of these materials and their effectiveness and efficiency in diverse educational contexts and with different trainees, from doctors and nurses to other health professionals. Initiatives for the joint development of e-learning materials by CELGI consortium members have already begun in the areas of delirium assessment and the management of urinary incontinence.

E-learning development also requires faculty competencies that are outside traditional instructional activities; training geriatrics faculty in best practices for the creation, use, and evaluation of e-learning is becoming more urgent. The competencies for e-learning will become as important as other competencies for curriculum development and instructor-led activities. At national geriatrics meetings, CELGI members have offered workshops and symposiums on "blended learning" that illustrate combining distance e-learning components with face-to-face instruction.^{10,14,15}

CELGI members are responsible, in part or in whole, for a substantial proportion of publicly available e-learning content in geriatric medicine. Sustaining their efforts is synonymous with sustaining CELGI efforts. As e-learning approaches to education gain acceptance in traditional medical school curriculum (and promotions committees), CELGI will increasingly advocate for national funding mechanisms that support professional and objective development and evaluation of such tools.

Evaluation, Peer Review, and Research

Development and implementation of e-learning in geriatrics is increasingly recognized as scholarly productivity for medical school faculty seeking promotion and tenure.¹⁶ To accelerate this movement, CELGI has begun offering regular, synchronous distance-learning programs delivered by national e-learning experts covering such topics as the use of specific e-learning materials, peer review, evaluation of e-learning, and the use of personal digital assistants in clinical education.

Individual CELGI members are also addressing the complex issue of assessing the quality, efficacy, and effectiveness of blending e-learning materials into traditional geriatrics education. Through collaboration with the AAMC MedEdPortal, geriatrics educators will act as co-editors and peer reviewers, selecting geriatric e-learning materials that will serve as evidence of scholarship for geriatrics educators, although the evaluation of e-learning should not be restricted to peer review. Any new approach to education technology must be justified to the primary users, administrators, and leadership, especially when the new technology requires a substantial resource investment. Current data are insufficient to identify best practices for evaluating e-learning materials, and few rigorous studies report on the effectiveness of e-learning in geriatric edu-

cation. CELGI is formulating a framework for evaluating e-learning materials grounded in theories of evaluation; the work of the AAMC, HEAL, IVIMEDS, and GeriatricWeb colleagues; a thorough review of the literature; and extensive feedback from experts in medical education. CELGI members will submit their own e-learning products to various forms of evaluation to experience the process first hand and determine which evaluation items are informative.

Dissemination

E-learning represents a new category for the distribution of content. The scholarship activity must be documented, and it must affect the body of knowledge in medical education, influence faculty and learners, and be durable. To disseminate e-learning products and research, the consortium identified the following strategies: the creation and maintenance of a Web site, partnerships with existing repositories of e-learning materials, and participation in national e-learning organizations and conferences.

Web Site

Creation and maintenance of the CELGI Web site is perhaps the easiest of these tasks. The site facilitates the consortium's mission of enhancing learning and teaching with e-learning. It serves as a starting point for information about upcoming educational events, a platform for communication among members and with other educational and e-learning organizations, and a forum to present the many benefits of consortium membership.

Digital Repositories

Repositories of digital materials are now available to manage access to e-learning materials for many disciplines. Although few at present, such repositories offer a vision of expanded access to a large number of high-quality, peer-reviewed, sharable e-learning materials. Multidisciplinary examples include the AAMC MedEdPortal,⁷ the HEAL,¹⁷ and the Multimedia Educational Resource for Learning and Online Teaching.¹⁸

For geriatrics, the Donald W. Reynolds Foundation supported the development of POGOe, the Web-based clearinghouse for educational products in geriatrics noted above. It offers geriatrics educators a variety of instructional resources to enhance their teaching, with a growing number of high-quality geriatric educational products developed with the support of the Donald W. Reynolds Foundation, the John A. Hartford Foundation, the Department of Veterans Affairs, and others. CELGI members are active POGOe participants, as users, contributors, and advisors for this repository as it rapidly becomes the one-stop shop for geriatric-oriented e-learning materials.

Other repositories created by CELGI members are the GeriatricWeb,¹⁹ a digital library of peer-reviewed and evidence-based clinical resources in geriatrics for the practicing clinician, and in Florida, the Online Geriatrics University (*GerIU*).²⁰ *GerIU* has created e-learning materials for medical students, residents, fellows, and nurses involved in long-term care.

Although relatively few in number, the handful of repositories compete in their own way, which can lead to confusion for clinical educators seeking teaching tools.

CELGI has crafted professional relationships with each of these repositories and actively promotes interactivity between them. The authors of the current study were important contributors to a process that resulted in formal agreements between MedEdPortal and POGOe to offer users at each respected Web site facilitated access to the reciprocal site.

Participation in Conferences and Organizations

CELGI members have actively participated in national meetings as symposium presenters and round table discussants, and they have presented posters and oral presentations describing the consortium's work. Geriatrics has important characteristics that make it unique and deserving of consideration along with other medical specialties in terms of the use of medical terminology, research approaches, and diagnostic and therapeutic interventions, among others, which need to be considered when developing specifications and standards for the creation of e-learning infrastructure and content. CELGI members are also working with national organizations such as the AAMC MedEdPortal,⁷ MedBiquitous,¹¹ and the Consortium on Medical Education and Technology²¹ to identify common areas of interest; promote the consideration of geriatrics issues in the design of specifications, standards, and guidelines; and identify opportunities for collaboration in the creation, use, and evaluation of e-learning materials.

THE FUTURE

The consortium members envision CELGI as a catalyst for the creation and dissemination of innovative and high-quality geriatric e-learning materials, as the benchmark for innovations in e-learning in geriatric education, and as a provider of a coordinated approach to addressing these challenges and opportunities. An important by-product of this collaboration will be the formation of a network of geriatrics faculty working on e-learning materials and a larger "living laboratory" for connecting practice to research and theory in education. Examples of this vision are already materializing in the medical field. The IVIMEDS is an international organization whose mission is to set new standards in medical education through a worldwide partnership of medical schools and institutions using a blended learning approach. IVIMEDS hosts a repository of a wide variety of e-learning materials for use by its member medical schools.¹² The Computer-assisted Learning in Pediatrics Project created a bank of peer-reviewed, interactive Internet-based patient simulations through multiinstitutional development addressing core pediatrics clerkship curriculum and serving as a successful model for cooperative creation of e-learning materials.²² CELGI members are committed to an ongoing process of quality improvement that continually measures the effect of their work against the benefits to their stakeholders and the geriatrics community at large.

GLOSSARY

Distance learning: Learning that takes place at locations remote from the point of instruction.

Interoperability: The ability of different types of computers, networks, operating systems, and applications to

work together effectively, without prior communication, to exchange information in a useful and meaningful manner.

Learning-management systems: Software (running on an intranet or the Internet) that supports an educational institution in the delivery, management, and administration of learning across the institution. Examples are WebCT and Blackboard.

Multimedia: The use of two or more media, such as text, graphics, animation, audio, and video, to produce engaging content delivered by computer.

Streaming: Playing video or sound in real time as it is downloaded over the Internet. The streaming process allows end users to view the file without first downloading it onto their own computer. The video is stored only temporarily on the viewer's computer.

ACKNOWLEDGMENTS

Drs. Ruiz and Mintzer would like to thank Dr. Bernard Roos for his mentorship and Dr. Rosanne Leipzig for her review of the manuscript. The authors would like to thank all the CELGI members for their dedication.

Financial Disclosure: Supported by the Stein Gerontological Institute and the State of Florida Agency for Health Care Administration (Florida's Teaching Nursing Home Program).

Author Contributions: All authors contributed equally to the concept, design, and preparation of this manuscript.

Sponsor's Role: The funding sources had no role in the concept, design, preparation, review, approval, or control of this manuscript.

REFERENCES

- Rosenberg M. *E-Learning: Strategies for Delivering Knowledge in the Digital Age*. New York: McGraw-Hill, 2001.
- Medical Never-Never Land Ten Reasons Why America Isn't Ready for the Coming Age Boom. Washington, DC: Alliance for Aging Research, 2002.
- Longitudinal Study of Training and Practice in Geriatric Medicine Training and Practice Update: Geriatricians and Geriatric Psychiatrists. New York: Association of Directors of Geriatric Academic Programs, 2003.
- Chumley-Jones HS, Dobbie A, Alford CL. Web-based learning: Sound educational method or hype? A review of the evaluation literature. *Acad Med* 2002;77(10 Suppl.):S86-S93.
- Cook DA. The research we still are not doing: An agenda for the study of computer-based learning. *Acad Med* 2005;80:541-548.
- Ruiz JG, Mintzer MJ, Leipzig RM. The impact of e-learning in medical education. *Acad Med* 2006;81:207-212.
- MedEdPortal. Association of American Medical Colleges [on-line]. Available at www.aamc.org/meded/mededportal Accessed February 28, 2006.
- Health Education Assets Library (HEAL) National Digital Library: Editorial Policy, Version 1.2. Health Education Assets Library [on-line]. Available at www.healcentral.org/services/policies/heal_editorial_policy_v1.2.pdf Accessed December 8, 2005.
- POGOe. Portal of Online Geriatrics Education [on-line]. Available at www.pogoe.org Accessed October 8, 2006.
- Hajjar I, Ruiz JG, Teasdale T et al. The use of the internet in geriatrics education: Results of a national survey of medical geriatrics academic programs. *Gerontol Geriatr Educ* in press.
- MedBiquitous [on-line]. Available at www.medbiq.org Accessed February 23, 2006.
- Harden RM, Hart IR. An International Virtual Medical School (IVIMEDS): The future for medical education? *Med Teach* 2002;24:261-267.
- CELGI Taxonomy Cube. Consortium of E-learning in Geriatrics Instruction [on-line]. Available at www.celgi.org/cube/ Accessed October 10, 2006.
- Ruiz JG, Mintzer MJ, Teasdale T et al. Information Technologies and Blended Learning in Geriatrics Education. *Gerontologist* 2003;43(Special Issue II):49.

15. Ruiz JG, Mintzer MJ, Hajjar I et al. The Consortium of E-Learning in Geriatrics Instruction (CELGI). *Gerontologist* 2004;44(Special Issue I): 210-211.
16. Ruiz JG, Candler CS, Teasdale T. Peer Reviewing E-learning. Opportunities, challenges, and solutions. *Acad Med* in press.
17. Candler CS, Uijtdehaage SH, Dennis SE. Introducing HEAL. The Health Education Assets Library. *Acad Med* 2003;78:249-253.
18. Malloy TE, Hanley GL. MERLOT. A faculty-focused web site of educational resources. *Behav Res Meth Instrum Comput* 2001;33:274-276.
19. The Geriatric Web. University of South Carolina [on-line]. Available at www.geriatricweb.sc.edu Accessed October 23, 2005.
20. The Online Geriatrics University (GeriU) [on-line]. Stein Gerontological Institute. Available at www.geriu.org Accessed February 12, 2006.
21. Consortium on Medical Education and Technology (COMET) [on-line]. Available at www.comet.med.nyu.edu Accessed March 24, 2006.
22. Fall LH, Berman NB, Smith S et al. Multi-institutional development and utilization of a computer-assisted learning program for the pediatrics clerkship. The CLIPP Project. *Acad Med* 2005;80:847-855.