

Regis University ePublications at Regis University

All Regis University Theses

Spring 2010

The Use of Web 2.0 Technologies to Support Continuing Medical Education

Steven M. Folstein
Regis University

Follow this and additional works at: <https://epublications.regis.edu/theses>



Part of the [Education Commons](#)

Recommended Citation

Folstein, Steven M., "The Use of Web 2.0 Technologies to Support Continuing Medical Education" (2010). *All Regis University Theses*.
4.
<https://epublications.regis.edu/theses/4>

This Thesis - Open Access is brought to you for free and open access by ePublications at Regis University. It has been accepted for inclusion in All Regis University Theses by an authorized administrator of ePublications at Regis University. For more information, please contact epublications@regis.edu.

Regis University
College for Professional Studies Graduate Programs
Final Project/Thesis

Disclaimer

Use of the materials available in the Regis University Thesis Collection ("Collection") is limited and restricted to those users who agree to comply with the following terms of use. Regis University reserves the right to deny access to the Collection to any person who violates these terms of use or who seeks to or does alter, avoid or supersede the functional conditions, restrictions and limitations of the Collection.

The site may be used only for lawful purposes. The user is solely responsible for knowing and adhering to any and all applicable laws, rules, and regulations relating or pertaining to use of the Collection.

All content in this Collection is owned by and subject to the exclusive control of Regis University and the authors of the materials. It is available only for research purposes and may not be used in violation of copyright laws or for unlawful purposes. The materials may not be downloaded in whole or in part without permission of the copyright holder or as otherwise authorized in the "fair use" standards of the U.S. copyright laws and regulations.

Regis University
CPS School of Education and Counseling M.Ed. Program
Research Project

Certification of Authorship of Professional Project Work

This form is required

Print Student's Name Steven M. Folstein

Telephone 414-690-9106 Email sfolstein@wi.ni.com

Date of Submission 4/26/10 Degree Program MEd

Title of Submission The Use of Web 2.0
Technologies to SUPPORT
Continuing Medical Education

Advisor/Faculty Name Gary Upton, PhD

Certification of Authorship:

I hereby certify that I am the author of this document and that any assistance I received in its preparation is fully acknowledged and disclosed in the document. I have also cited all sources from which I obtained data, ideas or words that are copied directly or paraphrased in the document. Sources are properly credited according to accepted standards for professional publications. I also certify that this paper was prepared by me for the purpose of partial fulfillment of requirements for the M.Ed. Degree.

Steven M. Folstein

Student Signature

4/25/10

Date

Regis University
CPS School of Education and Counseling M. Ed. Program

Professional Project Approval Form

Required Form

Advisor/Professional Project Faculty Approval Form

Student's Name: Steven M. Folstein Program MEd
PLEASE PRINT

Professional Project Title: The Use of Web 2.0 Technologies
PLEASE PRINT
to Support Continuing Medical Education

Advisor Name Gary Upton, PhD
PLEASE PRINT

Project Faculty Name Gary Upton, PhD
PLEASE PRINT

Advisor/Faculty Declaration:

I have advised this student through the Professional Project Process and approve of the final document as acceptable to be submitted as fulfillment of partial completion of requirements for the MEd Degree Program.

Project Advisor Approval:

 4-28-10
Original Signature Date

The student has received project approval from Faculty and has followed due process in the completion of the project and subsequent documentation.

Degree Chair or Designated Faculty Approval:

 4-28-10
Original Signature Date

REGIS UNIVERSITY
CPS School of Education and Counseling
M. Ed. Research Project/Thesis

Authorization to Publish Student Work on the World Wide Web

This form is required

I, Steven M. Folstein, the undersigned student,

Print student name

in the M.Ed. Degree Program hereby authorize Regis University to publish through a Regis University owned and maintained web server, the document described below ("Work"). I acknowledge and understand that the Work will be freely available to all users of the World Wide Web under the condition that it can only be used for legitimate, non-commercial academic research and study. I understand that this restriction on use will be contained in a header note on the Regis University web site but will not be otherwise policed or enforced. I understand and acknowledge that under the Family Educational Rights and Privacy Act I have no obligation to release the Work to any party for any purpose. I am authorizing the release of the Work as a voluntary act without any coercion or restraint. On behalf of myself, my heirs, personal representatives and beneficiaries, I do hereby release Regis University, its officers, employees and agents from any claims, causes, causes of action, law suits, claims for injury, defamation, or other damage to me or my family arising out of or resulting from good faith compliance with the provisions of this authorization. This authorization shall be valid and in force until rescinded in writing.

Print Title of Document(s) to be published: The Use of Web 2.0 Technologies to Support Continuing Medical Education

Steven M. Folstein
Student Signature

4/25/10
Date

Check if applicable:

The Work contains private or proprietary information of the following parties and their permission is required as well on the attached Releasor Form B

Complete if you do not wish to publish your work on the World Wide Web:

I do not authorize Regis University to publish my work on the World Wide Web.

Student Signature

Date

THE USE OF WEB 2.0 TECHNOLOGIES TO SUPPORT CONTINUING MEDICAL
EDUCATION

by

Steven M. Folstein

A Research Project Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Education

REGIS UNIVERSITY

May 2010

Project Advisor: Gary Upton, Ph.D.

Chapter 1

INTRODUCTION

All U.S. healthcare workers are required to complete continuing education throughout their careers to demonstrate that they understand and can apply the latest scientific findings to the treatment of their patients. For physicians, continuing medical education (CME) requirements are developed and enforced by the leaders of a number of organizations. The officers of the American Medical Association define continuing medical education activities for most physicians. The directors of the Accreditation Council for Continuing Medical Education (ACCME) set the standards for providers of accredited continuing medical education for physicians. The directors of the medical specialty boards set the certification standards for practitioners in the various medical specialties and subspecialties. Finally, the officers of the state licensing boards describe the education requirements for practitioners in their states. While all physicians share the requirement of completing CME credits during their careers, each individual physician must complete a unique set of CME requirements depending on his or her specialty and geographical location.

Statement of Problem

Continuing medical education has been offered in distance education formats for a number of years. Studies of these activities have shown that participation tends to be low, and that, while participants demonstrate learning, they report levels of satisfaction that are below what most educational planners would consider appropriate. Many

physicians have expressed a preference for live educational activities and have stated that a significant source of their learning is from the peer interaction they experience around a formal educational event. The leaders of medical societies have witnessed reductions in their operating budgets, which has led to less funding to provide the live education activities often favored by physicians. In order to meet their members' educational needs in a cost effective manner, CME planners may need to explore distance education formats as an alternative for some programming. The use of these tools must be evidence-based to better meet learner needs, in addition to addressing financial limitations.

Background of the Problem

In the last 10 years, there have been changes in the CME environment that are impacting physicians' needs for and access to CME. These changes have come from two main sources: a) the leaders of the organizations that regulate the CME enterprise, and b) the leaders of the organizations that have traditionally provided funding for CME providers. These changes have had a direct impact on the education programming offered by education planners in medical specialty societies.

The leaders of the American Board of Medical Specialties (ABMS), who are charged with coordinating the efforts of the various specialty boards, have developed the ABMS Maintenance of Certification[®] program that will create a more standard CME requirement for all U.S. physicians pursuing board certification (Pouwels, 2010). This change will also require the completion of practice improvement activities, designed to document a physician's efforts to change his practice, as well as the documentation of lifelong learning and completion of self-assessment activities. The developers of these activities have found that the most efficient method of implementing these requirements

involves the use of complex databases and software applications that can be relatively expensive to develop.

While the nation's physicians were being introduced to these new certification requirements, the leaders of the nation's pharmaceutical industry have received intense scrutiny from Congress under accusation of inappropriately supporting CME activities to market their products and influence the prescribing patterns of physicians, thereby increasing healthcare costs. As a result, the leaders of the Pharmaceutical Research and Manufacturers of America (PhRMA) revised the code of ethics that their members voluntarily support. One of the results of this updated code is that the grantors at the pharmaceutical companies have established very strict standards for the submission and review of grant requests, and in many cases have reduced the amount of funding they make available as educational grants. One result is that the developers of CME activities have less funding available at a time when their learners require more expensive educational opportunities.

The staff and volunteer leaders of medical specialty societies have responded to these changes by seeking greater efficiency in their programming choices. One option that has been widely adopted has been to offer more programming on the internet, which allows more learners to participate without the travel and production costs associated with a live educational event. Leaders at the ACCME released data in their 2008 Annual Report that shows that the number of internet enduring materials has increased by almost 50% since 2006 and the number of participating physicians has increased by a similar percentage. During this same time, the total income received by these organizations has stayed almost flat, with commercial support reduced by approximately 10% and total

expenses increased by a similar percentage (ACCME, 2009). Although web-based educational activities can solve the logistical challenges faced by CME programmers, physicians will only learn the knowledge and skills they need to improve their care of patients if the online activities that are offered incorporate effective pedagogical strategies that are based on evidence of how adults, and specifically physicians, learn.

Purpose of the Project

The purpose of this project was to develop a handbook to be used as a reference by the leaders of a national medical specialty society when planning online CME activities for their peers. The members of this society have been relatively slow to adopt online activities, but they have begun to recognize the need to change their programming habits due to financial limitations. By demonstrating the evidence supporting the use of web-based tools to support CME programs, and the best practices for implementing these tools in CME activities, the staff and volunteers organizing these activities will be able to make more informed programming choices resulting in more effective educational programs.

Chapter Summary

A number of changes have taken place in recent years that have affected many of the participants in the CME enterprise. Physicians are facing heightened education requirements, commercial sponsors are facing heightened restrictions, and medical specialty societies are facing a struggle to meet members' educational needs in a time of decreased funding. As a result, online education is becoming a more popular method of providing CME activities because of its ability to reach a large number of learners at a lower cost than live activities. In Chapter 2, the author reviews research on physician

learning and web-based education to identify the theories that support this approach to programming and the best practices to follow when implementing online tools in CME.

Chapter 2

REVIEW OF LITERATURE

The literature of adult education offers a number of theories that have been developed to help educators better understand how adults learn and what instructional strategies will be most successful to support learning. Often, the theorists developing these concepts have done so from a specific situational or philosophical context. One common feature of all of these thinkers was that they were primarily concerned with the experience of educating learners in a live setting, with instructor and learners in the same physical space during the learning activity. With the growth of the Internet and web-based applications that can deliver education in live and asynchronous formats to learners throughout the world, the experience of participating in education has changed significantly for a number of adult learners. This fact raises the question of whether or not the existing theories of adult learning are applicable in the new virtual environments, and what instructional strategies will be most effective with learners participating in these activities. In this chapter, the researcher examines the literature that addresses these questions.

The Theoretical Basis of Online Learning

Some authors have argued that existing adult learning theories are not applicable to online learning experiences. Greenhow (2009), for example, stated that there is a lack of a theoretical base to understand the uses and impact of web-based technologies in education. Snyder (2009) concurred, stating that educators need to develop evidence to explain how web-based interactive technologies support education and what types of

content they best support, and create new instructional design theories that maximize the effective use of these web-based tools in educational settings. She identified three elements that such a theory should include: a) the development of learning communities that engage learners in peer-to-peer interaction, b) Knowles' concept of andragogy, with its assumptions that adults are self-directed learners and learn best when addressing issues of real significance in their lives, and c) the concept of constructivism, which she felt addressed the learners' need to develop problem-solving capabilities. Other closely related theories, including experiential learning, self-directed learning, and transformational learning are also relevant when exploring the online learning environment.

Experiential Learning, Self-Directed Learning, and Constructivism

Zepke and Leach (2002) stated that the concept of constructivism has been described in a number of ways, but all include, as a core attribute, the active involvement of the learners in constructing new knowledge from their past experiences. They felt that this was a hybrid of experiential learning and self-directed learning. The authors stated that experiential learning, which traces its roots to the work of Dewey in the early 20th Century, involves learners in a process of reflecting on and analyzing their experiences. In this way, "learning is a process of making meaning from all experiences" (p. 206). Self-directed learning has been discussed from a variety of perspectives, but all assume that this process involves the learner in taking control of his or her learning experience. A number of other theorists have included this idea in their own thinking about the adult learning process, including Knowles and Brookfield, and have applied it to both the personal and the sociopolitical aspects of learning (Zepke & Leach). Selwyn, Goard, and

Furlong (2006) described it as “the regulation of knowledge within the individual’s world view ... In this way self-education is an activity whose chief function is the self-realisation of the individual” (para. 4, line 6).

Zepke and Leach (2002) identify several potential weaknesses of the concepts supporting self-directed and experiential learning. Central to their critique is the fact that neither approach addresses the context in which learners exist as a factor in the learning process. They feel that, because neither addresses variables such as an individual’s ability to make informed choices when pursuing self-directed learning or which experiences are most useful when using reflection to learn, these approaches do not adequately account for the learner’s experience in the real world learning situation. As a result, they proposed that constructivism more adequately describes the learning process because it places the learning experience into a specific context. They identified three elements of the constructivist approach to learning that emphasize the importance of context on the learning process: a) learners are always involved in relationships with others while learning, b) a facilitator should be present to help guide learners through the interpretation of their own and others’ experiences, and c) learners participate in critical reflection to insure that their reflections result in learning and change (Zepke & Leach).

Transformational Learning

Like the constructivist theory, transformational learning also incorporates the principle of social interaction as an integral part of the learning process. As originally defined by Mezirow (1991, as cited in Pohland & Bova, 2000), learners participating in a transformational experience are encouraged to learn by changing their biases and preconceptions about their experiences and their prior knowledge. Mezirow (1991)

stated that this process could only occur through the social process of interacting with other learners, who could provide alternative perspectives and challenge each other to reexamine their preconceptions. Teachers participating in a professional development program that incorporated experiential and self-directed elements demonstrated Mezirow's concepts in action. Participants used self-reflection through journaling, group discussion, and hands-on experiences in real-world schools that allowed them to challenge their existing ideas of effective teaching practice and develop new perspectives on their work that could transform their performance (Pohland & Bova, 2000).

Online Learning Environments

The theories discussed above were developed and described in the context of traditional live learning environments. Adult and professional educators can apply these concepts to their work with learners engaged in technology-mediated educational activities, but they must also consider factors unique to this environment. These factors are primarily related to the use of computer hardware and software, which, Selwyn et al. (2006) stated, have become essential skills in modern life, a worldview supported by adult education practice.

The Impact of Multi- and Hypermedia on Learning

The terms "multimedia" and "hypermedia" were first used to describe channels of communication in the 1960s (Gerjets & Kirschner, 2009). The two formats, while similar, differ in two primary ways. According to Gerjets and Kirschner, creators of multimedia works incorporate a variety of media and tools to communicate their messages, and the overall structure of the experience is controlled by the creator. Creators of hypermedia works connect modules of multimedia information in a network,

and the receiver of the information controls the structure of the message by experiencing the modules in a self-designed sequence. Gerjets and Kirschner analyzed the literature on these information formats to evaluate their impact on learning and identified a number of benefits and challenges they present.

Users of multimedia materials can engage a variety of sensory systems in the learning process, which allows them to receive greater reinforcement of the content. Instructional designers can use this feature to help their materials appeal to learners using a variety of learning styles. Learners with less experience with multimedia materials may struggle with materials that are densely constructed and include a high volume of materials. Users of hypermedia materials demonstrated higher motivation to learn in some situations, because of the greater control they had over the learning experience. This same freedom presented a challenge for learners who were not prepared to make optimal choices when self-directing the learning experience, or who did not desire the freedom to direct their own learning. Learners with specific qualities, especially greater prior knowledge, cognitive skills, and metacognitive abilities, were the only ones able to adapt their information usage strategies as a result of hypermedia learning experiences (Gerjets & Kirschner, 2009). These factors of learner involvement and engagement with multi- and hyper-media activities reinforce the positive qualities of constructivism described earlier and indicate that online learning may be an effective strategy for some adult learners.

Interactive Technology Supportive of Learning

All of the adult learning theories addressed above stress the importance of active learner involvement in the educational process. Users of hypermedia tools interact with

the technology by determining the sequence through which they encounter content.

Users of interactive web-based technologies, often referred to as Web 2.0, interact with the technology and other users by contributing to the content they experience. Learners participating in these environments are required to engage actively because the tools they are using incorporate interactivity with others as a defining (Klamma et al., 2007).

Unlike learners working in traditional classroom settings or older electronic formats, where information was presented in a static format, a learner in Web 2.0 formats becomes a “prosumer (both consumer and producer)” (p. 73) of course content. In a study that explored the impact of interactive web learning on lifelong learning, Klamma et al. stated that lifelong learning “refers to a society in which learning possibilities exist for those who want to learn” (p. 72), and where learning can happen in any place and at any time. This vision of lifelong learning is inherently a self-directed learning format.

Klamma et al. (2007) also addressed the role of learner incentive in this model of online learning, referring to Social Exchange Theory, which suggests that participants in an activity will contribute more when there is a reward to be gained through their participation. They stated that the reward can be intrinsic or extrinsic and is determined by the participant’s satisfaction with his or her relationship with the experience. Schoen et al. (2009) examined this element of online learning in their study of online continuing education programs for physicians. They considered these programs a disruptive technology, which initially appeals to a small group of learners whose needs are met by the technology and whose success helps the new technology to gain mainstream acceptance. Thus, learners will be most likely to engage with and persevere with a

learning experience if the experience is structured to encourage a type of engagement that is satisfying and rewarding to the learner.

Another team of researchers examined adults' uses of internet technology as a self-directed education tool. They found that subjects who used these technologies did not change the patterns of self-education, but instead, reinforced them. For example, they described study participants who had acquired knowledge through reading before using internet tools, who continued to read as a primary information source but supplemented their reading with internet use (Selwyn et al., 2006). They concluded that the presence of a computer and internet access did not convert the computer owners into self-directed learners, but rather that individuals who valued education were using their computers as an additional resource (Selwyn et al., 2006). Because this study was conducted in 2002, when internet access and internet tools were less developed than in Klamma and Schoen et al.'s work, readers should consider that their subjects' experiences of learning with online tools may have been different than those analyzed in the later research. This may account for the significantly different results reported by these researchers.

Positive Aspects of the Online Learning Experience

The studies discussed previously suggest that online study can effectively support adult learning by allowing opportunities for engagement with other learners and supporting some adults' desire to take control of their educational endeavors. The online environment offers additional benefits to adult learners that can enhance learners' satisfaction with the experience, which was also described as an essential element of the learning process. Luke et al. (2009) stated that learners can overcome time, scheduling, and geographic limitations by using web-based learning tools. An added advantage they

identified was the ease with which learning resources could be shared between the instructor and the learners, and among the learners themselves. Chamers and Lee (2004) found that corporate training offered through web-based technologies offered advantages to both learners and program planners, such as greater consistency in instruction, instant updating of content as needed, and instant distribution of content to all learners regardless of location.

Researchers have also found online professional development programs to be effective tools. Pang (2009) compared learners in a live course to those participating in an online, multimedia version of the same course. He found that both were effective, although the online course proved to be slightly more effective at increasing learners' knowledge. According to Pang, learners reported that the video components of the course enhanced their learning, as did the ability to download supplemental materials such as handouts. The interactivity of this course helped learners to create a stronger relationship with the content, resulting in a greater reward from their participation, as suggested by Klamma et al. (2007), encouraging them to persist in their efforts as self-directed learners. Selwyn et al. (2006) stated that many home computer users study during their time away from work to expand the knowledge and skills they need on the job, which suggests that users of these programs could be using web-based tools to become lifelong learners. These researchers have indicated that online education may support self-directed learning because of the interactivity and rewarding features inherent in this instructional format.

Employers have also been shown to benefit from the cost savings that can be realized by offering educational programs online. Chamers and Lee (2004) stated that

online corporate training programs “can train a larger number of employees in a shorter time frame and at reduced costs” (p. 348). They cited several examples of organizations, including Hewlett Packard, Aetna U.S. Healthcare, and Siemens Business Communications, which had all realized significant cost savings from the reductions in lost staff time and travel costs related to live staff training, sometimes in the \$1 million to \$4 million range (Chamers & Lee).

Elements of an Online Learning Experience

Researchers have begun to develop a theoretical foundation to describe the field of online education for adults, but because the field is relatively new, additional investigation is needed. Educators and instructional designers have identified some key elements of the online learning process, and have begun to identify essential elements to consider when working in this format. These include the design of the educational experience, the characteristics of the learner, the role of the instructor in facilitating learning, and possible technical limitations.

Design of Online Courses

Carroll, Booth, Papaioannou, Sutton, and Wong (2009) studied the experiences of UK healthcare workers participating in online continuing education programs offered by the public health service. Participants included multiple members of the healthcare teams of a hospital system in England who participated in web-based educational activities both in the workplace and in their homes. Based on the qualitative evidence the researchers collected from these learners, they identified five qualities that should be considered when designing online professional education: a) courses should be visually attractive and interactive, with easy navigation and adequate technical support, b) courses should be

structured flexibly, incorporating a variety of asynchronous interaction methods and offline participation options, c) courses should involve multiple opportunities for participants to interact with and learn from their peers, both actively and passively, d) courses should provide prompt technical support from facilitators, other learners, and technical support staff, and e) courses should provide testing to allow learners to demonstrate their learning, which they felt gave them greater confidence (Carroll et al.). Bryce, Choi, Landstrom, and LoChang (2008) reached similar conclusions when studying an online education programming implemented in a Canadian healthcare system.

Educational planners were advised to give attention to these elements of the activities they plan in order to ensure increased knowledge in learners. Most professional education programs, though, are intended to change performance in practice. Luke et al. (2009) stated that “in order for education to be effective, it must result in the effective translation into practice of the skills learned” (p. 161). Many educational designers have helped their learners transfer learning into practice through the incorporation of case studies and other practical exercises based on the learners’ actual work experiences (Luke et al., 2009; Schoen et al., 2009). Learners have been found to make decisions about enrollment in educational programs based on relevance to their work experiences, and to express greater satisfaction with professional education when the program includes direct relevance to their professional settings (Schoen et al., 2009). These learners’ responses support Knowles’ theory of andragogy and its emphasis on learning that is relevant to the participants’ real-world experiences.

Participants in Online Learning Experiences

Researchers have also explored the factors that define the participants in online education. Those with more education were found to be more likely to pursue self-directed education using technology (Selwyn et al., 2006). Kripalani, Cooper, Weinberg and Laufman (1997) found that 80% of practitioners of general medicine in Texas were interested in computer-based education and would consider buying new or upgrading existing computer equipment to do so. The learner's interest and skill in working with computers has also been identified as an influential factor (Kripalani et al.; Chamers & Lee, 2004). Learners who were less technically proficient expressed greater apprehension about and rejection of online learning and required more support (Chamers & Lee; Luke et al., 2009). Chamers and Lee also identified self-direction as an important quality for a successful online learner, which supports the findings of Selwyn et al. (2006) that access to online learning opportunities reinforced the habits of self-directed learners.

Instructors of Online Learning Experiences

As stated above, participants in online learning activities often expect more support than participants in similar live activities. In many cases, they expect this support to be offered by the course instructor. In a study of Canadian physicians participating in an online course, the consensus was that the online instructor was expected to demonstrate qualities comparable to a live instructor, such as: a) involving the entire group in the learning activity, b) answering learner questions promptly, c) prompting deeper thought and discussion about topics that were addressed, and d) maximizing opportunities for participants to learn from each other (Sargeant, Curran, Allen, Jarvis-

Selinger, & Ho, 2006). They also expected the instructor to clearly establish the course requirements at the outset and encourage the participants to provide personal introductions to establish a sense of community, as in a live classroom, as well as to provide an orientation to and ongoing support for the technical aspects of the online learning environment. More recent studies have shown that online learners continue to carry these expectations, especially that instructors encourage learners to become self-directed in their work and that they support the transfer or learning to practice (Robertson, 2008; Luke et al., 2009). These learners seemed to expect that the online course facilitator would take responsibility for the course design features Carroll et al. (2009) found to be effective at supporting learning.

Technical Limitations and Online Learning Participation

Some researchers have identified technical limitations that may affect satisfaction with and participation in online professional education. The presence of these limitations often impeded the functionality of multimedia materials, such as inadequate bandwidth or lack of audio capabilities on a learner's workstation (Chamers & Lee, 2004; Bryce et al., 2008). For learners participating in workplace settings, inadequate computer access was also identified as a barrier in at least one study (Bryce et al., 2008). These researchers reported on studies completed between the years 2000 and 2005, so it is possible that these limitations are less common in many professional settings as more workplace functions have been computerized. Nonetheless, the planners of and learners in online educational activities may still be affected by these concerns.

Physicians as Online Learners

Although online education has been in use for a number of years, it has been adopted more slowly in the realm of medical education, including continuing medical education. Luke et al. (2009) stated that physicians are less technologically proficient and need substantial technology and learning support when participating in online education. This may be a factor related to their formal training. Continuing medical education is often based in the participants' practice settings, which requires a degree of information literacy and knowledge management skills that have not been taught in medical school curricula (Parboosingh, 2002). Schoen et al. (2009) found that physicians in more rural areas may be more interested in enrolling in online educational opportunities because of the reduced number of live programs available to them. The number of physician participants in online CME programs has increased, growing by approximately 85% between 2007 and 2008 (ACCME, 2009). As more CME activities have been made available on the internet, more researchers have investigated their effectiveness with this population of learners.

According to Slotnick (2000), physicians learn in discrete episodes based in their practice experiences. These episodes are initiated by a problem requiring the physician to seek an answer to a clinical situation with which he or she is unfamiliar. More recent researchers have investigated how physicians use the internet and other online tools to facilitate the process of investigating the answers to these clinical problems. Gagliardi, Wright, Victor, Brouwers, and Silver (2009) stated that "physicians seek text-based or explicit, codified knowledge on the Internet" (p. 270) when investigating practice problems. This observation supports the research of Selwyn et al. (2006) that

demonstrated that many online study participants used the computer to reinforce their existing learning patterns. Physicians have been encouraged since the mid-2000s to use internet resources to investigate patient care questions at the point of care, and can now receive CME credit for doing so (American Medical Association, 2006). As a result, some physicians have changed their internet use habits and use online tools in a more self-directed manner to improve their care of patients. In Gagliardi et al.'s (2009) study of surgeons treating cancer patients, the participants successfully identified their learning needs, sought resources, and modified or confirmed their treatment plans based on research they pursued online. Surgeons faced with more complex patients were more likely to refer these patients to a specialist after completing this research. The study participants emphasized the need for adequate training on how to use the resources provided in order to be successful.

Past researchers of physician learning patterns found that most doctors did not value the documentation of learning in practice, but that user-friendly technology that supported knowledge creation, rather than simply documenting learning behavior, could change the users' attitudes (Parboosingh, 2002). Physicians pursuing board certification in internal medicine have been offered the opportunity to create a portfolio of their self-directed learning that will satisfy the self-assessment requirement associated with Maintenance of Certification (Green, Reddy, & Holmboe, 2009). Participants were required to document their patient care questions and the self-directed learning processes they undertook, and reflect on the application of their learning in practice and the learning experience (Green et al., 2009). The majority of study participants committed to at least one ongoing change in their practices as a result of completing the portfolio, and

although this process took longer than its alternative, a multiple-choice test, the participants preferred the portfolio option. These learners also reported a need for ongoing technical support in completing the activity, and those who felt they received adequate support expressed satisfaction with the program. These physicians reported the ability to transform their practices as a result of their participation in this online activity.

Online Communities of Practice

Physicians rely on interaction with their peers throughout their learning processes, and the lack of peer interaction in some online learning formats may account for their reticence to adopt online education formats as readily as other professionals have (Sargeant et al., 2006). Some CME providers have attempted to create the peer interaction that many physicians seek in live activities by developing online communities of practice (CoP). Participants in these activities have demonstrated varying degrees of satisfaction and success from these experiences.

Parboosingh (2002) described a number of differences between traditional live CME activities and online CoPs. Learners in live CME activities are exposed to information that expands their knowledge in discrete episodes and must be self-directed to maintain motivation to learn and to apply their learning to their practices. Learners in CoP settings explore clinical situations they have experienced in their practices and have a network of peers from whom they can learn and who can provide motivational and moral support on an ongoing basis. Tu, Blocher, and Ntoruru (2008) found that members of an online community learned by sharing their comments and thoughts publicly with each other and that this process created stronger bonds among the group members. Other researchers have found that replacing the personal interaction that occurs in a live setting

with online interaction through a discussion board can “promote the same kind of constructive dialogue” (Luke et al., 2009, p. 163). Some participants stated that the flexibility of participating online rather than in a live activity provided greater balance between their work and private lives, although others stated that they experienced difficulty with creating protected time that could be devoted solely to their participation in the CoP (Allan & Lewis, 2006).

Facilitators of online CoP experiences were found to be influential to their success through the types of activities they selected. According to Luke et al. (2009), “learning elements, problems, and case studies establish core content, encourage critical reflective practice, and build onto this more complexities so as to challenge learners to integrate new knowledge within clinical care plans and interprofessional practice” (p. 163). Other participants in workplace CoP activities felt that personal contact from the facilitator contributed positively to their experiences, as did simplicity in the design of the online tools used to support the community (Baek & Barab, 2005). Tu et al. (2008) also noted that, when community members represented multiple roles with varying skill levels from a team of healthcare providers, the participants were able to strengthen connections through the interactions that occurred.

In some studies, the community members failed to reach a successful degree of connection (Baek & Barab, 2005; Tu et al., 2008). When participants had inadequate time to devote to supporting the community through their participation, when trust was not established among the community members, and when power was unequally distributed among community members, the participants did not create the mutually supportive atmosphere that was described as typical of a successful community of

practice (Tu et al., 2008). Some educational planners have attempted to combine some live meetings of community participants, especially at the beginning of a program, with an online community (Guan, Tregonning, & Keenan, 2008) in an effort to support the participants' sense of belonging in the learning community.

Tools that Support Online Communities of Practice

According to Tu et al. (2008), "Web 2.0 is a Web technology that aims to enhance creativity, information sharing and collaboration among users. These concepts have led to the development and evolution of Web-based communities, such as social networking applications/sites, wikis, blogs" (p. 336). Developers of Web 2.0 applications and tools created a degree of interactivity that effectively supports the needs of participants in online learning communities. Their inventions have served as the mechanisms through which learners can experience the peer interaction they desire in an online environment. Some of the more common tools used by online learners to participate in CoPs include social networking websites, wikis and blogs, and personal digital assistants.

Social Networking Websites

Social networking services, such as Twitter and Facebook, have become popular because users have gained the opportunity to maintain social connections without the need for direct contact. Burgess (2009) stated that "the everydayness of social networking activities has powerful implications for informal learning experiences" (p. 69). This was because participants can "develop as autonomous learners and learn through others' experiences how to handle similar situations" (p. 69). She identified three forms of capital that users of social networking tools can gain. These included: a) bonding capital, by connecting with others to create new social groups, b) bridging

capital, by making new contacts and thus a form of artificial mobility, and c) linking capital, by joining members of one's network to form new groups. Burgess' statements are very similar to the benefits of communities of practice described by Parboosingh, as well as Klamma's description of the learner's need to gain value through online participation.

As stated earlier, Luke et al. (2009) observed that physicians had been slower to adopt online learning than members of other professions. Guan et al. (2008) evaluated the success of an online CME activity that incorporated social interaction as part of the learning process. They reported low participation in these portions of the course, and stated that learners reported lack of time and lack of interest as the most common reasons for not participating. David Crotty, executive director of Cold Spring Harbor Protocols, reported an informal survey he undertook of scientists over a six month period. In his interviews, the subjects revealed an increasing use of social networking websites, although many were using sites geared specifically to scientists and not the general public (Guterman, 2008). Unlike physicians, members of other professions who have participated in CoPs have made use of social networking and bookmarking sites to share practices and evidence and create shared knowledge with other community members through the peer interaction these tools enable (Greenhow, 2009).

Blogs and Wikis

Weblogs, or blogs, are online journaling tools that allow any individual with internet access to publish his or her thoughts and receive feedback from readers. Groups of people with shared perspectives have been presented with the opportunity to interact in a virtual space even if geographically separate (Luehmann & Tinelli, 2008). The result

has been a “shift in thinking [that] emphasizes tools that prioritize mediating and relations as opposed to producing; focuses on collective as opposed to individual intelligence; and realizes and values expertise and authority that are distributed as opposed to expertise that is ‘located’ in the individual” (p. 325). The writers and readers of blogs have experienced questioning and support from their fellow participants, while sharing ideas that have resulted in a collective knowledge base and participating in a learning community. Among physicians, “Clinical practitioners serving in rural and remote areas no longer feel that they lack proper academic and professional development support because of their geographic isolation” (Ducut & Fontelo, 2008, p. 63).

Few researchers have explored the uses of blogs as educational tools from the learner’s perspective (Robertson, 2008), although some have explored the uses of blogs to support professional education for teachers. Luehmann and Tinelli (2008) used blogs to develop a community of practice for science teachers attempting to introduce innovative teaching techniques in their classrooms. Many participants stated that the support they received from their virtual colleagues helped them overcome the isolation they felt when working alone to introduce change on their campuses (Luehmann & Tinelli, 2008). Ferriter (2009) described many uses for blogs as a development tool for teachers, stating that learning from blogs “has been uniquely authentic, driven by personal interests and connected to classroom realities” (p. 35). He described experiences in which blog users were able to learn from reading other author’s blogs and by receiving feedback to their own postings, and that blog entries could be used to prompt discussion of professional issues with local colleagues (Ferriter, 2009). All of

these authors have described applications that support the development of communities of practice as described above and that could be applied to physician learning.

Physicians and CME practitioners have been slower to adopt blogs as a form of interaction. Participants in an online discussion forum for CME professionals discussed the question of why these groups have not made more use of this technology in their professional work. Many of the participants cited the legal scrutiny and liability that could result from public statements made in these online forums by healthcare professionals (“Are We Late,” 2010). The developers of the site Sermo.com have created an online social media site open to physician participants only, and they state that over 112,000 physicians representing 68 specialties are members (Sermo.com, February 4, 2010). The site’s owners have created opportunities for non-physicians to post survey questions on the site and to receive a report of the users’ comments (Ducut & Fontelo, 2008).

The developers of wikis have created tools that also allow users to post their thoughts publicly in an online forum. These tools were created to allow users to interact with and help create the content of the site, whereas blog users have only been given the option to respond to another’s post. According to Robertson (2008), educators have responded positively to the use of wikis as a tool for collaboration and interaction when developing program content, although few authors have explored the uses of wikis as educational tools. He went on to say that the authors of studies exploring the use of wikis with teachers have found that participants were generally positive about the use of wikis to facilitate problem-based or case-based learning. Medical educators have frequently

used these forms of instruction to develop CME activities because of the direct applicability of the learning experience to participants' practices.

The editors of the *New England Journal of Medicine* have developed an activity called "Clinical Decisions" that incorporates elements of blogs and wikis to support physician learning using simulated patient cases (Guterman, 2008). In this activity, the authors present a patient case with no clear answer and describe three possible treatment options. Readers vote online on the option they feel is most appropriate and are given the opportunity to share their comments with other readers through a blog-like feature. Editors of the *Journal* reported that the first 3 of these activities attracted more than 6,000 users.

Many physicians have earned CME credit as manuscript reviewers for peer-reviewed medical journals since this activity format was approved by the AMA in 2006. Tu et al. (2008) studied the use of wikis to support the manuscript review process for such a journal, in which reviewers could share comments and interact in the development of their reviews, forming a community of practice. They made several recommendations for improving the effectiveness of wikis for the development of such a community. These included suggestions that the reviewer community have a facilitator from within the group, that group members continue to interact over longer rather than shorter time frames, that facilitators encourage participants to use the social aspects of the online tool to strengthen personal ties with other members, and that users receive access to adequate training and support tools (Tu et al., 2008). The results of this study supported the findings of Sargeant et al., Parboosingh, and other authors cited earlier in their descriptions of the features that define a successful online community of practice.

Personal Digital Assistants

Online learners can access their educational activities in a number of ways. As Personal Digital Assistants (PDAs) and smartphones have become more common, more learners have begun accessing online content using these portable devices. One researcher found that PDA use by healthcare providers increased from 10-15% of those surveyed in 1996 to between 45% and 85% in 2006 (Ranson, Boothby, Mazmanian, & Alvanzo, 2007). Physicians had been expected to master the scope of medical knowledge in the past, but the rate of biomedical discovery has made that impossible, with the growth in the volume of medical knowledge far outpacing the intellectual capacity of the human brain (Davis, 2010). Users of PDAs have found these tools to be effective for accessing information at the point of care, allowing them to make immediate application of information in clinical settings (Ducut & Fontelo, 2008). Current medical students, who are typically more experienced users of current technology and devices, have been fast adopters of these devices to support their educations. Some leaders have warned that, while PDAs can facilitate the accessing of information, they have not proven effective at developing the critical thinking skills physicians need to effectively apply the knowledge they find (Ducut & Fontelo, 2008; Ranson et al., 2007). Some physicians have used PDAs to share patient and clinical information, such as photos or test results, with virtual peers in order to receive feedback on their patient care plans (Ducut & Fontelo, 2008). These users have incorporated their PDAs as an access point to communities of practice in which they participate.

Chapter Summary

Although online learning is a fairly new method of educating adults, many researchers have identified instances where existing adult learning theories and principles may be applied. Online learners have reported preferences for activities that are easy to use and provide adequate support to create a sense of comfort with the activity. They also have expressed preferences for interactive experiences that allow them to share information with their instructors and peers and to receive feedback, learning through a constructivist process. Although physicians have been slower to adopt these technological interventions in their learning endeavors, where they have, they have reported similar preferences. Online learning developers have found that the Community of Practice model has worked effectively in many online CME activities. Physicians have not begun widespread use of Web 2.0 technologies like blogs and wikis as an educational tool, but many have started using PDAs and smartphones. Education providers have made use of these tools in other disciplines with success, and they have begun to experiment with their applications in physician education. In Chapter 3, this author describes the development of a resource that will support the application of these internet tools to continuing medical education.

Chapter 3

METHOD

Members of any organization can experience difficulties when faced with the need to change. The members of a professional society, who join of their own accord and who volunteer their time and energy in support of the organization's mission, often join and maintain their memberships during their professional lives because of a strong affinity they feel for the organization and the activities available to them as members. Members can feel alienated when sudden, drastic changes are made without being properly prepared for what is to come. This researcher developed an educational planning handbook that is intended to address these concerns among the society's members by introducing options for incorporating web-based interactive technologies as the basis for delivering or enhancing the society's educational activities.

Target Audience

The intended audience for this handbook is the members of the American Academy of Allergy, Asthma and Immunology, including both the volunteer leaders and the general members. All have an interest in the educational programming developed by and for the society's membership. The leaders bear a responsibility to maintain the quality of the society's annual meeting and other activities, which are known internationally as high quality events. The leaders are also responsible for the fiscal stability of the organization, and must balance the need for quality and the members' wide-ranging scientific interests with the financial realities of decreasing revenue and

increasing event costs. The general members are encouraged to participate actively in the educational programming process within the organization, and frequently feel slighted because their suggestions may not be programmed in a high profile setting or may be rejected overall. These physicians and researchers represent a wide variety of scientific and clinical interests, and they feel a responsibility for advancing the science of the specialty and their unique interests within it through their involvement in the educational programming developed within the society. Like the physicians described in the literature summarized in Chapter 2, most of the members of the society are not avid users of technological tools to support their continuing education efforts and have been slow to accept web-based resources that have been offered to them as member benefits.

Organization of the Handbook

The author developed the handbook, *A Guide to Developing Internet CME Activities*, to briefly introduce the relevant adult learning concepts and to describe practical aspects of integrating internet tools into online activities. The major sections of the handbook include: a) the differences between live and online learning, b) uses of internet tools in online CME activities, c) the effective design of online learning activities, d) the AMA definitions of enduring material activities and options for incorporating internet web 2.0 applications into these, and e) a short list of references that activity planners can consult. In this way, readers will be presented with practical information that they can easily apply in their work as activity planners.

Preliminary Assessment Plan

The author incorporated assessment by a sample of the target audience for the handbook. The handbook content was shared with several members of the association to

receive their feedback on its clarity and appropriateness. These included: a) the Chair of the Continuing Medical Education Committee, b) the Chair of the Annual Meeting Program Committee, and c) the Chair of the Education Division of the Board of Directors. These society leaders are the most involved with the educational program developed by the membership and are the most familiar with the accreditation requirements that the planners of continuing medical education activity must meet. Their feedback is discussed in Chapter 5.

Chapter Summary

In this chapter, the author identified the target audience for the educational planning handbook to be the leaders and members of this medical specialty society. The handbook's contents describe options available to the members who plan educational activities to incorporate internet technologies to support and enhance learning among their peers. The leaders of the society's education program were contacted to provide feedback on the clarity and appropriateness of the handbook's contents. The goal is to support the society's leaders and members to maintain the quality of the educational programming they offer and expand opportunities for members in their efforts to promote their scientific interests while expanding reach and minimizing costs. In Chapter 4, the author presents the handbook.

Chapter 4

RESULTS

Introduction

The members of the American Academy of Allergy, Asthma & Immunology volunteer their time and expertise to develop the educational activities offered by the organization. Most are familiar with programming live education meetings but have not had experience preparing online activities. As a result, they are not aware of the types of online events that can be developed for continuing medical education offerings. Because the members are primarily physicians and not adult educators, they are also not aware of adult learning theory and how these concepts can be used to enhance the effectiveness of online education. Presented in this chapter is a handbook that was designed to introduce online continuing medical education (CME) requirements and adult learning principles to these volunteers. An online version is available at aaaionlinecme.wikispaces.com.

A Guide to Developing Internet CME Activities

Prepared by Steven Folstein

Director of Education, American Academy of Allergy, Asthma & Immunology

April 2010

TABLE OF CONTENTS

Chapter	Page
1. INTRODUCTION	35
2. HOW ONLINE LEARNING DIFFERS FROM LIVE EVENTS	37
Creating a Community of Practice	38
3. INCORPORATING INTERNET TOOLS INTO ENDURING MATERIALS.	39
Blogs	39
Wikis	39
Videoconferencing	40
Mobile Applications	40
4. DESIGNING EFFECTIVE ONLINE ACTIVITIES	42
Prepare your Faculty Members to Engage Learners Differently	42
Engage Learners in Multiple Ways	43
Make it Relevant	43
Let Participants Demonstrate Their Learning	44
Make Access Convenient	44
5. ENDURING MATERIAL FORMATS	46
Journal CME	46
Test Item Writing.	47
Manuscript Review.	47
Performance Improvement.	48
Internet Point of Care Learning.	40
Other Activities.	50
6. PLANNING FOR SUCCESS.	51
7. SUGGESTED READING.	52

INTRODUCTION

The AAAAI is known internationally for the quality of its Annual Meeting. Allergist/immunologists from around the world attend each year to hear about the latest advances in the science of the specialty and how to translate those scientific discoveries into patient care that improves lives. As a member of an AAAAI committee, it is likely that you have participated in this process by submitting a suggestion for an Annual Meeting session, or possibly reviewed suggestions and collaborated with your fellow committee members to create sessions.

As an active AAAAI member you have probably attended an Annual Meeting in the last year or two, and have witnessed some of the changes that the current economy has made necessary – no shuttle buses between properties, no boxed lunches at many midday sessions, no printed handouts or abstract book. You have probably heard about the reductions in external funding that once made these amenities possible. These limitations, though, create new opportunities for AAAAI members to continue offering the high quality education for which the Academy is known, but in different formats.

A recent study predicted that, by 2016, at least half of all CME will be offered online (Harris, Sklar, Amend, & Novalis-Marine, 2010). Online education offers the opportunity to reach a larger group of learners at a lower cost than a live meeting, so in our current economic climate, the move to internet CME makes sense. Surveys of AAAAI members have found that many use the internet for CME, although the majority of members express a preference for live meetings to earn their credits. Online CME, if carefully planned, can be just as effective as live CME. The science of adult education

and familiarity with some simple web-based tools can inform your choices as you plan online CME activities that will make a difference in your learners' practices and still maintain the high standards expected of CME programs offered by the AAAAI.

HOW ONLINE LEARNING DIFFERS FROM LIVE EVENTS

Online learning offers learners many advantages that are not found in live events:

1. Learners control the pace at which they experience content.
2. Learners control the sequence with which they experience content; depending on the format, they can fast forward, rewind, or reconfigure the content to suit their needs.
3. Learners can access the material when convenient.

Online learning also has potential disadvantages:

1. Learners may not be able to ask questions of the instructor in real time to clarify their understanding.
2. Learners may encounter technical limitations that inhibit their ability to participate.
3. Learners are participating in isolation, with no peers to provide support.

Many adult learners, including physicians, state a preference for live educational activities because of the opportunity to interact with the other participants. In some cases, learners report gaining more knowledge from the hallway and coffee break conversations with other participants than they do from the formal presentations.

The challenge for the planners of online education activities, then, is to create opportunities for the participants to interact with each other as part of the experience. By carefully using simple, inexpensive internet tools, you can incorporate this kind of peer interaction into the activities you plan and help your CME activity overcome the limitations so many learners experience when they participate in an online activity.

Creating a Community of Practice

Adult learning theory tells us that adults learn by constructing new knowledge from their experiences. Learners actively engage in a process of receiving new information, analyzing it in context with their prior knowledge, and then developing new knowledge and skills as a result. This approach, known as constructivism, also emphasizes the importance of the learning environment to this process, recognizing that interaction among learners and the guidance of an instructor, along with opportunities to reflect on the experience, are essential elements of adult learning (Zepke & Leach, 2002).

As you develop your activity, think of the participants as a community of learners. Although they share the experience of interacting with the same content and learning activities, without personal contact with an instructor and other learners they may not develop the same level of engagement as they would in a live activity. Look for options to encourage a sense of community among the participants. Adult learners value the chance to give and receive feedback from their peers and will feel more invested and more satisfied with the experience when given the chance to do so. This interaction also gives learners opportunities to practice applying what they have learned, which makes them more likely to remember the content and to use it appropriately. By helping your learners create a community of practice, you are helping them to change their practice of allergy/immunology and provide better care to their patients.

INCORPORATING INTERNET TOOLS INTO ENDURING MATERIALS

Enduring materials are CME activities that can be used over time at various locations, such as print, recorded, or online resources. The ease of development and distribution of internet learning activities can make it possible to reach a larger number of learners in less time and at lower cost than a printed version of the same materials or a live event addressing the same content. As internet technology has grown more sophisticated and high-speed internet access more common, a number of new applications have been developed that make online learning much more than reading text from a screen. If used appropriately, these tools can enhance the outcome of your activity.

Blogs

A blog (short for weblog) allows anyone with access to publish their work online. Blog content can be made publicly available or limited to a specific audience. Readers can post their responses and comments to the author's postings, creating an online conversation between author and readers. To see an example of a blog built on Blogspot, the free blog platform run by Google, visit the JACI Journal Club at www.jaci-online.blogspot.com.

Wikis

A wiki allows multiple authors to collaboratively develop content that is published online. Like a blog, access can be public or limited to a specific group of collaborators. The wiki records when revisions are made and by whom so a history of the

project can be reviewed. Probably the most well-known wiki is Wikipedia (www.wikipedia.org), the free online encyclopedia. The online version of this handbook, available at aaaionlinecme.wikispaces.com, was developed as a wiki.

Videoconferencing

High-speed internet connections allow for easy transmission of audio and video signals. A number of online services allow for audio and videoconferencing online without the cost of conference phone lines, taking advantage of the built-in cameras and microphones now found in most laptop computers. These include Skype (www.skype.com), an online videophone service that allow users to make calls over the internet for free, and iVisit (www.iVisit.com) which provides videoconferencing capabilities for small groups at a minimal cost. Some business services, such as GoToMeeting (www.GoToMeeting.com), also allow for low-cost group conferencing over the internet.

Mobile Applications

Smartphone technology has made internet access more convenient than ever, and in some communities is the main source of internet access for web users. While convenient, the mobile internet is more limited in its functionality; for example, many multimedia functions common in standard websites will not work on a mobile device. To maximize the convenience of the mobile internet, CME developers have two options – to create an online experience that can function thoroughly given the technical limitations of the mobile web, or to create an application that can be downloaded to a mobile device. The first option will allow your activity to be accessed on any mobile device – see m.wikipedia.org to compare the mobile version of the site to the original. The second

option will be limited to users of the device that can run the application. Medscape, the popular medical website, now offers an application that allows iPhone users to claim CME credit (cme.medscape.com), and will soon release a similar application for Blackberry users.

DESIGNING EFFECTIVE ONLINE ACTIVITIES

Incorporating these web-based tools into your CME activity will not guarantee a successful outcome. All elements of the program must be analyzed with attention to the differences between the live and online learning experiences. By considering the following elements of your activity you will give your learners an experience that will support effective learning.

Prepare your Faculty Members to Engage Learners Differently

Your faculty members must be prepared to work differently to engage learners in an online course. This may mean involving the faculty members beyond the creation of the course; be sure to discuss this possibility when they are invited to participate so they can prepare accordingly. A few options to present to your faculty members include:

- Encourage your instructors to approach the beginning of the online course like they would a classroom by introducing themselves and asking learners to do the same. This can be done through blog or wiki postings. Participation can be encouraged by developing effective prompts. Post questions about your learners' practices, patient care philosophies, or prior learning on the subject at hand. This will make the participants more aware of each other and get them comfortable interacting online.
- Videoconferencing tools could also be used to develop a greater personal connection between the facilitator and the participants. A brief online audio- or videoconference could build even stronger connections than a blog or wiki

discussion. This could also be repeated during the course to provide live discussion forums for learners, and when participants complete the course as a means of assessing learning.

Engage Learners in Multiple Ways

Online learners are left much more to their own devices, especially in an asynchronous course where the learning is self-directed. To help sustain motivation and focus in your participants as they work independently, develop your course to use a variety of instructional formats and to appeal to a variety of learning styles. Consider putting some material in text format and some as audio or video files. If used carefully this approach can help to highlight important points and help learners better retain these important concepts. Another effective option is to create an interactive element at key points in the activity. A short series of questions – multiple choice, true/false, fill in the blanks – can serve this purpose and are easily developed. These interactive quizzes become the online equivalent of an audience response system in a live activity.

Make it Relevant

Adult learners are most engaged in a learning experience that directly relates to their lives, and that provides opportunities for easy application in their work or home settings. Each set of learners will represent a different combination of practice settings, years of experience, and prior knowledge on the subject at hand. If your course is presented through a blog or wiki, though, it is very easy to edit the content to suit the specifics of each cohort of learners. Based on the introductions submitted by your participants, work with your faculty members to fine tune the course content to more directly relate to their practice experiences and learning needs. This could be as simple as

adjusting the examples embedded in the text, but it will help your learners to engage more strongly with the content.

Let Participants Demonstrate Their Learning

One requirement of enduring materials is that learners must be required to either interact with the content or self-assess their mastery of it. Hypothetical case studies can satisfy this requirement by providing an opportunity to apply new information to patient care scenarios. These can easily be posted online as part of your web-based activity using a blog or wiki. You could also take advantage of the multimedia opportunities presented by the internet and create a simple video case presentation; these can be posted online at a free hosting site such as YouTube and embedded in your blog. Another option would be to present the case in a webinar format, using PowerPoint slides and audio; this could also be hosted online and embedded in your online course. Creating opportunities to practice applying course content to patient cases lets your participants build their mastery of the material and can create opportunities to interact with their peers in the learning process.

Make Access Convenient

One of the advantages of online education is the flexibility it affords learners. The materials can be accessed at the participant's convenience, regardless of day, time, or setting. With the growth of mobile technology such as laptops, netbooks, and smartphones, the mobile web has become more commonplace and has extended the reach of online education even further. As you construct the online content of your course, keep in mind that some of your learners may be accessing it from a mobile device. Blogs and wikis are typically accessible on mobile devices, but an online activity that relies heavily

on multimedia content may not be as successful since many mobile devices will not be able to play the audio and video files. If your activity will depend heavily on graphics or multimedia elements, you might consider if a mobile version of the activity could be developed separately to serve mobile learners.

ENDURING MATERIAL FORMATS

Regardless of how well designed your online activity may be, keep in mind that CME activities must meet certain requirements in order to offer credit. These come from two sources: the American Medical Association (AMA), which creates the definitions for the various types of CME activities, and the Accreditation Council for Continuing Medical Education (ACCME), which establishes the requirements for organizations that plan and present the activities. As you consider your options for developing new CME activities for AAAAI members, it is important to make choices that will meet the CME requirements. According to the AMA, all enduring materials must give clear instructions, give access to bibliographic material, and provide for learner interaction or self-assessment (American Medical Association, 2006). Some enduring material formats carry additional requirements that can be met through the use of online tools.

Journal CME

According to the AMA, providers of journal CME “must incorporate a mechanism for physician reflection and/or interaction with the article content” (American Medical Association, 2006). This is frequently met by providing a quiz on the article’s content, but other options can be considered. These include:

- participatng in a wiki discussion with other readers
- posting of blog entries in which readers respond to prompts from the article’s authors about how they could apply the information to their practices
- responding to case studies as described earlier.

By moving beyond the traditional quiz, online journal CME can take on many of the qualities of a live journal club meeting, in which learners create a learning community through discussion and exchange of ideas.

Test Item Writing

The AMA describes this newer form of CME as “a learning process wherein physicians contribute to the development of high stakes examinations, or certain self-assessment modules, by researching, drafting and defending potential questions” (American Medical Association, 2006). The questions could be for the American Board of Allergy and Immunology examination offered to meet Maintenance of Certification (MOC) Part II requirements, or other self-assessment activities accepted for MOC. Participants in this activity could easily use a wiki to record their research and drafting processes and to receive peer feedback from other test item writers. This more public approach to the test item writing process allows it to become more of a group activity, encouraging interaction among learners, rather than an isolated solo activity. Access to the wiki can be limited to the participants in the test item writing process to maintain the security of the test questions.

Manuscript Review

Manuscript reviewers work under the oversight of the journal editor to read and review articles submitted for publication. Like test item writing, manuscript reviewers must complete some level of research or literature review as part of the process and must document this activity. The reviews must meet quality standards established by the editor. A blog could easily be used as a mechanism for reviewers to record their research and post their reviews of the assigned articles, and could be accessed by the editor for

scoring. Access could be limited to the author and editor if confidentiality is preferred. Some journals have experimented with the use of web 2.0 technologies to create a community of manuscript reviewers, encouraging sharing and collaboration among the participants. These reviewers have described some benefits from this more collaborative experience, such as the professional development of less experienced reviewers and the advancement of the field (Tu, Blocher & Ntoruru, 2008).

Performance Improvement

Performance Improvement CME activities are long-term processes in which a physician or group practice selects evidence-based care measures and assesses their compliance with them. They then identify practice interventions in an effort to improve their success at meeting the measures, and after a period of time, they reassess their practices to determine if compliance has improved. These activities can be used to meet MOC Part IV in some cases. Often these activities require the use of complex web-based databases to collect and analyze the data collected, but in other cases, simple paper forms can suffice. A middle ground could be found by using a blog or wiki as the mechanism to collect patient data and record the participants' analysis of their outcomes, selected interventions, and post-intervention data. The blog could also serve as a journal of the physician's experience during the process, allowing the learner to reflect deliberately on his or her learning and the process itself, which will enhance the benefit gained from participating. If a group practice is participating, a wiki format would allow for input from all practice participants, so that the group would collaborate to document their practice behavior, analyze their findings, and reflect on the result of any changes made.

Performance improvement activities can benefit from mobile resources because they could simplify the collection of patient data at the point of care, and provide support materials that can serve as resources for clinicians as they implement new guidelines into their practices. Consider the complexity of the data being collected and the support materials needed by participants when deciding whether or not a performance improvement activity would be accessible on a mobile device.

Internet Point of Care Learning

This relatively new CME activity type provides credit for the self-directed learning physicians pursue out of need in their practices. Participants can earn credit for identifying a patient care question they encounter in practice that requires a literature search to be answered, completing research from an approved database to seek the answer, and reflecting on their experience to identify if their search was successful and how their learning will affect their practices. A blog or wiki format could be used by participants to record the required information that must be reported in order to collect credit: clinical question, database searched and resource(s) reviewed, and reflection. The online posting of this information could then easily be reviewed by the activity's planners to verify participation and approve credit. Another advantage to making these postings available online is that the blog or wiki becomes a searchable resource of its own, and other clinicians could search these to seek answers to their own questions. In this way the point-of-care participant shares his or her learning with others and becomes a resource for his or her peers, allowing for another virtual community to develop.

As with the performance improvement activities, a blog- or wiki-based point of care activity that could be accessed using a mobile device would allow users to literally

complete the activity at the point of care. This activity format offers the most advantages to providing mobile access to the learning materials.

Other Activities

The AMA has identified other types of activities that could be approved to offer CME credit to participants. Two specific examples are committee work and development of personal learning plans. Either of these could be facilitated easily through online tools. A committee developing a workgroup report, for example, could use a wiki as the platform for developing the project. Because wikis can track the editing history of the content, it would be simple to monitor each committee member's involvement in the project when assigning credit for participation. Working through a wiki would also eliminate the need to e-mail multiple drafts of a document to committee members and track responses, since all input would be collected in one place. Conference calls would also be managed more easily because all committee members could access the document online and know that the entire group is working from the same draft. Learning plans, like point-of-care learning activities, could be developed using a wiki template. Participants could then receive input from mentors with expertise in the area of interest.

PLANNING FOR SUCCESS

Live CME activities are not being eliminated. With the introduction of the interactive internet technologies now available, though, the options for creating highly effective enduring materials have never been greater. Necessity may demand that more educational content be delivered online, but this move can also be an opportunity to develop innovative, effective learning opportunities for AAAAI members. This handbook includes suggestions of methods to achieve this outcome. If you have thoughts of other approaches, contact the AAAAI Education Staff at 414-272-6071 or cme@aaaai.org to explore the available options.

SUGGESTED READING

Before moving too far ahead in your planning process, please review the information from the AMA and ACCME on the requirements for the various CME activity types. This information is available at the following websites:

- The AMA Continuing Medical Education site: <http://www.ama-assn.org/ama/pub/education-careers/continuing-medical-education.shtml>.
Download the “Physicians Recognition Award and Credit System” booklet to read the details of the various CME formats.
- The ACCME site: <http://www.accme.org>. Search the “Frequently Asked Questions” to learn more about the documentation and compliance requirements for each activity type.

Chapter Summary

Online learning provides many opportunities for membership organizations to provide education activities that are cost-effective and convenient. The planners of these activities require an understanding of how adults learn and of the internet tools available to maximize the impact of the activities on the learners. Volunteer activity planners need resources that simplify their efforts, especially when they are participating in new or unfamiliar programs. This handbook was designed to introduce the concepts of adult learning and interactive web technologies to physician volunteers developing continuing medical education activities, especially those unfamiliar with adult learning and online education. In Chapter 5, the author discusses the contributions and limitations of the project, recommendations for further development, and feedback received from a sample of the target audience of the project.

Chapter 5

DISCUSSION

This project was developed to provide a simple reference tool for physician volunteers to use when planning online continuing medical education activities for their peers. Because these volunteers are subject matter experts and not education professionals, the handbook needed to introduce key concepts related to adult learning without being too densely written. The physicians in the target audience for the handbook and the resulting education activities are also less likely to be familiar with the internet technologies available to support their efforts. In this chapter the author discusses the completed project.

Contribution of the Project

This project provides society members with potential solutions to the problem of developing online learning activities that will provide opportunities for learner interaction and can be produced cost-effectively by not-for-profit medical societies. The content is presented in a format that emphasizes application and usability, with the intent of encouraging readers to implement the concepts immediately. The readers' prior experience with live activities is acknowledged, and they are encouraged to build on those experiences when implementing the new concepts. By following the recommendations in the handbook and using these internet resources to build online education programs, medical society members should be able to develop low-cost online CME activities that other members will find appealing and effective.

Limitations

This project is limited by logistical realities. First, leaders of the society have expressed interest in expanding the development of online education activities by the society's members, but to date, no specific plans have been made to achieve this goal. Second, many society members are not familiar with web 2.0 technologies and may need additional hands-on training before feeling comfortable enough to engage in the planning of these activities, or to participate in them as learners. Third, the culture of the organization is strongly focused on live activities, especially the society's annual meeting, and once online activities have been developed, time will be needed to build awareness of and comfort with these new programs.

One additional limitation is that much of the interest expressed by society leadership has involved the repurposing of live activities into online courses. These efforts will require more time and effort from the volunteer faculty developing content. In order for the development of online programs to succeed, funds may be needed to compensate these faculty members for the additional time required to adapt their work into an online format.

Preliminary Assessment Results

Three leaders of the organization's education program were asked to review and comment on the handbook. Their responses were generally positive, with all reviewers commenting on the need for the organization to develop more online programming. The reviewers also stated that the focus on web-based tools that were easy to use and available at little or no cost would be beneficial to the society's education program.

Some of their observations resulted in revisions to the handbook. The descriptions of the advantages and disadvantages of online learning were revised for greater clarity based on reader comments. Also, the sections addressing test item writing and manuscript review were edited to address issues around confidentiality and content security.

The reviewers also suggested adding more detail about activity logistics, such as copyright of program content. In the interest of simplicity and ease of use, these additions were not made. These more technical issues are often dependent on the specifics of each circumstance and will be more efficiently addressed by staff managing each activity.

Recommendations for Further Development

One recommendation would be to work with society members to develop online activities adapted from recently presented live courses using the tools outlined in the handbook. The outcomes of the live and online versions of the program could then be compared to assess the relative effectiveness of the two versions, and learner feedback could be used to assess the success of these online tools as channels for presenting online CME activities. Another recommendation would be to proactively identify live courses planned for the coming year to be adapted into online offerings so that the faculty involved can plan for both versions of the course from the beginning rather than being asked to retroactively adapt their work into a new format. Faculty with interest or expertise in offering online CME activities could be identified and recruited to work with staff to develop an initial set of activities to begin the online education program. Finally,

a plan for developing awareness and promoting participation in the online activities should be developed to educate the members about the new offerings.

Project Summary

In this project, the author addressed the problem faced by leaders of medical specialty societies as they attempt to develop cost-effective online education that society members will find to be appealing and effective learning experiences. Physicians have expressed a preference for live education, but increasing costs and decreasing funds have made these activities impractical. The author reviewed the adult education and continuing medical education literature to identify best practices in the use of internet resources available at little or no cost that have been demonstrated to be effective at supporting online education for physicians. This review resulted in a handbook that can be distributed to medical society members who volunteer their efforts to program CME activities for the society's members.

REFERENCES

- Accreditation Council for Continuing Medical Education. (2009). *ACCME Annual Report Data 2008*. Chicago: Accreditation Council for Continuing Medical Education. Retrieved January 23, 2010 from http://www.accme.org/dir_docs/doc_upload/1f8dc476-246a-4e8e-91d3-d24ff2f5bfec_uploaddocument.pdf
- Allan, B., & Lewis, D. (2006) Virtual learning communities as a vehicle for workforce development: A case study. *The Journal of Workplace Learning*, 18(6), 367-383. doi: 10.1108/13665620610682099
- American Medical Association. (2006). *The physician's recognition award and credit system: Information for accredited providers and physicians – 2006 revision*. Chicago: American Medical Association.
- “Are we late adapters of social media?” (2010). Continuing Medical Education Discussion Board, February 2-4, 2010. Retrieved from http://www.linkedin.com/groupAnswers?viewQuestionAndAnswers=&gid=62807&discussionID=13217043&goback=.anh_62807
- Baek, E.-O., & Barab, S. A. (2005). A study of dynamic design dualities in a web-supported community of practice for teachers. *Educational Technology & Society*, 8(4), 161-177. Retrieved December 28, 2009 from ERIC database.
- Bryce, E., Choi, P., Landstrom, M., & LoChang, M. (2008) Using online delivery for workplace training in healthcare. *Journal of Distance Education*, 22(3), 149-156. Retrieved December 24, 2009 from ERIC database.
- Burgess, K.R. (2009). Social networking technologies as vehicles of support for women in learning communities. *New Directions for Adult and Continuing Education*, 2009(122). DOI: 10.1002/ace.335
- Carroll, C., Booth, A., Papaioannou, D., Sutton, A., & Wong, R. (2009). UK health-care professionals' experience of on-line learning techniques: A systematic review of qualitative data. *The Journal of Continuing Education in the Health Professions*, 29(4), 235-241. doi: 10.1002/chp.20041
- Chamers, T., & Lee, D. (2004). Web-based training in corporations: Organizational considerations. *International Journal of Instructional Media*, 31(4), 345-354. Retrieved December 24, 2009 from ERIC database.

- Davis, D. (2010). *CE in Nursing and Medicine: What Does the Future Look Like? Recommendations from a Macy Conference on Lifelong Learning Sponsored by the AACN and AAMC*. Presented January 29, 2010 at the 2010 Alliance for Continuing Medical Education Annual Meeting, New Orleans, LA.
- Ducut, E., & Fontelo, P. (2008). Mobile devices in health education: Current use and practice. *Journal of Computing in Higher Education*, 20(2), 59-68. doi: 10.1007/s12528-008-9003-2
- Ferriter, B. (2009). Learning with blogs and wikis. *Educational Leadership* (February), 34-38. Retrieved December 24, 2009 from ERIC database.
- Gagliardi, A.R., Wright, F.C., Victor, J.C., Brouwers, M.C., & Silver, I.L. (2009). Self-directed learning needs, patterns, and outcomes among general surgeons. *The Journal of Continuing Education in the Health Professions*, 29(4), 269-275. doi: 10.1002/chp.20046
- Gerjets, P., & Kirschner, P. (2009). Learning from multimedia and hypermedia. *Technology-Enhanced Learning*, 251-272. doi: 10.1007/978-1-4020-9827-7_15
- Green, M.L., Reddy, S.G., & Holmboe, E. (2009). Teaching and evaluating point of care learning with an internet-based clinical-question portfolio. *The Journal of Continuing Education in the Health Professions*, 29(4), 209-219. doi: 10.1002/chp.20039
- Greenhow, C. (2009). Tapping the wealth of social networks for professional development. *Learning & Leading with Technology*, June/July 2009. Retrieved December 24, 2009 from ERIC database.
- Guan, J., Tregonning, S., & Keenan, L. (2008). Social interaction and participation: Formative evaluation of online CME modules. *Journal of Continuing Education in the Health Professions*, 28(3), 172-179. doi: 10.1002/chp
- Guterman, L. (2008). Specially made for science: Researchers develop online tools for collaborations. *Chronicle of Higher Education*, 54(24), A9. Retrieved December 24, 2009 from ERIC database.
- Harris, Jr. J.M., Sklar, B.M., Amend, R.W., & Novalis-Marine, C. (2010). The growth, characteristics, and future of online CME. *Journal of Continuing Education in the Health Professions*, 30(1), 3-10. doi: 10.1002/chp.20050
- Klamma, R., Chatti, M. A., Duval, E., Hummel, H., Hvanberg, E. H., Kravcik, M., Law, E., Naeve, A., & Scott, P. (2007). Social software for life-long learning. *Educational Technology & Society*, 10(3), 72-83. Retrieved December 24, 2009 from ERIC database.

- Kripalani, S., Cooper, H.P., Weinberg, A.D., & Laufman, L. (1997). Computer-assisted self-directed learning: The future of continuing medical education. *The Journal of Continuing Education in the Health Professions*, 17, 114-120.
- Luehmann, A.L., & Tinelli, L. (2008). Teacher professional identity development with social networking technologies: Learning reform through blogging. *Educational Media International*, 45(4), 323-333. doi: 10.1080/09523980802573263
- Luke, R., Solomon, P., Baptiste, S., Hall, P., Orchard, C., Rukholm, E., & Carter, L. (2009). Online interprofessional health sciences education: From theory to practice. *The Journal of Continuing Education in the Health Professions*, 29(3), 161-167. doi: 10.1002/chp.20030
- Pang, K. (2009). Video-driven multimedia, web-based training in the corporate sector: Pedagogical equivalence and component effectiveness. *International Review of Research in Open and Distance Learning*, 10(3), 1-14. Retrieved December 24, 2009 from ERIC database.
- Parboosingh, J.T. (2002). Physician communities of practice: Where learning and practice are inseparable. *The Journal of Continuing Education in the Health Professions*, 22(Fall), 230-236. Accessed January 10, 2010. <http://www3.interscience.wiley.com/cgi-bin/fulltext/110480658/PDFSTART>
- Pohland, P., & Bova, B. (2000). Professional development as transformational learning. *International Journal of Leadership in Education*, 3(2), 137-150. Retrieved December 24, 2009 from ERIC database.
- Pouwels, M. *The evolving standards for MOC: Implications for CME/CPD*. Presented January 27, 2010 at the 2010 Alliance for Continuing Medical Education Annual Meeting, New Orleans, LA.
- Ranson, S.L., Boothby, J., Mazmanian, P.E., & Alvanzo, A. (2007). Use of personal digital assistants (PDAs) in reflection on learning and practice. *The Journal of Continuing Education in the Health Professions*, 27(4), 227-233. doi: 10.1002/chp.142
- Robertson, I. (2008). Learners' attitudes to wiki technology in problem-based, blended learning for vocational teacher education. *Australasian Journal of Educational Technology*, 24(4), 425-441. Retrieved January 10, 2010 from ERIC database.
- Sargeant, J., Curran, V., Allen, M., Jarvis-Selinger, S., & Ho, K. (2006). Facilitating interpersonal interaction and learning online: Linking theory and practice. *The Journal of Continuing Education in the Health Professions*, 26(Spring), 128-136. doi: 10.1002/chp.61

- Schoen, M.J., Tipton, E.F., Houston, T.K., Funkhouser, E., Levine, D.A., Estrada, C.A., Allison, J.J., Williams, O.D., & Kiefe, C.I. (2009). Characteristics that predict physician participation in a web-based CME activity: The MI-Plus survey. *The Journal of Continuing Education in the Health Professions*, 29(4), 246-253. doi: 10.1002/chp.20043
- Selwyn, N., Gorard, S., & Furlong, J. (2006). Adults' use of computers and the internet for self-education. *Studies in the Education of Adults*, 38(2), 141-159. Retrieved December 24, 2009 from ERIC database.
- Slotnick, H.B. (2000). How doctors know when to stop learning. *Medical Teacher*, 22(2), 189-196. Retrieved December 24, 2009 from ERIC database.
- Snyder, M.M. (2009). Instructional design theory to guide the creation of online learning communities for adults. *TechTrends*, 53(1), 48-56. Retrieved December 24, 2009 from ERIC database.
- Tu, C-H., Blocher, M., & Ntoruru, J. (2008). Integrate web 2.0 technology to facilitate online professional community: EMI special editing experiences. *Educational Media International*, 45(4), 335-341. doi: 10.1080/09523980802588634
- Zepke, N., & Leach, L. (2002). Contextualised meaning making: One way of rethinking experiential learning and self-directed learning? *Studies in Continuing Education*, 24(2), 205-217. doi: 10.1080/0158037022000020992