Supporting Information Technology Professionals—Virtually

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Campus information technology (IT) professionals need to keep up with emerging new concepts, trends and issues to be effective. IT professionals need to stay current in their chosen personal fields of expertise and develop and maintain skills to design and deliver effective information technology services on their campuses. One way to accomplish these goals is to improve the speed of technology transfer within and between institutions, and between IT professionals and experts. This paper provides an overview of the range of strategies and resources that IT professionals can use to engage in lifelong learning.

This paper also describes case studies and examples of two new types of professional formats, Virtual Seminars and Expert Events, that may help to address this need. Virtual Seminars are digital video seminars featuring national experts in a series of presentations on core information technology concepts and technical trends and issues. Expert Events are regular Webcasts featuring national experts in live interviews combined with real-time e-mail questions. These resources are available in multiple formats. The Virtual Seminars are available on the Internet and on CD. Expert Events are available live on the Web and then available in audio and text archives and Web sites. Use of these IT professional resources can lower travel costs, reduce time away from the office, and support professional networking and development.

Keeping Up with Information Technology

How Can Professionals Do It?

Campus IT professionals need to keep up with emerging new concepts, trends and issues to be effective. IT professionals need to stay current in their chosen personal fields of expertise and develop and maintain skills to design and deliver effective information technology services on their campuses. One way to accomplish these goals is to improve the speed of technology transfer within and between institutions, and between IT professionals and experts. This paper provides an overview of the range of strategies and resources that IT professionals can use to engage in lifelong learning. This paper also describes development case studies and examples of two new types of professional formats, Virtual Seminars and Expert Events, that may help to address this need.

Framework of Professional Learning

The importance of lifelong learning in professional lives was highlighted in a 1995 monograph by Michael Dolence and Donald Norris. They projected that information-age workers would need the equivalent of 30 credit hours of learning every seven years to stay gainfully employed in the Information Age. If that projection is translated to the five-day workweek, it is approximately 45 minutes of time for learning every working day.

Ironically, higher education institutions that have a primary mission of learning have been slow to implement ongoing programs that support continued lifelong learning for their faculty and staff. In the past, higher education institutions have supported degree learning on their campuses, and this has been comfortably sufficient. Now, new on-going learning programs are needed. Programs are needed that train faculty, staff, and students in the use of the technology in our core missions. Programs are needed to educate the community and support learning on how best to integrate the use of technology into all the processes of the university. Emerging teaching and learning environments on the Web and programs that support virtual education and

distance learning all require knowledgeable faculty and staff. Students also need to learn how to learn in these new environments.

Meeting the demands of this new lifelong learning while working as professionals is not easy. The new technologies mean that what we are doing is changing, in addition, how we do the work is changing. Barriers of time, skill, cost, and simple reluctance all conspire against effective learning. Fortunately, there is a panoply of choices from which to design effective programs for the IT community. Let's take a look at these choices.

Continuum of Learning Resources and Events

How might the IT community achieve effective lifelong learning? The information age is the age of multiple options. Just like Baskins and Robbins, there are 31 flavors and more of ongoing learning. More opportunities exist than we can really use. That multiplicity can also be part of the problem as well as part of the solution. IT professionals will also have many motivations for lifelong learning that include the need to learn new skills and information for new projects, for career growth, for career maintenance, or because the IT environments have shifted and new skills are needed in the new paradigms. A common example of an emerging paradigm is the Internet and the Web. No one in a higher education environment can simply choose not to learn the skills of electronic mail, Internet research, and collaboration over the net.

The learning resources available can be categorized in many ways. What follows is a look at a grouping of informal learning resources and formal, structured learning resources.

Informal Learning Resources

Informal learning opportunities are relatively low cost, with the primary barrier being that of time. Another key characteristic of the informal resources is that, as they are informal, they are often unstructured. With unstructured materials, it is difficult to be in a state of readiness to learn the knowledge that is available in a random set of resources. In other words, it is hard for our brains, or the knowledge representations, to be in the right place at the right time. Also, it is difficult to

learn new concepts or develop a comprehensive set of skills with informal resources. A common phenomenon is for a learning resource to become suddenly very meaningful after a learner has had a significant learning experience. The experience has provided a new base of knowledge that causes a previously meaningless resource to take on sudden meaning and relevance.

However, good self-directed flexible learners can overcome these barriers, and, in fact, this is often how gurus become gurus. Gurus are often very good at self-learning, and they have time or make time to do the learning. Access to appropriate tools and equipment is also needed. Gurus are talented at monitoring trends and issues with regular scanning of newspapers, lists, and vendor information and briefings. IT professionals who are not gurus, however, will find informal learning resources an excellent way of keeping up and upgrading one's existing knowledge. Informal learning resources tend to be inefficient ways of learning complex new skills as readiness for learning the material in these resources can vary significantly among individuals. Informal learning resources are serve as an excellent resource for keeping up with new developments.

Here is a list of some of the resources that are readily available, low cost, and generally accessible.

- General collegial networking, such as informal colleague net, on the electronic net, at the coffee or soda meeting place, other local meeting places, parties, and office and institution events

- IT trade press magazines, many of which are free to qualified subscribers

- Internet discussion lists

- Newsgroups on the Internet

- Electronic mail lists, such as EDUCAUSE, TLT (formerly AAHE list), *Chronicle*

- Customized subscription lists, such as *Pointcast, Wall Street Journal*

- Informal surveys

- Benchmarking visits to other campuses and from other institutions

- Vendor presentations either on campus, in local community, or regionally

- Television programs, i.e., Computer Chronicles and general news, such as CNN

- Customized tutorial walk-in or phone services (help desk and technical support)

- Regular newspaper scanning

- Expert Event Webcasts, such as CREN (Corporation for Research and Educational Networking)

- Help desks and other technical support services are often cited as good opportunities for informal unstructured learning. The primary drawback with learning with these services is that learners are in a general state of high anxiety when consulting technical support services and want to focus only on solving an immediate, usually time-pressing problem. This is not a good time for conceptual learning.

Let's look at the characteristics of the formal structured learning resources that are available for conceptual learning.

Formal Structured Learning Resources

Formal structured learning opportunities are generally more costly and more time consuming than informal ones. However, they can also be very effective. These learning resources are often used when broad conceptual learning is essential or when a significant new skill is needed. For example, workshops can range from free or low-cost two-three-hour or day-long seminars available on campus to week-long expensive seminars requiring air travel and per diem. These week-long seminars are often best utilized when a highly paid professional is going to transition to a new responsibility or when a new programming language or application that will be serving mission critical applications is being designed and implemented. Here is a list of some of the formal learning resources to consider.

- Books and CDs

- Workshops on campus, with vendors

- Tutorials provided by vendors of applications, such as tutorials and learning resources, supplied by electronic and print publishers

- Certification workshops

- Annual association meetings

- National and international conferences

- Focused skill development workshops, e.g., Word, Excel, PhotoShop, etc.

- Focused awareness workshops, such as customer service skills, interpersonal skills, managing multiple priorities, project management

- Degree-based programs, such as those offered at higher education institutions

These formal structured learning opportunities do require more time and money, but they are often recognized and acknowledged by managers who need to approve the travel and the time away from regular responsibilities. It is not always necessary to leave town, however. Many of the formal learning programs can be completed effectively at one's laptop or desktop; however, interruptions with normal operational duties can seriously interfere with one's concentration. In recognition of this, many institutions are grappling with ways to provide staff time away from their desks to focus on learning. Some of the recommendations include training centers for faculty and staff or even computing labs that promise a consultant to be on duty during certain times. Other times, it may make sense to have the employee work at home portions of the day.

It may seem surprising to see books and CDs in the list of formal structured learning resources. They are in this list because they differ from the informal resources in one essential way. Most books and CDs provide a structured overview and in-depth coverage of a focused topic. They often aim at the development of concepts and deep understanding. Most professionals read books because they want a more comprehensive understanding of a subject. They want the leisure to ponder and review concepts and develop a wider range of expertise in a subject area. This is different from the informal learning which often results in either no conceptual understanding at all or superficial and unrelated knowledge bits or bytes. Informal learning can play an important role in developing readiness for the more structured learning. Formal workshops often send out pre-reading packets before an in-depth workshop. These pre-readings prepare the conceptual grounding so that learning is more effective at the workshop.

As is noted later in this paper, however, many professionals are quite good at learning "while" they are doing other things. Thus, more opportu-

nities for learning at one's desktop are probably on the horizon and will likely gain more acknowledgment and encouragement from mangers as well.

Three Perspectives on Learning Resources & Events

There are at least three different perspectives on selecting learning resources for the IT professional. The perspectives are from the learning professional, the manager of the learning professional, and the provider or publisher of the learning resource. Each of these groups looks for learning resources that are best from their perspectives.

The learning professional often wants well-structured learning resources that make learning easy, interesting, effective, and timely. These resources provide for interaction with colleagues and dedicated time away from normal responsibilities, as well as time away from one's normal environs. National conferences that embed many learning opportunities with informal activities such as dinners, beverages, and special outings are very popular for these purposes. To be fair, these are often extremely effective; the primary drawback is that they tend to be quite expensive, with registration, travel, and per diem. Some managers watch for national conferences that are in their regions, load up vans, and double up on rooms, etc., that help both to provide opportunities and keep costs manageable.

The managers' perspective combines the need to keep the IT professionals current on the recent and emerging technologies while managing to keep the costs for that learning within budget. Another goal for the manager is to reduce to a minimum the amount of time that the professional is away from the office. At the same time, the learning that is accomplished with networking with other IT colleagues often helps to provide new strategies for solving problems. The challenge of budget for training is also problematic. The percentage of budget and time allocated to staff training and development needs to increase.

The perspective of the provider of the learning resources must also be considered. Higher education, which is non-profit and in the busi-

ness of teaching and learning, still often expects to pay less than commercial enterprises for training resources. Yet the costs of developing training for higher education IT professionals is no less than the costs of providing training for other IT professionals.

The major tradeoff faced by providers of learning resources is the tradeoff between the cost and time of development, the size of the target audience, and the life cycle of products. CDs generally cost in the hundreds of thousands of dollars to produce; yet the market expects to pay only $20 to $40 for CDs. This is why most distance learning materials are designed in those curricula areas where there is a very large market of millions of students. Learning resources with high development costs need to be marketed very broadly very quickly and designed for very large target populations. Resources on the Web are more attractive as it is possible to reduce the development time and distribution costs. This point is important to note as the two formats described later represent both ends of the continuum. The Virtual Seminars are quite costly to develop and take a minimum of six months at the current time but provide a very structured learning experience; the Expert Events are affordable, can be produced within weeks, and provide effective focused informal learning experiences. Each format serves different purposes, different learners, and different budgets.

"Keeping Current" Formats for Information Technology Professionals

The two "Keeping Current" formats that are described here are called Virtual Seminars and Expert Events. Both these formats have been developed by CREN since early 1997. These formats have undergone many reincarnations since the first plans for development were initiated. They have been (like many things today) undergoing constant refinement. Let's take a closer look at each of these formats.

Virtual Seminars Overview

The CREN Virtual Seminars are digital video presentations available both on the Web and on CD. These seminars attempt to capture the essential characteristics of the traditional stand-up, half-day or full-day seminars and bring these

seminars to the convenience of the laptop of the busy professional.

The seminars are designed for networking and IT professionals and have three primary goals: to acquaint IT professionals with the new possibilities provided by advanced networking technologies; to keep IT professionals up to date on the new networking initiatives and tools; and to give these professionals personal experience with these new tools.

The Virtual Seminars feature national IT experts describing core IT concepts integrated with current trends, topics, and issues. The seminars feature the "talking head" strategy with supporting graphic and textual slides of the traditional seminar format. The seminars also feature some of the best features of the digital interactive environment: interactive controls, ability to repeat, review, and jump ahead. This interactive control is particularly important with material that may describe difficult and unfamiliar concepts. Additional support material provided with the seminar are transcripts of the presentations, a glossary, references, presenter's biography, and links to additional material and references on the Web. Additionally, the seminar on *Untangling the Web* features interactive workshop material on the Web.

Origin and Purpose of Virtual Seminars

CREN sponsored the production of the series of Virtual Seminars to assist higher education in developing digital communications systems to meet the education and research requirements of the 21st century. One of the ways of achieving the design and building of effective systems is to support the development of the IT professionals, and others who are in positions of influence and decision.

IT professionals need both to experience these key technologies and track how they can be used to advantage in support of the mission of higher education. IT professionals in higher education are in a unique position to impact the way these new technologies shape the future of the use of the technology and, in so doing, shape the future of technology in higher education.

Currently Available Virtual Seminars

Three Virtual Seminars have been developed and are currently available. *Campus Communications Strategies* and *Untangling the Web* were released in August 1997. The third virtual seminar, *Creating Internet2*, was released in August 1998.

Campus Communications Strategies

Campus Communications Strategies features nine national networking experts delivering presentations on the design, development, funding, and management of campus networking strategies. This CD was based on a workshop originally sponsored by the Common Solutions Group in Keystone, Colorado, in 1995. That workshop explored networking strategies for the year 2000. This workshop has continued to be updated and offered at CAUSE and EDUCOM conferences in 1996–98 as well as in the CD format. The virtual seminar focuses on the core components and trends in networking strategies and is an excellent overview of these strategies and the technologies driving them.

A full listing of the presentations and the experts is provided in the appendix. The experts include such national figures as Doug Gale, Ken Klingenstein, Doug Van Houweling, and Mark Bruhn. For example, the first two presentations of the virtual seminar are an overview of Communications Basics and the Fundamentals of Communications by Doug Gale, the Vice President for Information Systems and Services at George Washington University in Washington DC. These presentations provide the basic concepts for the more advanced presentations that follow. Samples of the presentations are available at the CREN Website at http://www.cren.net.

Untangling the Web

Untangling the Web is a series of presentations by Howard Strauss of Princeton University, a nationally known expert on the World Wide Web. Strauss' presentations provide information for the novices among us in the section on the Power Browsing on the Web, a self-paced guided tour of the capabilities and features of the World Wide Web. Other presentations provide a rich array of new insights for those interested in Web development tools such as HTML, Java, and

JavaScript. Strauss, who is a regular on the Expert Event Series described in another section, addresses all of us with his vision of the future of the Web.

Creating Internet2

Creating Internet 2 was developed jointly by CREN and the University Corporation for Advanced Internet Development (UCAID). The Internet2 virtual seminar is a compact, yet in-depth look at the how, the why, and the when of advanced networking for research and education. This seminar features national leaders in networking and higher education: Doug Van Houweling, the president and CEO of UCAID; Doug Gale of George Washington University; and Ted Hanss, director of applications development for Internet2.

These virtual seminars are formal, structured learning experiences in the category of books and CDs. These seminars were carefully designed to build conceptual background for IT professionals and for general higher education staff and faculty. The seminars provide background information on significant initiatives and developments in higher education, explanation of basic communications and telecommunications concepts, and content on technologies and implementations affecting design and management of networks on and off campuses. The 17 presentations in *Campus Communications Strategies*, for example, provide the fundamentals of communications, ISDN, security, and network management, plus many more advanced topics.

Development Process of
the Virtual Seminars

We are still experimenting with the development process of these Virtual Seminars. As this is a new format, and because the timeliness of information technology content is a primary consideration, normal development times for CDs of two-three years is not appropriate. In addition, time equals money. Generally the longer a program takes to develop, the more costly the program will be. Technology is another factor. Long development times often result in starting a development project using one technology and then evolving to a newer technology during the

project time line. Decisions need to be made about which technologies to use in a project. Using older, but more stable technology is more predictable in terms of cost, time and needed expertise but increases the risk that the delivery technologies will not match the technologies used by the target audiences. For example, products tested with Netscape 3.1 browsers appear out of date if the users are using later versions of Netscape and other browsers by the time the products are available.

The phases in the development of these seminars parallel the development phases of instructional programs released as books or videos. Here are some of the development phases in approximately the order for the first two virtual seminars. Although this is a linear ordering, many of these tasks were done in parallel.

- The seminar topic and the experts were selected.

- The experts delivered a traditional seminar.

- Experts developed slides and prepared their presentations for videotaping.

- Professional videographers videotaped the Expert presentations.

- Videotaped presentations were digitized and edited.

- Slides were revised and reviewed to ensure accuracy with presentations.

- Ancillary materials were developed.
  References
  Graphics
  Titles
  Web site

- The virtual seminar digital environment was designed and programmed.

- The presentations were incorporated into the Virtual Seminar Environment.

- Web site and graphics were designed and implemented.

What Went Well with the
First Two Virtual Seminars?

The best thing about this process was that it adhered closely to the development process of the traditional seminar. By following this process, the time required of the experts was fairly

predictable, and the development process was also quite familiar to the experts. In other words, the experts were in familiar territory up to the actual videotaping. This process also resulted in a close "feel" of the traditional seminar. During the videotaping, the experts maintained a normal speaking tone and complexity of sentence construction; but they did feel strange without a live audience with whom to react and interact.

The timeline was also impressive. The project was planned in January 1997, and the CDs were delivered to CREN members by mid-August of the same year. The development of the Virtual Seminar environment was also impressive. Although the original goal of the project had been to deliver the seminars via the Web, it became apparent early in the project that this was probably not possible nor wise, given the state of the technology at the time.

What Was Problematic with the Development Process of the First Two Virtual Seminars?

The most serious problem with this process was the amount of digital editing that needed to be done to take the rough videotaped presentations and edit them into polished presentations. The videographer, Susan Gardner, had strongly recommended a process with scripted presentations to reduce the amount of editing. Without scripts, the level of editing was predictably high and difficult, causing initial time estimates to be two-three and even four times greater. The developers simply stopped keeping track of their time after awhile, and simply lived with their computers.

Also problematic was the use of technology that was still basically in the development stages. Progressive Networks, whose Real Audio and RealVideo were being used for the development environment ,was in the midst of new releases and bug updates at critical junctures of the project. In fact, the project often pushed the features of the software. Still, the project was a success. The development team created a new format for learning for professionals, and they were justifiably proud of their work.

With this experience fresh in the team's mind, everyone agreed to be part of the team developing the third virtual seminar. The goal this time was to produce another very high quality Virtual Seminar, but with less time, money and anxiety.

What Went Well with the Third Virtual Seminar?

This time, the development team knew that the most important "glitch" in the first development project was doing the videotaping of the presentations without a script. This was important for many reasons. One, with a script, the amount of editing could be dramatically reduced. Also, the amount of studio time was reduced. And experts, some of whom were not comfortable in front of a camera, could relax as they could become very familiar with exactly what they were going to say, and read the content from a teleprompter. However, moving to this process created another whole series of ripple effects throughout the project. (A bit like the king in the castle who brought in cats to get rid of the mice.)

Initially, filled with great optimism, the team charted a development process that included the development, before videotaping, of all the scripts of the presentations. This process was as follows:

1. The primary expert delivered a traditional seminar, using much of the material from a group of experts.

2. The seminar was audiotaped and the presentations were transcribed.

3. The seminar was re-designed based on the traditional seminar, the scripts, and the goals of the seminar.

4. The topics and the experts were identified and recruited for the presentations.

5. Experts developed slides for their presentations.

6. The experts developed the scripts to accompany their slides. (A very problematic step, as experts do not often do this.)

7. Scripts were iteratively reviewed by other experts and the expert .

8. The scripts were edited.

9. The scripts were delivered to a teleprompter.

10. The experts were videotaped using their scripts for their presentations.

11. Videotaped presentations were digitized and edited.

12. The slides were revised, reviewed, and edited to ensure accuracy with presentations.

13. Ancillary materials were developed.
    References
    Graphics
    Titles
    Web site

14. The virtual seminar digital environment was designed, programmed and moved to the Web.

15. The presentations were incorporated into the Virtual Seminar Environment.

16. Additional Web work was done.

What Was Problematic with the Development Process of the Third Virtual Seminars?

The biggest problem with the revised development process of the virtual seminar was also its greatest success. Developing the script before videotaping the presentations in the virtual seminars is definitely more efficient. Unfortunately, the development of a script places a much greater burden on the experts' time and skills. Time is one of the rarest commodities for these national experts, and preparing a script is foreign to most. Many experts slip into the form of the written word when faced with capturing their presentations on paper. The written voice tends towards more complex and longer sentences.

The challenge for the next virtual seminar is to design a process that facilitates script development without overburdening the experts. Transcriptions of oral presentations provide a good starting point in this process. A process that might strike a balance between the need for a script and the process of developing the script might be facilitated with more emphasis on design at the beginning. (Yes, this is a novel thought!) This new process might begin as follows:

1. Design or redesign the seminar as the first step. The preferred approach is to begin with an existing seminar. Then the first step in the project would be to design the seminar using the principles of instructional design. This would help to ensure an appropriate set of topics objectives, and content.

2. Identify the experts.

3. Provide assistance to the expert in the development of the slides and the presentation.

3. Audiotape the presentations.

4. Transcribe the presentations.

5. Develop the scripts from the transcriptions. Someone other than the expert would do this step, and the expert would be the primary reviewer.

6. The scripts would be reviewed by one other expert and the designer.

7. Then the scripts would be edited.

Once the scripts were approved, the presentations would be videotaped. The remainder of the process would be as before.

Cost of these Seminars

The first two virtual seminars cost approximately $150,000 each or $300,000 for a total of about 13 hours of presentations. A high percentage of the costs of these first seminars can be attributed to the prototype and experimental nature of the first seminars. Greg Marks of Merit, who was the manager of this initial effort, believes that it is appropriate to set a goal of driving the cost down to less than $10,000 an hour. Obviously, this is more than what other higher education programming generally costs; however, the cost is less than television broadcast programming.

By comparison, the development costs of the third seminar, including the development into both the Web and CD formats was about $60,000. As this was co-sponsored by two organizations, CREN and UCAID, the cost definitely seemed less burdensome. The actual pressing of the CDs was also sponsored by a company. However, the cost per hour still came to about $20,000, and many of the costs for script development were borne by individuals within the organizations and not attributed to the project. The effort expended in script development created a more organized, concise, and, we hope, clearer presentation of ideas. This planning and design resulted in the seminar being shorter than planned at about 2:45 hours, rather than the four hours originally planned. Ironically if the presentations had been longer and less precise, the cost per hour would be lower. (It is similar to the chal-

lenge of measuring programming productivity—elegant code requires fewer lines of code.)

For what's next on Virtual Seminars, stay tuned to the CREN Web site at http://www.cren.net. Some potential avenues to explore include ways to shorten development time and to change to a more efficient process with the videotaping, digitizing an editing while maintaining the high quality of the presentations. The second format to be described is the Expert Event format.

Expert Events Overview

The CREN Expert Events are multi-leveled phone conference and Webcasts designed to provide access to learning about networking and information technology from national experts, and to discuss questions, trends, and issues. The Webcasts are generally 45 minutes in length, although they occasionally run to 50 minutes. The first two series of eight events invited participants to participate in one of two ways: calling in to a conference bridge or by going to a Web site and using the RealAudio player for the audio and e-mail for questions. These were live events, synchronous for both the experts and the participants. These events featured a national expert addressing questions on information technology, particularly in the topics on the two virtual seminars, Campus Communications Strategies and Untangling the Web. The general format of the session was initial stage-setting interchange between the expert and the two co-hosts, followed by an interview of the expert interspersed with questions from the live participants. We discovered that the format was similar in some ways to a "Meet the Expert" radio talk show, but that the Webcast and the e-mail provided real-time questions and answers without someone to serve as an intermediary to prescreen the questions and answers from the phone conference participants.

Origin & Purpose of Expert Events

The design of the series of Expert Events offered during May and June 1998 was modified from the design of the first series offered in the fall 1997. The Expert Events were initially conceptualized as the "Expert Discussion Time" that would accompany the CREN Virtual Seminars. Knowing that professionals enjoy the lively inter-change with experts following a presentation, it was felt that offering users of the Virtual Seminars the opportunity to ask the experts questions about the Virtual Seminar topics would do two things: (1) provide structure and a timeline for IT professionals to complete a Virtual Seminar, and (2) encourage IT professionals to test out the technology and the concept of the Virtual Seminar and incorporate it into their own learning and the plans for their IT structure at their institution. The Virtual Seminars, available on the Web and CD, are in formats that encourage and enable the use of the materials anytime and anywhere. Given the time crunch that IT professionals face, anywhere and anytime usually translates into never and nowhere.

The evolution of the Expert Events over the nine months between September and June was interesting. The first series were linked quite tightly to the Virtual Seminar CDs and to the topics on the CDs. For the first series we even envisioned participants signing up for the seminar discussion so that a closer tighter community of seminar "attendees" could be formed. We were ready to give out certificates of completion based on completion of the VS and participation in the Expert Event. Gradually it became apparent that the IT community liked the availability of the experts, liked (to a greater or lesser degree) the topics of the Expert Events, but preferred a very loose structure not unlike a radio show. Feedback from participants indicated that they liked listening to the Webcast "while" they were doing other things. This is not unlike listening to the radio or audiotapes "while" driving; watching television in the background; listening to radio while cleaning one's house, car, or office. It appears that IT professionals might be into "anywhile" learning rather than "anytime" learning at least part of the time.

These Expert Events are similar to formats in the category of informal learning, but they are more structured, in that they are carefully designed to address specific areas of selected topics.

Development Process

The development of a series of Expert Events is similar to that of developing a radio or television series. As this was a new format using a new

mix of available technology, the first step was to test the technology to be certain that it would support the proposed format.

After testing the feasibility of the format, the development team proceeded with the planning of the series. We contacted our experts and enticed them into trying in this new format. We worked out the costs involved. Greg Marks at Merit agreed to be one of the co-hosts for the series. We made arrangements with Merit at the University of Michigan to use the licensed RealAudio software on their server. Merit also purchased the equipment necessary for the encoding link and arranged for the encoding engineer to do the encoding during the events. A final schedule was prepared and posted at the CREN Web site (http://www.cren.net). Before each event, an e-mail message was sent to all the member representatives for CREN and related distribution lists. The announcements for the first set of events was purposely kept small to provide experts and hosts experience with this format. Details about preparations are described in the next section.

Delivery Process

Preparing the Experts & the Content

The topics for the series closely paralleled the topics on the two Virtual Seminars. Most of the experts were also from the group of experts who did the presentations on the first two Virtual Seminars. To prepare for these events, we chose a model that included a tightly scripted beginning and end to ensure that we did not omit any essential information. For example, the beginning section introduces the expert and the co-hosts and provides information on how the participants can ask questions and view related information on the Web site. The closing section thanks the sponsors (CREN at this time) and alerts listeners to upcoming events. The preparations for the interview include the expert's generating a set of questions focused on a particular topic. As there were a total of seven different experts and five co-hosts for a total of 20 events, it was important to have a preparation session sometime in the 24-hour period prior to the Webcast. This preparation session was also used to test the quality of the office phone being used by the

team. A preliminary script was distributed before the preparation session. After the preparation session, one of the co-hosts integrated the questions into the script and then resent the final script to the team involved in the show. After a time, we figured out that the encoding engineer appreciated having a copy of the script as well.

On the day of the Webcast, the production team called into the conference bridge fifteen minutes before Webcast time for a final check that everything was ready to go. Sometimes, these fifteen minutes are uneventful; sometimes they are quite frantic. With all the preparation, we did have to cancel one session because of equipment failure at the last minute. Fortunately, a message put up on the Web site provided almost instant communication about the need for cancellation. This session was rescheduled for the following week.

Behind the Scenes with the Technology

The technology behind these Expert Events is quite straightforward. A phone conference bridge is established. Encoding equipment is linked into the telephone bridge to receive the audio. The equipment then digitizes the audio signal, creating a streaming audio file that is delivered over the Web. When we were doing early experimentation to see if this would actually work, we learned that there is about a 10-second delay from the phone conference to the Web audio.

The e-mail communication is also straightforward. An e-mail account is set up. We used expert@cren.net for the most recent series. Before each event, the account administrator links the account to the e-mail addresses of the expert and the two co-hosts. Then, the co-hosts monitor the e-mail as it comes in and integrate the questions into the event program. We leave the account active for about a week after the event before moving on to preparations for the next event.

The only piece of equipment other than the computing equipment that was needed is a product from Gentner (www.gentner.com) called a TeleHybrid. It interfaces the telephone to the sound card in the PC used for encoding. It ensures that there is a good signal match between the telephone and the sound card. It also allows the person doing the encoding, often Brian

Vaughan in or case, to pick up the handset and talk on that same circuit whenever needed. This is generally done in the 15 minutes before the actual beginning of the Webcast. A bare bones setup could be done, probably using some simple phone adapter from Radio Shack or other consumer outlet. However, the quality of the sound would probably suffer, and the ability to talk on the same line would be lost.

What Works

The Expert Events are gradually building an audience. While it is difficult to get good figures, an estimate of the average number of participants for the last series of four Expert Events was about 100 people listening to part of each 45-minute Webcast. What appears to be attracting people to the events is the ability to hear what the expert and fellow IT professionals are thinking about or struggling with on these topics. The most popular session to date has been a session by Howard Strauss when we featured the "Future of the Web." Other popular sessions have been network security (Mark Bruhn), authentication (Ken Klingenstein), and help desk strategies (Russ Vaught). The most popular seem to be the later events, linked to our growing audience.

The technology does seem to be working well. The plug-in audio player is freely available from Progressive Networks on the net, and most IT professionals appear to have machines that provide the audio capability and sufficient network speed. Over time, the experts have also started providing more content for the Event Web page. The sessions, Web pages, and links are archived so that people can replay any portion of the event or the entire event and also learn from the Web material.

The experts and the co-hosts also seem to enjoy this new format. It is less onerous than preparing a stand-up presentation at a conference. The only travel involved is to "anywhere" with a phone and a computer. The co-hosts generally require both phone access and Internet access. Occasionally, when one of the co-hosts had to be on the road somewhere and could not get set up with access to both a phone and the net, the responsibility for monitoring the e-mail was assigned to the other co-host. The need for two co-hosts continues to be an ongoing question.

Given all that is going on, however, the decision has been to continue with two co-hosts, a decision that provides for a built-in redundancy that is important as the audience grows.

What Doesn't Work

One of the characteristics of these events that does not work well is their unpredictability. One major recommendations has been to move to a regular day and time. As the Webcast is available nationally and internationally, late afternoon on the East Coast (4:00 p.m.) is the time of choice at the present time. Something else that did not work predictably well was having an open telephone line for anyone to come in at any time. Without video, it is difficult to know if someone is there, and it is more difficult to manage the flow of information and communication with visual signals. Also, it is much easier to incorporate questions at appropriate times with the questions coming in via e-mail.

Publicity for these events is still in its infancy. The events were purposely kept quiet in the beginning to provide time for testing and learning. These events are now really ready for prime time with the primary constraint now being the number of licensees for the RealAudio server at the University of Michigan. A more organized approach to announcements and features is planned, and the word of mouth publicity strategy is starting to work.

Cost of these Events

Each of these Expert Events cost between $700 and $900. This includes the cost of the conference bridge, the encoding engineer, the time of the co-hosts and the experts, the preparation of the script and the pool of questions, the transcription of the event, posting of content on the web, and the editing and archiving of the audio session. As the database of the transcriptions grows, the value of the sessions will also grow. A search engine on the Web site will enable IT people to search specific areas of interest on an as-needed basis.

What's Next with Expert Events?

CREN is planning a new series of Expert Events between September and June 1998-1999.

This series will be Webcast on Thursdays at 4:00 p.m., East Coast time, and will retain the 45-minute format, with a session every other week. Plans are being developed now for experts, topics, and co-hosts. We will be trying something new with a more permanent expert co-host to bring an additional level of technology and consistency to the series.

Conclusion

As the pace of technology continues unabated, the need to incorporate life-long learning into the daily life of IT professionals and others will accelerate. The new formats described provide experience in the process of design, development, and delivery of effective, timely, convenient, and cost-effective learning for IT professionals. These formats can transport experts across time and space to achieve important technology transfer. These formats also can provide personal access to consulting and professional networking. We look forward to seeing what testing and experimentation in this area will provide in the future.

References

Boettcher, J. V. (1998, May). How much does it cost to develop a distance learning course? It all depends. *Syllabus, 11*, 56–58.

CREN Web site (http://www.cren.net) Choose links for Expert Events and Virtual Seminars.

Daniel, J. S. (1997). *Mega-universities and Knowledge Media: Technology Strategies for Higher Education.* London: Kogan Page.

Sherron, G. T., & Boettcher, J. V. (1997). *Distance Learning: The Shift to Interactivity, 17,* Boulder, CO.

Acknowledgment

APPENDIX:
TOPICS, EXPERTS, & LENGTHS OF
THE VIRTUAL SEMINARS

Campus Communication Strategies

- **Communication Basics**
  Objectives—*Doug Gale (7 min)*
  Fundamentals of Communications—*Doug Gale (43 min)*
- **Campus Communications Infrastructure**
  Integrating Voice, Data, and Video in the Campus Networking—*David Lambert (27 min)*
  Collapsed Backbone and Switching—*Guy Jones (18 min)*
  Wiring Infrastructure—*Guy Jones (17 min)*
- **Intercampus and Off Campus Connectivity**
  Outsourcing Remote Access—*Ardoth Hassler (13 min)*
  Wireless Networking—*Brad Reese (8 min)*
  ISDN Fundamentals—*Guy Jones (13 min)*
  Internet2 and Networking Futures—*Doug Van Houweling (20 min)*
- **High Performance Networking**
  Advanced Networking—*Ken Klingenstein (60 min)*
- **Network Management**
  Network Management: Basics—*Ken Klingenstein (65 min)*
  Network Management: Tools and Best Practices—*Ken Klingenstein (34 min)*
- **Funding the Network**
  Networking Costs—*Doug Gale (23 min)*
  NSF Supported Internet Connectivity—*David Staudt (9 min)*
  Funding Strategies—*David Lambert (17 min)*
- **Network Security**
  Network Security: Basics—*Mark Bruhn (18 min)*
  Network Security: Tools and Best Practices—*Mark Bruhn (15 min)*

Untangling the Web

Note: Howard Strauss was the expert on all the presentations in this seminar.
- **Introduction** *(7 min)*
- **Power Browsing on the World Wide Web** *(40 min)*
- **Managing the New Web** *(73 min)*
- **Web Access to Access and Other Databases** *(30 min)*
- **HTML Basics** *(42 min)*
- **The Answers are Java and JavaScript** *(30 min)*
- **The Future of the Web** *(22 min)*

Creating Internet2

- **The Launching of UCAID and Internet2**—*Doug Van Houweling*
- **Internet2 Basics and Beginnings**—*Doug Gale*
- **Internet2 Architecture and GigaPoPs**—*Doug Gale*
- **Internet2 Technical Challenges**—*Doug Gale*
- **Why Higher Education Needs Internet2**—*Judith Boettcher*
- **What Makes an Internet2 Application?**—*Ted Hanss*
- **Internet2 Applications: Samples**—*Ted Hanss*
- **What Does Internet2 Mean for My Institution?**—*Doug Gale*
- **Meeting the Technological Challenges of Internet2: The Working Groups**—*Doug Gale*
- **Internet2 Industry Partners and Affiliates**—*Doug Gale*
- **Keeping Up with Internet2**—*Doug Gale*

Expert Event Series (Spring, 1998)

- **Future of the Web**—*Howard Strauss*
- **Privacy, Security and Handling Academic Business**—*Mark Bruhn*
- **Middleware: Authentication, Authorization and Directory Issues**—*Ken Klingenstein*
- **Help Desk Strategies**—*Russ Vaught*