The Future of CCCSAT

CCCSAT Staff

This is the second in a series of three articles on the technology that runs CCCSAT.

Technology should be like electricity, you turn it on, and it's there," says Sherilyn Hargraves, Project Director for the California Community College Satellite Network (CCCSAT). And that is exactly what she expects to happen when Californians receive educational content via CCCSAT.

To ensure the transparency of the technology, CCCSAT uses satellite and broadband technologies to transmit content. Chris Brawner, CCCSAT's chief consulting engineer, explained, "Broadband application from a CCCSAT perspective means delivering high quality multimedia to the community colleges throughout California." The project will begin with the transmission of video content via satellite to receiving sites located at California Community College campuses.

The members of the California Community College system, guided by the members of the Faculty Senate, will select courses from the California Community College curriculum to offer. Content will be utilized at the discretion of each district. Once those decisions are made, CCCSAT will deliver the courses.

The heart of the delivery system is the Network Operations Center (NOC) at Palomar College. Here, in a room much like the master control room of any television station, CCCSAT staff assemble, digitalize, store, and broadcast content. The difference is that a television station broadcasts one channel, while the NOC will start broadcasting on two channels and will expand to eight channels. All content, whether live or taped, is digitalized, compressed, and beamed to the

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Online Worksheet Helps Colleges Anticipate Costs of Distance Education

Jeffrey R. Young

For colleges and universities, moving into online education can be an expensive proposition, with many hidden costs, says Brian M. Morgan, director of the center for instructional technology at Marshall University. He's developed an interactive worksheet to help administrators calculate the price tag for creating an online program.

The World Wide Web site (*http://www.marshall.edu/distance/*) asks users a dozen questions about their institutional environments and their plans for distance education. Among the questions: "Does your institution already have a server in place to host online courses?" "What do you estimate that the percentage of growth rate will be for online courses at your institution?"

The site then generates a spreadsheet with cost and revenue projections for the first seven years of the online program. Users can easily change variables and get new estimates to see how different scenarios might play out.

Be warned: The site says it provides only rough estimates, and should not be used to make final budget decisions. Before entering the site, users

off the wire

ASSESSING COLLEGE READINESS FOR ONLINE EDUCATION

@ONE eNews

The California Virtual Campus Regional Center in the Bay Area has posted a self assessment for staff at community colleges to use as a tool to address the infrastructure and support systems campuses need to be successful in delivering online education.

The instrument is the outcome of work done at both Region 4 and Region 1. It is meant to be used with a campus team for the purpose of raising an awareness of issues regarding the institution's goals and attitudes, technical support structures, student services, faculty support and policy.

To view the assessment tool go to: *http://www.cvc1.org/assess.html*

CCC SURVEY FINDINGS 2000

@ONE eNews

The Summary Report for the 2000 @ONE Instructional Technology Survey is now complete and posted. Findings indicate that faculty continue to have positive attitudes regarding the potential for technology to improve instruction and that they are interested in learning how to use technology to reach instructional goals that benefit students - similar to findings in the 1998 survey.

Faculty use of technology is increasing in a number of areas, especially in the use of the Internet and email. Skills are improving, but results still indicate a need for ongoing training in uses of technology that reflect best practices. Faculty most prefer live, hands-on training that includes development of a product such as an instructional Web site or instructional unit.

Policy implications of the statewide @ONE Instructional Technology Survey 2000 include a number of issues with which campuses have been struggling. The changing workload of faculty, new roles necessary to support technology mediated instruction, and sufficient infrastructure all must be addressed before the California Community Colleges and their students will reap the benefits of technological advances.

To view or download the complete Summary Report 2000, go to: *http://one.fhda.edu/services/reports/@one2000docu.pdf*

CVC 4 Leads The Online Track At Technology Institute 2000

Heidi Larson
Instructional Design Media Specialist, CVC Region 4

P aul Meyers, project director of the California Virtual Campus Statewide/Rural Regional Center (CVC4), and a team of assistants led the Online Courses track at the Technology for Teaching 2000 Summer Institute sponsored by the Academic Senate and @ONE. This annual event was held at CSU/Monterey Bay in Seaside, California on June 5-9. Fourteen enthusiastic faculty members from all over California attended the Online track and left for home with a solid foundation for creating their own courses.

The Online track began Monday morning with Yvonne Maller, faculty coordinator for the CVC4. Yvonne presented a session on pedagogy and the principles of good practice in teaching. The ensuing discussion covered such topics as: faculty-student interaction, collaborative learning, active learning, tracking and reporting student progress, quality time on task, high standards of student performance, and learning styles.

Later in the day, Paul Meyers introduced the participants to Microsoft FrontPage and to course Web sites that had been set up on the CVC4 server. These Web sites came with a number of template pages, including a syllabus, glossary, site map, resources, weekly discussions, lectures, quizzes, and an area for students to upload their homework. After leading the participants through an overview of the template pages, Paul continued into more detail and some hands-on exercises

Tuesday was a hard-working and mostly hands-on day. In the morning session, participant Linda Mendez of Fresno City College demonstrated document management techniques by showing classmates how to use a scanner and an optical character recognition (OCR) application.

For the afternoon sessions, Yvonne Maller facilitated an overview of assessment techniques, both online and on-campus. The discussion started with a question on what to measure and how, and continued with a review of assessment and testing online. A substantial amount of time was devoted to the issues of concern such as security and integrity of online testing, *(continued on page 6)*

TECHNOLOGY INSTITUTE PROVIDES A VISION

T he Academic Senate and @ONE recently sponsored Technology for Teaching 2000, a five-day institute at CSU Monterey Bay. The 85 faculty and trainers at the Institute had an opportunity to focus on pedagogy and policy issues as well as hands-on learning in the computer labs. Faculty got the big picture regarding instructional technology issues through a number of Academic Senate position papers, including:

- *Academic Freedom, Privacy, Copyright & Fair Use in a Technological World*
- *Guidelines for Good Practice: Effective Instructor*
- *Student Contact in Distance Learning*
- *Guidelines for Good Practice: Technology-Mediated Instruction*
- *Guidelines on Minimum Standards for College Technology*
- *Technology in Education: A Summary of Practical Policy and Workload Language*

To view any of these papers go to:
http://www.academicsenate.cc.ca.us/Academic%20Senate%20Web/ Publications/PUBLIST.htm

The Institute started on Monday June 5, 2000 with a general session on instructional design principles for effective integration of technology into instruction. From there, five different tracks of California Community College faculty, instructional designers, and technology trainers worked in hands-on training sessions to develop instructional units, lessons, or teaching aids for use with students or trainees.

Participants also came away with a vision of where they wanted to go with technology in their instruction.

To view a complete report and photos from the event, go to:
http://www.academicsenate.cc.ca.us/Academic%20Senate%20Web/Events/ Institutes/Technology_institute.htm

What Does Knowledge Look Like and How Can We Help It Grow?

Judith Boettcher
Executive Director, Corporation for Research
and Educational Networking

I n June 1999, a group of neuroscientists in Canada announced that they may have found an explanation for the brilliance of Einstein's mathematical thinking. After studying a part of Einstein's brain that had been sitting in pieces in jars for more than 40 years, the team determined that a crucial region, the inferior parietal lobe, was 15 percent wider than normal. This region is the area used in mathematical thinking and imagery of movement. The scientists also found that a groove that normally runs through the parietal area of the brain took an unusual course through Einstein's brain, providing more room for this lobe, resulting in more interconnections of brain cells.

This announcement caught me just at the time that I was thinking again about the cognitive processes that we use in building new concepts, and especially in building concepts dependent on alien or difficult information. These thoughts then provoked thinking about the difficulty of designing content resources to facilitate learning. (I have been struggling over the last few months with concepts alien to me, such as digital certificates, and how they might work in authenticating machines, faculty, and students for accessing content resources across the Web.)

The need for more research on learning is becoming increasingly urgent. The amount of information that we need to continually learn is staggering. To design learning resources that support ease, facility, and yes, joy of learning, we must know more about how to structure knowledge. We must also know more about what types of interactions with the knowledge fit individuals. So, we have questions, such as, "What kinds of content resources are needed to support the growing of concepts? And as we want to do this on the Web, "What kinds of content

> *The need for more research on learning is becoming increasingly urgent. The amount of information that we need to continually learn is staggering. To design learning resources that support ease, facility, and yes, joy of learning, we must know more about how to structure knowledge.*

resources on the Web can help us learn more effectively?

The Internet Web itself is a good image to draw upon for an organic image-based theory of learning. The concepts that we must work to grow and form are the bulbs that will become our Web sites, portals, and core nodes of a related set of concepts, our interconnected centers of knowledge.

The processes underlying concept formation continue to be more or less a mystery today. Our understanding of what the brain/mind is doing as it learns is based on observable behaviors and what learners can remember or think they do. Many self-reports offer fascinating glimpses into the process. One of the news stories about Einstein's brain included his recollection that he developed his insights about the theory of relativity while conducting a thought experiment on "what it would be like to ride through space on a beam of light." Other self-reports describe having one's "trains of thought" interrupted and gathering one's thoughts" together.

The current constructivist theory (or philosophy) of learning speaks in terms of students building concepts and conducting their knowledge base. This is an improvement over the blank slate model in which the faculty were expected to write on the blank slates of the minds of their students. Over the last 15 years, the constructivist model has had imagery creep in, generating related concepts. One of these is "scaffolding" learning, which provides temporary supports for learners as they acquire concepts.

We may want to shift to a more animate imagery of the learning process, such as cultivation. Rather than thinking about building knowledge bases in our brains, we may want to shift to speaking of growing, nourishing, and cultivating core concepts. How about thinking in terms of

With the development of new teaching and learning paradigms incorporating the Web and distance learning, the time seems right to rethink learning theory and try to identify central principals about the nature of learning.

"seed concepts" that can be the core of the knowledge nodes within our brains/minds? Just as plants flourish in an environment with nourishing food and water, our learning brains/minds may develop richer, more dense, and interconnected concepts when they are able to grow and develop within rich, stimulating, and supportive environments.

Concepts Are More than Words

Lev S. Vygotsky is a Russian psychologist best known for his work on the relationship of thought and language, which he formulated in large part on his work in concept formation. But just what are concepts? We talk about them all the time in designing learning activities. An interesting way to think about concepts is that they are a good example of themselves. Briefly, concepts are abstractions that have been "generalized from a series of discrete impressions." In other words, concepts are ways of chunking information and making ideas more efficient to manipulate. This brings us full circle to the axiom that the more we know, the more we can know.

We get off track, I think, because we often think of concepts as singular entities like words, but Vygotsky's work dearly differentiates words and concepts. Words are not the concepts, but merely signs or symbols of the concept. This explains several phenomena. How often have you experienced reading a description of a new technology discovery, and find that you are only reading "words," and must start the page, the paragraph, the whole article over again? How many times as you are explaining a cluster of new ideas to students do their eyes glaze over? A reviewer of Stephen Hawking's 1998 book, A Brief History of Time, said that he was quite mystified both by the book and his reaction to it. He said that he understood all the words individually, but that he didn't have a clue as to what they all meant together. A dear case of difficult and alien concepts! In such a case, we are only dealing with the signs and symbols of a concept and not the concept itself. This example also suggests why learning all the' vocabulary words in biology, theology, or computer science is ineffective by itself. One ends up with just words, words, words! (Yet,

Hawking's book sold nine million copies in forty languages worldwide, a testament to our optimism about our intelligence, I think!)

Vygotsky's work on the formation of concepts and conceptual groupings also illuminates some of the details of the "ah ha" experience. As the words and the thoughts interact, shape, and transform each other, we often experience a flash of insight, and a set of formerly discrete isolated bits and pieces of information suddenly form a larger more complex thought. And suddenly, there is a ripple effect throughout the brain when "the new higher concepts in turn transform the meaning of the lower."

While this cognitive and learning theory is fertile ground, we have a good deal of our own cultivation to do as we ask the following questions: What are our brains/minds doing when we are forming and growing new concepts? How do our brains/minds work when we are thinking about solving problems? And how do we store what we know so that we can access it when we need or want it?

We have the beginnings of answers to some of these questions, but the need for more research on learning, concept formation, and thinking is urgent. We are now all spending more time than ever, learning new stuff to keep up with the world. We also are not learning much of what we should, because it takes too long. We do know that time is an element in learning, but how much do we know about speeding up the learning process and increasing the efficiency of the thinking process?

Our students are growing brains/minds that need to serve them during many great leaps of technology and social science that lie ahead. How do we design, develop, and integrate into a learning experience the knowledge gardens for our students?

Judith V Boettcher is executive director of the Corporation for Research and Educational Networking (CREN). She is also a Syllabus Scholar and contributes regularly to Syllabus magazine.

Technology For Teaching Institute

student authentication, and plagiarism. Yvonne also stressed the importance of using classroom assessment techniques throughout the term as well final course evaluation.

Finally, she demonstrated online quiz-maker programs that can be helpful in building and assessing quizzes and exams. Participants all signed

Fourteen enthusiastic faculty members from all over California attended the Online track and left for home with a solid foundation for creating their own courses.

up for one online service called QuizCenter, offered free to educational institutions and their faculty by the Maui Office of Technology Transfer and Economic Development *(http://motted.hawaii.edu)*. The site touts easy-to-create quizzes; students can see the correct answers as soon as they submit their quiz, and teachers receive student scores via email.

Wednesday morning Wayne Chenoweth of the High Tech Center Training Unit, demonstrated Dragon Naturally Speaking Preferred (*http://www.naturalspeech.com*). Using a headset or microphone, the application can understand both dictation into a regular word processing file and general verbal directions on running a computer (i.e."Open Netscape" and "Type Address"). Wayne talked about the advantages of this product for both faculty who have limited typing skills and for people with disabilities. As an extension, Wayne also suggested different ways to make a Web site accessible to the disabled, and discussed sites such as Bobby *(http://www.cast.org/bobby/)* that can be used to rate accessibility.

After introducing herself via an audio clip embedded in her session outline, Heidi Larson, educational media design specialist of the CVC4, discussed the use of audio in an instructional Web site. She cited several reasons why audio might be helpful: as an instructor introduction device; as a student introduction device, thereby giving a more "classroom-like" feel and enhancing student-student interaction; as a device for teaching materials like music or spoken language; as a way of bringing a historical figure more prescient in the minds of the students (i.e. using clips of FDR or JFK); as a way of bringing an event to life, such as the sounds of a volcano or the launching of a space shuttle; and as a way of reaching visually impaired students (along with a text transcription for the hearing impaired).

She proceeded to give a demonstration of the free RealProducer software to record audio and then link the audio to a Web site. Her outline of audio resources, which she hopes to expand, is available at: *http://host.cvc4.org/institute/audio/audio.htm*.

On Wednesday afternoon Matt Hightower, Director of Cerro Coso Online and instructor for several Cerro Coso online teaching certificate courses, revealed to the participants a number of time-saving tips for incorporating Microsoft office documents into their course Web sites.

Matt also demonstrated how to keep track of students' grades using Microsoft Excel, then how to keep those grades in a password-protected part of a Web site for faculty access from anywhere. He demonstrated how to post the students' progress on the Web using just their IDs so they can check their progress at all times.

A representative from Tegrity demonstrated how to incorporate the Tegrity EduCart into a class. For more information about the cart, visit the Tegrity Web site *(http://www.tegrity.com)*. Paul pointed out that the CVC4 has two carts available for loan to Region 4 campuses. See the CVC4 Web site for details *(http://www.cvc4.org)*.

Matt and Paul continued the day's program first with a demonstration of Microsoft NetMeeting and then a class project using the application. NetMeeting is free software that allows video conferencing from the desktop, shared files and a whiteboard, as well as chat via text and voice *(http://www.microsoft.com/windows/netmeeting/)*. NetMeeting could be useful in a class or during "office hours" to give students help or to explain something in real time.

The final session of the week was a comparison of two online course management systems, WebCT and Blackboard. Rick Mathews of San Diego Miramar College highlighted the features of the two systems and demonstrated how instructors use these systems to build and deliver their online courses. This session also provided an opportunity for Paul Meyers to explain online course hosting options provided by the California Virtual Campus.

By noon Friday everybody in the Online Courses track had acquired the skills to create their own basic classes. The final institute certificates were well earned and much deserved. ∏

Online Worksheet

must read a disclaimer noting: "If you rely on the information on this site, you are responsible for ensuring by independent verification of its accuracy or completeness."

Mr. Morgan created the site as part of his master's thesis in technology management at Marshall, which he completed while serving as director of the instructional-technology center. His project represents more than a year of research into the costs of distance education, he says, and his thesis is also available on the site.

"I hope administrators will take a look and realize that it's not an easy task to offer online courses without planning ahead," he says.

As part of his research, Mr. Morgan took a close look at his own university's distance-education effort, which he says was not as well planned as it should have been. Mr. Morgan was not involved with planning the effort, though he did help choose the software used to deliver the courses.

"We rushed right out and got some courses up quick" without even developing a policy on how professors would be compensated, he says. "It really hurt us," he adds, noting that it was more difficult to change practices in midstream than it would have been to establish a policy at the outset. Nevertheless, Mr. Morgan adds, the university has developed a successful online program.

Jan Fox, vice president for information technology and chief information officer at Marshall, says the university was quick to develop policies for its online efforts once they were under way.
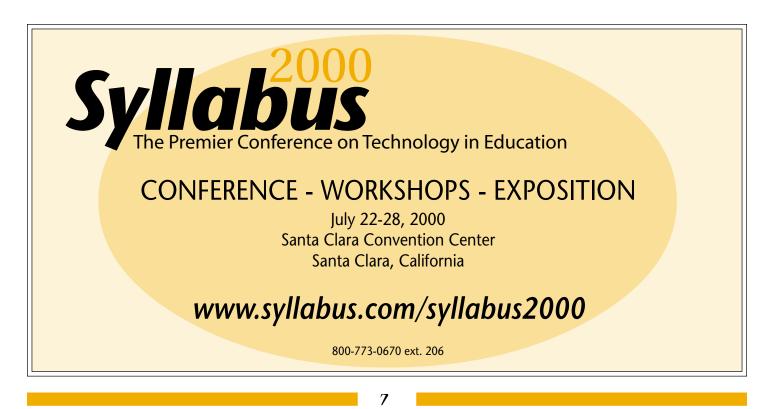
Although she praises Mr. Morgan for emphasizing many of the points that should be considered in planning online programs, she says his interactive worksheet doesn't take enough factors into account. For instance, she says, it does not consider that the computing infrastructure used for online courses can also be used to enhance traditional courses.

Mr. Morgan says that after administrators are presented with a realistic picture of what online learning costs, some colleges may decide not to even bother. The title of his thesis: "Is Distance Learning Worth It? ."

"I think the jury may still be out on that," says Rosemary Carlson, a distance-education consultant and a professor of finance at Morehead State University, in Kentucky. "There is a cost because it is a very labor-intensive effort on the part of the faculty to prepare an online course." ∏

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Future of CCCSAT

(continued from page 1)

satellite which sends it on to the receive sites.

The CCC system content first arrives at the NOC as a videotape. The videotapes are converted to MPEG-2 formats, compressed, and stored on computers. In a fully automated process, the broadcast schedule is sent to this video archive, which then supplies content to the video servers, computers that each store many days of broadcasting.

Video digitalization, compression, and transmission are only the beginning. Hargraves said, "We're looking at the broadband full-media opportunities for learning." Those opportunities will include use of the Internet within the near future.

Hargraves noted that this stage of technological development is analogous to the early days of television, when people tuned in to watch what were essentially radio shows. As people learned the new technology, television expanded. As CCCSAT begins to deliver broadband content on the Internet, the technology--satellite transmission, digitalization, and error reduction algorithms--will deliver broadcast quality multimedia experiences to Californians. The shape of those experiences will be determined by the imagination of instructors as they explore the possibilities of broadband applications. **T**

Part Three: Parsing the video data with meta data tagging.