# TechEDge

Introducing CENIC and the CalREN Network

by Jim Dolgonas,
CENIC Chief Operating Officer

CENIC is the Corporation for Education Network Initiatives in California. CENIC is a nonprofit corporation originally formed to develop and operate wide area networking for higher education institutions.

CENIC was founded in 1997 to provide high-speed network services to California postsecondary research institutions. The types of networking services needed by these institutions were not being met by the commercial Internet and just as with the national Internet2 network, a dedicated education and research network was a solution for meeting these needs in California.

The CENIC statewide backbone network, CalREN2, became operational in 1998. In 2000, CENIC's mission expanded when the Governor and the legislature provided funding to enable K-12 schools to connect to the CalREN-2 backbone network. And, this year, as CENIC completes a migration of the original CalREN-2 network to a new, multi-tiered network, CalREN, California Community Colleges and the California State University system will also begin to benefit from use of the backbone network.

www.cenic.org
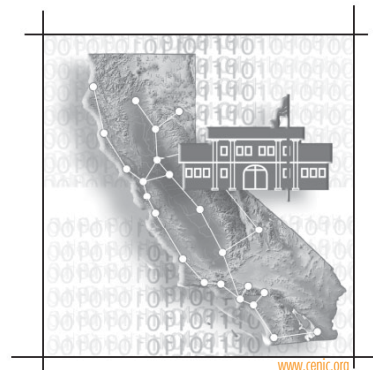
The new CalREN network offers several advantages for California Community Colleges and the other CENIC members. The new network is based on an owned fiber optic infrastructure. What this means is that CENIC has invested in purchasing fiber and optical multiplexers. This technology and ownership combine to promise very attractive long-term costs and the capability to upgrade the backbone network to higher speeds at much less than proportional costs.

In the short term, the community colleges' participation in CENIC and use of CalREN will bring the benefit of a higher speed backbone network than previously used.

Thriving Cal-PASS educational project expands statewide

Data-sharing embraced by growing number of community colleges, high schools and universities

by Della Elliott,
Grossmont-Cuyamaca Community College District Public Information Assistant

Heralded as a powerful new tool for improving classroom instruction, the California Partnership for Achieving Student Success (Cal-PASS) is well on its way to expanding statewide.

Funded through a grant from the California Community Colleges

Chancellor's Office and developed by the Grossmont-Cuyamaca Community College District, Cal-PASS is a K-16 information-sharing initiative that provides participating schools with new access to student data. From elementary school to university, teachers finally have the means to help students be better prepared.

As is the case with the best ideas, the concept behind Cal-PASS is simple and straightforward: to help students successfully advance in their educa-

Among the many proponents of Cal-PASS who attended an Aug. 4 news conference at Grossmont College in El Cajon to announce the statewide expansion of the innovative data-sharing initiative were, from left, Rich Leib, with the Board of Governors of the California Community Colleges; State Sen. Dede Alpert (D-San Diego) who chairs a legislative committee working toward implementing the state's master plan for K-16 education; and Michael Davitt, with Education Trust-West, an organization involved in K-16 issues.

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Tracking Technology

This September's meeting of The Community Colleges Board of Governors (BOG) in Sacramento included several technology-related items—a surprising and pleasing addition for those of us who have long been attending these meetings and hoping to raise the topic of technology a notch or two in the eyes of the Board. Starting with the presentation of the six Technology Awards (see ccctechedge.com for the 2003 awards winners), the BOG and their constituent audience made numerous references to the importance of technology and the role it can play for our system, especially during the current budgetary hard times.

On Monday afternoon of the BOG meeting, Catherine McKenzie and I presented the "Telecommunications and Technology Infrastructure Program (TTIP): Annual Report and Update," a report previously given to the CCC Consultation Council that outlined the uses of the TTIP monies, gave project updates on key TTIP-funded efforts, and provided an update on the Total Cost of Ownership (TCO) metrics as defined in the Technology II Plan. Some of the survey findings showed an especially alarming state of these TCO ratios, including:

- only 4% of CCC's meet the current K-12 ratio of student computers per full-time (FT) students (K-12 standard is one computer per five FT students)

- 26% of CCC's meet the baseline standard of one network administrator for every 300 computers

- 14% of colleges meet the standard of one "Level 1" support staff for every 150 computers (Level 1 Support Staff are the personnel who actively perform service calls)

- overall user support ratios for the CCC system were 790:1, while the ratio for CSU is 410:1, and the ratio for all public colleges and universities in the U.S. is 180:1.

The user-support ratio material caught the attention of a number of BOG members, especially Leslie Wang, who represents classified professionals systemwide. Wang lamented seeing firsthand the degradation of technology support in her job as a Senior Multimedia Technician at Delta College.

On Tuesday morning, a study session on "Access to Higher Education" provided more technology-related awareness amongst the group and audience. California Postsecondary Education Commission Director and former BOG member Bob Moore spoke of us not losing sight of the role technology must play in keeping access alive, especially during these tough budgetary and economic times. BOG member Carolyn Russell (Rio Hondo CC) echoed Moore's sentiment, and stated that she wished he had been present at the Monday session that showed the technology support levels the system currently grapples with.

These comments are encouraging signs that the message is being positively received—and the numbers are looking up, too. The TTIP funds were one of the very few system categoricals that were augmented from prior year levels (from $18,500,000 after the mid-year 2002-03 budget cuts to $22,050,000 in 2003-04). The number of distance education sections offered in Spring 2003 continued to increase (from 3,980 in Spring 2002 to 4,504 in Spring 2003, an increase of 13.2%), while the overall number of non-distance education sections declined from 168,831 to 160,093 during the same time span (-5.2%), a statistic that reveals the significance distance education is playing in keeping access alive for students.

On the other hand, continued funding for the California Virtual Campus (CVC) project is in flux, and one of the most compelling statistics worthy of alarm is the loss of student access to technology-related courses. In the Tuesday session, the report entitled "Access Lost: An Examination of Constriction and Rationing in the California Community College System," showed areas of curriculum that were lost due to the shrinking CCC budget between Spring 2002 and Spring 2003. Coming in second on lost full-time equivalent (FTE) course load was "Computer and Information Science" (losing over 3,100 FTE). Eighth on the list was "Computer Programming" (over 1,000 lost FTE), ninth was "Electronics and Electronic Technology (also 1,000 FTE lost), and eleventh was "Data Processing Operations" (over 500 FTE lost).

Technology curriculum was easily the largest vocational area where FTE losses occurred in the system. While I am sure market factors may be contributing to the declination of demand for the profession, I am equally sure that factors such as technology programs being high-cost in nature and having a large number of adjunct and part-time faculty (who have been laid off en masse) associated with them also weighed in on the unfortunate outcome.

The increased exposure of CCC technology programs will continue as we head into the negotiation of the 2004-05 budget; let's keep up the vigil.

Sincerely,

Patrick Perry

Patrick Perry
Vice Chancellor

Technology, Research, and Infomation Services
California Community Colleges Chancellor's Office

Conference Calendar

CalVIP Project Moves Video Over Internet

by Charles Mawson,
CCC Chancellor's Office,
Telecommunications & Technology Unit

The California Community Colleges Chancellor's Office is now working with 4CNet and The Corporation for Education Network Initiatives in California (CENIC) to move video conferencing from its current T1 network backbone to a Video over Internet Protocol.

The California Video over Internet Protocol (CalVIP) Project. will utilize the newly upgraded DS3 connections so that data and video can be accessed over the same network. This will allow the available bandwidth to be used more efficiently, saving the colleges money when their need for bandwidth increases.

The California State University and CENIC have worked together to form a joint steering committee to address the issues of implementing Video over IP on the CSU and CENIC networks. Membership of the CalVIP steering committee is drawn from the California State University, the University of California, the California Community Colleges, the K-12 community, the Independent CENIC universities and the staff of 4CNet and CalREN-2.

The immediate goal of the CalVIP steering committee will be to support the current environment for existing rooms and technology involved in video conferencing while integrating Video over IP.

In 1997, the Telecommunications and Technology Advisory Committee (TTAC) established a standard for video conferencing equipment for the CCC system, which enabled the implementation of a systemwide Video Conferencing Network. This network allowed for cost-effective real-time meetings for instructional purposes, student services, and administrative uses.

The focus of the video conferencing project has been to facilitate real-time interactions for participants in instruction and administrative staff meetings within a single college or district and/or between colleges in the CCC or CSU Systems. Video conferencing allows two-way video and two-way audio between point to point and among multiple sites.
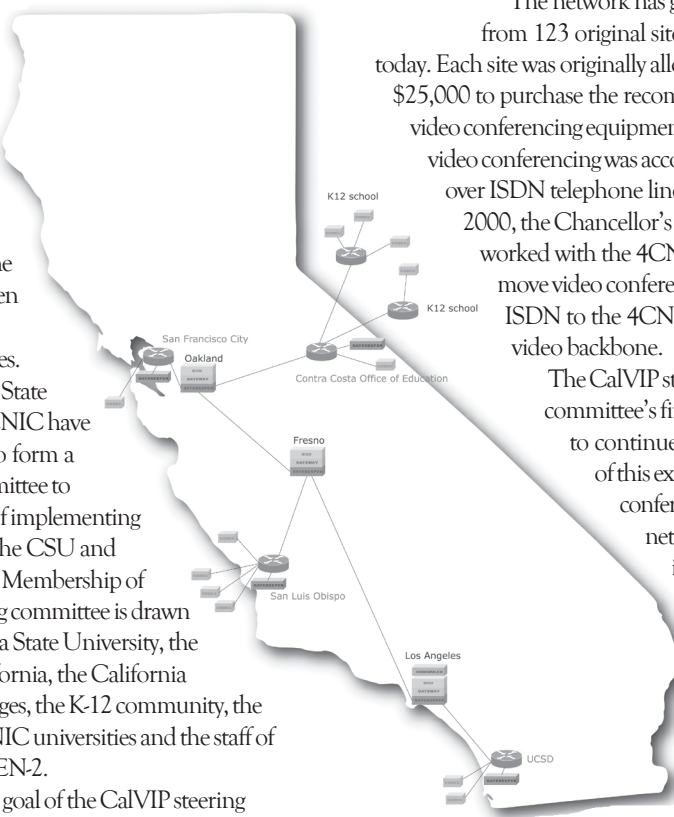
This technology allows participants to meet without traveling, and therefore reduces travel cost and improves the productivity of employees who do not lose time traveling to distant meeting locations. The use of video conferencing in the classroom offers the best comparison to the traditional classroom between remote sites. Colleges can bring together students from different locations and conduct classes that otherwise might not be available.

The network has grown from 123 original sites to 130 today. Each site was originally allocated $25,000 to purchase the recommended video conferencing equipment. Initially video conferencing was accomplished over ISDN telephone lines. In 1998-2000, the Chancellor's Office worked with the 4CNet staff to move video conferencing from ISDN to the 4CNet T1 video backbone.

The CalVIP steering committee's first goal is to continue support of this existing video conferencing network while integrating Video

over IP. The next goal is to establish standards and specifications for converting systems to the new H.323 environment as it fully matures.

With the CENIC Optical Network Infrastructure (ONI) Initiative creating a common network backbone for K-20 education in California, there is a need for current video conferencing systems to be converted to H.323. The older systems use fixed bandwidth ATM, which will no longer be supported on the ONI network.

There are other reasons for the switch to H.323, as well. H.323 is quickly becoming the new standard for video conferencing equipment and units are significantly less expensive than the older H.320 equipment. Vendor support for

CalVIP
California's Video over IP Network

Faces of Technology
Joseph A. Moreau: Chief Technology Officer

As Dean of Academic Information Services, Joseph A. Moreau is chief technology officer for MiraCosta College in Oceanside, California. He has responsibility for all technology-related operations and services, as well as instructional programs in Computer Information Systems, Computer Science, and Internet and Multimedia Technology.

In June 2003, Joseph was elected president of the California Community Colleges Chief Information Systems Officers Association (CISOA). As CISOA president, Joseph leads an association with a membership composed of chief technology officers from all 108 California Community Colleges.

Joseph is also Past President of the Consortium for Open Learning, vice-president of the Learning Resources Association of California Community Colleges, and he serves on the board of directors of the PeopleSoft Higher Education Users Group.

Because of his leadership roles, Joseph has a rare opportunity to impact the future of technology and education throughout the CCC system — a system that serves more than 2.9 million students. He is a stalwart advocate of integrating technology into education and administration systemwide.

At the September 8-9 Board of Governors meeting, Joseph spoke in favor of changing the Telecommunications and Technology Infrastructure Program (TTIP) allocation method to allow for centralized billing and payment of Internet connectivity costs for all districts in the state. He also urged the BOG to revisit funding for the TTIP Total Cost of Ownership (TCO) model in the 2004-05 budget.

In an interview at the Chancellor's Office, Joseph said that centralization and the TCO model, as put forth by the Chancellor's Office in the Technology II Strategic Plan, are crucial to the future of technology throughout the CCC system. He also outlined the important opportunity CISOA has to influence this future.

"We have many challenges ahead," Joseph said. "Technology in the community colleges is evolving and CISOA can play a leading role in this evolution."

The move toward centralization includes integrating administrative and instructional computing, a process that directly involves chief technology officers and therefore increases the importance of CISOA's role in shaping the evolution.

Another part of this evolution is a shift in the approach to purchasing technology within the community colleges. "We used to purchase technology like we purchase desks," Joseph said. "If it looked like a good desk, we would buy it and, as long as it didn't break unexpectedly, we could expect to get 25 years out of it.

"But that's not how technology works. We now understand clearly that in order to be current and effective, technology needs to be supported with a stream of resources. It needs to be replenishable."

Joseph said that the Technology II Strategic Plan's TCO model is a strong example of this new thinking at the state level. The TCO funding model accounts for not only the cost of initial technology purchases, but also the cost to keep these technologies current.

At the bottom line is an understanding that students expect that current technology will be available.

"Students today expect that technology will be available. They come from a K-12 environment that provides computing, and they know the level of skill they will need to compete in the job market. Or they come directly from the job market where they are fully

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Past President - Consortium for Open Learning
www.distlearn.com

President - California Community Colleges Chief Information Systems Officers Association
www.cisoa.org

Vice President - Learning Resources Association of California Community Colleges
www.lraccc.org

Board Member - PeopleSoft Higher Education Users Group
www.heug.org

aware of the skill level they need. If they can't find that kind of education and training in the community colleges, they will go elsewhere to find it."

Because the chief technology officers on all 108 community college campuses will be intimately involved with the changes occurring in technology, Joseph said he believes CISOA's work will be very important, in that it will unite a variety of groups, all with a common interest. Joseph said that through projects like CISOA's annual conference, the association hopes to connect a variety of stakeholders in a way that has not happened before by bringing together the college IT organizations, their Research and Planning Group representatives, various user groups, the state, and prominent vendors.

"It's important that we articulate a new voice and accept our broadening responsibility.

"It will be important for CISOA to develop a new identity with a firm, unified voice." Joseph said. "We need to make sure that state leadership at all levels hear us, so that proper investments will be made in hardware and software, as well as other technology purchases and, most importantly, support staff."

In speaking with Joseph about technology and education, it quickly becomes apparent that he has a clear vision of what needs to happen to ensure that the students, faculty, and staff of the California Community Colleges receive competitive technological service. His vision has been continually refined during the course of a career working with technology and media that spans 20 years.

He completed the certificate program in Motion Picture Arts and Sciences at the University of California, Los Angeles. He earned his BA in Visual Arts at the University of California, San Diego and his MA in Instructional Technology at the California State University, Los Angeles.

He began his career working as a videographer and media specialist for a variety of firms in the private sector including aerospace, architecture and graphic design, and a major television network.

In 1990 he left the private sector to begin a career in higher education, accepting the position of head of the Instructional Resources Center at Pasadena City College. Joseph worked on many projects while at Pasadena; most notably he was on the team that designed and implemented the 70,000 square-foot Shatford Library that opened in 1993.

He also initiated the transition from "traditional" media to fully digital media resources and helped to create the first digital production suite, which provided resources and tools for working with the new digital technology.

In 1997 Joseph left Pasadena for West Hills College in central California to become the Dean of Learning Resources. During his time at West Hills he oversaw the development of a sophisticated distance education infrastructure that included interactive video and Web-based courses.

In 2000 Joseph accepted his current position of Dean of Academic Information Services at MiraCosta College. Over the past several years Joseph has been researching the copyright and intellectual property issues surrounding the development of digital instructional materials by higher education faculty and staff.

Throughout his career as an administrator he has also taught in the fields of Computer Information Systems, Education and Multimedia Production, and he said

that interaction with students is the most gratifying aspect of his job.

"I've been successful in raising money for technology and those technology dollars have had a wide impact. That has been important and rewarding." Joseph said. "But I also strongly value my ability to interact with and help students on a personal level."

After 20 years, Joe said that he is still absolutely inspired. "If I were to look back at it," Joseph said, "When I first started out I would never have imagined that I would be more excited today. This is a wonderful time to work in the colleges. We find ourselves in a time where what people dreamed of 20 years ago, technology makes real today."

CISOA Leadership: A Changing Mission

Established in the1985, CISOA has led the state's community colleges in:

- **providing direction to information system development,**
- **facilitating collaboration and communication among districts and colleges on information technology issues and projects,**
- **improving the efficiency and effectiveness of planning and management efforts both locally and statewide**

Over the past few years, several new groups including commercial software user groups (Datatel, Banner, Peoplesoft) and other professional organizations within the community colleges have assumed an important role in ongoing development and utilization of college information systems. In light of this change CISOA is expanding its leadership role to help coordinate the efforts of all stakeholders.

The first initiative in this direction will commence with the 2004 CISOA Conference to be held at the San Diego Hyatt Regency Islandia, February 22 – 25. In collaboration with the CCC's Research and Planning Group, chief information systems officers and their staff will gather with college researchers, software user group representatives, and the Chancellor's Office staff to discuss issues of mutual concern. Central to the conference will be issue surrounding the collection, analysis, and reporting of information regarding student learning outcomes as outline in the new WASC accreditation standards.

Details on the conference agenda, program, and registration will be posted on the CISOA Web site at www.cisoa.org in October.

He also knows that the current budgetary shortfalls are straining the entire CCC system. "I hope that the current climate will not drive people away from the colleges, that they will not switch careers or look elsewhere because of it," Joseph said. "Technology is crucial to our future, and the stakes are too high—for our students, for our economy, and for the future of our state to throw in our hand now. Now is the time when we need the best minds and the most dedicated professionals to put their skills to use."

Joseph said he thanks God everyday for the opportunity he has to contribute, as well as for his two daughters, Hannah, 13, and Raquelle, 9, who he said are the number one successes of his life. Beaming, he described them as wonderful children and great students, and said that they will be successful in whatever they choose to do.

Joseph has a home on an acre of land in Vista, California where he lives with his wife, Susana, and their daughters. He enjoys landscaping and is continually working on home improvement projects. He said that if he hadn't ended up in education, he probably would have been Bob Vila.

"Faces of Technology" is a regular feature of TechEDge newsletter. Each issue, it will highlight an individual making contributions to technology in the California Community Colleges.

CENIC

And, the low cost of community college participation in CalREN permits the Chancellor's Office to upgrade all colleges' connections to DS3. In the longer term, as bandwidth needs of the community colleges grow, it is hoped that existing levels of community college expenditures will be sufficient to provide for needed additional backbone network capacity.

CENIC operates with strong participation from member institutions through technical advisory councils and an annual conference. The advisory councils are chaired by representatives from member institutions and currently meet every other month. The meetings are open to interested participants from all member institutions.

The Chancellor's Office has the current schedules for these meetings. The next annual CENIC conference is at Marina Del Rey on March 15-17, 2004.

For more information about CENIC, please visit **www.cenic.org**

CALVIP

H.320 is also dwindling while overall cost is increasing.

In 2003, the CCC Chancellor's Office gave each of the California Community Colleges another $25,000 to upgrade their video equipment for compatibility with the new ONI network. This funding supports the move from older equipment to the equipment needed to utilize the emerging H.323 technology.

Finally, the CalVIP steering committee has as its goal a concentrated effort to evaluate new technologies such as streaming video, and to make recommendations for implementing these technologies into the system.

The steering committee will continue to define the focus of the CalVIP project and develop appropriate working committees to research, test, evaluate and make recommendations to the tasks the committee identifies as needing action. The CalVIP steering committee will also be responsible for communicating the status of this project to the participating organizations.

In the CCC and CSU systems, use of video conferencing for instructional purposes, student services, and administrative uses continues to grow. As this tool is used by more and more, the CalVIP project and the work of the steering committee will have a wide impact on the way that California educators teach, conduct business, and communicate.

For more information about CalVIP steering committee activities and project status visit: **www.csu.net/CALVIP/**

For more information on ONI visit: **www.cenic.org/ONI.html**

Cal-PASS

tion, instructors need data to track performance. Then, they need to share the information to act on their findings.

"Good information and its integration into teacher-to-teacher discussions are at the heart of Cal-PASS," Grossmont-Cuyamaca Community College District Chancellor Omero Suarez said at a news conference the college district held in August to announce the project's expansion. "Cal-PASS addresses the desire of all teachers to know what happens to their students and, knowing this, how to positively impact the next students."

La Mesa-Spring Valley School District Superintendent Brian Marshall, one of several proponents from across the state who attended the news conference in support of the initiative, said the discussions that result from the data exchanges are invaluable because they present the all-too-rare opportunity for instructors from all levels to compare what each is teaching in the classroom.

"The conversations that arise from the data sharing are what's crucial," Marshall said. "We've wanted this kind

Nuts and bolts of Cal-PASS

Each participating institution signs an agreement to provide data once a year and appoints a representative to gather and access data. A database administrator oversees the operation of a $300,000 data server at the California Community Colleges Chancellor's Office in Sacramento that stores the millions of records provided by Cal-PASS member institutions.

The information can then be analyzed by researchers, who in turn, can offer educators data-based information relating to a variety of instructional issues. To ensure confidentiality, students' identification numbers are encrypted and access is password protected and restricted to personnel working directly on the project.

Through the Cal-PASS project, elementary, middle, high schools, colleges and universities can learn the answers to questions such as:

- How do students do when they leave here?
- Were they well-prepared? Are adjustments in curriculum, or course content, necessary to improve student preparedness?
- How many received degrees? What did they get their degrees in? How long did it take?

of information for over 15 years. When we're able to review true data, we're given the tools to really integrate curriculum and identify its strengths and weaknesses."

State Sen. Dede Alpert (D-San Diego) who chairs a legislative committee working toward implementing the state's master plan for K-16 education, also spoke glowingly for the project developed by college

district under the direction of Chancellor Suarez and Dr. Brad Phillips, senior director of Institutional Research, Planning and Academic Services.

"This is a huge part of the answer to how to truly improve education," Alpert said about Cal-PASS, which began as a pilot program in 1998 between GCCCD and San Diego State University.

CCC Live Caption: Funds for Increased Access

Guest Opinion by Laurie Lofland, CCC Live Caption Project Manager, CCC Technology Center

The use of information technology in education has created unimaginable opportunities, but it has also created obstacles to access; obstacles which may exclude students with disabilities from using new and critical resources. Imagine being cut off from an education, simply because of a hearing impairment.

Live streaming video and Web conferencing have added an audio component to distance education that can enhance and enrich the learning experience. Without real-time captioning, hearing-impaired students face an obstacle to participation in live events that may be essential to their education.

The challenge of keeping education open to all, regardless of disability, is critical, and it requires the immediate and earnest attention of California Community College distance educators. Campus policymakers must ensure that any technology advances in distance learning make accessibility the norm, and not the exception, so that no student is excluded.

As California Community Colleges face an expanding demand for technology-based instruction, participation is growing, and so is the need to avoid excluding even a single student because of a technology barrier that prevents them from participating. These technology barriers are systemic and technology advances within the network of California Community College campuses must improve access in two ways:

- acquiring new equipment that incorporates accessibility
- enhancing compatibility with existing platform designs and applications.

Real-time, or live, captioning of distance education courses will remove a barrier to distance education. The Captioning of Live Distance Education Program, or CCC Live Caption, has been established by the Chancellor's Office to support increased student access to distance education by providing reimbursement funding for real-time captioning of live distance education courses in the California Community Colleges.

Initial reimbursement funds of $1.44 million will help defray live captioning costs and assist the California's Community Colleges to pursue the ideal of universal design, an approach that incorporates accessibility into the design of software and hardware, rather than as an adaptation after the fact. Distance and disabled students educators are encouraged to take advantage of these funds.

To qualify for live caption reimbursement funding, a community college must offer distance education courses and provide real-time captioning of live courses in an audio and video format that would not be accessible to hearing impaired students. Real-time captioning can be performed through an outside captioning vendor or in-house if a campus has the necessary equipment and resources.

Through the CCC Live Caption program, California's Community Colleges have the opportunity to enhance and make possible the educational experience for many students who would otherwise be unable to participate effectively. Just as removing architectural barriers requires a comprehensive plan for implementation, removing technology barriers will also require a shared-campus responsibility. Real-time captioning of live distance education courses will help to remove these barriers.

Learn more about CCC Live Caption by visiting the Web site:

www.ccclivecaption.com

Thanks to a three-year, $1.5 million expansion grant approved in 2002 by the Board of Governors of the California Community Colleges, Cal-PASS has grown well beyond the Southern California region.

The data collected from Cal-PASS participants includes basic student information, such as courses, grades, and outcomes. What can be learned from these simple facts and their potential for improving instruction has educators clamoring for data and brainstorming with colleagues on ways to enhance student preparation.

Their goal is to find out what students are learning and help them prepare for that next rung up the educational ladder – something that couldn't be accomplished on a meaningful level in the past because of the lack of hard data. The Cal-PASS system makes it possible to share data without compromising students' privacy rights, a logistical hurdle that needed to be cleared before Cal-PASS could be put into use.

Progress in technology has also dissolved technical barriers like conflicting computer systems

Among the attendees of a news conference at Grossmont College in El Cajon announcing the expansion of the Cal-PASS data-sharing project were, from left: Dr. Omero Suarez, Chancellor of the Grossmont-Cuyamaca Community College District; Dr. Ted Martinez, Jr., President of Grossmont College; Rich Leib, Member of the Board of Governors of the California Community Colleges; Dr. Brad Phillips, Cal-PASS Director; and Patrick Perry, Vice Chancellor, California Community Colleges.

and limited hardware capacity that, until now, have made data sharing to the scale of Cal-PASS impractical.

Such data, eagerly absorbed by instructors who previously relied largely on word-of-mouth to assess student progress, is the basis for insightful reports and other tools that track and analyze academic performance.

Under the stewardship of GCCCD's Brad Phillips, statewide project leader, new data-sharing consortia have been formed in Long Beach and Riverside/San Bernardino, with more groups pending. About one-fourth of all community colleges in California are part of a consortium and more are signing on, as word spreads about the remarkable educational breakthrough that Cal-PASS represents.

Since February, when the first funds were received for the project's expansion, Cal-PASS participation has grown from 15 institutions in three counties to about 500 campuses in 18 counties.

Cal-PASS
California Partnership for Achieving Student Success

For more information about Cal-PASS, contact: Brad Phillips, Senior Director, GCCCD Office of Institutional Research, Planning and Academic Services, (619) 644-7736, brad.phillips@gccd.net

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