Telecommunications and Technology Infrastructure Program

California Community Colleges Chancellor's Office
Jack Scott, Chancellor

Prepared by the Technology, Research and Information Systems Division and the Office of Communications

APRIL 2010
April 28, 2010

The Honorable Arnold Schwarzenegger  
Governor of California  
State Capitol  
Sacramento, California 95814

Dear Governor Schwarzenegger:

I am pleased to present to you the legislative report on the Telecommunications, Technology and Infrastructure Program (TTIP) managed by the Chancellor’s Office. This report meets 2008-09 Budget Act requirements.

The effective use of technology creates enhanced learning opportunities in the California Community Colleges. Included in this twelfth annual report are program highlights, financial charts and future program direction.

If you or your staff have questions, please feel free to contact Morgan Lynn, executive vice chancellor for programs, at (916) 445-1774 or mlynn@cccco.edu.

Sincerely,

Jack Scott, Ph.D.  
Chancellor

cc: Legislative Analyst Office  
Department of Finance
The California Community Colleges serve more than 2.9 million students and is the largest system of higher education system in the nation. The state’s 112 community colleges are charged with providing workforce training, basic skills education, and preparing students for transfer to four-year institutions.

The Chancellor’s Office Telecommunications and Technology Infrastructure Program (TTIP), was defined by Budget Act language in fiscal year 1996-97. For the 2008-09 fiscal year, $26,197,000 was allocated to provide technical support and technology application innovations, and to coordinate activities that maximize the system’s investment in technology with the expressed goal of improving learning outcomes.

TTIP provides 9% of the total funding needed to support the California Community Colleges. The colleges and districts rely heavily on general apportionment and other non-TTIP revenue sources to support their technology needs.

This twelfth annual report highlights up-to-date information on the programs. One is The Technology Center, which provided technical assistance and planning, cooperative purchase agreements, and supported new statewide technology pilots and ongoing technology programs. Each program aims at the effective application to improve education.
A portion of the funds are available for district allocation to maintain local technology capabilities. The Cal-PASS (California Partnership for the Achieving Student Success) program receives $2,000,000 of the total TTIP budget to support and expand that program.

An addendum, *Fiscal Review of the California Partnership for Achieving Student Success (Cal-PASS)*, is bound separately, as required by Budget Act language.
Methodology

The Chancellor’s Office Telecommunications and Technology Unit is continuously engaged with grant teams and personnel throughout the state. In addition to reviewing bi-annual updates, the technology unit staff attends regular project meetings and participates in impromptu discussions and face-to-face events with the teams. The staff also collaborates on current technology issues with advisory committees from the system’s colleges.

Data used in this report was submitted by the director of each grant project. Additional project details can be found at the following url and then selecting the individual grant:

TTIP Background

The Chancellor’s Office Technology, Research and Information Systems division governs TTIP, which is guided by provisions of the Tech III Plan. The Tech III Plan builds upon the work established in Tech I and Tech II.

Tech III continues to develop programs with the following objectives:

- Protect the state’s prior technology investment
- Expand and improve student services
- Utilize current technology to leverage the existing infrastructure

Funding for some TTIP projects comes from the Chancellor’s Office. Since 1996-97, the Chancellor’s Office has funded six systemwide technology projects, all from a competitive grant process. These projects are listed on the next page.
Summary of Chancellor’s Office TTIP Funded Programs

The Chancellor’s Office recognizes that technology is an increasingly integrative and essential part of many services and programs in the college system. The following six projects are included and highlighted in this year’s report:

**The Technology Center**, which incorporates the following programs:
- Corporation for Education Network Initiatives in California (CENIC)
- CCCApply
- eTranscript California
- CCC Clearinghouse

**The California Partnership for the Achievement of Student Success** (CalPASS)

**3C Media Solutions** and **EduStream**, a partnership

**CCC Confer**

**@ONE**

**California Virtual Campus**

To maximize resources and services for technology projects, a collaborative effort, **The California Educational Technology Collaborative**, was formed. Members are the project directors from:

- Technology Center and CENIC participation – Butte College
- Cal-PASS – Grossmont-Cuyamaca Community College District
- 3C Media Solutions – Palomar College
- @ONE – Evergreen Valley College
- California Virtual Campus – Butte College
- CCC Confer – Palomar College
- EduStream – San Bernardino Community College District
The Technology Center

The California Community Colleges Technology Center (CCCTC), hosted by Butte College, facilitates and coordinates technology projects such as California Community Colleges Apply (CCCApply) and eTranscript California. Additionally, CCCTC staff disburses funds, manages contracts and develops resources for external funding. The Technology Center is funded by a $6,150,000 grant in partnership with Butte College.

The Technology Center publishes a newsletter, TechEDge, which provides information about systemwide technology to more than 1,800 readers. The Technology Center also provides discounted help desk support services to colleges and maintains dedicated servers for Learning Management used in online professional development courses.

Due to frequent outages it was necessary to ensure system stability. The server array was relocated to a new secure and hardened data center. Its safeguards, such as fire suppression, back-up air-conditioning, and a generator are designed to prevent interruptions in service and to withstand a variety of disasters.

Funding for the Technology Center made the following possible:

- Migrated new server array to a hardened data center.
- Increased storage area network capacity to 4 times the current capacity by replacing aging hardware.
- 45,000 active subscribers to 169 hosted list serves, with an average of 300,000 to 360,000 messages per month.
- Host to CCC Apply, eTranscript California and CCC Clearinghouse.
- Adopted comprehensive security and virus software solution.
- Plans are underway to convert the TechEDge newsletter to digital format in 2009-10.
TTIP funds a portion of initiatives for California's education and research communities. TTIP leverages resources in order to obtain the most cost-effective networking. This strategy supports TTIP missions and answers the growing needs of faculty, staff, and students.

TTIP partners with the Corporation for Education Network Initiatives (CENIC). Because CENIC's infrastructure costs are significantly lower than leasing or purchasing telecommunication lines from existing fiber and telecommunications vendors, it produces larger economies of scale for connectivity. Partnering with CENIC to use their California Research and Education Network (CalREN) has resulted in millions of dollars in savings. For more information see http://www.cenic.org.

CENIC was formed by (and still consists of) charter members from the University of California, California State University, the California Community Colleges and K-12, Stanford, CalTech, and USC.

CENIC provides:

- Centralized funding for no-cost Internet connection at all colleges.
- $2.2 million potential annual savings through the California Teleconnect Fund program, a 50% discount.
- Connection at all colleges and districts to the CalREN for data, Internet access and video.
- Economies of scale and peering (where two or more networks exchange traffic between each other’s customers freely, and for mutual benefits) continue to assist in improving connectivity rates. $16 per mbps/mth.
- Connection at approved off-site centers to CalREN.
- $4 million funded to Library Automation.
- 1,010 video conferences scheduled and connected.
CENIC: Increased Bandwidth and Circuit Upgrades

Bandwidth upgrades were initiated in 2007-08 and continued into 2008-09. The initial upgrades provided high priority sites, such as those districts serving multiple campuses, greater delivery from one connection.

Working with the California Public Utility Commission, the California Community Colleges became eligible for California Teleconnect Fund discounts on December 1, 2008. The cost savings realized from these discounts provided resources for additional circuit upgrades for the remaining colleges, who were not part of the initial phase.

Internet Traffic Charges

The Chancellor’s Office annually renegotiates the pricing of Internet traffic generated by the California Community Colleges. In addition, CENIC’s aggressive efforts to establish peering connections reduced Internet traffic charges even further.

The following table shows the Internet traffic charges by year:

<table>
<thead>
<tr>
<th>Year</th>
<th>Mbps Rate per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to 2003</td>
<td>$260</td>
</tr>
<tr>
<td>2003-04</td>
<td>$126</td>
</tr>
<tr>
<td>2004-06</td>
<td>$95</td>
</tr>
<tr>
<td>2007-08</td>
<td>$20</td>
</tr>
<tr>
<td>2008-09</td>
<td>$16</td>
</tr>
</tbody>
</table>
The Technology Center

CENIC: Connectivity to Approved Off-site Centers

One time funding was included in the 2006-07 budget to extend the CalREN network to the approved California Community Colleges’ off-site centers. In following years, several new centers were added to the network. Even without ongoing funding, CENIC was able to provide these centers with improved connectivity without increasing the current TTIP allocation.

Library Automation and Electronic Information Resources

In addition to funding connectivity, TTIP provided four million dollars, or $36,036 per college, for ongoing costs of electronic library resources. New resources include databases for journals, periodicals, newspapers, encyclopedias, and electronic books.

Video Conferencing and Connectivity

CENIC works with the California Community Colleges and their partners to facilitate video conferences. They have scheduled 1,010 or approximately 6,800 hours on the CENIC CalREN Network. This represents every conference in which at least one participant was a community college site, and does not include point-to-point video conferencing.

There has been an overall decrease (24%) in academic use of video conferencing, and an overall increase (9%) in administrative use of video conferencing across the three segments (including the, CSU, and UC). This decline is ascribed largely to budgetary constraints.

Increased faculty understanding of technology and the availability of collaborative applications for distance learning has also led to the decline.
CCCApply is a Web-based student application process that is made available to all community colleges. The site (www.cccapply.org) provides comparative descriptions of the colleges and their programs in an efficient, automated program. To date, 100 colleges subscribe to CCCApply.

Student applications are up 37% from fiscal years 2007-08 to 2008-09.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Student Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2007–June 2008</td>
<td>1,169,555</td>
</tr>
<tr>
<td>July 2008–June 2009</td>
<td>1,596,578</td>
</tr>
</tbody>
</table>

Because of its popularity, the current application process is being updated. To improve the user’s experience, the next generation’s specifications utilize Web 2.0 interfaces. New technologies such as cloud computing platforms will ensure reliable operation under varying demand loads. Cloud computing is defined as “a computing capability that provides abstraction between the computing resource and its underlying technical architecture (e.g. servers, storage, networks), enabling convenient, on-demand network access to a shared pool of configurable effort or service provider interaction.” Clouds have five essential characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. Employing cloud computing and an open-source model could lower college costs up to 50%. Expected completion is in fiscal year 2010-11.

CCCApply highlights include:

- More than 5.6 million applications to college (cumulative).
- 1.6 million college applications processed for fiscal year 2008-09.
- More than 4.6 million student accounts.
- 96% of those surveyed said they would recommend CCCApply to other students.
- New web site released with help for student services and parents.
- Specifications for next generation application underway.
The Chancellor’s Office has established a statewide Internet-based system for requesting, transmitting, downloading, and viewing academic transcripts. This system is referred to as “eTranscriptCalifornia” and was formerly known as “CCCTran” (http://www.eTranscriptCA.org).

Current participants include:

- 31 California community colleges
- 17 California state universities
- 3 private universities

The success of eTranscript California has prompted the University of California system to develop a proof of concept for their system. UC Santa Barbara is preparing the documentation for the Office of the President. The proof of concept will address the steps, procedures and technical updates necessary for UC participation in the project.

The specifications for requesting composite transcripts are now available through CCCApply. Composite transcript request capability allows a student’s academic record from K-12 through all colleges to be automatically generated. This powerful feature assists in academic planning, degree audit and longitudinal data analysis by capturing a complete history of a student’s academic activity.

Additional funding to expand the number of participating K-12 institutions and to develop the composite transcript is currently being sought by federal sources through the California Department of Education.

eTranscript California highlights include:

- 51 California institutions currently participate.
- 85,000+ live student transcripts delivered.
- Reduced per transcript processing cost from 7 dollars to 50 cents.
- Reduced staff workload--500 transcripts automatically process in 15 minutes.
- Specifications complete for a comprehensive (K-20) academic record.
The Online Grants and Instructional Resource Clearinghouse (http://www.governet.net/C4/) is a Web-based, central electronic repository for materials, resources, processes and best practices for grants, projects and instruction.

In 2008-09, the project’s focus and its funding were reviewed to assess functionality. Changes in electronic curriculum are in beta testing and will be available in spring 2010.

The widely used Curricunet System, which exists under the California Community Colleges Clearinghouse umbrella, was modified to support the Web-based reporting and workflow automation for programs and curriculum.

CCC Clearinghouse will process course outlines and program information that is electronically submitted by the 112 colleges, as well as non-Curricunet districts. In addition, it will serve as a single data repository for curriculum and programs, which are critical to maintaining data quality and consistency.

CCC Clearinghouse highlights include:

- An electronic program of curriculum and program submission to the Chancellor’s Office is in beta testing.
- Improved program application tracking and processing times.
- Single data storage location for curricular programs at the Chancellor’s Office.
- Reduced paper usage and improved data accuracy.
- All districts will have access to the Chancellor’s Office automated program and curriculum submission feature, including non-Curricunet users.
The California Partnership for the Achievement of Student Success (Cal-PASS) (http://www.cal-pass.org) began in 1998 as a data-sharing project between San Diego State University and the Grossmont-Cuyamaca Community College District. Its purpose is to collect and share performance data as students progress from one educational level to the next.

Since its inception, Cal-PASS has brought together primary, secondary and post-secondary segments through regional educational data-sharing partnerships. Its member institutions now include all UCs granting baccalaureate degrees, 18 of the 23 California state universities, several private universities, all community colleges, and two-thirds of the K-12 districts.

To further the efforts of curricular alignment, 66 professional learning councils (with more than 1,400 faculty members from all of the segments) meet monthly to improve student transition and success.

Cal-PASS highlights include:

- More than 7,700 K-12 schools and higher education institutions in 58 counties participate.
- More than 345 million student records are in the Cal-PASS research database.
- Continued focus on curricular alignment across education segments.
- Standard metrics for analyzing, reporting and tracking (SMART) tool deployed.
- The SMART tool enables users to access to their data through an easy point and click interface.
- Sixty-three research studies conducted on member institutions.
- Five new professional learning councils (PLCs) have been developed.
- Sixty-six PLCs serve in math, English, counseling, science and EL/ESL.
3C Media Solutions and EduStream, a partnership

3C Media Solutions

3C Media Solutions (www.3cmediasolutions.org), formerly CCCSAT, is a digital satellite communications system for broadcasting distance education, instructional, and professional development programs to colleges throughout the state.

The organization has increased its services to include streaming media, media-on-demand, conference services and media production coordination.

In 2008-09, 3C Media Solutions partnered with EduStream, a video-on-demand service hosted by the San Bernardino Community College District, to provide professional video-on-demand guidance and services to constituents.

3C Media Solutions highlights include:

- 419 3C streaming faculty accounts (streaming media).
- 65% of the campuses are served.
- 85 of the 110 campuses participate in 3C Media webcasts.
- Held the Third Annual Student Film and Video Festival and increased the number of participating colleges.
- Increased coordination with the regional programming centers, providing additional live distance education courses to the system.
EduStream was envisioned by San Bernardino Community College District as a way to provide quality online educational media for faculty and staff to use in their online courses. It is funded through a five-year renewable grant for $2.5 million from the California Community Colleges Chancellor’s Office in partnership with Palomar College.

EduStream is a digital repository that partners with content vendors to provide high-quality, American Disability Act compliant educational media for the benefit of faculty, staff, and students.

Faculty and staff link educational media into their course management systems where students can view it during the online course. Learning objects provide a more interactive learning experience and increased academic rigor.

EduStream highlights include:

- 3,000+ American Disability Act compliant educational videos.
- No cost service for California Community Colleges.
- More than 140 member colleges and universities across the United States.
- Seamless integration into any course management system (Blackboard, Moodle, Angel, etc.).
- Four 24/7 live Web-streaming channels (more can be added as needed).
- Provide 100GB of multi-media storage provided for each college.
Systemwide e-Conferencing – CCC Confer

CCC Confer provides no cost, systemwide audio and electronic web-based conferencing services to all college staff and faculty.

The e-Conferencing grant for $3.2 million, awarded to Palomar College in 2001, funded the development of a comprehensive, coordinated e-conferencing tool to complement the decentralized infrastructure of the California Community College system.

Initially supporting small group meetings, the success of CCC Confer eventually prompted a separate grant to encourage and expand the use of e-conferencing technologies in the classroom.
Systemwide e-Conferencing – CCC Confer

CCC Confer highlights include:

- 27,392 e-conferencing meetings, serving more than 192,000 individuals.
- 300% growth in demonstrations and training.
- 77% growth in Teach & Confer.
- 58% growth in faculty office hours.
- More than 1 million minutes a month usage.
- New customers, particularly in the areas of faculty, tutoring and administration.
- Secured perpetual license agreement, allowing unlimited users and ultimately lower costs.
- Moving from satellite to Cal-REN backbone in 2009-10, per engineering report recommendation.
Systemwide Technology Training for Faculty and Staff (@ONE)

This project was funded through a grant of $730,000 in partnership with Evergreen Valley College and Mt. San Antonio. Striving to improve instruction through the technology, @One offers free or low cost ($100 maximum) training for the faculty and staff of the colleges. Instructors provide face-to-face training, online and self-paced courses, webinars, accessible archives, and downloadable materials. @One (http://www.ccone.org/) provides training and technology information.

Trainings fall into five general areas and are designed in various skill-level tracks to address the needs of faculty and staff:

- Fundamental technology skills
- Technology-enhanced instruction
- Multimedia
- Online teaching and learning
- Technical training

@One highlights include:

- 365 participants benefited from Hands-On Institutes computer training.
- Offered free or low-cost training to community colleges faculty and staff.
- 4,427 participants enrolled in instructor-led, distance education courses.
- Online courses increased by 50%.
- Seminar offerings increased by 42%.
- The Online Teaching Conference ran at full capacity with 242 meeting face-to-face and 298 participating online.
- The number of sponsors increased 67%.
- @ONE Trainers’ Bureau was created and includes over 50 trainers.
- The @ONE eNews reaches 6,600 individuals, an increase of 16%, and delivers both training news and tips.
California Virtual Campus (CVC)

The California Virtual Campus (CVC) is a 10 year statewide community college system program to create comprehensive instructional support for faculty and students. It addresses development of content and delivery of cutting-edge online and hybrid instruction. The principal goals are to support the California community colleges in online course offerings, e-learning and/or distance education. It is funded through a $2 million grant in partnership with Butte College.

In 2008, California State Senate Bill 1437 created an expanded role for the California Virtual Campus as an educational entity. It authorized the “California Virtual Campus to pursue specified purposes relating to education technology to the extent funding is available.”

As such, the bill supported programs to advance universal Internet service, as well as:

- Research-based innovations in teaching and learning using new technologies.
- Ongoing collaboration with 10 community-based organizations.
- Providing residents in low-income neighborhoods with access to high-speed networking and computers.
- Provide education entities with technical assistance.

The Chancellor’s Office has responded to the direction of this bill in the following manner:

- Formed the California Educational Collaborative, a K-20 group dedicated to sharing information on technology.
- Launched a community-based organization Connectivity Pilot Project with CENIC over the CalREN educational network.
- Continued partnership with CENIC – K-20 California Educational Technology Collaborative.
- Established initial grants to provide CalREN access to community-based organizations to increase access to online education resources.

- Developed an intersegmental online California High School Exit Examination and expanded its use to 42 counties. This tutorial prepares students to pass the exam.

- Convened four annual meetings of the K-20 CETC community, California state libraries, community-based organizations, State Dept. of Education, California Technology Assistance Project, adult education and universities so that all segments are represented.

- Commenced the Electronic Portfolio Pilot Project. Recruited 23 participating institutions from all California educational segments: K-12, CCC, CSU and UC.

- Established an initial partnership to enhance transfer opportunities with CSU East Bay and the California Community College system – the CSU-CCC Pathways Project.

- Created a science, technology, engineering and mathematics education plan from meetings with the business community.
California Community College Educational Technology Collaborative (CCCETC)

The California Community College Educational Technology Collaborative’s (CCCETC) (http://www.cccetc.org) mission is to foster collaboration between systemwide technology projects and the individual colleges to improve and enhance technology resources and services.

The collaborative strives to maximize resources and services available to the California Community College system through:

- Effective resource management
- Resource sharing
- Prevention of service duplication
- Increasing funding opportunities

CCCETC members are technology infrastructure providers, service providers, fundraising experts, program directors and Chancellor’s Office staff.

Current memberships include:

- CCC Confer ~ e-Conferencing
- 3C Media Solutions ~ satellite broadcasting, pod-casting, streaming
- EduStream - IP-based media content broadcast
- @ONE ~ faculty/staff training
- CCC Clearinghouse ~ electronic repository
- CVC ~ California Virtual Campus
- CCC Technology Center ~ shared information infrastructure services

The collaborative's partner organizations include:

- Foundation for CCCs, fiscal agent
- CENIC, network provider
California Community College Educational Technology Collaborative (CCETC)

CCETC highlights:

- Further improvement and enhancement in the reach of technology resources and services.
- Manage and share resources and eliminate duplication of services.
- Expand membership and opportunities into K-20.
- Provide each college with 100GB of multi-media storage through EduStream.
- Initiated digital textbook pilot to support e-Textbook purchases and integrate with student and course management systems.
Financial Charts

The Chancellor’s Office provided 9 percent of the $26,197,000 TTIP budget. General apportionment funds accounted for 67 percent. Instructional equipment, state funds, federal funds, local, and private funds accounted for the remaining 24 percent. The table below shows TTIP funding over the previous seven fiscal years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Funded Amount</th>
<th>Percent Change from previous year</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-02</td>
<td>$44,300,000</td>
<td>58</td>
<td>Continuation of prior year’s services.</td>
</tr>
<tr>
<td>2002-03</td>
<td>$18,500,000</td>
<td>&lt;139&gt;</td>
<td>Videoconferencing upgrade; Phase 1 of connectivity upgrade (T-1 to DS-3); all local technology initiatives and technology training monies eliminated.</td>
</tr>
<tr>
<td>2003-04</td>
<td>$22,050,000</td>
<td>16</td>
<td>4Cnet merges into CENIC; DS-3 connectivity upgrade continues; dedicated video T-1 is eliminated and moved onto CENIC.</td>
</tr>
<tr>
<td>2004-05</td>
<td>$23,397,000</td>
<td>6</td>
<td>Completion of Internet &amp; video upgrades; addition of California Virtual Campus line item into TTIP.</td>
</tr>
<tr>
<td>2005-06</td>
<td>$24,397,000</td>
<td>4</td>
<td>CCCApply introduced international applications and a BOG Fee Waiver; 300 percent increase in CCC Confer usage; completion of CVC program transition.</td>
</tr>
<tr>
<td>2006-07</td>
<td>$26,397,000</td>
<td>8</td>
<td>10 year anniversary of TTIP program; CCC-Tran goes live after beta-test phase; Cal-PASS expansion with additional funding; @ONE and CCC Confer increase usage by faculty and staff.</td>
</tr>
<tr>
<td>2007-08</td>
<td>$26,197,000</td>
<td>0</td>
<td>Same budget as previous year. Began adding the official off-site centers to CalREN. Increased bandwidth for colleges maxing out on current connection. Began the K-20 CETC.</td>
</tr>
<tr>
<td>2008-09</td>
<td>$26,197,000</td>
<td>0</td>
<td>Same budget as previous year. Qualified for 50% CTF discount.</td>
</tr>
</tbody>
</table>
Chart 1, below, shows the percentage of funds for the seven funding sources (Telecommunications and Technology Infrastructure Program; instructional equipment, library materials, and technology program; General apportionment funds; other state funds; federal funds; local, and private funds).
**Chart 2**, below, shows the relationship of funds in the seven areas reported by the colleges compared to the previous six fiscal years. Consistent with previous years, the General apportionment category continues to represent the majority of expenditures for college technology dollars, with TTIP funds on the decline.
Chart 3, below, details the expenditure trends over previous six fiscal years. TTIP allocations are shown by category.

CENIC expenses for 2004-05 decreased due to more favorably renegotiated bandwidth usage rates, which have remained fairly steady through 2008-09. CENIC’s 2008-09 growth is due to increased bandwidth for some colleges, who were maxed out. TTIP allocations for Library Automation remained consistent over previous years. Technology training has not been funded for several years, reflects little to no annual spending and therefore has been removed from the chart.
Emerging Concepts

In the spirit of continuous improvement, the Chancellor’s Office Telecommunications, Technology and Infrastructure Program is looking to the following areas where technology could enhance the educational experience and generate efficiencies. Each area is defined and highlighted below:

**Service-Oriented Architecture**: one access portal that allows users to log in to a single system and access the multiple electronic student services tools provided by the California Community Colleges. The service-oriented architecture model allows for seamless integration into local systems to improve the user’s experience, and addresses the critical information systems security by controlling user access through a single entry point.

**Centralized Testing and Assessment**: a centralized assessment test delivery system and data warehouse for the California Community Colleges. Centrally selected assessment instruments will be delivered via the Internet and test scores, along with additional assessment data, will be stored in the data warehouse. It allows for a reduction in testing instrument, costs and improves test portability.

**Digital Textbooks**: facilitates lower cost of electronic textbooks by seamlessly integrating the student and course management systems with online catalogs. Electronic textbooks may be purchased at the time of course registration and directly linked to a student’s course(s).

**21st Century Skills and Digital Literacy**: to enhance transfer, workforce success and improve student access to programs and services, the 21st century skills task force will evaluate and develop digital competencies and needed skills in California.
Conclusion

Using technology continues to change the way educational institutions run their business and educate their students. The Telecommunications, Technology and Infrastructure Program brought high-speed broadband to the California Community Colleges and the program continues to challenge the status quo through innovative solutions.

The partnership with CENIC provides high-bandwidth connectivity and enabled the system to negotiate an annual savings of up to 2.2 million dollars through the California Teleconnect Fund Program. During the economic downturn, this savings allowed other critical initiatives to continue supporting the California community colleges and the extended educational community.

Initiatives under the TTIP umbrella support the colleges through a wide range of complementary technologies and functions:

- Transcripts, college applications and curriculum data are sent electronically.
- Ideas are shared in virtual meetings.
- Low-cost technology trainings are available for staff development.
- Multi-media solutions and educational materials are available for all the community colleges.
- Intersegmental collaboration facilitates ideas for expanded services.

The year 2010 marks the end of the Tech III Plan which drove the efforts of the Telecommunications and Technology and Infrastructure Program. It will also mark the creation of the Tech IV Plan. Tech IV will continue the philosophy of continuous improvement to increase efficiencies, reduce costs and support the educational communities of the future.
Acknowledgements

Chancellor Jack Scott would like to acknowledge and thank those individuals who have made significant contributions to this report. The Telecommunications, Technology and Infrastructure Program report was made possible through the efforts of the following individuals and their teams.

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