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Editorial

The tyranny of technology

Donald G. Perrin

The filmstrip projector and gramophone were educational innovations in the first quarter of the 20th century. Sixteen millimeter motion picture projectors were invented in the mid 1920's, but little used until after World War II. Parent-teacher groups (PTAs) raised money to hasten their introduction and groups such as Educational Britannica and Coronet made educational films. Projection and listening devices enabled participation of groups, even large numbers of students in classrooms and auditoriums. They were essentially one-way communication devices regarded as teaching aids – a luxury for teaching and easy to eliminate when budgets were cut.

The language laboratory was the first technology for individual student use. In foreign language teaching, students could record their reading out loud, compare it with a native speaker, and through practice, master speaking the language. School administrators manipulated their budgets to get a language lab for their schools, but the technology failed them. The teachers needed training; there were few prepared materials so teachers had to make their own. By the time they got it all working, the equipment broke down and there was no budget for maintenance.

People understood that a car needs fuel, roads, driver training, a license, and maintenance, but for education this was a new experience – the tyranny of technology. Any improvement in education that requires equipment and materials and maintenance and training places stress on educational budgets designed to minimally support teachers, administrators and school buildings.

Sputnik was a disruptive technology that changed the course of U.S. education in the 1960s. Sputnik made it apparent that our educational systems were lacking, especially in science and engineering. The National Defense and Education Act provided money for research, new curricula, and educational technologies. The new science curricula required new equipment for teaching. New educational technologies were developed were individualized and interactive, such as teaching machines, programmed learning, and later, computers. That also meant that multiple units were required, enough to teach at least one class at a time.

As federal funds disappeared, school budgets were not sufficient to maintain innovations, and teachers went back to the old way of doing things. It was not until the advent of the computer and the Internet that substantial funding was once again available for an initial period. Unfortunately, much of that original purchase became obsolete with no mechanism in most school budgets for replacement.

Today, (according to Wikipedia) n*ew media refers to content available on-demand through the Internet, accessible on any digital device, usually containing interactive user feedback and creative participation. Common examples of* new media *include websites such as online newspapers, blogs, wikis, video games, and social* media.

The tyranny of technology is that it requires resources for training, equipment, materials, and maintenance. Political intervention was used to fund bussing and testing programs. There is no movement toward adequate funding for schools, and particularly for instructional technologies.

Perhaps the only hope for the future is that every student will own a digital device that can be used for education.

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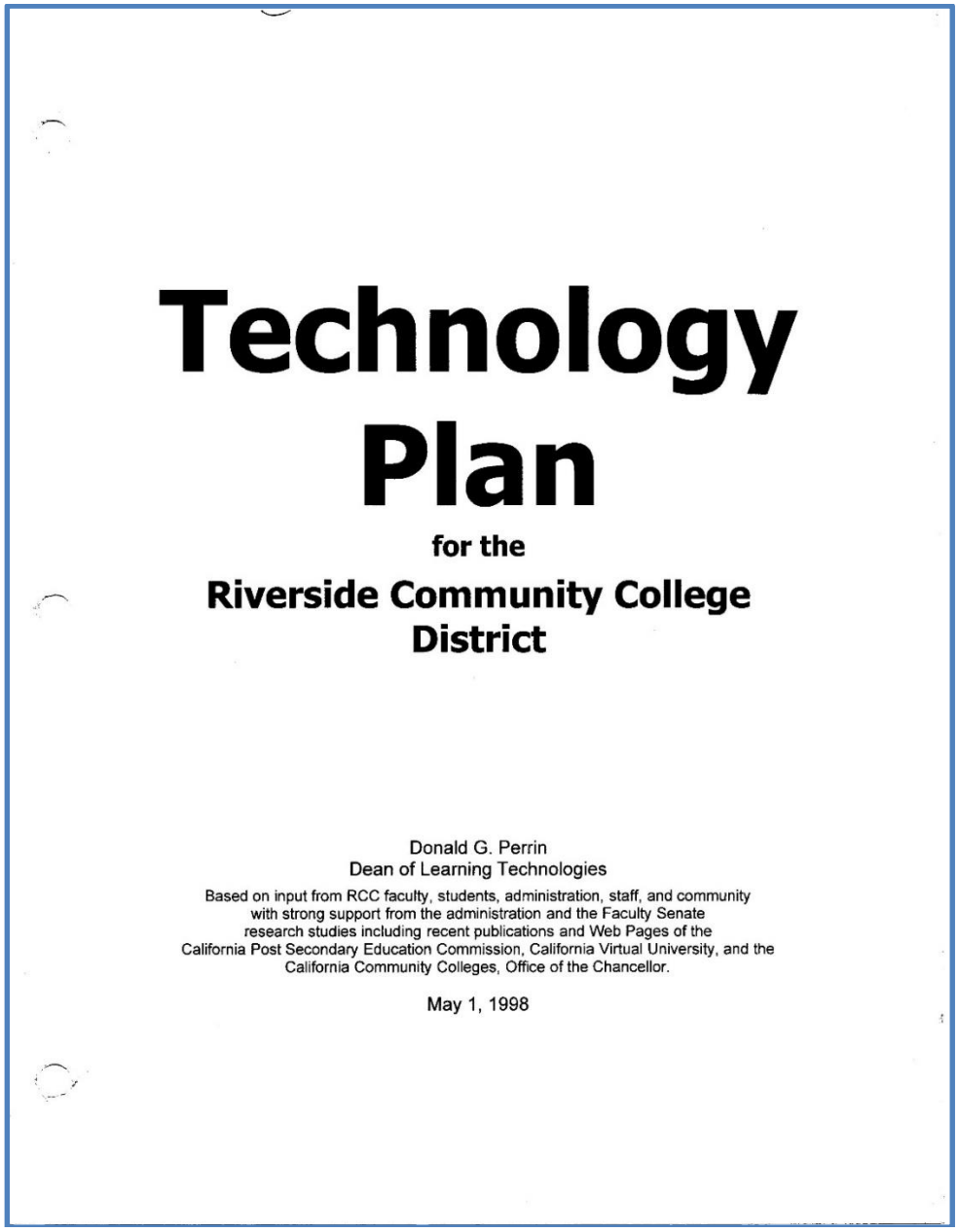
Technology Plan

Editor's Note: In March 1997 I resigned my position as Director of the Alquist Center for Innovative Learning at San Jose State University to become Dean of Learning Technologies for the Riverside Community College District, located 60 miles East of Los Angeles, California. My role was to develop and implement a comprehensive technology plan to support future growth of its three campuses and enhance employment opportunities for its students. This required a needs assessment, training for faculty, setting up computer laboratories, classrooms, and networks, and a plan for future growth.

By May of 1968 the needs assessment was completed, faculty training was underway, and the computer labs and classrooms were operation on all three campuses. Much of the plan continues to be relevant for institutions setting up comprehensive technology support, especially in developing countries. For this reason, I am publishing it here. Since most of the references are working documents not available on the web. Rather than adding hundreds of pages of documents, they are included as links to appendixes.



Technology Plan

for the

Riverside Community College District

Donald G. Perrin
Dean of Learning Technologies

Based on input from RCC faculty, students, administration, staff, and community with strong support from the administration and the Faculty Senate
research studies including recent publications and Web Pages of the California Post Secondary Education Commission, California Virtual University, and the California Community Colleges, Office of the Chancellor.

May 1, 1998

Preface

Technology Plan
for the Riverside Community College District

Images of the Future – a 1997 view

Image yourself in the year 2001. Then look back to the nineteen nineties. You see a period of economic uncertainty followed by sweeping changes. It is so different now. Look with pride at the role education has played in building Greater Riverside into a prosperous community.

You stand at the entrance to the City Campus in front of the new library— learning-resources building. To your left is a parking lot with an umbrella of trees. As students stream onto the campus, move with them as they file into classrooms, laboratories, the library and learning resource areas, and the technology building . . .

The *technology building* occupies space that was once the library. On the second level there are television studio-classrooms. TV classes are transmitted via cable and microwave to unserved and under-served segments of the community. Two-way television connects the Norco and Moreno Valley campuses to share small enrollment classes as well as popular instructors and courses. A farm of satellite antennas on the roof receive classes from across the hemisphere to expand RCC's curriculum offerings.

In another part of the technology building, faculty develop multimedia courses for Internet II and the World Wide Web. Powerful networks connect RCC campuses to each other and to the Internet. RCC lessons and resources are accessed in schools, businesses, homes and communities across California and around the world.

The third floor of the technology building is a 24-hour computer lab. At one end are classrooms for instructor-led learning. When classes are not in session, these rooms are open to extend the capacity of the lab. Lab-aides and instructors move throughout the lab quietly assisting students. Others instructors support students from their offices via computer-telephone.

The first floor of the Technology building houses file servers, video servers, and technical support. The *Media Center* has been integrated with *Academic Computing.* The familiar equipment carts have disappeared and *Electronic Classrooms* facilitate teaching with computers, television and audiovisual media. Some faculty develop classes on computers in their offices; others prefer the well-equipped Teaching-Learning Center where they receive production assistance and training.

The Library-Learning Resources Center (LLRC) is a hybrid of books and computers. Its electronic information systems, computer commons, multimedia collections, and teleconferencing rooms are linked to quality resources measured in LCs (1 LC = total information resources of the Library of Congress. Everything is state-of-the-art. Even the small group study rooms have computer and television access.

RCCD now provides unparalleled service to the Riverside community. *Passport to College* has become a national program creating a tidal wave of enthusiasm for learning among parents and students. Alternative learning options attract students with a diversity of learning styles. Partnerships with business and industry provide students with internships, work experience, and an easy transition to their chosen careers.

Technology Plan
for the Riverside Community College District

Abstract

The Technology Plan will provide RCCD faculty and students with *Information Age tools* to enrich teaching and learning and to improve employment prospects for graduates. It enables access to computers and the Internet on-campus and throughout the community; it ensures rich and relevant learning experiences to support a diversity of learning styles and cultural backgrounds; it provides training and technical support so that technology is available, reliable and facilitative of the teaching-learning process.

This plan is for the period 1998-2003. Phases One began in the Spring of 1997. Because of dynamically changing technology and uncertain funding, this plan is a work-in-progress that will be continually updated.

Phase I of the *Technology Plan* is a *needs assessment* based on data from faculty, students, administrators, community, professional associations, technology providers, and government. Planning began with appointment of the Dean of Learning Technologies in March of 1997.

Phase II of the *Technology Plan* is installation of computer labs, training and curriculum integration. Equipment was installed in the new open labs and classrooms at Norco and Moreno Valley beginning in August 1997. In all, 60 new computers were added to the Information and Systems Technology Lab on the City Campus. Norco and Moreno Valley used Secondary Effects funds; City campus used Block Grant funding.

Phase III builds infrastructure and support staff. A broadband network was designed for installation on the fiber optic backbone. In Fall 1997, ATM networks were installed at Norco and Moreno Valley using Secondary Effects funds. Funds are being sought to install a similar network on the City Campus in Summer or Fall of 1998.

Technicians with skills in hardware, software, programming and networks are being recruited to build and maintain functionality of computer labs and classrooms. A faculty-trainer is being sought for the Teaching Learning Center.

Phase IV strengthens support for students and instructors, optimizes services, and contains cost. Proposals are being written to augment funding for online courses and telecourses for distance learning.

Information technology has a high priority in local, state and national education programs. Successful implementation of the RCC Technology Plan will enrich teaching and learning and enable RCC graduates to compete successfully in the global marketplace.

Introduction

The **Technology Plan** is designed to support the mission and goals of the California Community Colleges and the Riverside Community College District. The plan advocates technology to resolve problems of access, scheduling, and communication. It integrates technology with best practices in teaching and learning to provide students with knowledge, experience, and the critical thinking skills necessary for productive employment.

The Mission of the California Community Colleges focuses on *advancement of California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement (Appendix A).*

The Riverside Community College District mission statement emphasizes *intellectual and cultural awareness, critical and independent thought, and self-reliance (Appendix B).* The RCCD Goal Statement focuses on specific local needs and concerns — *student retention and success, institutional accountability, information technologies, economic and community services, relevance of programs,* and *increasing the college going rate (Appendix C*).

Information technology plays a dual role.

- Computer and Internet skills are necessary for RCC graduates to be competitive in today's job market.
- Information technology is a facilitator of learning that can significantly accelerate achievement of RCCD's mission and goals.

The Technology Plan is intended to:

- Focus major issues about adoption, implementation, and evaluation of teaching and learning technologies for deliberation by RCC administration, faculty, staff, students, and the community at large.
- Provide policy guidance, a design model, an implementation plan, and a budget plan.
- Anticipate and plan for teaching and learning needs of faculty and students in a wide variety of disciplines.
- Ascertain cost and cost-benefits of current and emerging technologies.
- Explore options that can result in higher quality of service and substantial long-term cost savings.

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Chapter 1

The Rationale

The purpose of the Technology Plan is to promote orderly growth and successful integration of technology into teaching and learning throughout the Riverside Community College District. Today, communication technologies are the focus of activity in commerce, government and education. It is imperative for RCCD graduates to be computer literate to meet demands of their chosen vocations and professions in the information age.

Computer literate means to be **skilled in the use of computers for research, data acquisition, data entry, and writing reports.** In technical terms this requires ***ability to use a computer, network, printer and scanner.***

Computer literacy requires:

> ***Basic knowledge of hardware, operating systems and software***
>
> ***Ability to copy and back-up files, do simple troubleshooting when problems occur, and determine what hardware, software and networks their job requires.***
>
> ***Specific knowledge, skills and experience with programs such as Microsoft Office 97 with its word processing, presentation, spreadsheet, database and scheduling programs.***
>
> ***Expertise in using Internet browsers such as Netscape and Microsoft Explorer.***
>
> ***Skill to efficiently search the Internet for specific data and resources and extract the most relevant information.***

Many public and private K-12 schools are beginning to implement computer literacy programs. Some students have access to computers at home; some have their own personal computer PC). The reality in 1998 is that the majority of RCCD students are not computer literate so that computer training must be designed to serve a spectrum of users from novice to expert.

The Planning Group for the *California Virtual University* graphically describes the transitions we are facing as we move into the Information Age:

> First, the national economy is closely tied to advances in information technology and telecommunications. As the Golden State takes a central role in the Information Age, our companies and industries increasingly depend upon employees with high levels of training and educational attainment.

In 1960, only 41.1% of the nation's population had completed high school, and only 7.7% had a similar amount of college. By 1992, 79.4% had completed high school and 21.4% had completed college. Individuals without some college education will be unable to compete with their better-educated peers and will fall further and further behind on a variety of economic indices. Further, the existing gap in wages between high school graduates and college graduates will increase dramatically as we enter the 21st century.[2] Nationally, there has been a significant decrease in unskilled jobs that might be offered to individuals with only a high school education.[3] In essence, Californians of the 21st century will need to be well educated to succeed financially.

A second trend is a corollary of the first and reflects the rapid changes in a "knowledge society" that depends on and benefits from technological development. Adults in the workforce are finding it increasingly necessary to upgrade their educational skills in order to advance in their careers. They are also changing jobs and careers with surprising frequency.[4] In many cases, the success of a planned job or career change depends on the availability of additional educational opportunities, either in a degree program, in a continuing education certificate program, or in specific courses.

And demand for education among adults is not limited to skill development and job training, but includes a range of civic and personal subjects — from history and political science to music appreciation and parenting. The combined effects of these two trends, one affecting the college-age student and the other affecting the working adult, can be expected to expand sharply the demand for services from California's institutions of higher learning.[5]

Initial needs assessment and priorities for RCCD

When the Dean of Learning Technologies was appointed in March 1997, he conducted an initial assessment and set priorities for tasks to be accomplished. Construction was underway on large open labs for Norco and Moreno Valley and bid specifications were needed to purchase equipment for installation prior to the Fall 1997 Semester. That meant setting up an initial standard for computers, printers, servers and networks. (*Appendix D*).

An assessment was made of existing computer, television and audiovisual equipment and the way in which they are used by faculty and students. Substantial funding for technology was expected in the 1997-98 academic year, so it was important to set up initial priorities for use of those funds. There was broad consensus that development of computer labs should take precedence over upgrades for television and audiovisual technologies (*Appendix E*). There was concern that City Campus did not have enough state-or-the-art equipment to teach Office 97. This problem was corrected prior to the Fall Semester.

Next Steps

Attention was focused on preparation of a Preliminary Technology Plan for presentation at the President's Retreat on July 31, 1997. This required in-depth understanding of RCC's needs and the RCCD culture.

Some students learn their computer skills in English and Writing Labs and in computer labs for Information Systems and Technologies (Business Education and Computer Information Systems). There is no organized attempt to determine computer literacy of incoming students or to ensure that students learn computer skills prior to graduation.

The collective participation of faculty, staff, administration and counselors is needed to affect this change. Assessment of computer skills as part of the admissions process would facilitate early intervention so that students exceed a threshold or minimum skill level and benefit from technology throughout their program of study. To achieve this requires courses, instructors, state-of-the-art computer labs, networks, file-servers, and Internet access to support the student population. Initial barriers were lack of computer labs, computer literate faculty, academic networks, and internet connections

The first priority is labs for students. However, without computers and training for faculty these labs cannot be fully utilized.

Faculty must learn basic applications such as word processing and email. They must learn how to use these tools to facilitate teaching and learning. Faculty must become expert in applications such as Word and Excel, choose off-the-shelf learning-ware (interactive courses delivered online or on multimedia CD-ROMs), and learn how to prepare online lessons for the World Wide Web. Off-the-shelf and instructor-prepared materials can be combined to accommodate a variety of student needs, goals, competencies and learning styles.

Preliminary Technology Plan

A Preliminary Technology Plan was presented by the *Dean of Learning Technologies* at the President's Retreat on July 31, 1997 (*Appendix F*). Its purpose was to focus major issues for deliberation by administration, faculty, staff, students, and the community at-large. The plan

initiated a dialog that continues to guide planning and implementation. It proposed an initial emphasis on large open labs for students, a lab for faculty training and production, and future-oriented standards for computers, networks, servers, operating systems and software. It explored the possibility of distance learning to extend college access throughout the Greater Riverside Community. It made ten recommendations to stimulate a dialog on projected changes. The recommendations related to policies, procedures and priorities, hardware and software standards, development and operation of computer laboratories, faculty training, television outreach, and distance learning.

Faculty input

Presentations on the emerging Technology Plan were made to chairs and faculty at retreats, department meetings, and the Academic Senate (*Appendix G*). The Dean met on several occasions with the ***Faculty Senate Committee on Computer Technology and Equity*** and with the Faculty President. The Committee prepared a survey to determine the technology needs of faculty, perspectives on technology-based learning, levels of experience, requests for training, and intention to use computer technologies for teaching and learning. The survey was administered to the total faculty.

More than half of full-time faculty and about twenty percent of adjunct-faculty responded from the three RCCD campuses. Responses supported the need for computers in instruction. Faculty emphasized their need for access to computers, training, mentoring and support to develop interactive lessons using computers, multimedia, and the Internet. They requested computers in faculty offices and faculty work-areas, reported their current level of experience on a specific list of hardware, software and authoring skills, and listed skills they would like to acquire. (*Appendix H*)

Administrator input

The Technology Plan was presented to the President's Retreat, the Budget Bunch, and the Cabinet (*Appendix I*). From an administrative point of view, there were five reoccurring concerns:

1. What does technology do to improve teaching and learning?
2. What does technology do for recruitment, retention, transfer, and future employment?
3. What does technology cost? How will it be implemented? What funding is available?
4. What happens if we fail?
5. What must RCC do to ensure success?

Detailed answers are provided below for each of these questions:

1. What does this technology do to improve teaching and learning?

Discipline requirements. Computer skills are integral to many disciplines: Applied Technology, Business, Computer Science, Engineering, Graphic Arts, Information Systems, Journalism, Manufacturing, Nursing, and Science. It enriches courses in Writing, verbal and visual communication, performance and information based technologies such as Broadcasting, English, Criminal Justice, Foreign Language, Music, Political Science, Theatre, and Television Production. It is vital to disciplines dependent on numbers and graphical representations such as Accounting, Economics, Engineering, Geography, Mathematics, and Political Science. The above represent more than 90% of Community College curriculum. Disciplines least dependent on computers (at this time) are Athletics, Auto Shop, Cosmetology, History and Philosophy. As a minimum, these disciplines require ability to do research on the World Wide Web and use word processing to write reports and class papers.

What the Research Says. Research demonstrates media and distance learning to be equal to or better than traditional methods.[6] The next section explores logistics and other benefits that are powerful reasons for adopting information technologies and distance learning.

2. What does this do for student recruitment, retention, transfer, and future employment?

Access and flexibility are a driving force to support student recruitment, retention, transfer, and future employment. Technology can provide access to unserved and underserved students by reducing barriers of time, distance, and inflexible schedules. Just as short courses and weekend courses have caused an explosion of enrollments on RCC campuses, online courses will attract a significant number of students who otherwise could-not or would-not attend College. It also gives program flexibility to on-campus students.

A recent study at the University of Colorado found that its regular student body combined on-campus and online courses to overcome problems in scheduling and reduce the time to graduation

Colleges can also use distance learning to expand on- and off-campus course offerings, provide alternative teachers for students with different learning styles and take care overflow enrollments.

Recruitment: An increasing number of entering students learned to use computers in school, at home, or at work. They will tend to select colleges with expert faculty, state-of-the-art computer labs, and opportunity to develop their computer skills.

Retention: Computer excellence will positively impact retention. Inadequate computer resources could be a significant reason for abandoning a college course or program and/or moving to another education provider. This is especially true of students who enroll in computer related disciplines.

Transfer: Transfer students are more academically oriented. In addition to the requirements of their discipline, they need better research tools including electronic libraries and better report writing and presentation tools. The school systems and universities surrounding RCC have, or are in the process of developing, excellent computer labs and information technology services.

Future Employment: As we move into the information age, computers are becoming integral to almost every part of the economy. There are few jobs, even at the basic wage level, that do not require some level of computer skill. Such skill is increasingly important for upward mobility in vocations, careers and professions and will undoubtedly be more important in the future.

3. What does it cost? How will it be implemented? What funding is available?

What does it cost? Computer technology requires a level of budget that is without precedent for education providers. For this reason, State and Federal governments are currently providing substantial support.

How will it be implemented? The Dean of Learning Technologies has four departments — Academic Computing, the Teaching-Learning Center, Distance Learning, and the Instructional Media Center. He will collaborate closely with teaching departments and faculty to provide the necessary level of support.

What Funding is available? State and Federal governments are providing special budgets, incentives, and support systems for computers and distance learning. This

includes new infrastructure, faculty training, and positions for technical support, lab assistants, and faculty training. The faculty computer training and production lab on the City campus was opened in March 1998 (*Appendix J*).

Careful planning and coordination is essential to optimize use of the new resources. A well-articulated plan will benefit both college and community as we progress into the new millennium.

4. What if we fail?

It is clear that some institutions will lead and others will be laggards in adoption of information technology. It is essential that RCC provide its students with information technology skills equal to or better than those provided by other California colleges and universities. Economic development of the Greater Riverside Area requires a technology literate workforce and RCC is positioned to be a key player in this scenario.

Failure may be represented by unfavorable feedback from students, by unfavorable feedback from employers, by RCC graduates not being employed, not being retained after employment, and/or by loss of enrollments at RCC. Clearly, RCC will want to benchmark its graduates against the ***best*** colleges in the region and in the State of California.

Success will be measured by:

- Favorable feedback from students
- Favorable feedback from employers
- RCC graduates receiving preference in employment
- RCC graduates receiving rapid promotions
- Increase in RCC's enrollment based on success in placement

Assuming that technology will expand access to new student populations, another measure of success is participation of previously unserved and underserved segments of the population.

5. What must RCC do to ensure success?

First, we must be aware of community and statewide needs and trends in order to be proactive. We train and educate for jobs that are only now being created. The California Postsecondary Education Commission (CPEC) is studying the implications for colleges and universities:

> *In many respects, the technological society of the future is already upon us. California's global economy is increasingly becoming knowledge-based, where all workers in every sector are expected to possess the technical and analytical capacity to reason, make informed judgments, and solve problems of varying complexity. The manner in which workers collaborate and communicate is becoming richer and less tied to location and occupational rank. In response to changing work force needs, and in order to expand access and learning, higher education institutions are beginning to consider a fundamental restructuring of the ways in which they provide instruction, research, and public service.*[8]

State and Federal resources are providing an infusion of technology into all levels of education. Technology components developed for on-campus learning may support distance learning and *vice versa.* Private, corporate, online and virtual colleges and universities are flourishing because they provide easy access, flexible schedules, and support for the non-traditional learner. They already offer short courses, Weekend College and online learning. RCC is following this same strategy with positive results.

In March 1998, the Board of Governors of the California Community Colleges scheduled a public hearing on Title 5 regulations for distance education (Appendix K).

The new information economy

The California Postsecondary Education Commission (CPEC) interprets the changes taking place as a paradigm shift from an industrial economy to an information economy:

> *If the Information Age is the name most often given to the social and economic organism that is to replace the Industrial Age, then the computerized network will represent its central nervous system. The Internet and hundreds of other networks are changing the way people perceive reality, just as the assembly line and bureaucratic organizations changed the way people behaved and lived during the Industrial Age that is now winding down. Dolence and Norris believe that almost every aspect of life, including education, will be changed by this one fact, and they constructed a matrix to illustrate it, which is shown below.*

The matrix suggests a change in the way we do business, with new criteria for success. This should be reflected in our curriculum, the way students learn, and in evaluation methods and criteria. This is not a simple change. Colleges that can negotiate this transition successfully will have the advantage as we enter the new millennium.

Differences between Industrial Age and Information Age

	Industrial Age	Information Age
Nature of Jobs	Tightly defined positions within an organization	Knowledge workers who are mobile
Nature of Organization	Rigid, formula-driven	Fast, fluid, flexible
Source of Organizational Value	Physical assets	Intellectual assets, group-centered knowledge
Pattern of Learning	Time out for training	Fusion of work and learning
Competitive Advantage for Education	Virtually exclusive teaching franchise. Clustering of instructional resources is a major competitive advantage	Network scholarship the measurement of competence; certification of outcomes establish competitive advantage
Defining Educational Roles	Provider	Facilitator, knowledge navigator, and learner/ service intermediary

Source: Dolence and Norris, 1995. (9)

Dolence and Norris provide a matrix to highlight the changing metaphors for the information age that affect education.

> *Immediately obvious from this array is that the new paradigm is not just about technology, but about structural reform; it is equally clear, however, that those reforms cannot succeed without technology. Current technology systems in higher education are totally inadequate for the needs of knowledge navigating learners in the Information Age. . . by tomorrow's standards, today's academic and administrative software, enabling systems software, and learning ware are inadequate both in concept and implementation.*

Technology will improve efficiency and performance, but initially the price will be higher.

Changing metaphors for learning organizations

Industrial Age Classrooms, libraries, and laboratories	Information Age Networks
Teaching	Learning
Seat time-based education	Achievement-based learning
Classroom-centered instruction	Network learning
Information acquisition	Knowledge navigation
Distance education	Distance-free learning
Continuing education	Perpetual learning
Time out for learning	Fusion of learning and work
Separation of learners and learning systems	Integration of learning systems

Source: Dolence and Norris,

> *. . . technology will not be a short-run solution to the dilemma of limited resources and strong enrollment pressures, but also that the advent of technology may actually increase costs throughout education before any savings can be realized. To be sure, many see electronic networks as a way to deliver education far more massively than in the past, but for that to occur, the networks themselves will have to become far more ubiquitous than they are at the present time. Education remains very far from the day when everyone will have the potential to be connected to nearly universal educational opportunities at a reasonable cost, even though almost all forecasters believe that ubiquitous networking is inevitable. For that to occur, however, there will have to be major infrastructure expenditures to expand telecommunications capacity, or bandwidth as it is now commonly called.*[8]

If cost-saving is not realized by the paradigm shift to information technology, then access, relevance, quality of instruction, effectiveness of learning, time to learn, retention, and employment of graduates become the criteria for program evaluation. Partnerships between RCC, business and community will ensure quality and relevance as we move into the information age.

Drucker's *Theory of the Business*[10] rates success of an institution by its ability to match institutional mission and resources to the needs of its environment. Assuming that enrollment is linked to the relevance and accessibility of courses and programs, the explosive growth in enrollment from RCC short-courses and weekend programs is a response to a previously unserved need. Specifically, it opens up college programs to commuters who would like to attend but cannot attend during the week. Online courses and telecourses can similarly extend community access through learning at a distance and flexible time-frames.

Definitions:

For the purposes of the *Technology Plan,* technology is defined as information technology — technology that is used in support of one-way and two-way instructional communications, teaching and learning. This includes:

> **Audiovisual** technologies such as film, slides, audio and video using traditional audiovisual projectors, players, and television equipment

Broadcast (analog) technologies such as radio, television broadcast via satellites, earth stations, cable and fiber. It includes telecourses, teleconferences and interactive (two-way) television and electronic libraries

Computers and related digital technologies involving hardware and software:

Computers, printers, scanners, computer networks and related equipment

Computer operating systems, programming languages, authoring systems, software, learning ware and applications for word processing, desktop publishing, graphics, slide presentations, animation, digital audio and video editing, interactive multimedia, web page browsers, web pages, email, listservs, and other programs for creation, storage and manipulation of data, page/screen layout and display

Distance learning involving electronic communications for print, graphics, one- and two-way audio and/or video, interactive multimedia, and networked media communications.

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Chapter 2

Needs assessment

This chapter reviews RCCs current technology resources as a baseline for future planning. It describes technology functions and identifies needs and possible organizational changes for the future. It sets goals and schedule for introduction of new technologies. It will be a phased development that rolls forward as each phase is completed. Levels, time frames and priorities will be adjusted as required.

Overview of technology by district and campus

Instructional Media Center (IMC) provides classroom support with projectors, sound and video playback, public address systems, production of audiovisual materials for instruction, a learning resources center, and technical support for campus events. Until recently, **audiovisual** and **television** were the principal communication technologies for instruction in the Riverside Community College District.

Television via videotape is used in classroom instruction. Each campus has a satellite downlink connected to a few classrooms and an interactive television system that works on digital telephone lines. There are no campus cable systems.

Computer laboratories have been developed to support interactive learning in applied technology, art, engineering, english, computer and information technologies, music, science, social science, and writing. Computers are now integral to teaching and learning in almost every area of the curriculum. The marriage of computers with telecommunications has created networks. The Internet, a global network of networks, has caused the computer to take center stage as an emerging educational technology.

Distance learning currently uses cable television to distribute tape-recorded television lessons via local cable and wireless-cable. Over 1,000 students enroll each semester in approximately 22 courses. Broadcast lessons are complemented by 15 hours of on-campus instruction. The new infrastructure for computers will facilitate development of online courses and programs for distance learning.

Current technology services and identified needs

This section will deal with technologies under the organizational units that manage them and in some instances propose alternative organizational structures.

Instructional Media Center (IMC)

The IMC is responsible for the following functions:

1. Acquire, manage, setup, operate and maintain audiovisual equipment and systems for use in classrooms, laboratories and auditoriums.
2. Provide media, equipment and operator support for classes, meetings and special events in classrooms, meeting rooms, auditoriums and stadiums.
3. Set up and operate public address systems, audio and video recording; schedule, downlink, record and distribute satellite videoconferences and lessons to classrooms/conference rooms; schedule, setup and operate two-way interactive video between campuses and with external organizations.
4. Maintain equipment.
5. Design, install, support and maintain specialized classrooms for television viewing and display of computer and Internet presentations

6. Produce media — design, produce and duplicate graphics, slides, overheads, audio, videos, and multimedia; produce video lessons in collaboration with faculty, record off-air programs; edit and/or copy audio and video-cassettes
7. Provide training sessions for faculty in classroom use of media and media production. Provide a laboratory to enable faculty to produce their own instructional materials using audiovisual and computer-based materials.
8. Manage the Learning Resources Center — provide media and equipment support for students to view and listen to prerecorded materials
9. Operate video library — select, acquire, catalog, store, loan, and maintain videocassette titles. Note: Discussion is underway with the Librarian to transfer functions 8), 9) and to the proposed Library-Learning Resources Center in 2001.

Positions to support technology-based learning

The IMC has six positions on City Campus — 1.0 manager, 2.0 technicians, 2.0 assistants, and 1.0 clerical. The IMC is open from 7:30 am to 9:30 pm Mondays through Fridays. Moreno Valley has one full time technician; Norco has two classified hourly positions. The majority of classroom support is provided by student assistants and classified hourly personnel.

The IMC supports classroom instruction with equipment such as television receiver/monitors and overhead projectors, slide projectors, audiocassette and videocassette players, videodisc players, CD players, public address systems, and other AV equipment items as needed. TV, VCR and overhead projectors are permanently installed in some classrooms. The instructor must initiate the request for media, equipment, and operator assistance.

With the exception of the newly purchased interactive video system, the equipment at the City Campus is quite old. Many projectors and television sets are more than l5 years old and breakdown of such equipment occurs with increasing frequency. In some instances parts are no longer available for repairs. Moreno Valley and Norco have more modern equipment.

The one media library is housed on the City Campus. It has approximately 6,000 videocassettes that include lesson materials previously supplied as 16mm films, slides and filmstrips. Videos are reserved by instructors for students to view in the Learning Resources Center. To receive credit (and funding), students must log in, view the assigned video, and log out.

The greatest immediate change in IMC function is installation of new television monitors, computer connections, computers and digital video projectors in classrooms. In the interim, carts with videocassette players, computers and digital video projectors can be checked out for classroom use. Services and equipment will be available on all three campuses.

Part of the IMC space on the City Campus is being shared with the new Teaching-Learning Center (faculty computer training and production lab) described later in this section.

At Moreno Valley the IMC houses the head end for cable television. This may be extended with additional educational channels and a public access channel. This Campus, in conjunction with the City of Moreno Valley, is seeking a grant from TCI Cablevision television for a television studio as part of the new Cable Franchise Agreement (Appendix L). The district is planning to contact local cable companies for cable head-ends on the City and Norco Campuses.

Identified needs:

1. **Video collection:** Weed the video library. Archive or eliminate titles that have not been used for three years. Convert catalog to MARC system and combine with library catalog. Set up an online ordering system for media, equipment, operators and technicians and specialized facilities. Set up video distribution between campuses via

the Intranet. Review the wisdom of transferring the video collection and distribution functions to the Library.

2. **Equipment:** Update inventory of heavily used equipment. Phase out old and unreliable equipment. Reduce portable equipment to minimum to reduce setup and service costs. Review the wisdom of simplifying the equipment inventory and assigning little used items to faculty and/or classrooms that still use them. Review the wisdom of supplying laptops for faculty use from the IMC and/or the Teaching-Learning Center.
3. **Classroom networks:** Install telephone, video (coaxial) cable, category 5 computer wire and fiber optic to selected classrooms and connect to campus hub. Connect satellite and cable systems to campus classrooms and the Intranet. Review the wisdom and cost of installing telecommunications in all classrooms, laboratories and conference rooms.
4. **Classroom equipment:** Install computer, digital projector, television, and overhead projector in selected classrooms. Install public address systems where needed. Have room scheduling assign these rooms to frequent users of technology. Design carts that are similarly equipped for use in traditional classrooms. Review the wisdom of taking (some) electronic classrooms from room scheduling and scheduling them from the IMC or *Distance Learning.*
5. **Two-way videoconferencing:** Review cost-savings of owning a video bridge for multi-campus connections. Review the wisdom of converting all videoconferencing and distribution equipment to MPEG II video standard. Review the wisdom of combining this function with *Distance Learning.*
6. **Cable head-end:** Review the wisdom of having a cable head-end on each campus, and whether or not public-access can effectively be handled by each campus. Review the wisdom of assigning head-end and public-access functions to *Distance Learning.*
7. **Professional production:** Graphic production capabilities of the IMC should be increased to support development of World Wide Web pages and Television Courses. Review the wisdom of combining the production functions of distance learning, telecommunications and graphics.
8. **Faculty production:** Review the wisdom of combining faculty AV production with the Teaching Learning Center.
9. **Space requirements:** Review the wisdom of a dedicated classroom for videoconferencing (remove from room scheduling); restoring the classroom to IMC so that the Teaching-Learning Center can occupy the space it now shares, and remodeling work areas to use space more efficiently.
10. **Personnel needs:** Initiate training and restructuring to efficiently provide a comprehensive and quality support to classrooms, laboratories, auditoriums, and special events in a variety of on- and off-campus settings. Review the wisdom of combining some of the user-support aspects of media services with academic computing (academic computing and media).

Distance learning

Distance learning serves the following functions:

1. Distribute RCC courses and programs, using a variety of technologies, to unserved and underserved segments of the Riverside population. This includes students who are *geographically* remote from the campus, those with *schedules* not compatible with class times, persons who are *physically* unable to attend for a variety of reasons, and

non-traditional learners whose learning styles are not well supported by traditional methods of teaching.

RCC currently offers up to 22 telecourses each semester via cable television. One 0.2 position is allocated to coordinate acquisition and scheduling of telecourses, faculty, classrooms and times for class meetings on-campus and at regional sites; preparation of data for the catalog and other forms of marketing; preparing reports; and resolving student and faculty problems.

Telecourses are prerecorded and distributed to cable companies or cable head-ends. Moreno Valley is a head-end for TCI Cable. The head-end for Cross Country Wireless Cable is at the University of California, Riverside. A head-end for Charter Communications was proposed for the City Campus in the recent Franchise negotiations with the City of Riverside. If Public Television broadcasts any of these courses, they are listed in the schedule provided to students. Each course is complemented by five three-hour sessions on-campus that include interactive, tutorial and testing components of the class. Two telecourses have been produced by RCC, Math 51 and PhysEd 22. A third course, Guidance 45, is currently in production.

Each Semester, approximately 1,200 students enroll in RCC telecourses, receiving the television segments in classrooms, industries, and homes. Television classes link people together according to a fixed schedule. Whenever possible, televised lessons are repeated throughout the day and week to support different learner schedules. Videotapes extend television courses to anywhere-anytime learning.

Television has the advantage of low cost distribution on broadcast and cable television channels. These courses can be viewed by the public at large as well as those who enroll for degree or certificate credit. The "drop in" audience is often larger than those who enroll. About 20% of students who enroll in telecourses become certificate and degree students. Thus, television provides a community service, extends college attendance, and recruits new students.

A broader definition of distance learning

Distance Learning is defined as learning that occurs when instructors and students are geographically separated. Instruction is accomplished using print, broadcast and cable video, videotapes, audiotapes, telephone, fax, computers, CD-ROM, email, listservs, and the Internet. It may be synchronous (students and instructors meet at a specified time as with a television class) or asynchronous (students set their own schedule to interact with lesson materials, the instructor and with other students using discussion boards, chat, forums and emails). Often these are combined, e.g. television for instruction with computer forums and email for interaction. In the future, television and online courses may be shared with collaborating institutions and consortia. Students can access distance learning courses on-campus, in the workplace, or at home.

Computer and internet courses at RCC

Community Services recently introduced online courses and RCC faculty are beginning to prepare online courses. There are three steps to a fully online course:

1. Most faculty start with a syllabus and handouts online. Class interaction is enhanced by email and chat rooms, discussion boards and forums on the Internet. Students may attach their class projects to email instead of presenting printed copies.
2. Parts of the curriculum are transformed into interactive learning experiences on the Internet. Links are provided to major resources for the course. Interaction via the Internet plays an increasing role in teaching and learning and takes a larger segment of instructor time.

3. Some courses may be suitable for development as stand-alone courses. Lessons are revised based on student performance data. Frequently Asked Questions (FAQs) are built into the online course and improved through developmental testing. As better presentation and interaction capabilities are built into the web lessons, the need for instructor intervention and interaction is reduced.

Other ways to use distance learning

Distance learning is a way to expand course offerings, support students with different learning styles, and to serve students who need entry to a course that did not make because of insufficient enrollment, or as an alternative to a course that is already closed. It is a way to extend RCC's facilities to the workplace and the home. It enables the College to share its best instructors with on-campus and off-campus populations.

By supplementing local curriculum with distance learning, even small and rural colleges can be full service institutions offering a complete range of courses to serve each student's needs. It is a logical means of offering college courses to high schools, and for colleges to receive courses and programs from universities.

Distance learning is projected to be a major area of future growth for postsecondary education. It may be the only practical way for many people to attend College because of their complex lifestyles and time and geographic barriers. Based on its ability to supply quality programs and services, Distance Learning is potentially the fastest growing segment of instruction at RCC.

The cost of telecommunications technology infrastructure needed to support distance learning is partially offset by substituting virtual classrooms for brick and mortar costs. The cost of courses licensed through consortia is based on the overall number of students enrolled in distance education courses. The cost of courses licensed from other sources includes a term license fee and a per-student enrollment fee.

Identified Needs:

1. **Needs Assessment and Planning:** Conduct surveys to assess the current and future need for distance learning in the greater riverside community. Determine the market for broadcast and cable courses and online courses. Review and update the current policies and procedures for distance learning for the RCCD. Coordinate with faculty and administration to develop a long-term plan for distance learning with a comprehensive set of policies and guidelines.
2. **Television Studio-Classrooms:** Construct and equip studio-classrooms to ***originate*** live television lessons and two-way (interactive) video lessons and teleconferences. Consider the wisdom of locating these classrooms adjacent to the Telecommunication department to involve the expertise of telecommunication's faculty and provide production experience for student interns. Also, the production studio(s) may be used for RCC to produce courses to be marketed or shared with collaborating colleges and consortia.
3. **Management of Two-Way Interactive Television.** Consider the wisdom of moving scheduling and support for both origination and receive aspects of interactive video from the IMC to Distance Learning.
4. **Television Viewing Classrooms:** Set up classrooms to ***receive*** satellite classes and teleconferences, broadcast and cable classes, and videos from the RCC video library. These rooms would have permanently installed monitors and/or projectors and telephones for scheduling and feedback. . Consider the wisdom of moving scheduling

of classrooms and satellite teleconferences, off-air recording and playback from IMC to distance learning.

5. **Television Network:** Design a network for central distribution of video lessons on each campus, between campuses, and to cable head-ends. Review the wisdom of having this function moved from IMC.
6. **Online Courses:** Determine the role of distance learning in developing and distributing online courses. Collaborate with faculty in selecting externally produced courses and in developing RCC courses for external distribution.
7. **Production:** Set up a professional production facility to produce, in conjunction with faculty, distributable online and television lessons and courses from prototype lessons produced by faculty.
8. **Personnel Needs:** One or more full-time persons are required on each RCC campus to develop a comprehensive set of distance learning programs and services linking RCC campuses with surrounding communities; train faculty to use the internet to augment interaction with and between students; train and support faculty to design and produce tele-lessons; 2-way interactive video; and online courses;
9. **Staffing:** Immediately increase staffing to 1.0 with classified hourly help to coordinate assessment and program development as outlined above. Prepare a Distance Learning Plan for the District and for each campus.

Computer labs and networks

Networked computers serve many functions for faculty and students including the following:

1. Learn how to use computers and networks
2. Learn how to use general purpose computer applications for word processing, spreadsheet, database, printed reports, graphics, visual displays, presentations, project organization, scheduling, and accessing information on the Internet.
3. Learn special purpose applications related to career or vocational needs.
4. Learn computer languages for creating programs, authoring multimedia; searching, organizing, and transforming data; artificial intelligence, and robotics.
5. Learn to design, create and format text, graphics, desktop publishing, animations, sounds, video, multimedia, interactive media, hypermedia, and web pages.
6. Create interactive multimedia for communication, teaching, learning, research and user interfaces for rapid storage and retrieval of information.

Computers are important to support individualized learning in every discipline. Online courses do not depend on the presence of a live teacher so that learning can occur anywhere and at any time (asynchronous learning). Feedback is achieved through telephone, email, chat and discussion boards.

Visual and interactive learning ware accommodate different learner preferences, pace and schedules. This moves control and responsibility for learning from the instructor to the student. It opens educational opportunities for care-givers, persons with disabilities, business people who travel, or others who cannot participate according to a predetermined schedule.

Academic Senate resolution

In 1996 the RCCD Academic Senate set up two goals for computer technology:

- Create open computer labs on each campus to provide students in all disciplines access to computer technology to complete academic assignments and projects.
- Acquire and implement state-of-the-art technology to support student access to computers with word processing and software, in-class computer demonstration equipment with digital projectors, and campus wide access to the Internet.

Computer labs are attached to teaching departments except for large general-purpose (open) labs recently installed at Moreno Valley and Norco as a result of Secondary Effects funding. On the City Campus the Information Systems and Technology lab on the first floor of the Business Education building is being extended to serve as a shared (open) lab.

Infrastructure and equipment — Fall 1997

There is a fiber backbone on each campus with shared-ethernet networks. With the exception of the English/Writing labs, the best equipped computer labs and teaching classrooms are at Norco and Moreno Valley. The City Campus has a computer inventory dating back to 1983 (286, 386, 486) and some older Macintosh computers. Shared Ethernet was replaced with 10/100 Switched Ethernet at Moreno Valley and Norco. Approximately 300 new computers were purchased for open labs and teaching classrooms at Norco and Moreno Valley. There were no construction related funds on the City Campus, so the differential was partially made up using Block Grant funds.

The table below shows the resulting number of computers for instructional use by Campus as of October 1997. After eliminating obsolete computers in the shaded columns, there are 740 computers to support more than 16,000 Full-time-Equivalent Students (FTES) on three campuses — a college ratio of one computer for every 23 FTES.

Computers and Computer to FTES ratios

Campus	Obsolete Macintosh	Macintosh	Obsolete 8088-486	Pentium	< 5 years old	Est. 1997-98	Ratio
City Campus	14	60	107	180	240	11000	1:50
Moreno Valley			38	242	242	2600	1:11
Norco	21		17	280	280	3000	1:11
Total	35	60	163	702	762	16,600	1:23

Computing this statistic separately for each campus gives a different picture. The computer to FTES ratio at Moreno Valley and Norco is of the order of 1:11 while on the City Campus it is about 1:50.

If labs are open for an average of 60 hours/week; that equates to a maximum of 14 minutes per course per week for students on the City Campus and one hour and ten minutes per course per week at Moreno Valley and Norco. In practice, how many computers are needed?

One way to determine the required number of computers is to total the number of computer laboratory hours for class and study needed to support each course.

Time should be allowed for novices to learn to use the computer and applications (gain computer literacy) and for students to do research on the Internet; participate in lessons

whether live, web, or interactive multimedia; complete class projects and assignments, and take tests. Data derived by this method tends to be as unreliable as estimating traffic on a highway that is not yet built.

Another approach is to benchmark equipment levels against organizations with comparable courses and programs. This produced the statistics shown below:

Computer:FTES ratios for selected schools and colleges

Institution	Number of Computers	FTES	Ratio
Ngee Ann Polytechnic-Singapore	5,000	12,000	1:2.4
California State University, San Bernadino	4,000	12,000	1:3
Goal for State of California K-12			***1:4***
Redlands East Valley High School	400	2,000	1:5
RCC Norco	280	3000	1:11
RCC Moreno Valley	240	2600	1:11
State of California K-12 — current ratio			1:14
RCC City Campus	220	11,000	1:50

For planning purposes, a goal of 1:4 was initially proposed for the RCCD, the ratio proposed for the State of California K-12. This would require 4,150 computers compared to the present inventory of 740, an increase of nearly five times. An Excel model was created to explore short term and long term costs.

Cost model for computer labs

The 1997 totals were entered for each campus. Growth formulas were based on the number of Full Time Equivalent Students (FTES) on each campus during 1997. For simplicity, the first iteration used the following assumptions:

1. All existing inventory is obsolete
2. Computer purchased should be state-of-the-art (Pentium II or above)
3. The useful life of computers is five years
4. Inventory will build for five years, and beyond this time
   20% of the inventory will be replaced each year
5. FTES is constant at 1997 levels
6. The desired computer to FTES ratio is 1:4.

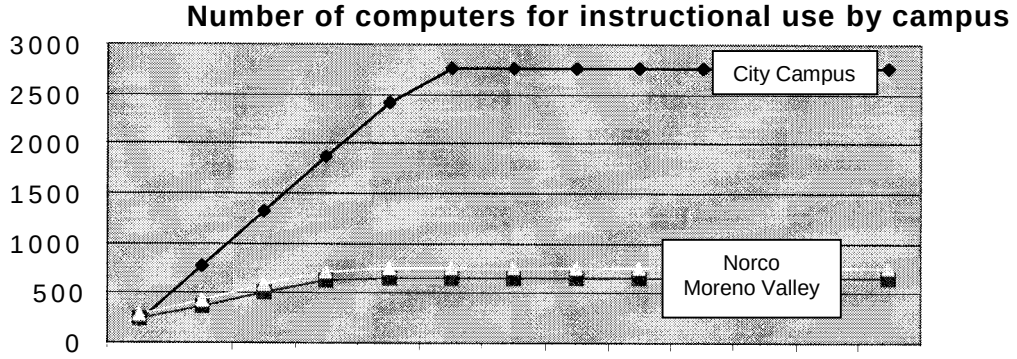
The spreadsheet was set up using formulas so that results for different ratios could be quickly displayed.

The result is shown below. A total of 830 computers will need to be purchased each year to achieve and maintain the 1:4 goal. The number required for City campus will be twice the number for Moreno Valley and Norco combined.

Number of Pentium Computers

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Annual Purchase
City Campus	220	770	1320	1870	2420	2750	2750	2750	2750	2750	2750	2750	2750	550
Moreno Valley	240	370	500	630	650	650	650	650	650	650	650	650	650	130
Norco	280	430	580	710	750	750	750	750	750	750	750	750	750	150
Total Inventory	**740**	**1570**	**2400**	**3210**	**3820**	**4150**	**4150**	**4150**	**4150**	**4150**	**4150**	**4150**	**4150**	**830**

The growth curve shows a steady increase until leveling occurs in year 5. Beyond this point 20% of the oldest computers would be replaced each year.



A standard configuration for student computers was set up in conjunction with faculty from *Computer and Information Systems and the Computer Technology and Equity Committee of the Faculty Senate. The Provosts* of the Norco and Moreno Valley campuses were involved in the process. All student computers will be Pentium II with MMX technology, minimum of 64K RAM and ZIP drive. The bid specification is described in *Appendix D*.

The price a 300Mhz computer workstation on January 2, 1998 was $3,106. By May 1 the price had fallen to $2,266. The price is entered as a variable at the top of the spreadsheet. The gray center-column is used to input other price data. The boldface numbers in the right-hand column are results based on an annual purchase of 830 computers. The bottom line is the total cost of ownership.

Many costs originally estimated were replaced with accurate data as it became available. For example, network, server and printer cost was estimated at $1,000. Initially, network cost was $900 per workstation, server was $500 per workstation, and printer was $200 per workstation. Total cost for network items totaled $1,600.

First Trial Spreadsheet — Total Installed Cost of Workstation

Purchase Price per Pentium computer	$3,106	Total annual cost for Pentiums	**$2,577,980**
Specialized computer equipment (Mac, Silicon Graphics, etc.) calculated at 5% number of Pentiums purchased and 10% of cost			**$257,798**
Network, server & printer cost per computer	1000	Total network/ servers/printers	**$830,000**
Electrical and computer wiring/fiber	100	Total electrical	**$83,000**
Software and licenses	500	Total software and licenses	**$415,000**
Internet Services	150	Total Internet services	**$124,500**
Faculty training & production lab	350	Total faculty training & production	**$319,550**
Furniture and installation	250	Total installed cost	**$207,500**
		Annual Total	**$4,815,328**

The required number of technicians and lab assistants was calculated based on the total workstation inventory each year. Assumptions for this spreadsheet were:

- One technician can support computer, server, networking, and printer hardware and software for 300 workstations
- Only 50% of the campus labs (the open labs) will have lab assistants
- Open labs will be open 80 hours per week for 50 weeks each year
- There will be one lab aide for every 50 workstations in open labs (this is less than the current operating ratio of one lab aide for 30 workstations)

Technicians and Lab Assistants

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Computer Inventory	740	1570	2400	3210	3820	4150	4150	4150	4150	4150	4150	4150	4150
Technical support based on one technician for 300 networked computers													
Technicians	2	5	8	11	13	14	14	14	14	14	14	14	14
Number of lab assistants to support 50% inventory based on one lab aide for 50 computers. Computer labs will be open 80 hours each week for 50 weeks.													
Lab assistants	30	63	128	153	166	166	166	166	166	166	166	166	166

The next step was to reduce the bottom line to an acceptable cost while optimizing *Return on Investment.*

Optimizing Cost and Function

The first item challenged was the district wide 1:4 Computer:FTES ratio. Would on-campus utilization be that high? How much computer time would actually be used? How many students would use computers at work? At home? Laptops?

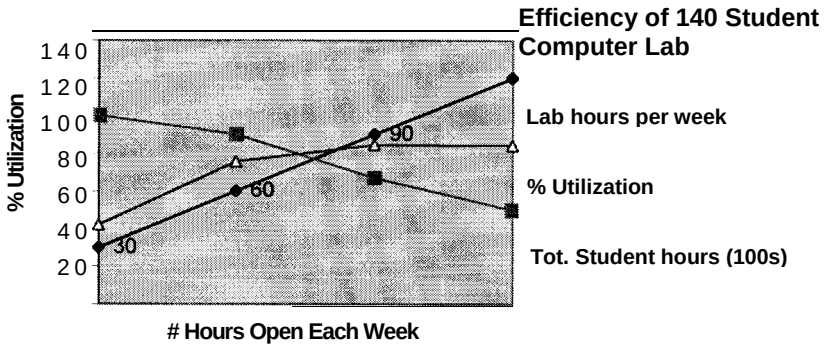
The ratio was dropped to 1:5.

The second item compared K-12 with college use. K-12 would be limited to school hours and school days — a maximum of 40 hours per week. Open labs at RCC would be open sixteen hours a day for 7 days — a total of 80 hours. On the other side of the coin, college courses may be much more demanding and require a student to spend much more time on the computer.

The ratio was dropped down to 1:7 for extended hours and back to 1:6 for more demanding projects.

The third item compared open labs with teaching labs where instructors use part of each lesson time for lecture, discussion and demonstration. If students, on the average, use those computers for 50% of class time, they could be used as little as 5 hours per day and for only 4 or 5 days per week. Compared with 80 hours per week for an open lab, equipment use in a teaching lab is only about 30%. Initially only one third of classrooms will be lab classrooms where every student has a computer. The remaining two thirds of classrooms will have an instructor computer with a digital projector.

High tech programs at Norco and Moreno Valley may require more computer access while City Campus, with more academic and transfer programs, may require less. The recommended ratio for Norco and Moreno Valley is 1:6 and for the City Campus1:8. This maintains a district-wide ratio of 1:7. Further optimization may adjust these ratios based on actual use data. For example, lab hours can be increased to accommodate more students. This is illustrated by this hypothetical graphic:



Optimization reduces the per student cost of physical plant and support personnel to 60% of the original estimate. That is an acceptable planning goal.

Growth and growth inhibitors

Up till now the plan assumed level enrollment. Growth factors are simple multipliers. Other variables include faculty training, faulty adoption of computers for instruction, and availability of large spaces that can be converted to computer labs. Space is so impacted on the city campus it is a major deterrent to growth.

Identified Needs:

1. **Large general purpose labs.** Set up a large open lab on each campus that is accessible to students for extended hours six or seven days each week. Equip the labs with state-of-the-art hardware and software. These labs may not support specialized programs such as Computer Assisted Design (CAD) and multimedia authoring programs, but should serve greater than 90% of student needs.
2. **Establish a faculty lab on each campus.** This lab will support faculty development and training and faculty production.
3. **Provide computers for faculty.** Initially it will not be possible to provide all faculty with individual computers. In the interim, faculty will be encouraged to use the faculty lab. Eventually, full-time faculty will need computers, printers and networks for email, access the Internet, handouts and presentations, review media, and correct homework. Adjunct faculty will use the faculty labs unless they have shared offices that are suitably equipped.
4. **Connect the Internet to all student and faculty computers.** The Internet is a fundamental research tool for almost every discipline. It is important for faculty and students to have access and use it effectively. A code of ethics is needed to guide faculty and students in responsible use of this valuable resource.
5. **Develop services for faculty and students.** In addition to technical support and training, logon systems and needed for security and to record *positive attendance,* and other network services such as email, web access, 24-hour help desk, and monitoring to detect and resolve computer and network problems before they occur or before they impact a significant number of users.
6. **Personnel needs.** Academic Computing needs personnel for technical operations and laboratory support. A digital video engineer, network technicians, programmers and computer technicians are required to support computers, servers, printers, scanners, networks, hubs, routers and associated telecommunications equipment and services such as Intranet and Internet, and to test, troubleshoot and maintain operating systems and software applications on all computers.
7. **Lab assistants** are needed to assist students and faculty in the laboratories and classrooms. The assistants must be computer literate and have adequate experience with the hardware and software used in the classes.
8. **System reliability.** Workstations and networks should be 99.9% reliable to minimize interruption to work schedules and loss of data. This means that networks and servers should be of high quality, with redundancy, backup, and hot swappable components so that equipment can be run 24 hours X 7 days each week without interruption.

The teaching-learning center

Faculty computer training & production lab

Instructor training is a prerequisite to effective use of the new student computer labs and classrooms. All three campuses will require student and faculty labs to develop computer literacy and basic skills with word processing, spreadsheets, databases and web browsers.

Specifically, the Faculty computer training and production lab will train faculty to:

- Use computers, computer applications, networks and the Internet.

- Design, produce, implement and evaluate printed materials, instructional presentations, and interactive teaching and learning media developed on a computer.
- Acquire or develop, implement and evaluate lessons segments, lessons and courses that involve computer text and graphics, presentation graphics, color overhead projectuals, desktop publishing, 3-dimensional graphics, digital audio and video, animations, interactive multimedia, CD-ROMs, and Web pages.
- Teach advanced workshops and assist individual faculty to design, produce, implement and evaluate media to enhance lessons and courses.
- Test, demonstrate, implement and evaluate new and emerging learning technologies

Advanced workshops will be conducted on scanning, optical character reading, image capture, creating graphics, digital photography, digital image processing, digital audio and digital video editing and conversion, PowerPoint presentations, creating interactive multimedia, CDs and CDROMs, authoring multimedia programs using Authorware, Netscape, Explorer, and HTML, and authoring courses for the World Wide Web.

The faculty lab on the city campus will have 12 networked Pentium II computer stations with Internet access, a WWW server, flatbed scanner, slide/negative scanner, color printer, high speed B&W production printer, and an extensive variety of applications software and authoring programs. This facility will ***be*** replicated with smaller numbers of computers at Norco and Moreno Valley.

Identified needs

1. Faculty must have ownership and a controlling interest in development and use of the Teaching-Learning Center.
2. A faculty person should manage the lab on behalf of the faculty.
3. The lab must be accessible on a 24 X 7 basis.
4. Equipment and software should be state-of-the art and well maintained.
5. Assistance should be always available during regular business hours.
6. The faculty lab should be a model classroom and operate in the same manner as the computer classrooms and labs used for instruction.

Priority for computer labs and networks

For the foreseeable future, the major focus of activity will be installation of computer labs and networks, training faculty, and development of online courses. Television technologies will have lower priority for available dollars.

It is important for every graduate of RCCD be computer literate and skilled in use of the Internet. This will be an expensive venture for RCC, but the alternative is is not consistent with our mission as a Community College.

Transition to Information Age technology can be successfully accomplished by the year 2001. It will require careful planning, good teamwork, community industry collaboration, and success in generating additional sources of funds.

Doing more with less

Computers are a scare resource and will continue to be so. It will take four more years to build the inventory assuming that sufficient dollars are available. This will parallel faculty development activities. Initially there will be shared access for faculty in the Teaching Learning Centers or a

shared office environment. Power users will receive new computers and those whose primary need is word processing and Internet will initially receive lesser computers.

There will be a strong emphasis on large open labs because they are efficient and relatively economical to maintain. Priority will be given to open labs with extended hours, labs shared by several departments such as the physical sciences and mathematics lab, and consolidation of small labs in order to extend lab hours and minimize supervision cost. Scarcity mandates a lower priority for departmental labs open a few hours a week and teaching labs where the primary use is demonstration and discussion.

Internet access at home and at work can reduce pressure on campus labs. This requires changes in policies and procedures for measuring positive attendance. These changes are already underway for Distance Learning. In the future, performance measures will replace seat time while tutoring and mentoring that now require line-of-sight supervision will be replaced by reasonable access using email, bulletin boards, listservs, chat rooms, and computer forums. There are now video-phones (Skype) and 2-way television for the Internet that allow the instructor and groups of students to see and hear each other and conduct discussions. Online systems enable participants to, write and sketch on a common white-board, and make presentations to each other.

Economy can also be achieved through specialization. If present trends continue, Norco and Moreno Valley will be high tech campuses that require a large numbers of computers compared to their FTES. Norco will specialize in engineering, computer science, computer-assisted design, graphics and multimedia. Moreno Valley will specialize in high-tech medical sciences. If the mission of the City Campus is to support more academic courses, it may need a smaller computer-to-student ratio.

The gap analysis between needs and available resources (space, infrastructure and budget) suggest that it is impractical to achieve the 1:7 ratio on the City Campus prior to construction of the proposed LLRC in 2001. Many of the steps recommended in the report of July 31, 1997 have already been implemented enabling this report to prepare RCC for the next stage of development.

RCCD Educational Master Plan

Learning Technologies created two documents for the 1997 – 2005 Master Plan for the RCCD.

Chapter 10: Requirement for staff and facilities – learning technologies (Appendix N)

Chapter 11: Overall Technology/Equipment Requirements (Appendix O)

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Chapter 3

Implementing the vision

In Chapter One a rationale was developed relating technology to the mission of the College. RCC students need information technology skills to be effective and to be competitive in Information Age society. Faculty need information technology skills to make teaching and learning more effective. The College needs an information technology infrastructure to improve learning and provide learning technologies to meet the needs of the 21st century. It is being asked to handle larger numbers of students from diverse cultures and educational backgrounds, provide higher quality graduates, and to achieve this with proportionately less funds.

Chapter Two examined the technology resources of the District for supporting teaching and learning. It found an aging audiovisual support structure, a distance learning program without a clear role in the College mission, computer labs and networks that were substandard, and lack of a mechanism to support faculty in learn and use the new technologies for instruction. As a result, a Division of Learning Technologies was proposed with four departments: Academic Computing, the Teaching-Learning Center, Distance Learning, and Instructional Media Center.

Developing support for teaching and learning

The clients for *learning technologies* are students and faculty. A Task Force with representation from students, faculty, administration and community should be convened to continually refocus the technology plan to support the teaching and learning mission and the needs of the community.

Academic computing

This is a new unit concerned with teaching and learning in classrooms, laboratories, auditoriums, library, faculty labs, faculty offices, community settings, and online activities of Distance Learning. It collaborates closely with *Computing Services* which supports business and administrative offices and functions of the College. Computing Services provides network and telecommunications support for instruction.

Academic Computing and Computing Services collaborate closely in the design of networks, setting technology standards, and troubleshooting system level problems where they occur. Jointly they design new networks that keep administrative and instructional information electronically separated. They will plan and implement a broadband Intranet connecting the three campuses that is capable of transmitting video, voice and data. They are planning extensions of the network infrastructure so that all faculty offices and areas used for teaching and learning will have high quality connections to College resources and the Internet. They are planning higher quality support for all areas of the college by providing a better infrastructure, state-of-the-art technology, and excellent technical support.

Unresolved issues that require collaboration include a campuswide *Acceptable Use Policy,* a Post Office Protocol (POP) server for student email, community wide connectivity to Web Servers for online courses, and community access to electronic library resources. As new technologies emerge, new challenges will be presented for joint resolution.

Most areas of instruction are expected to use computers and the Internet in instruction. It is a matter of some urgency to provide the necessary computer facilities and courses.

Academic Computing is responsible.

Academic computing is conceived as a District wide unit. It is responsible for:

- Support the academic mission on the three RCC campuses;

- Develop a large general-purpose laboratory on each campus with computer classrooms and specialized laboratories as needed;
- Plan, install and maintain computers, servers, networks, and computer laboratories for instructional programs; install, configure and maintain hardware and software; provide internet support;
- Provide programming and maintenance for academic file servers, WEB servers, CD-ROM servers, email servers, routers, switches, concentrators, and other networking equipment within labs and classrooms;
- Hire, train, schedule and manage technical support and lab assistants to support computer laboratories, classrooms, smart classrooms, auditoriums, library, faculty offices, and faculty training and production areas;
- Interface classroom networks and services with the Intranet, Extranet, and Internet.
- Ensure security and acceptable use of RCCD academic computer resources.

The Teaching-Learning Center

The Center will facilitate faculty development and training, and support faculty production of materials including online lessons for use on-campus and for distance learning. It is designed to assist faculty to learn to use computers in instruction, preview and select off-the-shelf courseware, and develop lessons and courses in interactive multimedia formats for distribution via CD-ROM and Internet. On the City Campus, this lab will be housed on the first floor of the present library building. It will begin operations June 1, 1998. Sites are being identified to replicate this function at Norco and Moreno Valley.

The Center is designed to provide a non-threatening environment where faculty and staff can learn to use computers, software, networks, and related equipment. It has a wide range of software and courseware for faculty to try out and adapt for their own instructional purposes. It will provide the opportunity for faculty to hone computer skills and develop computer related instructional materials involving word processing, desktop publishing, databases and spreadsheets, computer graphics, slide presentations, animations, digital audio and video, interactive multimedia, web pages, and online lessons and courses.

It is proposed that the lab will be staffed by one district level instructor, a lab manager, and lab assistants. Assistance will be available to faculty at all times during regular business hours. Faculty and faculty groups will be given 24-hour and 7-day access when required.

Distance learning

Distance Learning will collaborate with faculty and teaching departments to select and / or develop online and television lessons. It will promote, distribute and manage distance learning programs, collaborate in production of telecourses, provide technical support for two-way interactive television, and provide training for faculty in teaching via television.

At this time, distance learning is based primarily on videotaped lessons from the Community College Consortium, the Annenberg Foundation, Miami-Dade and Dallas Community College District. Each video course is complemented by five three-hour sessions conducted live on campus. The Coordinator sets up class times and instructors in conjunction with teaching departments, provides schedules and class data for the catalog, coordinates duplication and distribution of tapes and broadcast schedules to three local cable operators, and plans future improvement and expansion of distance learning services.

Distance Learning is projected for rapid growth. It uses communication technologies to reach learners who cannot attend on-campus classes at the time they are scheduled, or who for reasons

of time and distance do not have access to a college education. Distance learning includes: 1) television based programs that broadcast on-campus classes and/or combine classes using two-way interactive video; 2) Internet based programs developed in conjunction with the instructional computing unit; and 3) Combination of Internet and/or television based classes produced by RCC or from other educational providers.

Television classes require studio-classrooms for program origination and teleconferencing, and media classrooms for viewing live and recorded lessons and courses. Studio classrooms will be supported by control rooms and a master control center for recording, playback, and routing television signals to broadcast transmitters, cable companies, telephone companies, and Internet Service providers. There will be lesson preparation rooms, rehearsal rooms, administrative offices, faculty offices, conference rooms, and storage areas for classroom sets, props, backgrounds, and equipment. All television classrooms will have conference telephones and digital video projection displays.

At this time, one classroom in the Instructional Media Center has been converted for interactive video and teleconferencing. It is proposed that television classes will be located on the second floor of the present library building when the new LLRC building is constructed. In the interim, videotaped classes will continue to be produced in the Telecommunications TV studio and the IMC.

Instructional Media Center (IMC)

The IMC is housed on the first floor of the present library building on the City Campus, and has assigned spacer on the Norco and Moreno Valley campuses. It will continue to provide classroom services, media distribution, technical maintenance and support for campus events. Based on the recommendations of the Learning Technologies Task Force, some of its present functions may be reassigned to the Library in preparation for the proposed restructuring for the new Library-Learning Resources Center. The media library, media catalog, and the learning resource center are designated as part of the new LLRC.

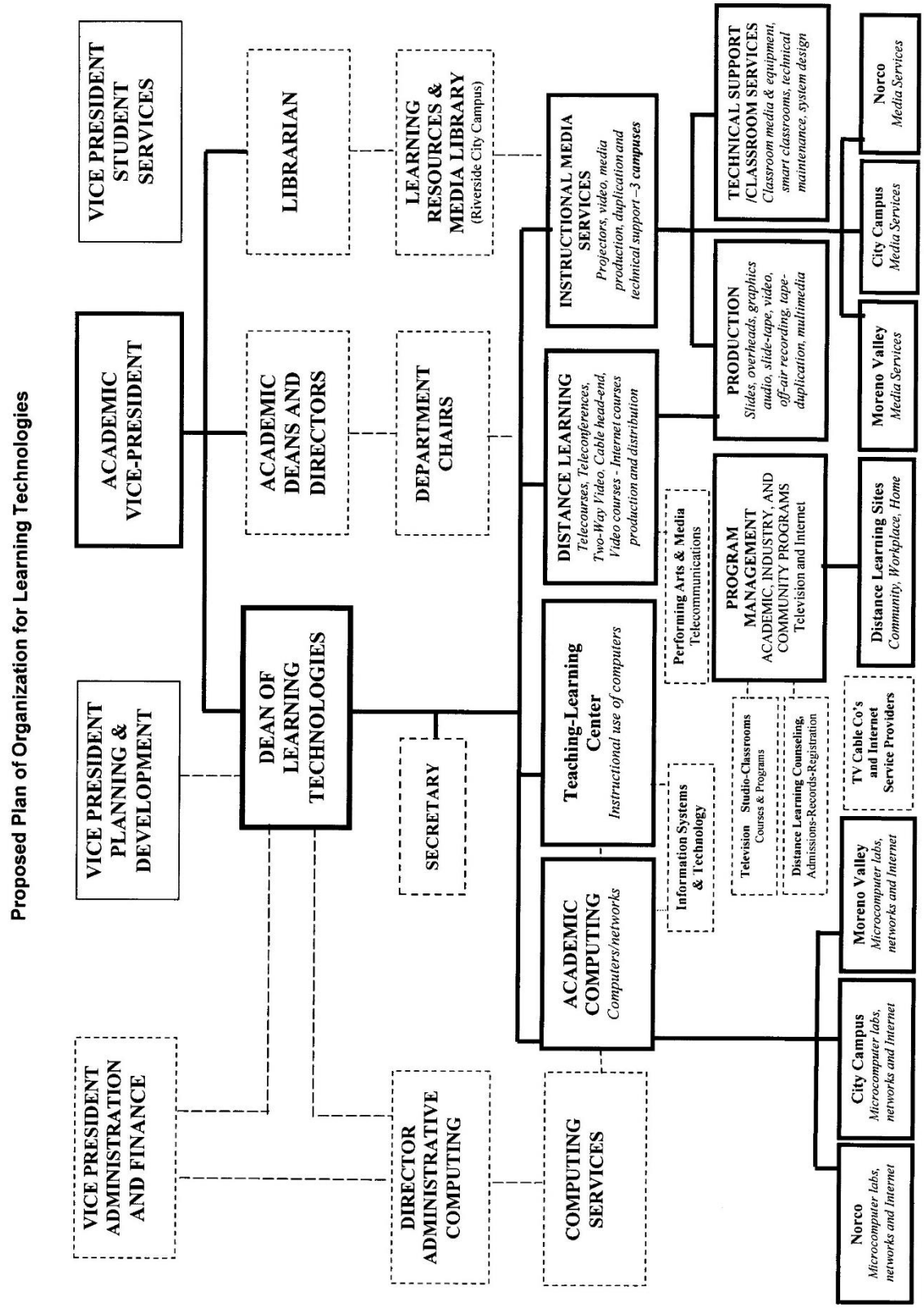
Media distribution will be increasingly electronic and on-demand. Since the media library catalog and collection is projected to become part of the LLRC, electronic distribution will be a joint IMC-LLRC activity. Live video and recorded video from the videocassette library will be supplied to classrooms and libraries on all three campuses from the City Campus facility. IMC technicians will be responsible for operation and maintenance of the video distribution system and provide technical support for two-way interactive video.

Classrooms will have installed technology commensurate with instructional needs computers, networks, Internet, digital and video projection will find increasing use in RCC classrooms and require quality service and maintenance for effective operation. The IMC will continue its role of training faculty and students to use audiovisual and television equipment.

Production services will be expanded to provide digital imaging, graphic, photographic and on-location video support for Internet, multimedia and television courses and presentations, including editing and duplication of video and digital media.

The relationship of these four departments to other operations of the College is shown in the Organization chart on the next page.

Proposed Plan of Organization for Learning Technologies



Personnel Plan

Creating a new organization requires new positions and reassignment of existing positions as roles are changed or expanded. It is expected that district staff will play a significant role in improving teaching and learning through technology. It will be responsible for district wide services such as computer and television networks, and district wide programs such as distance learning. It will be responsible for long term planning, proposal writing, partnerships, identifying and obtaining new sources of state and non-state funds, and optimizing support for technology related programs throughout the District.

1. **Current personnel.** The Dean of Learning Technologies is supported by 1.0 Secretary. Academic Computing has one district level position. Its classified hourly help and student assistants are funded through the Information Systems and Technology departments. The Teaching-Learning Center has no positions or funding. Distance Learning has 0.4 position and classified hourly help. The Instructional Media Center has five positions on the City Campus, one position at Moreno Valley, and classified hourly persons at Norco.
2. **Scheduled personnel additions.** A faculty trainer position and three full-time Computer Programmer and Network Specialists were requested in the 1997-98 budget so that one technician could be assigned to each campus to support instructional labs. These positions were given top priority in Fall 1997 and are not yet filled.
3. **Projected growth.** Personnel levels will be based on priorities of the college and availability of funds. Some personnel requirement will be formula driven. For example, one technician is needed for each 300 networked computers to ensure an acceptable quality of service. By the year 2000 the college will be teaching certification courses for troubleshooting and maintenance of computer hardware, software and networks. At this time expansion of the technician pool can be accomplished using interns from the certification program supported by RCCD technicians and instructors. Every economy that can be accomplished without loss of quality or loss of service will be implemented. For example, fewer lab assistants are required in proportion to the number of students in large computer labs.
4. **Priorities: District.** In 1997-98, Academic Computing is in crisis mode awaiting funding for technician positions. A large amount of equipment was procured, installed and tested but networks are not functional on the City Campus.

   A full time position is needed to develop Distance Learning. Funds are needed for networks, Internet connections, and distance learning classroom-studios and teleconferencing rooms.
5. **Priorities: City Campus.** Labs, equipment, and personnel are very limited on the city campus. With favorable budgets, this condition can be corrected in two to three years. Major effort must be given to getting the fullest possible utilization out of this scarce resource.

   Space is a serious problem. Operation and maintenance is greatly simplified where equipment is concentrated in a few large laboratories. Such spaces do not exist on the City Campus. The nearest approximation is the Computer and Information Science labs in the Business Building, and the computer labs operated by the English Department and Writing Center. Special purpose labs should be kept to a minimum because the large general purpose lab is staffed and more efficient (Appendix P).

   A space has been identified in the Instructional Media Center for the Faculty Computer Training and Production Facility.

Many present needs cannot be resolved until construction of the new LLRC in 2001. Collaborative use of resources will simplify the growth and transitions that must occur in the intervening period.

6. **Priorities: Moreno Valley:** Technicians and lab assistants are needed immediately to develop the capabilities of the new general purpose lab in the Science building, and to properly maintain the other computer laboratories on the campus.

   The addition of the cable head-end for TCI Inc enables Moreno Valley to broadcast a variety of educational and cultural programs direct from the campus. Communication systems are being developed to connect to the County Hospital to support the new Physician Assistant program.

7. **Priorities: Norco:** Technicians and lab assistants are needed immediately to support development and operation of the new general purpose lab in the Humanities building, and to properly maintain the other computer laboratories on the campus.

   The specialization in engineering, computer science and multimedia should provide a resource for distance learning in the State of California. It is suggested that, in addition to the regular distance learning courses via television and Internet, that Norco originate distance learning courses in engineering, computer science, megatronics, and related technologies.

1998-99 Priorities for Technology Personnel

Refer to chart — Organization Plan for Learning Technologies on page xxxx.

Academic Computing:

1.0 Manager, Computers and Networks — Mark Oliver

1.0 Technician — City Campus — new position

1.0 Technician — Moreno Valley Campus — new position

1.0 Technician — Norco Campus — new position

6.0 Hourly Classified Technicians for three campuses

Lab Assistants / Student Assistants for open labs — 3-campuses - new

Note: This will not provide sufficient technical support for more than the large general purpose labs, nor will it provide adequate support for the installation and testing of systems to be installed before and during the Fall Semester of 1997. The academic network will continue to be dependent on the Administrative Computing unit for network support, maintenance of computers for faculty and instructional specialists, and support for equipment maintenance.

Teaching-Learning Center

1.0 Instructor (new)

1.0 Lab Aide / Student Assistant (new)

Note: The instructor will train faculty in the use of computers and production of instructional materials including desktop publishing, PowerPoint presentations, multimedia, and Web Pages. Training will be conducted in small groups on three campuses to guide/assist faculty in design, production, implementation and evaluation of computer based instructional materials. This person

will also be responsible for developing a faculty newsletter for to keep them abreast of new teaching techniques, technologies and software.

The lab aide (two 20-hour positions) will keep the faculty lab open as needed for up to 40 hours each week and provide assistance for faculty to use hardware and software; design, produce and test materials; and implement presentations and multimedia in classrooms and labs.

Additional positions may be required in the future for Norco and Moreno Valley.

Distance Learning

1.0 Distance Learning Coordinator — Sharon McConnell (increase from 0.4) 2.0 Classified Hourly (increase from 0.5)

Note: This position will coordinate existing courses delivered on tape to local cable companies; review available resources to expand the offerings via cable; prepare a plan for use of interactive video to link RCCD campuses and 4Cnet campuses; support development and implementation of online courses and explore the distance learning options for certificate programs taught at RCCD.

Additional positions may be required in the future for Norco and Moreno Valley.

Instructional Media Center

1.0 Coordinator and Media Specialist (Henry Bravo)

1.0 Media Clerk (Becky Soto) 1.0 AV Tech (Michael Prosser) 1.0 Evening Service (Harry Petty)

1.0 Media Specialist — Norco (0.5 Huy Ngyen + 0.5 **new)**

1.0 Media Specialist — Moreno Valley (Gustavo Segura) Student assistants

Some functions of the IMC may be reassigned to the Library and to Distance Learning. However, the increase in high-tech classrooms and services may require a similar level of staffing for the IMC.

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Chapter 4

Reflections – December 2015

Donald G. Perrin Ph.D.
Dean of Learning Technologies 1997-2000

The essential parts of the five year plan were implemented in the first 18 months. A number of details not written into the plan important for its success are added here.

My previous ten years were spent in the Silicon Valley developing the Alquist Center for Innovative Learning at San Jose State University. This gave me excellent preparation to work with faculty and administration, state-of-the art hardware and software, and faculty developing college level media and materials in many subjects. I worked with the latest PC and Mac computers, peripherals and software. I adopted switched 10/100Mbps networks two years before they were adopted for San Jose State University. My lab had a server and the latest peripherals from Silicon Valley companies, including the first read/write CDROMs. I extended my network and internet connections to studio classrooms for ITFS television. I was equipped to prepare the Riverside Community College District for the new millennium.

RCC already had architectural plans for a large computer lab on each of its three campuses. They had also made an initial purchase of model 8088 PC computers that were essentially obsolete. I was able to initiate purchases for (then) high standard Pentium PCs, printers, servers and switched networks. The computer center had set up dual networks for security to separate academic and business functions. I advocated one network since they could be separated electronically. All of vendor bids recommended one composite network.

Computer equipment and software have an average life of about five years, so I bargained with the administration for an annual replacement budget equal to 20% of the inventory, with new equipment going to areas where it was most needed. We contracted with Microsoft for $42 per computer per year for ***all*** Microsoft software with updates to new versions as they became available. Since almost every computer needed an operating system and Microsoft Office, this represented a very significant cost saving for over 2000 computers used for academic and administrative purposes. The option to lease computers (Appendix Q) was rejected because future budget cuts could eliminate a large numbers of computers and make it impossible to teach some subjects.

Many of the teaching departments requested their own computer labs, equipment and software. A local state university had gone this route with devastating results. It consumed valuable space and departmental budgets. Departments could not afford to keep the labs open except for classes. The result was that these labs were closed and not available for student use most of the time.

As Dean of Learning Technologies, I recognized that RCC needed special purpose labs for subjects such as music, desktop publishing, nursing and Graphic Information Systems. Initially I rejected the Music Department's proposal because it did not include recent innovations, such as playback for musical compositions for orchestra. Desktop publishing required Macintosh computers, but I encouraged them to add a few PCs since some students would be required to use them in the field. Nursing had its own space and very specific requirements for hardware and software. It was a day program. I was able to negotiate for Graphic Information Systems (GIS) to use it in the evenings to train students to use ESRI GIS software.

Other teaching departments were encouraged to group with related disciplines if they needed a specialized lab. Two such proposals were funded. The large and well-staffed general purpose labs, one on each campus, met all other requirements. In some instances instructors were in the lab at certain hours to provide additional help for their students.

In the first few years, very few students had their own computers or access to them at home. As a result the general purpose labs were heavily used. Over time, many students got their own digital devices and the labs were used mostly by students who preferred to do their homework on campus, those who did not have laptop computers or tablets, and those who needed assistance in learning and using the software.

Since most of the five-year goals were accomplished by 1999 and the new Library-Learning Resource Center on the City Campus would not be built till 2001, I taught classes for *Computer and Information Systems* to test the viability of the new computer classrooms and instructional materials, such as the Shelly-Cashman manuals. In the year 2000, I retired and returned to the Silicon Valley to join the Ohana Foundation, a startup company for educational media that later moved to Hawaii.

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Fifteen years later RCCD web page states its mission to be:

> dedicated to the success of our students and the development of the communities we serve. To advance this mission, our colleges and learning centers provide educational and student services to meet the needs and expectations of their unique communities of learners.

The college is focused on career and academic education. In 2015, the three campuses served a total of more than 38,000 (mostly part-time) students, and graduated about 5,000 students with degrees and certificates. For more detailed statistics, go to: http://rccd.edu/rccPresidentSearch/Documents/RCCD%202014%20Quick%20Look.pdf

Success is reflected in the rapid growth of Riverside and the low 6.6% unemployment rate in the region. For current information on the city of Riverside view this video: www.riversideoed.com. For further information about this paper contact dperrin@itdl.org

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