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Agile Learning, New Media, and Technological Infusement at a New University: Serving Underrepresented Students

by Armando A. Arias, Jr.
California State University, Monterey Bay

Occasional Paper No. 70
Spring 2000

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Abstract

The author suggests how one acdemic institution, California State University, Monterey Bay (CSUMB) is planning for a distributed learning and distance education program, utilizing the latest technologies and innovative pedagogy to meet the needs of all underrepresented and underserved students. This need is especially high for the Latino/a population of the Salinas Valley, where some of the poorest Latino populations in the nation can be found.

The university's students, faculty, and staff represent a geographically and culturally diverse group of people, whose richness is mirrored in CSUMB's commitment to the establishment of a multilingual, multicultural, and intellectual community.

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Agile Learning, New Media, and Technological Infusement at a New University: Serving Underrepresented Students

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Agile Learning, New Media, and Technological Infusement at a New University: Serving Underrepresented Students

Introduction

This paper suggests how California State University, Monterey Bay (CSUMB), a new institution, is planning for its mandated distributed learning and distance education program, utilizing the latest, most appropriate, and most cost efficient distributed technologies and innovative pedagogy to meet the needs of all underrepresented (and, under-served) students, and the high need for serving especially the Latino/a population of the Salinas Valley (where we find some of the poorest Latino populations in the nation in a 20 by 100-mile stretch of agricultural land, located adjacent to the campus).

An important part of CSUMB's identity and an enriched learning experience is reflected in the diversity of its learners. The university's students, faculty, and staff represent a geographically and culturally diverse group of people, whose richness is mirrored in CSUMB's commitment (albeit, struggle) to the establishment of a multilingual, multicultural, and intellectual community; a model, pluralistic academic community (Arias, 1996).

Located on the historic site of Fort Ord, the largest U.S.military base in the world, it first opened its doors to students during the fall semester of 1995. Due to severe limitations in the amount of advance planning time that was available to initiate the campus, the first cohort of students arrived at a university that was still deeply immersed in the developmental process. Thus, over the past four years, faculty, staff, and students have worked vigorously to design, develop, and engage in an innovative academic program (Arias, 1999a; 1999b).

History

The new California State University Monterey Bay (CSUMB) was created after an extensive statewide study as well as tremendous regional/community public support. A major part of the reason for this support is that the future of the California State University System (CSU) is at risk of losing public support. California citizens are clamoring for an "improved educational system" one that will prepare students better, and at the same time meet the skills set of the work force for the 21st Century. Additionally, the mission of this long standing institution (CSU) of providing access to a growing and diverse population needing higher education in California will not be met unless dramatic steps are taken now to meet it. To meet its responsibility to provide continuing access to the top one-third of high school graduates, the CSU must plan to serve thousands more students. The CSU System faces an increase of 100,000 full-time-equivalent students by 2010; the majority of those will be Latino. This enrollment growth has been characterized as "Tidal Wave II."

Accommodating the enrollment growth, while simultaneously providing quality education within this context, will require a new paradigm for looking at how we utilize our public resources and apply them creatively. In the case of physical space alone, the CSU will need to accommodate a roughly 26% overall increase in students. If all available existing physical plant space on all the CSU campuses were used to maximum capacity, CSU would still be short of space.

The magnitude of change that is necessary requires fundamental restructuring. The problem is that the CSU System presently has no model for transforming its existing institutions (Consortium for Educational Technology for University Systems, 1997). The "case" of the new CSUMB gives hope to the State that a possible model for both incremental and fundamental change is in the works. This excerpt demonstrates the vibrancy of the vision:

> California State University Monterey Bay's Vision Statement defines CSUMB as "serving the diverse people of California, especially the working class and historically under-educated and low-income populations. The identity of the University will be framed by… cooperative agreements which enable students, faculty, and staff to cross institutional boundaries for innovative instruction… broadly defined scholarly and creative activity, and coordi-

nated community service… the curricula of CSUMB will be student and society-centered and of sufficient breadth and depth to meet the statewide and regional needs, specifically those involving both inner city and isolated rural populations (Monterey, Santa Cruz, and San Benito)." *Partial statement.*

Psychological and Geospatial Barriers to a Vibrant Service Area

For the past 70 years the land mass (55 square miles in all) where the campus is presently located served the nation as a military base known to many as Fort Ord. It is located on the upper rim of the Monterey Bay peninsula on one side, and similarly situated on the opposite side, overlooking the Salinas Valley. For many years, non-military personnel had to literally drive around this area in order to get from one side of the peninsula to the other. Even though, today, people may drive through the campus, without any sort of guard post or military permission, they continue to go around "the Fort." There continues to be a psychological barrier; many view "the Fort" as a barrier to life's ambiguities and oppressions. The military records show that Latinos were trained for military battle by the thousands on this site; many went to battle and did not return. The records indicate that many more Latinos "per capita" enlisted and died defending the United States than any other group; war after war after war. There are even records of thousands of Latino soldiers who were trained at Fort Ord, were born in the United States, lived their lives in Mexico, were drafted into the army, went to war, fought and sometimes died for our rights, returned from war (with wounds and honor), and went back to Mexico to live out their lives. Hence, they showed tremendous allegiance to the United States and never took advantage of their military benefits (a la Veterans Hospitals). Some of these Latinos are now students at CSU Monterey Bay and are at the vanguard of transforming the base under the crusade "from swords to plow shares."

Over the years Fort Ord gained a worldwide reputation for having an atmosphere of racial diversity; many soldiers referred to this atmosphere as a "comfort zone." Military personnel in "mixed racial" marriages were most often "encouraged" to transfer there. As a result of retiring military personnel and the agribusiness which attracted and exploited Japanese and Mexican people, the surrounding region has one of the most ethnically diverse populations in the United States.

Since the base closed in 1991, some military personnel remain. Thus, beyond CSUMB faculty, staff, students, and their families who live on the campus property, there are also approximately 900 military personnel and their families. To the north is the community of Marina with a high percentage of Asian-Americans. To the south is Seaside with a high percentage of African-Americans. To the east is the Salinas Valley with a very high percentage of Hispanics. Within the Monterey peninsula there is an international populace, due primarily to the long-standing influence of the Defense Language Institute, the Monterey Institute of International Studies, and historical migrations of migrants who worked picking vegetables, fishing sardines, and serving some of the world's wealthiest people in Carmel and Pebble Beach. Interesting to note is the fact that persons of Hispanic origin in the Salinas Valley (just east of the campus) are younger than non-Hispanics, indicating that an increasing proportion of CSUMB's new students will come from this group. Presently the campus has approximately 30% Hispanic students and, as a result, has becomes a member institution of the Hispanic Association of Colleges and Universities). *(**Note:** The breakdown by gender of the Monterey, Santa Cruz, and San Benito County's population is similar to the rest of the state and nation with 49% male and 51% female.)*

When authorization to establish CSUMB was initially granted, growth projections called on the university to grow gradually to a full time equivalent population in excess of 20,000 by the year 2030. However, subsequent restrictions on the water allocation that will be available to the campus now indicate that the university will be able to serve a traditional resident/commuter student population (i.e., water users) of no more than 12,000 students. Furthermore, because of limited available local water resources, the aspiration that CSUMB will serve 25,000 students as part of a mandate from the California Postsecondary Education Commission, and as an effort of CSU to respond to burgeoning enrollment pressures

resulting from Tidal Wave II, will not be realized unless approximately half of those students can be served in off-campus settings (Consortium for Educational Technology for University Systems, 1997). Thus, approximately one-half of the university's FTES will need to be generated through a variety of distributed and low-residency programs. Needless to say, this presents a great challenge. This becomes an opportunity for transforming the traditional "deficit paradigm for looking" at Latino/a populations as "the problem," and for beginning to focus on how it is that, once recruited into institutions of higher education, Latinos/as are part of the solution. Hence, CSUMB must recruit and retain Latinos/as at nearby (within 100 miles), yet rural, San Benito County communities, such as Gonzales, Chualar, King City, Greenfield, Paso Robles, Santa Rosa, and Santa Maria, all of which have high Latinos/as populations.

A Commitment to Multiculturalism, Diversity, and Pluralism: Student and Faculty Characteristics

The growth of the campus community has been rapid, since opening day in the fall 1995 through the spring of 1999; the campus grew from approximately 450 people to over 2,000. The range and variety of background, experience, and demographics of CSUMB's students, faculty, and staff offers the university a sound base from which to honor its commitment to multiculturalism, diversity and pluralism (Arias, 1999b). Interesting to note is that an estimated 90% of the faculty, staff, and students live on campus, making for a diverse living setting as well.

Enrollment History and Trends

The current snapshot of the student members of the campus community reveals a culturally diverse group of enrollees. To date, the total student population is over 2,000 and reflected in the following ethnic/racial composition (rounded figures):

White	*45.0%*
Latino/Latina/Hispanic	*30.0%*
Asian/Filipino	*9.0%*
African-American	*4.0%*
American Indian	*2.0%*
All Other	*4.0%*
Unknown	*6.0%*

The data show that in each ethnic group, except White, there was an increase from the first to the second year (see data sets from the California State University, Monterey Bay's Office of Contracts and Grants). However, enrollment of White students dropped over 6%. Indicators tell us that, historically, other colleges have done a tremendous job at recruiting students from the region; nearby San Jose State University is a favorite place for local students because it allows them the opportunity to move away from home and live an hour away.

The gender make-up of the student body for the same time period reflects a majority enrollment of females that is consistent with national trend data for 4-year public institutions. Of the estimated 1,800 students enrolled in the spring 1999, 62.8% were women and 37.2% were men.

Recruitment efforts continue to generate cultural diversity. Projections for fall 2000 suggest an incoming group of ethnically diverse students similar to the existing student body (as above), but with a slight increase in the number of Latinos/as and women.

Faculty Characteristics

Interesting to note is that CSUMB faculty also comprises a multicultural and diverse group. Of the tenure/tenure track faculty members at CSUMB the ethnic breakout is as follows:

White	47.0%
Asian	22.0%
Latino/a/Hispanic	17.0%
African-American	11.0%
American Indian	1.5%
Unknown	1.5%

In an unweighted comparison to the CSU faculty as a whole, the CSUMB faculty tends to be more diverse. The following data represent the CSU ratios:

White	79.3%
Asian	10.3%
Latino/a/Hispanic	6.0%
African-American	3.9%
American Indian	0.6%

A New Paradigm for Designing and Implementing Distributed Learning and Distance Education

While CSUMB has been working hard to develop the structures, programs, and services required to meet the immediate needs of its approximately 2,000 matriculated students, the prominent role that distributed learning services are expected to play in the life of this university has always been acknowledged (Arias, 1999b).

A major goal of CSUMB is to develop the capacity to deliver high quality distributed learning programs utilizing innovative pedagogies. Beyond the more traditional and localized extended education service, there is a particular need for CSUMB to develop model distributed learning and low-residency education programs.

CSUMB has invested heavily in faculty and technology with the intention of becoming a major player in distributed learning. CSUMB has established the Distance and On-Line Learning program and have hired highly experienced individuals to further our distance education goals (Arias, 1996).

The "cyberworld" of the year 2000 and beyond requires individuals who have a unique blend of creativity and the technical understanding of computers and networks (Senge, 1990). The CSUMB faculty is taking its cues not only from traditional academic programs, but also from the Open University of the United Kingdom, the Instituto Tecnologico de Monterrey,and the highly innovative *Monterrey Institute* for Graduate Studies, the world's first multilingual virtual doctoral graduate school (see www.degee.com) and from relationships with industry. These companies provide advice annually in the directions we need to pursue to evolve our technologically enhanced on and off-campus programs. Their Media Learning Complex, a state-of-the-art facility containing a variety of workstations and peripheral devices as well as functional space for creative design and development, their Teledramatic Arts and Technology studio for video production, plus, the electronic pedagogical research being applied in the Social and Behavioral Sciences Centers, provide unique opportunities for supporting distributed learning delivery.

Concepts such as "cyberworld," "the technological society," "the information age," and "the global community" are often used to characterize the accelerating complexity of modern life (Lipnack and Stamps, 1997). And the dramatic changes implied by these types of characterizations are challenging all contemporary institutions to reexamine both their goals and their modes of operation. In the case of higher education, this analysis suggests that its traditional goal of exposing students to, and assisting them in the comprehension or understanding of, the organized bodies of knowledge and skills contained within the discrete disciplines can no longer be considered adequate preparation for either professional work or responsible citizenship (Senge, 1990).

For this reason, the overriding educational goal at CSUMB is to develop in its students the capacity to move beyond information recall and comprehension to the higher-order cognitive processes of information analysis, synthesis, evaluation, and application. In its broadest terms, CSUMB is committed to assisting all students, particularly historically under-educated, technologically underserved, and low-income populations, to develop the capacity to apply a broad range of knowledge and skills. These traits are acquired from multiple sources, applied to the resolution of complex, real-life problems, and develop the knowledge, skills, and dispositions required for active and responsible membership in a multilingual, culturally pluralistic, technologically sophisticated, and democratic society.

To achieve this higher level of education, the university recognizes that it also will be necessary to develop non-traditional approaches to the design of curriculum and instruction (Arias, 1997).

It is within this context that much of the experimental foci, such as "other ways of knowing and diversity," the discovering of multiple intelligences and more, are emerging and in some cases becoming central to the developmental agenda of higher education nationally, and indeed globally, and their experiences are beginning to position us to contribute to that agenda. Additionally, the creative energies of the founding Latino/a faculty, staff, and administrators, who were selected to launch this university, are starting to generate a wide range of ideas and plans which

need a distributed learning and distance education mechanism to be operationalized and optimized. Realizing that this "intersection of opportunity" may occur only once in an academic lifetime, they embarked to identify (among literally several thousand curriculum vitae) the best minds in the industry. To name just a few, they attracted Luis Valdez, founder of the Teatro Campesino, movie producer, and teledramatist, who became a founding professor and served as the university's first chair of the Academic Senate. Under his leadership innovative academic programs were designed, such as Teledramatic Arts and Technologies, or "TAT." The TAT program creates a learning environment whereby students learn and practice the integration of a multiple of media (CD-ROM, digital data manipulation, web-based designs, etc.) for the purpose of managing knowledge in virtual environments.

Manuel Carlos, a long-standing member of the faculty at the University of California, Santa Barbara, left his post to join CSUMB as the first faculty hire and began making early contributions not only in terms of how the new curriculum ought to be integrated and cross-disciplinary, but also in terms of how student field research experiences may be enhanced through virtual simulators; his work is the first technological application of its kind. Judith Baca, a professor at the University of California, Los Angeles and director of a community based art collaborative, came to the university and introduced digital imagery as a new method for creating murals. Her methods have contributed heavily to the "state of digital art" especially as it relates to social action. Amalia Mesa-Baines, recipient of the coveted MacArthur Award (known as the "genius award") joined the faculty and became a leader in the crusade for interdisciplinary pedagogies while incorporating on-line methodologies; recently her images of Dolores del Rio were added to the permanent collection of the Smithsonian Institution. Ruben Mendoza is "breaking new ground" in the field of archaeology through applications of GIS (Geospatial Information Systems) methods combined with server-based logic virtual h). He also leads a team in the examination of object-oriented model design, knowledge management, and distributed cognition for the purposes of further expanding the university within the context of its core values and founding principles (Arias, 1999b; 1998). In his capacity as global educator Dr. Arias and his colleagues have since founded *The Monterrey Institute for Graduate Studies* which is the world's first multilingual doctoral level virtual graduate school in conjuction with the Centro De Estudios Universitarios in Monterrey, a prestigious thrity year old institution located in Nuevo Leon, Mexico (see the internet domain *www.degree.com*).

Many other second and third phase Latino/a faculty hires, like Juan Gutierrez who is providing cutting edge insight to the areas of assessment, are making significant creative contributions. His on-line assessment tools are timely and are gaining national attention. As a pioneer in the "New Media Project," Rina Benmayor is combining critical thinking to her "bench work" as an oral historian when applying web-based techniques for teaching and learning. The work of the Social and Behavioral Sciences as a whole, with its Latino/a focus, received commendation from the California Postsecondary Education Commission for having designed "one of the most technologically innovative academic programs the State of California had ever seen." The university, too, in its recent accreditation visit from the Western Association of Schools and Colleges, was hailed as having created a "highly creative and innovative environment for the infusion of technology."

In short, CSUMB has an emerging "technological brain trust" of Latinos/as who have made significant inroads to the applications of new technologies and new "ways of knowing and diversity," thusly, viewing the contributions of Latinos/as as a tremendous asset – by curricular design. Although this may be the case, it is a constant struggle becoming a university of its vision. While the opportunities for success have not diminished, it is important to continually renew the coordination and control of events that will shape the character of the institution. Significant political and technological challenges lie before this young university. From a political standpoint, the university is presently at a crossroads with its leadership. Latinos/as are clamoring for leadership that will not veer from the original Vision Statement. There is an apparent need to "back fill" positions vacated by those Latinos/as who, for whatever reasons, have left the institution. But, from a technological standpoint, one of those challenges is establishing an educational program that will serve both on- and off-campus students; again, especially the under-served and underrepresented students living in the heavily populated Latino/a communities. This service may be provided through a multiple of media (cable TV, computer mediated, telecommuni-

cations, etc.) and a highly flexible course schedule. At the same time, requests from the off-campus community for educational programs and services (especially those that serve Latino/a students and uncertified teachers) are accelerating each month.

Moreover, California, with its ever-expanding population and unruly new laws against Affirmative Action and bilingual education, is in dire need of emergency credentials for new teachers who are bi-literate and multicultural. CSUMB's distributed/distance education plan could provide a model Distributed Teacher Credential for teachers on the Emergency Licenses program. Relatedly, the National Hispanic University recognizes this and is planning to addresses this phenomenon as well; especially through the use of distance and distributed education.

"Agile Learning" and the New Media

Faculty and staff at CSUMB are well aware of the applications of communication technologies in higher education across this nation. This understanding of how the "new media" are being applied have prompted faculty and staff alike to re-evaluate the functions of learning and teaching in terms of effectively serving underrepresented/Latino/a students. It has also caused the reexamination of electronic pedagogy and the social processes which support that form of pedagogy (Arias and Bellman, 1991, 1994a/b, 1995,1996a, 1997; Arias, 1999a). Faculty fully realize that introducing electronic technology into pre-established learning and teaching models does not necessarily create new paradigms that will capitalize on the potential of the medium to transform the educational process. Rather, faculty fully realizes the distinction between how distance learning and networked learning is important. While distance learning attempts to replicate the classroom ambiance across geographic space, networked learning involves the acceleration of interactions between teachers, researchers and students through electronic networks (Arias and Bellman, 1995; Arias, 1997). The acceleration between teachers, researchers and students is causing an atmosphere of "agile learning."

At CSUMB, a radical shift toward a new model of learning and teaching is developing; students have referred to it as an "electronic pedagogy of the oppressed" (as described above). Based on the integration of networked capabilities into instruction, there is emerging a Freirian reinterpretation of the relationship between teacher and student, the elimination of the temporal and spatial restrictions on the instructional process, and a blurring of the distinctions between "distance" and "campus-based" education. The idea is that learning and teaching incorporate "appropriate levels of technology" and intense interaction, both face-to-face, and "on-line." Learning remains an intensely human and social experience, based on group dynamics developed across a spectrum of networked-mediated, as well as classroom, residential, and community activities (Arias and Bellman, 1995).

While taking into account especially the needs of underrepresented students, CSUMB was among the first to develop a technological infrastructure to deliver an educational program using an "intranet" design in conjunction with the Internet for collaborative learning and teaching. During the past five years, faculty have explored how to utilize fully the "World Wide Web" as a distributed method for course delivery using advanced multimedia technologies as both interface and program management systems. "Contact hours," "seat time," and "virtual or networked education" are being re-evaluated as CSUMB develops an approach to education which emphasizes outcomes and competencies and replaces a credit-based system with the assessment (including on-line electronic assessment) of demonstrated learning.

At CSUMB learning and teaching are considered to be complex adaptive systems that allow individuals to explore alternative structures and model their potential for increasing the effectiveness of higher education. The objective at CSUMB is to create a "smart campus." The campus has an information infrastructure that supports widespread integration of technology into the educational process, but that technology alone is insufficient to assure major changes in teaching and learning (Gunneson, 1997). Thus, other important variables, such as the curricular approach, must be taken into account while at the same time "transforming" technology. As more and more "learning communities" are formed, students and faculty come to a new understanding of how the electronic environment, by virtue of its ubiquitous nature, can have an impact on distributed cognition or how people learn "together" while they are apart (Grenier and Metes, 1992).

The outcomes based education (OBE) approach used at CSUMB, together with the information technology infrastructure, and electronic pedagogical behavior, is what produces a transforming educational effect (Broad, 1997). As the faculty in the Social and Behavioral Sciences Center has experienced, outcomes-based education separates course completion from satisfaction of educational requirements. Emphasis is placed on the students' demonstration of what they know and are able to do, not on completing a pre-determined set of courses. Faculty explicates in advance of instruction the learning outcomes students are expected to achieve, and students understand that they must demonstrate proficiencies associated with those outcomes in order to satisfy graduation requirements.

Under faculty's guidance and supervision, students are allowed and encouraged to develop their own individual pathways to achieve learning outcomes (Cornerstones Workgroup, 1997). This places greater emphasis on the learning process, which is a shift in pedagogical focus that serves all students well. Faculty attention is focused on planning and evaluating the effects of teaching rather than on developing course content. Students discover they can learn on their own, and with others, and in multilingual learning communities, hence, through many different learning experiences both on- and off-line. They become less dependent on the information and learning assignments provided by faculty and more dependent on their own initiative and judgment as a community of learners. As Uri Triesman found in his research on Asian student's success in mathematics courses at the University of California, Berkeley, students who study in groups performed better on tests than those who did not. Likewise, Latino/a students using electronic technology in a "high tech" environment learn to share learning experiences with each other and discover unexpected sources of instructive support. This enables students to become "agile learners," hence, learning and teaching one another while they are apart (Arias and Bellman, 1995). The array of educational alternatives which emerge motivates underrepresented students to utilize technology even more to take advantage of available educational opportunities. Faculties are equally motivated to use the technology to expand the learning options provided students. An "electronic pedagogy of the oppressed" is emerging that will transform both learning and teaching for underrepresented students for the 21st Century.

Research that supports the fact that Latino/a students do well in "high tech" environments is emerging (Arias, 1999a and 1999b). For the purposes of this paper, "high tech" environments include settings where faculty and staff have integrated workstations and each student was assured access to a computer. As part of CSUMB's assured access policy, approximately 90% of students bring a computer to campus with them, or buy one through one of CSUMB's attractive purchase/lease plans. Many of the remaining 10% received computer awards. Computer labs are available in the library, and computers are available on a 24-hour basis; the Media Learning Center and dorms also provide computer access for students without their own computers. Classrooms, labs, offices, many apartments, and residence halls are networked. People living off-campus most often subscribe to an Internet provider, such as Redshift. Each student has an e-mail account, at least 15Mb of private server storage and nearly every student has his/her own web page. When students become seniors and work on Capstone projects, their server storage space is expanded to 25Mb. In short, it is routine for students to access the Internet several times a day, and they are quite accustomed to publishing electronically on WorldWide Web. Electronic mail serves as the primary communication, scheduling, and document distribution mechanism. The First Class server (computer-mediated conferencing software) links students to each other via e-mail and chat rooms to faculty, and to drop boxes for submission of course materials. The goal at CSUMB is to provide a flexible and well-defined interchange framework and suite of applications. As a social form, the networked environment provides for the formation of new learning communities and more opportunities to encourage multiculturalism and multilingualism.

In addition, CSUMB's library has regional and national access to on-line reference materials. Learners have access to more than 7,000 full text on-line journals through Lexis-Nexis, EBSCO, Masterfile, Expanded Academic ASAP, Business and Company ASAP, Academic Press IDEAL, Project MUSE, Novosoft, and World Wide Web publications. Students may also order journals and books from interlibrary loan electronically. Linkages to partner libraries permit shared materials.

The majority of both instructional and administrative activities (e.g., correspondence and organized activity-specific dialogues) takes place via electronic mail, computer mediated conferences (often utilizing organized learning groups) and meetings are scheduled electronically, and documents are created by computer and shipped over the network. The implications for creating efficiencies in instruction and other related educational functions, such as assessment, record keeping, and a wide array of administrative and instructional support services, are enormous. Social and Behavioral Sciences Center members also create GIS digital maps that demonstrate a variety of campus-related phenomena from the distribution of students or where they came from in the state, to space availability and more.

Relatedly, students in the Social and Behavoruial Scienced Center (SBSC) are designing enterprise object-oriented models to link existing on-line materials to visually process one's activities (i.e., fulfillment of learning requirements, IT design, or budget, etc.) in relation to other activities and the impact decisions may have on stakeholders. Enterprise-based object-oriented (OO) and Unified Modeling Language (UML) modeling makes it possible for faculty to direct student-based projects to build the needed visual environments to organize people, technologies and activities (Arias, 1999a, 1999b, and 1998). In the SBSC's modeling approach, the focus is on "things and relationships between things" described in commonly used terms. The modeling software bridges the so-called "semantic gap" between the people and the computer language. Once a "map" of objects has been produced, users can navigate and visualize very complex relationships. Objects can hold data, such as how students are assessed for university learning requirements and major learning outcomes, course schedule data, software availability, scanned images, weight, and other relevant information. Another important property of an Object is its ability to perform work scripted in "methods." Thus an Object can be given the capability to perform functions, such as performing computations, gathering data from other computers, showing video of servicing a part, or accessing a 3D-CAD drawing for viewing. This "active model" is much more than a GIS map for navigation in an abstract process model (Arias, 1999a). It becomes the actual work environment for individuals and teams. It creates an occasioned environment for learning, assessing issues and impacts, communication, and expanding personal electronic pedagogies.

In his keynote address to the U.S.-Mexico Chambers of Commerace and the Association of American States, the author of this paper unveiled a futuristic object-oriented model of a design for envisioning and to some extent operationalizing a binational agenda for higher education. The model was presented to Seretaries of State from both countries as a tool for planning in order to develop "what if" scenarios, like "what if" the U.S. and Mexico were to collaborate on a truly binationally located institution of higher education. Or, "what if" they were to build a technological infrastructure for creating a truly binational virtual university. To a large extent *The Monterrey Institute for Graduate Studies* is well on its' way to achieving this goal with private support. The Monterrey Institute with its' goal to become the primary U.S. institution to educate and train the greatest number of people of color receiving Ph.D. degrees each year, will utlilize object-oriented models for its' virtual or distance education "facilities," student electronic portfolios, and for organizing its' full breadth of teaching, learning and assessment, as well as administrative activities, all on a global basis.

Latino/a students are beginning to apply enterprise object-oriented models for incorporating everything in their academic experiential universe, from their Individual Learning Plan to their Senior Capstone Project and much more. Many are beginning to see this as a tool for examination of self, whole life planning, and as a new form of electronic resume. They see it as a personal empowerment tool that can transform the processes of discovery, learning, research, and communication through emerging forms of distributed cognition (Arias, 1999a).

The intense electronic culture at CSU Monterrey Bay is transforming the social and learning environments on campus, especially for Latino/a students; as they communicate bilingually (Spanish/English) with agility via an open electronic forum and collaborate on course work via electronic conferences (Metes, Gundry and Bradish, 1998). Course syllabi and assignments appear on the World Wide Web. Work is distributed electronically via campus servers and handed in automatically into write-only drop folders

via electronic mail. It is routine for underrepresented students to produce artwork, do research, submit assignments, make appointments, and create and perform class presentations, all by computer. Latino/a students communicate in Spanish and English among themselves and discuss work with their instructors on-line in either language. The bicultural characteristic of both students and faculty is certainly an added dimension. Students use collaborative document techniques to work together, use spreadsheets and charts to portray numerical information, and make multi-media portfolios of their work. They are skilled at using scanners, digital cameras, and projection equipment, and most can make Web pages. Team-taught courses (both on-campus and between universities, especially with Mexico) utilize the same electronic pathways. These examples leave us with the indelible impression that when underrepresented students are given the opportunity to engage the new technologies, they do so with agility and, often, in new unique ways.

Case Studies in Technology Integration in Agile Learning and Teaching

Within each major at CSUMB, students must learn discipline-specific technological skills through classroom, lab, and field experiences that incorporate both the outcome-based education approach and technology into the curriculum. One of the most innovative Centers on campus that is providing institutional leadership in this way is the Social and Behavioral Sciences Center (SBSC).

Social and Behavioral Sciences Center

Multimediated applications to the social and behavioral sciences have altered the way students learn and approach their studies. It has also altered the way faculty members teach and relate to the student (both on- and off-line). Prof. G. Baldwin (personal communication, Spring, 1998) said that faculty lectures are available in multimedia formats that vastly increase learning opportunities and change learning formats for students, as well as offering them alternative "pathways for learning" (a live classroom performance, a video-tape of that lecture, computer mediated conferences of the same, a live satellite/microwave broadcast, etc.). These multimediated applications and diverse electronic formats accommodate both on- and off-campus students with a range of learning styles (e.g., distributed, distance, etc.) and flexible scheduling needs.

In the Social and Behavioral Sciences Center (SBSC), students work in peer groups on selected projects, using computer-mediated technology in the research, writing, and presentation phases. Latino/a and other students often create multilingual peer groups. Faculty engage students through project-based learning; the projects interpolate theoretical learnings into applied learning within the framework of real-world simulations or experiences.

For example, National Science Foundation funding has supported the SBSC in development of a path-breaking multimedia interactive learning simulator (which contains the entire curriculum and instructional materials) for teaching students how to conduct field research in an electronic (computer) environment, known as the Ethnographic Research Multimedia Project (ERMP).

Prof. Manuel Carlos (personal communication, Summer, 1999) reports that the ERMP has already developed and is continuing to create various levels of multimedia interactive learning simulators, which contain the entire curriculum and instructional materials for teaching students how to conduct virtual field research in an electronic environment. Students train as ethnographers in class and laboratory settings by working on ethnographically authentic interactive textual, visual, and aural medium mediated by computer technology. The electronic filed site approximates "real life" situations to train students in scientific principles and protocols. The coursewares (text, curriculum, and CD-ROM) are currently in beta testing at CSUMB, the University of California, Santa Barbara, and the Universidad de Queretaro. The materials have multimedia elements that include text, slides, video clips, and audio, maps, text, and statistics that pertain to research conducted in Mexican peasant communities. The simulators allow students to test hypotheses for the communities and for global impact studies. Feedback permits students to monitor their observations against control elements that test for apparent contradictions, reliability, etc. Latino/a students are attracted to not only the on-line simulators, but also to the summer field trip requirement to Queretaro, Mexico.

Another fascinating area that has captured the imagination of Latino/a students for the purposes of causing social action is one of the most rapidly growing modern technologies or GIS. Although you typically find GIS in engineering, natural science, and geography departments, and even business schools, SBSC embraces the relevance of GIS as a tool to study human social forms. GIS is, therefore, incorporated as an equal partner to the blend of social and behavioral sciences; faculty, staff and students learn to manage georeferenced information. Faculty members are directing students vis-à-vis project based learning to design GIS digital maps with any kind of attribute data that have important spatial significance. Latino/a students have been focusing (by their own accord) on such topics as vegetation land use as compared to the development of low-income housing for local farmworker families, pesticide utilization in different areas of the county, road networks and their proximity to communities of people of color, gang territories, drug rates, and diseases. Similarly, from a proactive standpoint SBSC students have already conducted extensive research on the region to determine how to target recruitment of underrepresented students for a possible satellite campus. Students are now planning a study that would map regions in the Southwestern United States where Latinos/as have been displaced or relocated as a direct result of urban renewal. They are particularly concerned with mapping areas where institutions of higher education have been established and Latino/a communities were displaced (i.e., Auraria Higher Education Complex in Denver, San Antonio College, San Diego State University, Texas A&M University-Kingsville, San Diego City College, new extensions to San Jose State University, etc.).

Similarly, the SBSC Institute for Community Networking (ICN) promotes the academic study of civic networking: the use of telecommunications by the general public for local community and economic development, non-profit service delivery, and civic participation in government. Various names have been used to describe such systems: community computer networks, civic networks, public access networks, free-nets, public information utilities, electronic town halls, telecommunities, community communication centers, and telecottages. Others have defined public access networks as "an electronic system of information bases and/or person-to-person communications, structured around defined public interest goals in a particular geographical area or jurisdiction" (Baldwin, 1997).

Using a Silicon Graphics Indy computer and Netscape server software, the ICN is dedicated to the study of "virtual communities," "virtual identities," and the Internet's emerging global community. The social psychology of on-line behavior and how it is shaped by telecommunication policy is explored through project-based learning labs, simulations, and real-life activities on the Internet. Students are encouraged to work closely with their own community to develop such systems, then publish and present their findings at regional and national community networking conferences (Baldwin, 1997). It is projects such as these that underrepresented students are drawn to: social action-based project learning.

The following annotated list highlights the electronic pedagogical techniques utilized by faculty to synergistically blend technology and competency based education into an advanced model for educating students in the social and behavioral sciences in the 21st Century. Again, we have no evidence that underrepresented students have "trouble" adapting to the new technologies.

Web Based Technology: HTML (HyperText Markup Language) technology has enhanced all faculty courses. All SBSC course syllabi are available via the Internet as well as the Intranet. The Center's home page is linked to course material on faculty computers or campus servers, which work with "connected-CD-ROM" technology that seamlessly integrates the full motion and stereo experience of the CD-ROM with the interactivity (on-line grading, on-line assessment, chat, etc.) capable with the Internet. Syllabi are located on the World Wide Web and are being utilized in team-taught on-line classes by professors at other institutions.

Competency-based education and web-based syllabi allow faculty to design curricula that address the required (and operationalized) learning outcomes. In the event students lack a skill necessary to achieve the learning outcomes they are pursuing, the HTML-linked syllabi enable students to learn in a non-linear fashion - not bound strictly to the path for learning established by any professor. Non-linear access of curriculum content allows SBSC majors to draw on curriculum content engineered by other faculty. Multiple syllabi that interact with the learner in this manner are not possible with course-based curriculum.

The web-based curriculum, in some instances, reaches out into the community for course content. For example, the Institute for Community Networking has parallel course content about community information systems. Students work with non-profits and government agencies to construct web sites that distribute those organizations' public information.

Collaborative Writing as Pedagogy: E-mail and electronic documents are incorporated into all learning activities. This is a highly interactive method for improving writing skills and has been embraced by all faculty in the Center as part of our pedagogy. Students are required to rework documents, individually or as part of small research teams, several times before they are accepted. Collaborative writing and peer editing, combined with electronic dissemination of the product, is a powerful teaching tool (Hiltz, 1988; Johnson-Laired, 1988). The electronic distribution of these documents via e-mail allows students to overcome the scheduling problems usually faced by nontraditional students who have less time to spend on campus due to family or career obligations.

From the student's perspective, the use of new technologies to deliver the curriculum is just as dramatic as the competency-based system of electronic assessment presently under construction. Faculty, staff, and students have found that the innovative use of multiple mediated applications provides a qualitatively more thorough, efficient and more independent means of engaging students, as Paolo Freire would recommend, whether the engagement occurs synchronously or asynchronously. The social aspects of the Internet are used as a fertile ground for social science research, allowing students to demonstrate competency in various technologies as well as traditional social science research methodologies and theories.

Electronic Multimedia Portfolio Assessment

Students exhibit, in the form of multimedia portfolios, the basis for meeting All University Learning Requirements (ULRs), Major Learning Outcomes (MLOs), and state requirements. The multimedia portfolio incorporates the use of digital text, digital data, digital art, HTML, and object-oriented modeling technology for a comprehensive and formal multimediated presentation. The portfolios exhibit how students have met all graduation requirements over the course of university attendance. The purpose of a multimedia portfolio is not only to create a new method of learning/teaching communication (deliverable presentation and outcome assessment). It also affords the student permanent digital records (i.e., electronic resume that can be designed into an active object-oriented model) of accrued university work, as well as a student's assessed learning experiences. In addition, the academic work (during final assessment) can be provided to the faculty member, assessment specialist, and/or the senior assessment committee in an easily accessible format. The multimedia portfolio is based on Netscape Gold, Microsoft Word, the CSUMB Seal Server, as well as other campus computer hardware.

The Utilization of Computer Messaging Systems (CMS)

The use of computer messaging systems, or CMS in particular (from e-mail and synchronous multilingual "chat rooms" to computer mediated and focused/organized dialogs), is but one powerful example of how basic technology (readily accessible and low cost) has greatly impacted teaching and learning, especially with underrepresented students. It has, and will continue, to provide new opportunities to reach Latinos/as. This has been clearly demonstrated in our computer networking pedagogical approaches involving culturally and linguistically diverse groups of students from the region (Baldwin, 1997). In the course of experimenting with new pedagogies, professors have been able to both cause and evaluate various features of computer networked learning offered via the Internet that is truly bilingual, bicultural, and sometimes global in focus. They have shown that computer-messaging systems that are designed for bilingual (Spanish/English) settings greatly augment regular classroom instruction. We have also learned that CMS is a viable technology for Latinos/as taking courses on- and off-campus, distance learning, and/or through distributed educational modes that are "intra-netted." CMS provides individualized and group attention to bilingual/bicultural students that can not be obtained using traditional methods of monolingual, majority dominant cultural classroom feedback. It supports a Freirian method of instruction, whereby students are much more actively involved in the teaching and learning process rather than being passive recipients. Latinas report that the

"playing field" is leveled as well. Latino/a students utilizing CMS also report that the anonymity of the technology promotes bilingual discussions whereby students prefer to converse in both Spanish and in English. Latinos/as report that this is the sort of discussion that otherwise would be inhibited in traditional classroom formats. Examples of this are the success of on-line courses that incorporate a multiple of computer messaging systems (synchronous/asynchronous communications, computer mediated conferences that are conducted over time and by invitation only about a specified topic, etc.).

Let's say, for example, that two professors choose to add forms of computer messaging systems to augment their existing syllabi to accommodate numerous on-line (computer mediated) teaching, learning, and assessment experiences. They incorporate CMS, as a viable instructional form for team-teaching, small group study, bilingual chat rooms, and conference dialoguing modes. They also decide on a textbook that is printed in Spanish and English. Utilizing CMS, one professor may be physically located at an institution in the U.S. while the other is in a Spanish-speaking country. Both professors should be bilingual/bicultural. In U.S. classrooms serving primarily Latino/a students, we have found that it also helps if the professors in the Spanish-speaking country are recipients of advanced degrees from a U.S. institution; most are willing to experiment with CMS in their personal electronic pedagogy.

Other personal electronic pedagogies may be adapted, like encouraging students in a math class to determine the answer to an equation through detailed description or text in Spanish or in English, or in both languages, thus allowing students to work in virtual groups they form (with students of either dominant language). In this sort of learning environment, bilingual students have the option to approach problem solving through text, in both languages, as a group, and also attempt the numerical approach with more confidence. Concomitantly, students and professors experience a learning behavioral paradigm shift, as they simultaneously become learners and teachers. Students and professors alike come to a new understanding about multiple ways of knowing (classic Freirian learning), and soon begin to view their subject matter from a multiple of perspectives and dimensions, as well. Contrary to traditional myths about on-line teaching and learning, CMS greatly accelerates and facilitates the ability to unify knowledge, hence, an "agile learning" style. In this setting, we have learned that all approaches to problem solving are viable. This approach sends a powerful message about the nature of learning to faculty and students, especially would-be teachers. In short, CMS encourages other ways of knowing and diversity, by design.

The application of computer messaging systems (CMS) in the classroom in this way is but an analog for how that many multilingual-global group settings may be formed for the purposes of conducting everything from classes, to assessment, to group research (working together while apart) and how these may be successfully and qualitatively conducted over an Intranet or over the Internet. Again, it is relatively low-cost and has had a dramatic positive impact on teaching, learning, and access.

Computer messaging systems promote student-to-student interaction and collaborative work. Underrepresented students who may not have experienced the new media and, as those more sophisticated in technology, learn with equal facility. As a consequence of having this experience and familiarity with new technologies, many Latino/a students who traditionally are not "heard" have switched to becoming individuals with emerging voices both on- and off-line. This attributes to a new dimension to the developmental of self (in the social psychological sense). The "self-efficacy effect" on Latinos/as alone is something we look forward to as it empowers underrepresented students early in the 21st Century.

What we have is an emerging electronic pedagogy being formed as a direct result of new forms of engagement. As the new media develop, underrepresented people must leverage its "broadcast" facility to learn from each other in new ways, become the learners and the teachers, and at once design pedagogical breakthroughs to advance the unheard voices, as the focus must be muti-fold:

- CMS, and new media itself, involves emerging pedagogical factors that, once realized, unveil new "ways of knowing" for diverse populations which must be applied in virtual environments;
- by empowering underrepresented people through electronic tools, such as computer messaging systems and other new media, new social forms (social networks) will be created and make positive changes to the existing virtual landscape;

- we must continually renew new media (CMS, etc.) and subsequently re-examine new tools for expanding the paradigm in support of "other ways of knowing and diversity";
- we must understand the integration of the CMS tools, within the context of multiple cultures and languages, and at the same time strive to build virtual environments that embrace diversity.

Much more strategic thinking surrounding access to, and use of, the new technologies is needed. Too many administrators focus only on the acquisition of computer hardware as the cure-all to their technological deprivation. By comparison, the availability of technology may be measurably higher at CSUMB, but it is these sorts of experiences that have left faculty with the indelible impression that the quantity (or lack thereof) of computers in an institution is not the primary obstacle. The obstacle lies in the limited vision and direct experience people have about what computer communications systems can provide. Most particularly when people get creative about sharing resources within and between institutions, electronic bartering may vary from sharing files, to servers, to materials located on the servers, to leveraging software purchases with major corporations. There presently exists unlimited access to endless amounts of technological opportunity (e.g., databases, software, and networks) if only people learned to distribute the costs. Rooms full of computers are not necessary; rather, new behavioral approaches to technological utilization are absolutely necessary.

Presently, CSUMB is grappling with the idea of how to share the vast amounts of on-line materials with other like institutions. They are beginning to view knowledge as "social capital." In this way, they are exploring expansion of their on-line materials with the National Hispanic University (NHU) in such a way that would encourage on-line team-taught courses. This would allow the NHU to leap forward into on-line teaching and not have to make costly mistakes, and at the same time concentrate their resources to similarly related support.

What faculty and administration want throughout elementary, secondary, and post secondary education is to readily assemble the hardware needed to provide students and teachers a new pathway for accessing information throughout their region, nationally, and internationally. CSUMB's underrepresented students are beginning to realize that one computer, readily available and connected to a server, can take the place of a room full of computers. Once the student, teacher, and/or administrator develops the strategic thinking that directs them to seek beyond their institution to gain access to sorely needed software and other relevant materials, cam we develop a "last mile" perspective on technology. Perhaps César Chávez would depict this as a "si se puede con tecnologia" perspective, as researchers (Arias and Bellman, 1990; 1991; 1993b; and, 1994b) have found:

A. Underrepresented students in a "high tech" environment experience

1. How "base" and advanced technology greatly augments regular classroom instruction and is a viable technology for multilingual and multicultural teaching and learning;
2. How new media are viable technology for off-campus or distant education especially in underrepresented communities;
3. How computer messaging systems serve as viable interactive components to video or live instructional television courses by providing individualized attention to underrepresented student needs and requirements that cannot be obtained using traditional methods of audio and video feedback. Likewise, video lectures that are purchased by the institution often have faculty that represent the dominant culture and do hold similar values and beliefs as underrepresented students – CMS can bring a new "balance" to that omnipresent variable;
4. How computer messaging systems technology facilitates writing across the curriculum and greatly improves student writing, editorial, and logical skills in multiple languages and, at the same time, promotes group support for the value of multilingual on-line communications regardless of the level of competency in a language;
5. How computer messaging systems are important for developing "open" attitudes or connectivity with users' diversified electronic groups;
6. How when used with video presentations of lectures, computer messaging systems permits students to learn more deeply than with the televised segments alone. Where computer communications were first used to augment and supplement video instruction, video now supplements computer-communications-delivered instruction. This is a major shift learning from the individual to distributed cognition;

7. How underrepresented students are able to master both basic and advanced computer communications techniques and immediately begin learning and communicating on-line.

B. Pedagogical Benefits

1. Computer messaging systems support a Freirian method of instruction, whereby students are much more actively involved in the learning process rather than passive recipients.
2. This technology is particularly useful for facilitating group discussion and constructive criticism in virtually all areas of the curriculum.
3. The medium is viable for reaching culturally and linguistically diverse learners, and has been positively received by students.
4. Computer-naive students learn with agility equal to those more sophisticated with the technology.
5. Social science and humanities students having some word-processing skills learn and accept the technology at a level equivalent to students taking computer sciences courses.
6. Students adapt particularly well to the technology when interacting with students from distant locations and campuses.
7. Group reading of computer-mediated conference notes in a class promotes discussion with students on distant campuses and international sites.
8. Coupled with visual materials, thinking textually is sufficient to improve literacy even when a liberal attitude is taken toward grammar, syntax, and spelling.
9. Writing skills in more than one language improve with active participation in computer conferences. (Arias & Bellman, 1994; 1995; 1997.)

C. Social Psychological Impact

1. Computer-mediated conferencing and supportive technologies (e-mail, chat rooms, videoconferencing systems, etc.) promote participation and learning in traditionally communicative apprehensive learners. This is especially the case with shy students, whose first language is not English, and women who are not apt to verbally confront men. In each of the latter three categories; individuals willingly express themselves when interacting on-line.
2. This technology greatly augments student interaction and promotes attitudes that such learning is a legitimate and necessary part of the pedagogical process. In traditional classroom situations, students are often reluctant or denied the opportunity to interact with others except the instructors; computer communications as discussed here promote student-to-student interaction.
3. The anonymity of the technology promotes discussion that might otherwise be inhibited out of concern for student face-to-face negative feedback.
4. The anonymity of the medium is sufficient to promote critical discussion and is as effective as anonymity of identity in conferences.
5. The connectivity of the medium promotes friendly attitudes toward those engaged in discussion, and promotes more critical than hostile competitive discussion.
6. A combination of computer conferencing and telecommunications technology (a la VTEL) promotes stronger group attitudes and participation than E-mail distribution-list-organized conferences (Arias & Bellman, 1994; Arias, 1997, 1999a, and 1999c.)

Expanding Education for Underrepresented Students Through Partnerships

As a start-up institution, CSUMB planners found themselves in the fortunate position of being able to make the best possible choices in technological and information-technology infrastructure, and as a direct result made major investments in technology. To their credit, planners collaborated with over 20 major research institutions that rim the Monterey Bay, school districts in the region, corporations in the Silicon Valley, as well as the State and Federal Government (Naval Postgraduate School and Defense Language Institute), and provided the leadership to work together to develop further advanced infrastructure for especially interconnected-technologies. One high profile example of this is CSUMB's collaborations with Pacific Bell, AT&T/Lucent Technologies, and other corporations to develop an ATM network connected through a Lucent Switch, via CSU-NET, to provide access to the Internet. This helps facilitate interaction between the ATM and ISDN networks for the schools, the community, and the relatively isolated region. This positioned CSUMB as a leader in high-speed ATM capabilities, giving full connectivity to entities such as BayNet for live underwater video from Monterey Bay and statewide distance education

multimedia using near-broadcasting quality video and high speed multimedia as well as access to scanning electron microscopes. Collaborative efforts are also under development for off-campus extension of the high-speed network with local cable TV and Ethernet to campus residences.

Examples of how students are engaging opportunities and at the same time leveraging technology partnerships include:

- *AT&T Signature Schools Project:* In a partnership which includes the non-profit, community-based Greenlining Institute, the Latino Issues Forum, the Detwiler "Computers For Schools" Program, and other non-governmental organizations like AT&T, CSUMB is designing a "Signature School" teacher training curriculum for use in an "at-risk" San Francisco elementary school population. The project places Internet-ready computers into the school classrooms, and the homes of teachers and students, (40% of the students live in the Bay View and Hunters Point housing projects, a disadvantaged African-American neighborhood) in order to improve academic success of these students. Results from this initiative will be shared systemwide within CSU and will be distributed nationally.

- *California Academic Partnership Program (CAPP):* CSUMB is also a partner along with Gavilan College, San Benito High School, the *Free Lance* Newspaper, Radio KMPG, Hollister, the Office of Emergency Services, Cupertino Electric, the City of Hollister, and others, in an innovative, technology-focused "School-to-Career" Program designed to raise the English scores of Latino students to meet college entrance requirements, increase the number of Latino students entering 4-year colleges, and increase the number of Latino instructors at San Benito High School. As co-director of this CSU-funded program, CSUMB is providing support through the university academic and student support systems, telecommunications and International Entrepreneurship and Education Studies degree programs, teacher training programs, curriculum and articulation guidance, service learning and talent search services.

- *Monterey Bay National Resource Center:* As part of a Title VI grant application, CSUMB has proposed to establish a National Resource Center comprised of the major educational and corporate players in the region. This would focus on language acquisition, curriculum development, and integration of technology. One of five institutes within the Monterey Bay National Resource Center, the Institute for the Creative Use of Technology will adapt and develop indigenous, foreign, and English language programs that will be offered to other educational institutions, including CSU campuses, and marketed as appropriate.

- *Docent Training:* This project utilizes teleconferencing and Web Page resources to train docents for the Monterey Bay Aquarium using microwave/satellite technologies.

- *Monterey Bay Net:* CSUMB and Monterey Bay Net provide Internet access for 42 Monterey Bay area schools via through the "Initiative for Information Infrastructure & Linkage Applications."

- *CSUMB Service Learning Institute:* Places students as technology tutors at local public schools and as experts at non-profit agencies, such as in the development, coordination, and multitude of on-line activities created for the First Annual International Salinas Valley Mariachi Conference and Festival.

Industry Collaborative Projects for Education

English as a Second Language 2000: Working with Granite Corporation and HRB Systems, CSUMB is currently evaluating the format and content of the English as a Second Language Program (ESL2000) in order to develop a proposal to improve and enhance this computer-based, self-study program. In addition to correcting technical problems within the program and integrating the latest pedagogical techniques, this project involves the reprogramming of the software to network and Internet standards for on-line and distance learning purposes.

- *Archipelago Productions:* This software development company is a subsidiary of the major educational publishing house, Harcourt-Brace, and has recently relocated its headquarters to

Monterey due to the region's language resources and CSUMB's technology focus. Archipelago Productions has proposed a collaboration to develop an "English as a Second Language" program. It would be a follow-up program for Archipelago's best-selling introductory Spanish course or "Encuentros."

CSUMB has also crafted a number of strategic alliances with leading-edge technology companies to create state-of-the-art tools and learning experiences for applied technological innovation. Some of these alliances include:

- *Sun Microsystems:* Sun Microsystems installed a full Sun site, one of fewer than a dozen such sites in existence. The massive server capacity this site offers allows CSUMB to provide 'community server' resources. For example, every CSUMB student, staff, and faculty member is given space for home pages, and numerous non-profit and educational institutions within the region are also given space. Additionally, the university makes server space and support services available for entrepreneurial web-based student activities.

- Silicon Graphics, Inc.: Silicon Graphics, Inc. has equipped CSUMB with one of only a half dozen full Silicon Graphics Studios. The studio is positioned as a university and community learning resource. Courses are offered to CSUMB and other universities' students and faculty, and employees of commercial firms, all of whom want to learn the techniques of high-end, 3-dimensional computer animation.

- *Lucent Technologies:* Lucent equipped CSUMB with a Definity 3GR Switch and a switch to the experimental telecommunication laboratory, so that learners may explore the many dimensions of ITC (integration of telephone and computing) technology. The way planners "design-in" both distance/distributed educational functions and student services (for students at a distance) will be a major contribution to the applications' engineering. This will prove invaluable once we begin to link, through telecommunications, to cities with large Latino/a populations (Salinas, Gonzales, Chualar, King City, Paso Robles, Santa Maria, etc.). The "switch" will allow for telephone registration and access to multi-lingual auditory environments.

- *Sony:* Sony equipped the university with a full Avid computer-based, video-editing facility and a state-of-the-art, on- and off-line customized Sony System 3000 editing and broadcast control system. CSUMB now has one of the most advanced professional video broadcast, post production, and long distance learning sites of any university in the nation. The high-end nature of this hardware has contributed to the integration of the study of theater with film, video, audio, and Cyberspace. CSUMB is furthering the development of an all-digital, postproduction center, for basic video editing to digital imaging.

These are but a few examples of the rapidly expanding technologically-oriented projects at CSUMB. As a whole, they demonstrate the redeeming features of this campus that constitute a rich mix of both residential and virtual learning. In the near future, CSUMB may grow to be as high as 80% residential. Plans for utilizing technology can only be a catalyst for agile learning, teaching, research for overcoming distance (even on its own huge land mass), and for providing access for all students, especially our historically underserved and underrepresented populations.

Conclusion

Historically, the State of California and the California State University System has not made investments in trying to be responsive to a diverse population that is rapidly changing. Policymakers have systematically ignored the needs of the largest and fastest ethnic group – Latinos/as. The RAND Corporation and others postulate that, by the year 2005, there will be 1 million students qualifying for admittance into either the University of California or the California State University who cannot be admitted because both systems will be totally impacted. The majority of these students will increasingly come from underrepresented populations. This is being called the "Third Wave" by the California Roundtable. Unless new ways of delivering quality learning are invented and unless we increase the capacities of existing institutions, students (especially underrepresented ones) will be locked out of higher education. The proper utilization of technology offers some hope — especially as partnering occurs with existing institutions (Daniel, 1996).

Under the leadership of Franciso Hernandez, Vice-Chancellor at the University of California at Santa Cruz they too have come to similiar technological realizations as they embark on a steward effort to bring distance education courses to Latino high school students headed for the University of California. They have researched existing entities, such as, the Cisco Academy and have found that while many "off the shelve" programs are of high technological quality, they lack the integration of the core values you embedded in the Vision Statement at CSU Monterrey Bay, such as, multilinguism, globalism, ethical reflection and the like. Hence, they will most likely begin to design their own courses that will reflect important core values-such as these. Relatedly, during the summer of 2000 Dr. Arias and his team of researches surveyed and interviewed over 200 corporations in the Silicon Valley. In nearly every case corporations experessed a "high need" for students to possess these "skills sets" as well. In addition the number one finding was that corporations wanted students that could manage projects. But this typically meant in a global and multilingual context.

Private and public institutions of higher education should strap on this challenge and join to carry education to underrepresented students in new ways, both where they live and through distributed education centers. Innovative educators must develop well-defined visions of how computers and telecommunications networks can improve teaching and learning. Once a vision for serving Latino/a students through the utilization of new technologies is realized, cooperative ventures with institutions such as the National Hispanic University (NHU), K-12, and/or public agencies could prove invaluable. The NHU has an important goal in locating their campus in a Latino/a community. The idea is to improve participation among area high school graduates. Hence, when improving access for Latino/a students, a more targeted approach will have greater impact. That is not to be taken lightly.

For instance, last academic year San Jose State University graduated only five Latino/a science majors. If the NHU targets just 20 Latino/a students and provides them with a science curriculum, while simultaneously providing them with ample academic (retention) support (a la, on-line materials, on-line peer group learning experiences in bilingual and/or bicultural modes, access to high end hard/software, etc.), they could create class after class of Latino/a science graduates, perhaps 20 per year within the next five years. That is four times more Latino/a science majors than SJSU produces with a total student population of nearly 30,000. The National Hispanic University presently has 300 students.

In the near future, the vision of a public and private partnership will become a reality through the utilization of videoconferencing systems and the Internet. This will enable more institutions like CSU Monterrey Bay, The National Hispanic University, The Monterrey Institute for graduate studies, and others, to serve the more Latinos/as, to expand their curriculum, share resources, and collaborate on projects that, without the technology, would be deplete of learning augmentation or be too labor intensive. As more and more universities like the CSUs and the UCs improve their on-line materials and virtual learning experiences, we will find increased opportunities for Latino/a populations.

CSUMB has, as part of its Vision Statement, a mandate to serve historically underserved and underrepresented students, and as its founders (especially Latino/a faculty) are contributing to new ways of engaging Latino/a students through the utilization of new technologies, the campus is positioning itself to substantially increase the number of underrepresented students. Be that as it may, it too needs to establish well-founded partnerships with entities such as the National Hispanic University. At the minimum, CSUMB faculty from underrepresented groups aspire to make original contributions, while simultaneously building bridges between groups, ethnic groups, racial groups, and class groups.

In short, through continuous renewal, this university must be fully responsive to the needs and constraints of the 21st Century.

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