

The “4-D” World of Higher Education: A New Context for Student Support Services

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Not long ago, one might have thought that student services and information technologies were only marginally related. The former was humanistic and personal, the latter technical and impersonal. This article will suggest that the digital revolution in the university and in the culture as a whole mandates the widespread adoption of technology in all facets of student support services. In exchange for developing new skills, one can also discover powerful new tools for meeting student needs.

George Kuh (1997) has described the importance of developing new skills and tools, even if it means discarding old ones. He emphasized the human side of student support services as opposed to the technological. But his thesis is accurate at either end of the continuum, and the following investigation shows how these perspectives constitute complimentary rather than contradictory sets of skills and tools.

The following is divided into three broad categories: a description of the emerging “4-D” environment in higher education, a discussion of the implications of that environment for student support services, and a presentation of a new model of student support services which takes advantage of the opportunities afforded by the 4-D world. The context, implications, and recommendations for a 4-D environment are described.

The 4-D World

Higher education will be one of the growth industries in the next several decades. Currently, the approximately 3,700 institutions in the United States enroll approximately 15 million students. In 10 years, that number may stand at 25 million students, the vast majority of whom may be pursuing new job skills and knowledge rather than a formal degree. “The nontraditional student will have become the norm and will represent the ‘dog’ rather than and ‘tail’” (Twigg & Heterick, 1997). Professionals no longer speak of a single career, but rather of a series of jobs in a career portfolio.

As Davis and Botkin (1995) assert in *The Monster Under the Bed*, “[I]f you are not being

educated in your job today, you may be out of a job tomorrow.” The lesson for all forms and levels of the formal educational establishment is clear—a new and potentially rival mega-industry is emerging to meet the growing demand for education. It is that private mega-industry—the union of computers, telecommunications, entertainment, new media, consumer electronics, and publishing—that will take over the training needs of tomorrow’s workers unless the formal education system wakes up to the monster in its midst.

Accordingly, higher education is moving into a radically new climate which has implications for everything it does—teaching, learning, advising, administration, and student support services. The components of the information revolution have been described in a variety of ways, but it is useful to highlight at least four that are impacting higher education: It is digital in nature, distributed in location, diversified in resources, and “disintermediated” in terms of user access. Together these elements form a 4-D environment for colleges and universities in the coming decades.

Technology is Digital and Diversified

The changes in college environments are driven by innovations in and the increasing convergence of digital technologies. Soon people will be able to combine text, voice, and video in real time, with interactivity, and not need to worry about the constraints of physical space or distance (or perhaps even bandwidth). Students can get what they need, when and where they need it, anytime, anyplace, whether in real-time or through asynchronous interaction.

The Internet is perhaps the most obvious and important technological development of the past several decades. It may not be an exaggeration to state that the emergence and future evolution of the Internet and World Wide Web will prove to be the single most important contribution to mass education since the invention of movable type more than 500 years ago. It may even spell the ultimate doom of linear, text-based learning.

Its growth is phenomenal. According to researchers at the University of Michigan, Internet traffic has increased by a factor of 860 in

under 7 years (MacKie-Mason, 1996). The growth in multimedia on the World Wide Web portion of the Internet is even more staggering—a 61% per month compound growth rate (MacKie-Mason, 1996). Still, in 10 years, will the accidental superhighway known as the Internet be as irrelevant as the CB radio? Here is one assessment of the Internet's growing pains:

... open networking seems as fundamental to civilization's needs in the first half of the 21st century as ubiquitous, open roads did in the first half of the 20th. The lesson of the Internet is simple and lasting: people want to connect, with as little control and interference as possible. Call it a free market or just an efficient architecture: the power of open networking has only just begun to be felt. (Anderson, 1995)

According to a recent Educom/IBM report, conservative estimates put the current number of Internet users at 50 million (Twigg & Oblinger, 1996). Predictions are for more than a billion users before the end of the decade; network traffic will exceed telephone traffic.

Microprocessing speed and capacity double approximately every 18 months. But bandwidth will see the most revolutionary change in the next decade. While computing power is estimated to increase 100-fold between 1990 and 2000, bandwidth expansion is anticipated to be between 800 and 1,000 times greater than it is now. The expansion in bandwidth will allow, for example, the delivery of multimedia directly to the home (Twigg & Oblinger, 1996).

The Internet symbolizes both a technical and a social revolution, as important and widespread in its effects as the printing press, the steam engine, the telephone, the automobile, the television, and the personal computer. It is becoming the grand synthesis of all previous forms of human communication through the integration of the technologies on which it is based. Any discussion of education in the 21st century must assign to it a central, and perhaps, dominant role.

There is at least one disquieting note about the emerging digital (or Internet) culture. It is fiercely independent in these formative, frontier years, evoking distrust and even hostility to any form of centralization and to almost any ethic of social responsibility. Presumably, these tendencies will moderate once the computer culture matures and becomes more representative of the general population. But in the near term, the

"helping professions," and the programs which they espouse, may not find the political landscape of cyberspace very accommodating.

Technology Distributes Learning Opportunities

The concept of physical place is central to the traditional paradigm—campus, classroom, laboratory, library. Similarly, clocks, calendars, and highly structured units and sequences of time figure prominently in the traditional instruction process. Ideally, the constraint of place provides face-to-face interaction between faculty and students, and the constraint of time insures that learning and feedback occur simultaneously (i.e., in real time).

However, digital communications also produce a distributed social and learning environment. The sense of physical structure, such as a campus, begins to give way to scores of virtual communities in cyberspace. People can seek and find others with common interests with relative ease and anonymity. Again, the face-to-face experience of asking questions and finding answers may become the exception rather than the norm.

Because the information resources are becoming more diversified in format and content, Information Age models of learning are independent of space and time and suggest only a marginal need for face-to-face interaction. And while the technologies and tools for learning are diversifying, the students and academic programs are losing their standardized images. Technology will be the chief means for addressing social and demographic diversity, and for responding to the cognitive diversity of learning styles (or "multiple intelligences," as they are sometimes called).

For example, information and telecommunications networks—many of them wireless—will soon be as ubiquitous and portable as telephones. Information will be available in a variety of digital formats that can be accessed virtually anywhere, anytime, using personal tablets or other hand-held devices. The individual learner determines when, where, and how learning occurs, which may or may not involve the campus or a faculty member. The learning tools of the Information Age are increasingly personal in a way that traditional information providers and resources could never be. Learning is becoming more individual-centered rather than group oriented, and it is becoming more self-paced in style with the individual in control.

Though much of learning is social in nature, interpersonal interaction does not need to occur "in person" or in real time to be effective. Virtual

classrooms and discussion groups can be easily created using communications technologies that combine video, voice, and text. The truly revolutionary quality about digital technology is that it can be used to construct artificial environments and promote interaction within them. The availability of simulated or virtual environments gives learning a greater experimental and experiential dimension: the student learns by manipulating and integrating multisensory inputs as opposed merely to listening and reading. And given ubiquitous communications networks, social interaction between instructor and student and among students can occur with a frequency and depth often impossible through traditional channels.

Paradoxically, as access to and control over information resources is becoming more diffuse, decentralized, and distributed at the individual level, the technologies themselves are becoming more integrated and the industries which build and use them are becoming more interdependent. Technical innovations in digital electronics are fueling horizontal integration across industries, and economic considerations are promoting vertical integration within them. The net result is a massive realignment and convergence of information technology industries where hardware and software, delivery modes and content production, products and services, medium and message will be virtually indistinguishable.

Technology Creates Disintermediation of Services

Disintermediation describes an important change in the structural relationship between service need and delivery. Virtually every technological advance in the marketplace—from microwave ovens to telephone answering machines to automated bank tellers—has placed consumer convenience at or near the center of its appeal. Such innovations almost always save time and usually save money by reducing the number of tasks one must perform or the number of people involved in necessary tasks. Technological change, fiscal efficiency, and cultural expectations will induce similar changes in student support services.

A digital or networked world is not kind to middlemen—in any profession. Instead, it is a world of intense personalization: Individuals can get in contact with a product or a service, a person or an idea, on their own. While car salesmen are no longer needed—if they ever were—it does not follow that faculty members, librarians, or student service professionals are no longer needed. Rather, the nature of their roles will change dramatically to fit a new model of learn-

ing and of student support services.

The Future of the 4-D University

Whatever the obstacles, the basic contours of the 4-D environment will prevail in the long run because the technology will permit it, the culture will expect it, and the politics will demand it. Individually and collectively, there are secular forces at work that will create pressures for change that the university can lead or follow, but not ignore.

The broader culture will send messages about the use and benefits of technology that cannot be dismissed by the university. Despite academic tradition, the everyday values, norms, and expectations of new generations of students, faculty members, and staff—firmly rooted in the technology of the Information Age—eventually will permeate every discipline and function of university life. Rather than something special, technological innovations of all kinds will become mere appliances, as widely used and taken for granted as the telephone.

Finally, political and economic realities will force hard decisions about the use of scarce resources. Fundamental cost-benefit questions will need to be asked about buildings, staffing needs, and possible technological alternatives. It is unlikely that legislatures or regents will continue to support education models that stand very far outside the efficiencies of a 4-D environment.

Implications for Student Support Services

What, then, are the broad implications of increasing technology use for student support services? The 4-D environment is changing how students relate to the institution and how faculty members relate to students. The now familiar saying is that faculty roles are shifting from being the “sage on the stage, to the guide on the side.” A similar shift is taking place among student services professionals who are moving from information gatekeepers to information navigators and student mentors. Increasingly, students can directly access most of the data they need. The challenge is navigating and making sense of the information environment: Student services professionals can help meet the demands of a 4-D world.

In another context, each institution of higher education has been characterized by a series of 10 structural pillars that are rooted in a bedrock of traditional academic culture (West, 1995). The pillars—such as physical libraries, a faculty guild system, rigid financing formulas, a campus phys-

ical plant, classroom and lecture instruction, among others—comprise a system of core values, unchallenged assumptions of both substance and process. They derive primarily from two historical sources: the academic culture borrowed from 17th century traditions of German and British university systems and the organizational structures and processes borrowed from the experiences of 19th and 20th century industrial bureaucracies. Both of these traditions are ill-suited for the demands of the Information Age.

Student support services happens to be one of the traditional pillars. It grew out of at least two historical eras, both of which are post-World War II developments: a demographic boom of young undergraduates on residential campuses and a social revolution intent on providing public services for needy and underserved populations. Although demographic characteristics of students have changed dramatically in later decades, as have the social and political landscapes, the labor-intensive model of student services persists in varying degrees. In part, this may be because the economies of scale afforded by information technology are too often rejected as impersonal and insensitive among service providers trained in an earlier era.

For example, the idea of a student remains closely linked to idyllic images of the college campus itself—a continuous, four-year residential experience of young, full-time undergraduates. The reality is that universities are seeing an increasingly part-time clientele who step out and drop in with regularity; older, mobile, and flexible commuters balancing school with job and family responsibilities. So social and demographic change has made former images of higher education consumers obsolete.

Likewise, economic changes have made traditional career expectations obsolete. The information economy has fundamentally altered the nature of job preparation. Today, there are no obvious beginning and end points to higher education—instead, it is continuous and open ended. Learning is lifelong as jobs, careers, and entire industries appear and disappear in the span of a few years rather than a few decades.

The fundamental imperative for any organization in the Information Age is defining and responding to its consumers as individuals. The force of past images still prevents higher education from clearly defining the nature of the clientele it now serves. The marketing model of the Information Age emphasizes diversity and small, specialized market segments; yet, the client

paradigm of higher education still is the Industrial Age model of “one size fits all.” Neither the formal rules nor the informal norms of academe allow deviations from that standardized model. Although student services personnel have led the way in promoting a more differentiated approach to the student population, the academic culture has been slow to follow.

Increasingly, every economic and lifestyle decision is on the side of speed and convenience—“information on demand” stands at the heart of that economic calculus and cultural value system. But, in addition to speed and convenience, there is a third core value of the digital world: personalization. However, personalization does not need to occur “in-person.”

Consider three of the most common complaints about the quality of student advising: outdated information, unequal student access to information, and the lack of personal attention. The key to all of these problems lies in students’ abilities to control their education by directly accessing information—specifically, by leveraging technology tools like the World Wide Web, E-mail, listservs, kiosks, and degree audit and degree simulation software. The marvelous features of networks is that their information can be easily updated, anyone can use them at any time, and individual feedback and group interaction can be achieved with a simple click of a mouse.

Like David Letterman does, we can construct a Top Ten list of reasons why information technology can improve the nature and delivery of support services to students. Here are some of the major reasons from the combined perspectives of the student, institution, and support staff:

10. **Speed and Accuracy.** Computers never make mistakes; humans often do. Unfortunately, computers must rely on humans to get any work done. But if humans create efficient programs the first time, or update information regularly, accurate service delivery will be measured in seconds rather than in hours, days, or weeks.
9. **Convenience.** Information is most useful if students can get to it when they need it. Digital networks and the vast array of integrated digital toys on the market insure that students will have multiple channels of information access, 24 hours a day, 7 days a week.
8. **Efficiency.** Approximately 85% of the university budget involves personnel costs.

Education will always be a labor-intensive industry, but savings can be achieved by consolidating and automating tasks across functional areas.

7. **Security.** Despite the press that computer hackers often receive, we remain convinced that information that is stored and transmitted electronically is more secure than that maintained and shared on paper. The trick is to stay at least one step ahead of that 1% of users who may have the technical skills (and lack the moral discipline) to cause a problem.
6. **Evaluation.** Almost nothing is more important and less heeded than a program evaluation, whether of student services or anything else. Computer networks are marvelous tools for tracking and self-monitoring. Utilization statistics are by-products of their use.
5. **Planning.** When properly designed, a technology-based system will almost always promote greater integration of policy areas—for example, between administrative and academic information; between classroom and nonclassroom experiences; among academic, career, and personal counseling.
4. **Professionalization.** Time is the most precious human resource. To the extent that technology frees staff from routine and mechanical tasks, people can become more proficient and productive on substantive matters.
3. **Outcomes.** Student satisfaction, retention, and graduation are among the most critical indicators of success for any institution. We do not have data testing this proposition, but we would expect to find a positive correlation between college success indicators and an institution's level of technology investment in student support services.
2. **Interactivity.** We would like to offer another hypothesis: The greater the level of campus and student investment in computer networks, the greater the levels of student to faculty, student to student, and student to advisor interaction, both synchronous and asynchronous. Virtual communities are no less real and no less important than physical ones, particularly where they revolve around issues of intellect and knowledge.
1. **Customization.** Technology permits students to become active designers of their educational experiences. Equally important, it also permits institutions to target, track,

and communicate with special student populations as never before through the integration of Web sites, E-mail, bulletin boards, FAQs, listservs, and chat rooms.

It is no accident that customization is ranked as the number one benefit of a 4-D environment. In many ways, student services professionals have been way ahead of others in the university. They have always treated students as customers; they have always had a student-centric view of the university as opposed to an institutional, departmental, or disciplinary view; they have always responded to students as individuals rather than as groups. Customization should come naturally to that profession; now, it simply has some powerful technological tools to help out.

But in a 4-D world, student support services must be considered more in terms of mass customization than individual service. Higher educational professionals need a technology model of student services that is more targeted and personal than the standardized, "one size fits all" technology of the Industrial era. But it must be less labor intensive as well. A model is needed that promotes student access to needed information at the same time that it increases institutional productivity and efficiency.

Consider L. L. Bean, the catalog sales giant located in Maine. The company is a good example of mass customization on a grand scale. Through the use of sophisticated databases, the company can integrate and thereby learn about the total range of individual needs and interests, anticipate sales, and target demand—"anticipatory selling." Similarly, library professionals are moving from a just-in-case warehouse of information resources to a just-in-time deliverer of a just-for-you design. By tracking individual requests over time, both procurement and delivery of information can be targeted with greater precision.

Much of student support services can involve routine transmission of information about courses, degree requirements, scheduling, financial aid, admissions, registration, articulation, housing, social events, and so forth. Many of the questions students have about such information are repetitive, predictable, and relatively easy to answer. The changes occurring in the 4-D environment make it possible for such information to find the student rather than the reverse. Through push technologies and integrated communications devices of all kinds, students can customize their own information needs and simply let com-

puters and networks find and deliver the data to them. Why spend the time and effort to go get it when it can be automatically delivered?

Automatic data access does not mean that context, interpretation, and personal advice may not be needed as well. Raw data is not information and it does not structure behavior. But it also makes little sense for human beings to spend their valuable time and talents on mundane tasks best left to computers and networks.

Inherent limitations of technology exist in any full-blown model of student development. Most of the functions that technology can address turn out to be administrative and logistical and revolve around academic requirements, course scheduling, financial regulations, and the like. Educators probably cannot expect technology to help with broader and more complex concerns of career counseling, psychological growth, moral development, or social responsibility. The interpersonal element (whether in-person or not) remains at the heart of almost all forms of student support services, particularly those that address student needs from the standpoint of the whole person and makes the difference between merely navigating students and mentoring them.

Still, the management of student support services (as distinct from their delivery) will always require a heavy infusion of technical information and of sophisticated technological tools—hardware, software, and networks. In that sense, it is no different from any other management function in the university. Much of the challenge for student services is integrating the operational values of a largely humanistic profession with managerial demands for sound research, comprehensive information systems, strategic planning, political adroitness, and technical sophistication. The sheer scope of support services, and the great numbers of students involved in them, imply a need for elaborate databases and information tracking systems. Given current technologies, their implementation is not very complicated, but can be expensive—that is, until one considers the expense of not using them.

A New Model of Student Support Services

A new model of student support services is needed, both on a single campus and among state and national institutions. As indicated earlier, our underlying premise is that higher education can be a growth industry well into the next century, but only if it is willing and able to make some fundamental cultural and procedural changes.

Higher education professionals are entering an era of lifelong learning for the entire population, but businesses tend to be in a far better position than formal educational institutions to serve that demand—in large measure, because they are technologically better positioned. The demographic and market demand for higher education will go elsewhere unless student support service personnel adopt an Information Age approach to conducting business.

An advising and technology monograph published by NACADA has an excellent assortment of articles on various systems that are currently in operation around the nation (Kramer & Childs, 1996). The technologically featured programs include degree auditing, electronic data exchange, phone registration, document imaging, kiosks, computer-assisted advising, E-mail, listservs, and Web applications. Individually, these may be very good systems, but each tends to serve only one isolated function, such as recruitment, registration, admissions, graduation, or advising. The real need is for a more comprehensive model of student support services and a more integrated technical approach for implementing it. The following describes what such a system might look like at the intracampus and intercampus levels.

Intracampus

Fragmentation is a major problem in the design and delivery of student support services at most institutions. Too often, various functions are separated organizationally, physically, and technically, creating confusion for students and duplication of effort among staff. The goal of an integrated student services model should be to make the structure and process seamless, whether the issue is financial aid, housing, social activities, academic advising, career counseling, testing, admissions, graduation, or anything else. Increasingly, students expect university services to be as accessible and user-friendly as an ATM machine or a Web browser.

Consultants with Coopers and Lybrand have been working with five campuses of the California State University (CSU) system to develop a user-friendly model (O'Leary, Beecher, Nguyen, & Sinsabaugh, 1997). Here are some of the principles underlying that project: Student services should be

- available at the time and place, and in the medium, of students' choosing;
- logically bundled and hassle-free;
- one-stop or no-stop;

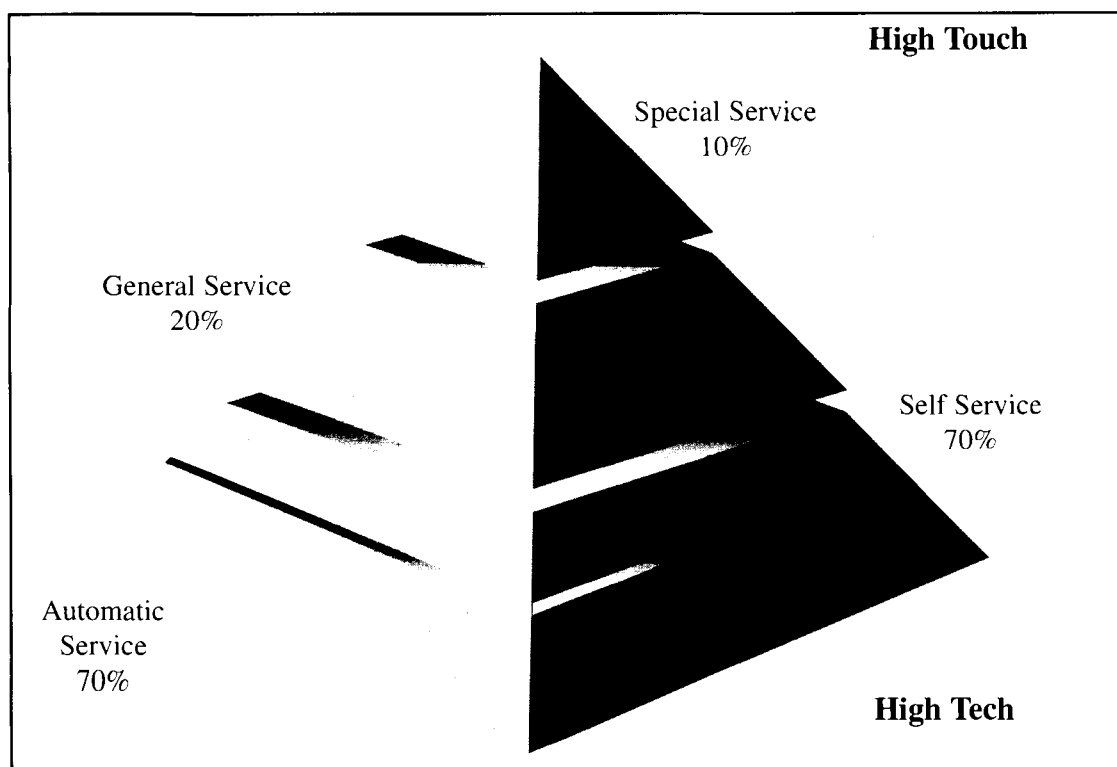


Figure 1 Pyramid Model of Student Support Services

- cost-effective;
- high-tech, but personal;
- integrated, seamless, and collaborative;
- consistent and dependable.

These principles are based on at least three important assumptions. The first one is that students can and will accept greater responsibility for their own support service needs if provided with tools and information that are convenient and easy to use. The second assumption is that student services staff can and will relinquish their self-contained roles to become cohesive, cross-functional teams of support professionals. The third assumption is that students pass through several stages of an educational life cycle with different needs at each stage.

A fully integrated student support system often requires a radical redesign of the entire process; tinkering with existing functions may not do the trick. Figure 1 shows the service pyramid model developed in conjunction with the Coopers and Lybrand consultants.

Notice that there are four levels of service: automatic, self, general, and special. The two

lowest levels are delivered entirely by technology. The two highest levels require some degree of personal intervention or assistance, but typically account for only one third of the services required. By using high-tech to address the routine logistical needs of all students, support staff are thereby freed to satisfy the high-touch needs of individual students.

The service pyramid model is focused on the student as opposed to the organizational divisions within the university. For example, from a student's perspective, traditional administrative divisions are irrelevant and obtaining financial support for the coming semester should not require multiple trips to the offices of financial aid, student employment, bursar, and registrar, as well as his or her major department and advisor. Both information and services should be logically bundled and then delivered using the highest level of technology that is feasible and appropriate.

Intercampus

However, neither the student's nor the institution's need for information stops at the campus gates. An even broader vision of support services is therefore required, one that crosses campus,

state, and even national boundaries. The inter-campus model should make it easier to gather, store, and share information about students and about institutions than is currently the case.

For example, everyone is aware of the horror stories about students who apply to multiple institutions, transfer from one institution to another, or try to map credit units from several institutions into a coherent degree program. Typically, both the student and the institution need access to the same types of information, but too often it is stored and delivered in different formats. There must be a simpler solution. Again, technology is the obvious remedy when faced with information needs that are relatively simple, repetitive, and predictable.

The model of student services that is required would consist of a digital, portable, lifelong portfolio of personal information—demographic, academic, occupational, and so forth—stored and updated on a single card, able to be electronically transmitted to any institution or organization in the nation. This model is being developed and tested within the CSU system and on a larger scale, with several national institutions. Standards are being established for data exchange, storage, access, security, and privacy.

Certified repositories might also be established to facilitate student outreach or job placement. With authorization from portfolio owners, institutions and organizations could “mine” a single database for profiles that meet specific needs.

Both the student and the institution require information concerning admissions applications, fee payments, financial aid, test scores, transcripts, degree requirements, job opportunities, and the like. The goal must be a seamless link between individual and institutional information, with capabilities for interaction, evaluation, and matching of individual and institutional needs. But this also is a client-centered model of student services that shifts ownership and control of the information from the institution to the individual.

Every aspect of this model requires unprecedented collaboration among hundreds of institutions on some extremely detailed administrative issues. But the ultimate goal makes it worth pursuing—a common front door to all postsecondary institutions and an efficient electronic means for navigating the administrative environment from any place at any time. This model of student services may not eliminate all lines, paperwork, phone tag, and bureaucratic procedures, but it will make most of the process easy and much of it automatic.

Conclusion

Higher education is moving toward a networked environment of learning, teaching, and university management, beginning with the individual and ending in a global community of learners and information resources—education on demand. This involves a movement away from mass production of services and toward mass customization; from time, place, and institutional dependence to mobile learning; from a faculty-centered and institutionally controlled environment to one that is learner centered and controlled; from passive, print, and lecture modes of teaching and learning to collaborative, active, multisensory approaches; from synchronous interaction in physical spaces to asynchronous exchanges in virtual environments.

Where learning and support services once were purely human processes, they are now shared with machines. Where once they were confined largely to campuses and classrooms, they now permeate every form of social activity from work to entertainment to home life. Where once they were linear and hierarchical, they now reside in systems and networks and less in individual experts. Where once they were confined largely to childhood and adolescence, they now span the human life cycle. Knowledge life cycles are measured more in terms of months than years or decades.

To further this vision (and to rescue public higher education), a new organizational ethic is needed which emphasizes speed over delay, innovation over tradition, outcomes over process. In place of the structural and procedural rigidity of the cited pillars, instructors need fluid and open networks that are constantly adjusting to change in both the external and internal environments. Networks, and the virtual environments which they permit, offer the best adaptive mechanisms for higher education in the decades ahead.

Integrated Technology Strategy

Network-based student support models are only a small part of the total picture. A broader vision and a broader planning framework than a single institutional pillar is needed. Although this could be a topic for several additional papers, we can briefly suggest how student support services might fit into an Integrated Technology Strategy (ITS) designed to transform the entire institution.

Figure 2 summarizes the ITS planning and implementation model being using in the CSU system (California State University Systemwide Internal Partnership Team Staff, 1997). Notice that

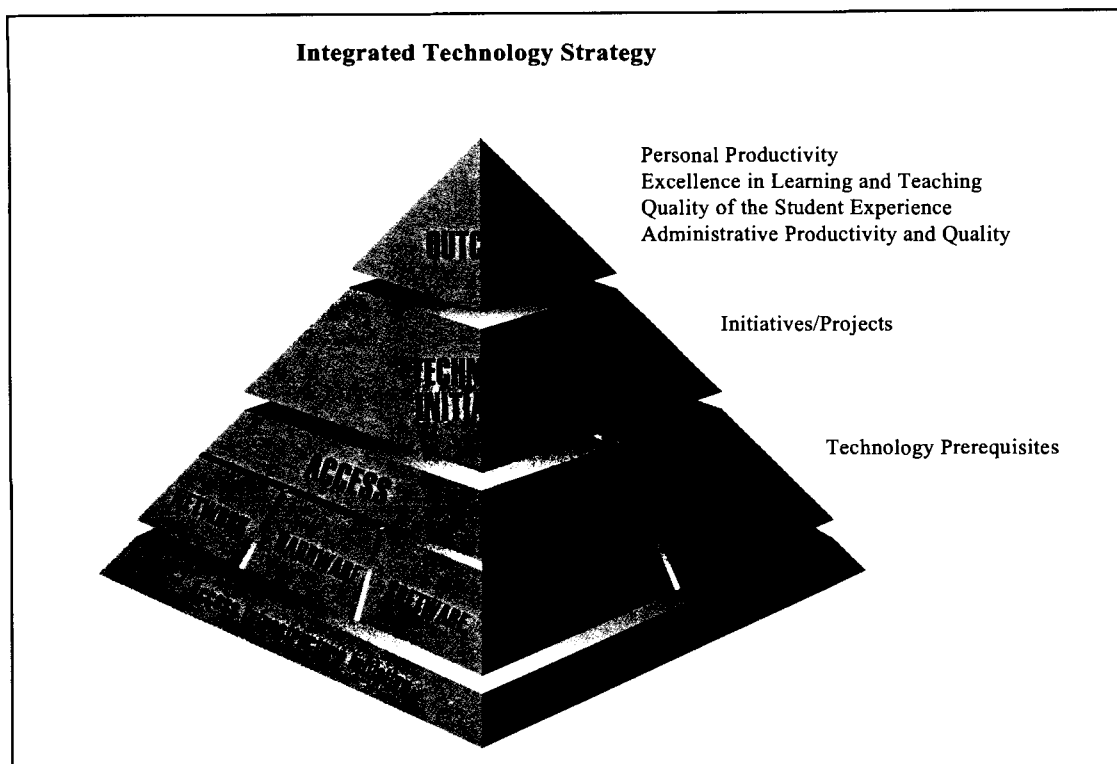


Figure 2 Integrated Technology Strategy Model

there are four broad goals or outcomes at the apex, a technological and human infrastructure at the base, and a series of academic and administrative initiatives or projects linking them in the middle. Student support services are part of that middle area along with distributed learning, library resource sharing, procurement and administrative systems, among others. It is critical to note that the prerequisite infrastructure—network, hardware, and software access, and user training and support—must first be in place before any technology-based programs can be implemented. While technology itself is neither the focus nor the intent of this strategy, it is difficult to envision fundamental change without it.

The first lesson from the ITS experience is that a technology and human infrastructure is an enabler of institutional reform, and in a 4-D world, it is a prerequisite. The second lesson is that, once in place, such an infrastructure can be instrumental in simultaneously transforming all of the traditional pillars of an institution.

In an even broader context, it may not be an exaggeration to say that educators are witnessing the dawn of an entirely different civilization,

standing at the brink of a digital frontier coincidentally opening to the expanse of a new century. For the first time in human history, the age-old constraints of time and place have been rendered all but irrelevant.

In the industrial era, machines replaced much of human physical labor. In the digital era, both machines and human physical labor are being replaced by the fusion of sand and glass, the building blocks of computer chips and networks. So what is left? The answer is intellectual labor, imagination, and human empathy.

And so we have come full circle with George Kuh's observations. Computers are only incidentally about computing. We live not in a computer age but in a network-centric culture. The animating impulse of that culture is connections, both human and technical. The ultimate job of student services professionals is building human connections, and information technology can be both their best tool and their best friend in that pursuit.

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Authors' Notes

Tom West, coauthor, and Robert Heterick, current president of Educom, have had a good-natured habit of borrowing ideas, phrases, and slogans from one another for many years. The practice has reached a point where neither can remember where or by whom the notion of a 4-D environment was first introduced. Therefore, they have agreed to take equal credit—or blame.

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