GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas – society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period (March 21- April 25) and bring it to our attention for review.

Please answer the following questions for each document you submit:

(Feel free to submit as many of these forms as you would like)

1) What is the name of the document? Developing Interdisciplinary Researchers: What Ever Happened to the

2) Author: Bullough, Robert Jr

3) Source: *EDUCATIONAL RESEARCHER* 2006 35: 3

4) Which of the following areas does this document best address? (Please select only one)

- ◯ Society
- ⬤ Technology
- ◯ Economy
- ◯ Environment
- ◯ Politics and Legal Issues
- ◯ Education
- ◯ Other

5) Relevance: Argues the humanities provide a bridge to create true interdisciplinary discourse and research

6) Page/Section:

7) **Attach Document/Place URL Here:**

Download the free Adobe Reader X: http://www.adobe.com/accessibility/products/reader/

To attach a document: **Reader 9: Use "Tools"-"Comments and Markups"-"Attach a File as a Comment"**
                        Reader X: Use "Comment" (upper right), then select the paper clip icon under "Annotations"

Questions email: lynne.davidson@gcccd.edu Research, Planning and Institutional Effectiveness

Educational Researcher

Developing Interdisciplinary Researchers: What Ever Happened to the Humanities in Education?
Robert V. Bullough, Jr

The online version of this article can be found at:
http://edr.sagepub.com/content/35/8/3

Published on behalf of

American Educational
Research Association

American Educational Research Association

and

$SAGE

http://www.sagepublications.com

Additional services and information for *Educational Researcher* can be found at:

Email Alerts: http://er.aera.net/alerts

Subscriptions: http://er.aera.net/subscriptions

Reprints: http://www.aera.net/reprints
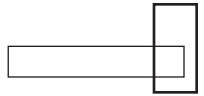
Permissions: http://www.aera.net/permissions

Citations: http://edr.sagepub.com/content/35/8/3.refs.html

Developing Interdisciplinary Researchers: What Ever Happened to the Humanities in Education?

by Robert V. Bullough, Jr.

In response to changing federal priorities, much discussion has taken place recently about the need for graduate education programs to firmly embrace interdisciplinary research, or "interdisciplinary integration across related fields" (National Research Council, 2004, p. 6). The related fields usually are understood to be certain social and behavioral sciences. From the perspective of the humanities, the author challenges an emerging view, widely regarded as commonsensical, about the proper nature of interdisciplinarity in education and what counts as good education research (Hostetler, 2005). He devotes particular attention to the problem of determining and distinguishing ends and means and the dangers of narrowness, and provides examples of the value of the humanities to education research.

Virtually no one would argue against the centrality of graduate education in socializing future generations into the values and commitments of academic work, despite deep disagreements about the nature of the work to be done and most especially about the nature of inquiry in education and the value of the various approaches to it. Representing an increasingly powerful point of view, Margaret Eisenhart and Robert DeHaan (2005), for example, have made a strong case for the importance of socializing neophyte education researchers into the norms of what they describe as scientific inquiry (p. 5). Arguing that the "general processes of inquiry in interpretative and experimental sciences are virtually identical" (p. 5), they propose a doctoral program that includes four components: core courses (almost exclusively research methods courses); research experience; teaching experience; and interdisciplinary collaborations. When viewed in the light of the presumed unity of all forms of inquiry and the common examples used to make the argument, the plea for interdisciplinary collaborations appears to be more for multidisciplinarity than for interdisciplinarity. In the latter, fields outside the social and certain physical sciences are discounted, and disciplinary frameworks are maintained while insights are borrowed from other frameworks, all more or less residing within the same conceptual and methodological family, when an impasse is reached within one's own. What seems neglected is the value of the tension arising from intense conversations across differing worldviews or patterns of sense-making about some puzzle or problem that is recognized in some way as shared. In such conversations, disciplinary boundaries are made permeable and interpretative horizons jarred and then forced outward.

While reading *Advancing Scientific Research in Education* (National Research Council, 2004) and noting what appears to be a celebration of the methods of scientific problem solving, I was reminded of a statement that John Dewey made as he explored the significance of scientific inquiry to human affairs in his Gifford Lectures, published as *The Quest for Certainty* (1929):

> In principle, the history of the construction of suitable operations in the scientific field is not different from that of their evolution in industry. Something needed to be done *to accomplish an end;* various devices and methods of operation were tried. Experiences of success and failure gradually improved the means used. More economical and effective ways of acting were found—that is, operations which gave the desired kind of result with greater ease, less irrelevancy and less ambiguity, greater security. Each forward step of a tool suggested operations not in mind when it was invented and thus carried the perfecting of operations still further. There is thus no *a priori* test or rule for determination of the operations which define ideas. They are themselves experimentally developed in the course of actual inquiries. They originated in what men naturally do and are tested and improved in the course of doing. (p. 124)

One phrase caught my eye in the quotation above, which I have italicized: *"to accomplish an end."* This phrase stands out starkly for two reasons: Interdisciplinarity itself appears to be understood as a research procedure or means; and, most important, in the current debates over what counts as good research, there has been little discussion of ends (see Willinsky, 2005). We fail to question the purposes of research. In part, it is this failure that underpins Erickson's recent charge that the NRC report "ends up justifying scientism rather than science" (2005, p. 4).

Making their case for the development of research "expertise," Eisenhart and DeHaan argue that core courses should be offered and that these must be "scholarly, rigorous, and intense enough to bear the burden of familiarizing students with the orienting concepts in each field, the culture of scientific inquiry, and the special demands of research in education" (2005, p. 10). Where, one wonders, will these young aspiring experts learn what makes a question worthy of inquiry and educationally important, and where will they gain the courage to go outside established bounds when dissent is needed and necessary? (This point admittedly is linked to Eisenhart and DeHaan's belief in the value of interdisciplinarity, as will become clear later.) Another apt comment by Dewey comes to mind: "That a man may grow in efficiency as a burglar, as a gangster, or as a corrupt politician, cannot be doubted. But from the standpoint of growth as education and education as growth the question is whether growth in this direction promotes or retards growth in general" (1938, pp. 28–29).

What About Ends?

While I puzzled over why there has been so little discussion of ends, of "questions of human well-being" (Hostetler, 2005, p. 16), a quick response came to mind. Perhaps there is now no need for thinking directly about ends, because neophyte researchers, through experience and education, already are well acquainted with what are the significant educational questions. For, as John Goodlad comments, "today's educational problems and issues are much the same as they were when I entered the first grade" (2004, p. 256). This reason does not hold, however. It is true that educational problems are persistent, but it is also certainly the case that, as the wider social and political context changes the way that these otherwise persistent problems are understood, what is taken as a satisfactory response to them also changes, sometimes dramatically. What is recognized as problematic and how it is framed as a problem makes all the difference in how it is resolved and on what counts as an adequate resolution.

Is it the case that good, researchable questions will emerge from being socialized into a research culture? Perhaps, but perhaps not. In a highly controversial statement, Paul Feyerabend (1975) captures what often happens in the process of the socialization of scientists: "Just as a well-trained pet will obey his master no matter how great the confusion in which he finds himself, and no matter how urgent the need to adopt new patterns of behavior, so in the very same way a well-trained rationalist will obey the mental image of *his* master, he will conform to the standards of argumentation he has learned, he will adhere to these standards no matter how great the confusion in which he finds himself, and he will be quite incapable of realizing that what he regards as the 'voice of reason' is but a *causal after-effect* of the training he has received" (p. 25). Kestenbaum (2002) makes the point more gently: "Habits of mind and the reductions they permit become natural . . . [and are] sources of blindness" (p. 81). This is precisely the origin of normal science, a concept noted by Eisenhart and DeHaan and associated with the work of Thomas Kuhn (1962). In the social sciences, studies by Richard Hamilton (1996) of the power of disciplinary orthodoxy to elevate nonsense to good sense, to divert attention from contrary facts, and to deter formation of alternative explanations, forcefully underscore the point: Despite common belief, the Panopticon that Foucault found so disturbing and placed at the center of his critique was never built; unemployed workers did not support the Nazis, and, closer to home, boys are not outperforming girls in school. Advocacy of an accepted position often comes to replace critical originality, and "[f]or the sake of intellectual convenience people hang on to cherished organizing principles" (1996, p. 200). Of course, convenience is not the only reason for embracing a wrong-headed orthodoxy. Well-funded advocacy groups may and often do promote narrow self-interest.

The philosopher Walter Kaufmann uses the term "scholasticism" to point to the operation of a sort of normal science within the humanities. His description nicely captures much that is done within the academy to sustain orthodoxy, Right and Left. For the scholastic scholar, Kaufmann argues, work becomes, "[i]n Einstein's phrase, a kind of 'sport,' if not a game, or a racket" (1977, p. 45). For scholastics, as in normal science, others set purposes. It is the game—expressed through skilled employment of established methods—and playing it well and within bounds that is important. Lacking a sense of wider context, what is left is instrumental reason, a sharp focus on means, methods, and ideology, what some years ago my colleagues and I described as "technocratic-mindedness" (Bullough, Goldstein, & Holt, 1984). The problem, as Garrison (1997) reminds us, is that ends and means cannot be separated: "[T]o desire some good, some ideal 'end-in-view,' is to simultaneously desire the means or operations needed to actualize the good" (p. 34). Attempts at separation produce harmful consequences; and the "game" produces its own ends.

Another troubling reason for ignoring ends comes to mind: Perhaps ends are ignored because they can be taken for granted. Perhaps it is assumed that the debate over the purposes of schooling in the United States is now closed: Education ends are clearly set and well established, and there is nothing much to discuss except means. Raise those test scores! Multiple stories could be told that support this view, from the history of the rise and triumph of standardized testing, the origins of which are fascinatingly described in Zenderland's biography of Henry Goddard (2001), to the reduction of all educational purposes, including the cultivation of democratic values and commitments, to economic values, a view underpinning the assumptions of the President's Commission on Excellence in Education that produced *A Nation at Risk* (1983).

On Interdisciplinarity

Generally speaking and as noted, calls of the sort made by Eisenhart and DeHaan for interdisciplinary work in education tend to be contained by social science and natural science frames of reference. The social science frame is rooted in an unfulfilled and deep longing for the status and authority of the hard physical sciences. This said, interdisciplinarity in generous or constricted forms is to be embraced because of its generative promise, the promise of fresh insight, of new metaphors and models for making meaning. As such, interdisciplinarity stands simultaneously as a research method, loosely conceived as a way of engaging a problem, and as an aim in its own right as a form of education. Its promise as a form of education is constrained, however, when the boundaries to be crossed are circumscribed by the assumptions and research methods of the sciences (see Schneider, 2004) and their "range of convenience" (Kestenbaum, 2002, p. 82), to the exclusion of other potentially promising and provocative worldviews and methodologies.

Ironically, despite a century of longing for full membership, education—at least a large portion of it—finds only an unsettled and uncomfortable place within the social sciences despite bold talk about "education science" (Committee on Scientific Principles for Education Research, 2002). Nevertheless, education as a field of inquiry is commonly thought of as a social science by educators and by those who engage in and seek to foster education research and who advocate a reorientation of graduate studies in education. Interdisciplinarity (really multidisciplinarity), when understood in these narrow terms—as bounded by certain sciences or social sciences and the assumptions they share about the nature and purposes of inquiry—is unlikely to get far outside established research biases, habits of mind, and social commitments. Given such narrowness, the likely research outcomes are triviality, confirmation, and conformity—predictable sameness—

in the quest for administrative convenience (see Popkewitz, 2004). What is needed in the face of expanding cultural pluralism is a research community committed to "greater effective theoretical pluralism" (Hamilton, 1996, p. 218). This requires reaching beyond the guiding assumptions and methods of the physical, behavioral, and social sciences, which, in any case, are far less sure than has been argued in both *Scientific Research in Education* (Committee on Scientific Principles in Education Research, 2002) and *Advancing Scientific Research in Education* (National Academy of Sciences, 2004). Alternative traditions and modes of inquiry are called for—not as replacements, but as complicating additions and helpful correctives.

Here, again, Feyerabend (1975) proves provocative. He argues for "counter-induction" and against what he describes as the inherently conservative "consistency condition"—that interpretations and insights must confirm previously established conclusions—a point central to claims for "verisimilitude," or the "appearance of truth" as a standard for judging meaning in the human sciences (Polkinghorne, 1988, p. 176). Feyerabend asserts that bias and blindness are found through contrast and comparison: "[P]rejudices are found by contrast, not by analysis" (Feyerabend, 1975, p. 31). Yet within-paradigm analysis continues to hold sway. The challenge of examining "something we are using all the time" to reveal presuppositions and to open alternatives requires stepping outside and embracing an "*external* standard of criticism, [a] set of alternative assumptions . . . constituting . . . an entire alternative world" (p. 32). What is required is a firm but playful embrace of otherness, of counter-cultural research assumptions, of stepping out of a comfortable research paradigm with attendant theories and into an uncomfortable one, even if for only as long as it takes to finish reading a helpfully disquieting book.

> The first step in our criticism of familiar concepts and procedures, the first step in our criticism of "facts", must therefore be an attempt to break the circle. We must invent [or seek out and engage] a new conceptual system that suspends, or clashes with the most carefully established observational results, confounds the most plausible theoretical principles, and introduces perceptions that cannot form part of the existing perceptual world. This step is . . . counterinductive. (1975, p. 32)

For education researchers, the humanities present abundant opportunities for breaking the circle, inviting counter-inductive moments into lives lived otherwise well within the conceptual boundaries of an aspiring educational science. There is, of course, a long and rich critical tradition in education that draws on the humanities and that is counter-inductive and counter-cultural in the sense of speaking outside of but to dominant discourses, with the aim of recasting the purposes and practices of schooling and thereby altering what counts as a legitimate avenue for inquiry. Numerous authors and their works come to mind, each work offering in its time a contrary voice and a pointed challenge to researchers. I shall mention only a few familiar works, starting with a personal favorite: In February, 1932, George Counts spoke at the annual conference of the Progressive Education Association. His address was entitled, "Dare Progressive Education Be Progressive?" and was later included in *Dare the School Build a New Social Order?* (1932). The address stunned members of the association and initiated a lively and intense discussion of the purposes of public schooling in America

that, over time, became a central concern of a wing of educational progressivism, including those educators connected to the Eight-Year Study (see Kridel & Bullough, in press).

More recently, drawing on insights from literature and existentialism, Maxine Greene's *Teacher as Stranger* (1973) opened up for consideration the inner life of teachers in new and fresh ways that helped set the stage for a large and still emerging body of research on the inner and emotional life of teachers. Two years later, *Curriculum Theory: The Reconceptualists* (Pinar, 1975) marked a shift in curriculum thinking, and legitimated and offered alternative directions for scholars, particularly young scholars whose work was leading them outside traditional curriculum questions—objectives, sequencing of activities, evaluation. The publication of *Ideology and Curriculum* (Apple, 1979) encouraged a veritable deluge of studies of the "hidden curriculum"— the buried and sometimes pernicious influences of schooling on the young—first explored by Antonio Gramsi (see Entwhistle, 1979). *Caring: A Feminine Approach to Ethics and Moral Education* (Noddings, 1984) led to a fundamental reconsideration of the nature of teaching and being with and for students, and has encouraged an abundant and growing research literature. Elizabeth Ellsworth's (1989) provocative article "Why Doesn't This Feel Empowering? Working Through the Repressive Myths of Critical Pedagogy" shook up the educational Left, revealing a fundamental blind spot that continues to be explored. In looking outside established education discourses, each of these authors turned toward the humanities for fresh questions and critical insights into established practices, trying to make better sense of what they were witnessing and experiencing as educators and scholars. Unfortunately, all of these authors stand at the margins of education research. But, as Feyerabend suggests, fundamental insights are born at the margins, outside of normal science.

Marginalizing the humanities or dismissing them as inconsequential to graduate study and research in education has had, and will continue to have, far-reaching and unfortunate consequences. Not that the work will end, for certainly it will not. Rather, with marginalization of the humanities, whatever science of education is created will be to some degree impoverished. Unable to hear the still, small voice of dissent, it will be narrowed, driven by too many of the wrong sorts of questions and miss many opportunities for gaining transformational insights. Recall, it was the humanities that first formed, then articulated, the questions of equality and justice that loom so large in the thinking of many of those now working toward a science of education but who wish to equalize test scores as a surrogate measure.

Considering the Humanities

It is important to recall that the humanities were not always tangential to educational inquiry. As an incipient university study, the foundational disciplines of education included psychology, history, and philosophy, as well as various practical studies (Lucas, 1999). To be sure, as education graduate students rubbed up against history and philosophy, they probably felt a surge of self-worth arising from association with these older, well-established, disciplines. But more important, these disciplines broadened understanding and expanded the range of what was considered worthy of inquiry.

The aim of building a science of education is not new but represents a long and often-frustrated ambition.[1] Early in the last century, education stood between the humanities and the social sciences. At least in principle, it embraced simultaneously technical and emancipatory aims (Habermas, 1971): the aim of gaining and learning how to gain the compliance of students to achieve specific outcomes, and the aim of assuring their social participation and encouraging self- and social-transcendence. Historically, within the field of education, the humanities have been the keepers of the emancipatory aim, part of a grand moral tradition and social ambition evident in the works cited above. But standing between the humanities and the social sciences has proved difficult. As C. P. Snow (1959) long ago noted, finding a middle position between (disciplinary) cultures is seldom successful, yet much is lost in operating only within a single conceptual world, which offers an illusion of certainty and encourages hubris. As it stands, education as a graduate study has failed in the attempt; and sides were long ago chosen.

The State of the Humanities

It is the ideal of the humanities, more than current practice within them, that supports the value and promise of a rich and generous educational interdisciplinarity. To be sure, arguing for the value of humanities to education researchers in the current historical moment is no mean task, in part because the humanities, themselves, have done little to help the cause. There is no doubt that the state of the humanities has contributed to their relative weakness within the university. A quick review of that state is in order.

The sharpest criticism of the humanities comes from those who love them best. Seeking repair, Joan Scott (1995) observes that the humanities as a field of study has few allies within the academy; and she makes the surprising claim that champions of diversity have done terrific harm to them, adding immeasurably to a sense of crisis. She argues that within the university the aim of empowerment has found expression in the presenting of knowledge that affirms students' life experiences, that reflects them "as they already know themselves to be" (p. 300). Echoing a form of fundamentalism and embracing disengagement, an appeal is made to self-confirming "familiarity" and personal identification as the basis for motivation, for judging content, and even for evaluating a professor's worth as a teacher and researcher. Otherness is dismissed rather than embraced. As representatives of shared and recognized categories, individuals meet and are confirmed, not challenged; "identity is the only foundation for learning" (p. 300).

> Ruled out as possible stimuli for the desire to learn are the challenge of the new and fundamentally unfamiliar, or a sense of frustration, or an inability to identify, or a purely cognitive interaction, or the sheer pleasure of acquiring mastery. Indeed these are taken as "disempowering. . . ." (p. 300)

One result is that those who are taught become increasingly alike, as do those who do the teaching and, it is important to note, the researching. Orthodoxy and fights among orthodoxies over agenda, resources, position, and prestige dominate the humanities, where it is increasingly difficult to make the case for "the value of critical intellectual work—work typically associated with the humanistic disciplines" (p. 301).

Framed in opposition to a common, idealized, and objectified "other" as enemy, identity politics brings feelings of belonging but tends to slide "toward the premise that social groups have essential identities" (Gitlin, 1995, p. 309). Without pretense, research is reduced to politics and disciplines to self-contained interest groups, just the sort of thing that brings the scorn of social scientists and raises questions about the possibility of interdisciplinary work. What remains is a radically fragmented university where those on the Right and Left talk in closed circles, backs turned outward, as though they and they alone understand and occupy the world, and struggle for power to impose their own versions of order on others through "programmed schools of commitment" (Bromwich, 1997, p. 239).

Given this state of affairs and supported by a robust vocationalism, perhaps it is not surprising that on campus the humanities have been pushed aside in favor of the sciences, which seem to offer at least the possibility of making a truth claim and of adding up to an effect of some kind. This said, I doubt that many educators are even aware of the decades-long turmoil that is the humanities. As a practical study, education has an advantage not enjoyed by the humanities—there is, by definition, an overarching moral imperative, a center: the well-being of children and young people. Certainly, education has its own problems with fragmentation and fundamentalism, and numerous diversions prove enticing when one seeks to make a career; there is no question but that education is replete with scholastics, and narrow and seductive research specializations abound. Still, I suspect that most education researchers understand their work as inextricably linked to this moral center and, because of it, take seriously the challenge of otherness and, if pushed, would feel a failure when playing at the sidelines even if engaged in "antidisciplinary" work. No other explanation can adequately account for the persistence of university–public school partnerships despite the near-insurmountable difficulties and high personal costs involved in sustaining them.

By being concerned primarily with generalizations, accumulation, and patterns of consistency or congruence, science has never been very good at attending to otherness or to difference. It is here that the humanities, as historically and traditionally understood, have particular value despite their recent institutional slippage into parochialism. The humanities call attention to alterity, difference, relationship, morality, and purpose, and by acknowledging human frailty offer means for softening the "fundamental pain of . . . loneliness" (Hoffman, 2005, p. 29) and fulfilling the passion for connectedness and meaning that envelop all educational endeavors. The humanities elevate and embrace the outlier, through whose eyes central tendencies are best understood. No one learns in the abstract, no one has public experiences. Unlike the quest for the holy grail of "best practice" that consumes the science of education, confrontation with the questions that animate the humanities, at least traditionally, illuminate distinctive, remarkable, interesting, provocative, disconcerting, and sometimes even shocking ways of being and interacting, each representing a form of human practice and interrelatedness of importance to schooling and teaching. Indeed, issues related to teaching and learning speak directly to the deepest longings of humanity. In contrast, "best practice" represents a call to training, where outcomes are predictable and contextual and personal differences are of relatively minor consequence. Better to speak of promising or

better practices than "best." Training, as R. S. Peters once wrote, "always suggests confinement" (1967, p. 7). The humanities press against confinement and invite reconsideration and reconstitution of the self and the projects that define the self, especially during dark times. Clearly, researchers ought not confuse training with education or try to substitute one for the other, even when training and its perfection are rightly needed and called for.

Imagination and Humanistic Traditions: So, What Sort of Mindedness Do We Wish to Nurture?

Describing those who work in the humanities, Kaufmann (1977) identifies four "types" of mind, each embracing a very different conception of what counts as research and each well represented in schools of education. In addition to the scholastic mind, which he sees as lacking perspective, Kaufmann identifies journalistic, visionary, and Socratic minds (critics). He is unabashed in his criticism of the "mindedness" of the academic journalist, who is a teller of others' stories and personal anecdotes; and, while lamenting the dominance of the scholastic mind in higher education, Kaufmann recognizes that scholastic minds may and often do play an important and valuable role in cultivating a rich territory staked out by others. In contrast, Kaufmann asserts that visionaries and Socratics are crucially important to the health of the humanities, providing perspective, pressing against easy consensus when a point of view or theory becomes too convenient, and revealing alternatives: optional yet valuable ways of encountering and making a world. This is the stuff of imagination, whose power "lies in its capacity to multiply perspectives rapidly" (Garrison, 1997, p. 15).

Socratic minds—the minds of Counts, Greene, Pinar, Apple, Noddings, and Ellsworth—reject both dogmatism and naive relativism and seek to nurture a "critical spirit [that] immunizes students against the facile notion that any view is as good, or bad, as any other. Students are taught to distinguish clearly untenable views from the few positions that appear to be defensible" (Kaufmann, 1977, p. 33). For the Socratic and visionary mind, questions of ends, of the good, are front and center in research as they invite others to engage in the struggle with what ought to be done, even as outcomes are inevitably uncertain, almost happily so. Asking such questions and then taking them seriously inspires humility, demanding of researchers the habit of pausing and wondering about oneself and about one's project as well as about the other. It requires, at least for a time, the setting-aside of instrumental rationality, the drive to move ahead quickly before knowing the reasons for acting. In contrast, scholastics quickly rush on to their work as sport, seeking to win praise and garner influence. Both the Socratic and the visionary understand the importance of the pause, of not writing before one has anything worth saying and, when writing, of striving to say just what one means. This is the stuff of philosophy, religion, literature, history, and, also of art and music, the traditional humanities, that makes pausing purposeful, productive, and necessary.

Harry Broudy (1988) provides another way of thinking about the importance of perspective and interdisciplinarity to education research that is worth briefly noting here. He wrote as a philosopher and as a student of William Ernest Hocking. Broudy described four uses of schooling: associative, replicative, applicative, and interpretative. It is the last that is of concern here. The *interpretative* use of schooling is a "process related to application but far less specific and detailed" (Broudy, Smith, & Burnett, 1964, p. 54). Interpretation involves imposing order and form on experience, gaining perspective and getting oriented by using categories and concepts to name a situation in order to make sense of it. Language imposes order, and so do the central concepts of the disciplines. "Whenever we use our school learnings . . . to perceive, understand, or feel life situations, we say that we are using our learning primarily for interpretation, and not replicatively, associatively, or applicatively, although strictly speaking, these uses do not necessarily exclude each other" (p. 54). It is important to note that "in a sense . . . the interpretative use of knowledge is the most fundamental of all, for without a prior interpretation of the situation we are not sure what we shall replicate, associate, or apply" (p. 54).

So, we must ask, What sort of interpretations of the world—concepts, values, beliefs, attitudes—will be encouraged by a science of education and training within it? To be sure, interpretations will be made one way or the other, fruitless or fecund, generous or stingy. Probably it is in the interpretative uses of knowledge that the training of education researchers most often fails, not in the replicative or applicative uses, which now dominate debate. Yet, as noted, the interpretative lies behind the other uses of knowledge and reveals their power and sets their value. It is difficult to think broadly and complexly about an issue when there is nothing to think with—when one has methods without philosophy, techniques without history—or when what is there is severely limited by narrow and highly technical training, whereby science is reduced to process. Such training is most often directed by scholastics, the technocratically minded, and much of the teaching is done by would-be journalists. The danger is that graduate studies in education as Eisenhart and DeHaan conceive of it will, for the most part, produce scholastics. No group is less well suited to provide useful guidance during times of great uncertainty.

Interdisciplinarity and Perspective Taking

"Questions of research," as Popkewitz (2004) argues, "do not just arise from nowhere" (p. 65); they arise from the traditions in which researchers are educated. "Theories are formed within the intellectual tradition in which those theories work. . . . The unquestioned presuppositions orient how the researcher approaches the world to be known, shapes and fashions what is asked, and forms the objects that are investigated, and just as important, filters out other types of questions as sanctioned for inquiry" (Popkewitz, 2004, pp. 65–66). Although education, like the humanities, is filled with its own version of scholastics, there is also a smattering of Socratics and visionaries. The latter two types, however, must not be confused with either rightist or leftist preachers. Here I provide a few examples of the potential power of the humanities to enable what might best be described (drawing on Garrison, 1997) as "outlaw" thinking, or nonnormative discourse. These examples underscore the value of striving to reach beyond ourselves and our own mindset in our studies, our interactions, and our projects. I shall focus on a few persistent educational questions and seek to present them counter-inductively, as Feyerabend would say.

First, consider learning. Debates have raged within the social sciences over how students learn, and one still hears passionate pleadings from constructivists (constructivism comes in various flavors) who argue the virtue of their positions in contrast to some evil called behaviorism. For various reasons, it is difficult to get

outside this interpretative circle. Drawing on the humanities is helpfully troubling; both views might well miss fundamental and crucial elements of what learning is (and, notably, how learning is experienced—a question too seldom considered). Clifford Mayes (2005a), for example, brings a broad and profoundly religious perspective to the question. Writing of "death and resurrection" in the classroom, Mayes argues for the importance of providing "sufficient opportunities" for students to fail. Referring to the biblical Mother Eve, he asserts: "Our first, great Mother-Teacher understood the need for both failure as well as success in the eternal maturation of the spirit. Following her example, spiritual teaching evidences [a balanced] mixture of the bitter with the sweet. . . . Not only does the spiritual teacher not let a student get caught in failure; [she] does not let him get caught in success" (pp. 68–69). Taking Mayes seriously, one begins to think about planning for what perhaps can best be described as "smart" failure, for confronting limitations and repenting and overcoming ignorance. In this way a student becomes increasingly teachable ("unteachability" being a source of common complaint among teachers) and learns how one learns, discovers the need for reliance on others when encountering difficulties. This is a radical notion. In another work, Mayes (2005b) draws on insights from Jungian mythology to rethink aspects of the nature of teacher-pupil relations; when predictability is the aim, such relations are often thought to be at their best when businesslike. Calling attention to the nature of transference and counter-transference, Mayes points to neglected but important and researchable aspects of how teachers and pupils interact. He raises the generally neglected question of what teachers gain from these relationships and how the relationships are formed to satisfy one or another compelling, and not always healthy, desire or need on the part of the teacher. Identifying and making these desires explicit may have a dramatic impact on the nature and quality of teacher-student relationships, revealing important aspects of those relationships that are most life-affirming for both parties, most likely to encourage learning, and, dare I say, most promising of higher test scores. From comparisons of this kind one discovers, drawing on an insight from Stephen Toulmin (2001), that the "eccentric can be used to explain the central, rather than the other way around" (p. 30). As noted, attending to outliers opens worlds of understanding by revealing what has been missed or intentionally ignored, possibly for good methodological reasons.

In a controversial piece about the teacher-student relationship, Bullough, Patterson and Mayes (2002) draw upon the work of the theologian Walter Brueggemann to explore ways in which teaching involves the prophetic.[2] Viewing teaching in this way sheds light on how teaching often is a "calling," to which one is "summoned, . . . impelled by a sense of inner necessity" (p. 315). Teachers who experience teaching as a calling may engage their work in unique ways reflecting their sense of investment in a deeply moral enterprise. This understanding may account for some aspects of a teachers' classroom and school behavior, most particularly how personal failure or success with students is experienced and understood, including failure to raise standardized test scores. For "called" teachers, facing threatening accountability measures puts the entire self at risk. In addition, the authors note a critical component of teaching as prophecy, where the teacher-prophet necessarily engages in criticism of the world "in order to

reimagine [it]" (Bullough, Patterson, & Mayes, p. 325) and thereby help the young to reimagine themselves as learners. These authors call attention to an ever-present utopian impulse in teaching, where living ideals are always awaiting realization, ideals that may very well ground acts of teacher resistance as well as inspire willing self-sacrifice in service to the young. The authors also open a way for thinking about leadership as a form of service and of ministering grounded in truth-telling rather than as a set of skills taught in administration programs.

Consider yet another example, the nature of moral education. In *Moral Imagination* (1993), the philosopher Mark Johnson demolishes taken-for-granted Enlightenment moral theories grounded in laws and rules and argues for a theory set in four requirements: (1) the development of moral imagination; (2) gaining knowledge of our own moral understanding; (3) forming moral empathetic imagination; and (4) envisioning imaginative possibilities for taking action (pp. 198–203). Empirically testable, the implications of this theory for classroom disciplinary practices and for resolving student disputes through managing conflict are provocative and far-reaching. Discipline comes to be thought of as involving opportunities to develop students' imaginative moral capacities, including the ability to step into others' shoes, rather than as means for achieving compliance alone. Similarly, this theory points to often-neglected possibilities for perspective taking and practicing moral reasoning through student conflict management.

Questions and works of these sorts stand outside the interpretative circle set by a science of education. Yet, as I have suggested, they open up important areas for research and offer insights useful for reimagining and productively reframing the problems of teaching and learning.

Conclusion

Maxine Greene, writing more than three decades ago, warned of the dangers of a concept she often championed, "wide-awakeness," which has a direct bearing on the challenge of interdisciplinarity and the nature of perspective taking. Although she writes about teachers, her point holds for education researchers as well:

> One of the risks of "wide-awakeness" is that the sights and sounds of a culture in crisis may overwhelm. At one extreme, they may thrust the teacher back into reliance on precedent; defensively, he may become an automaton. At the other extreme, they may cause him deep disquietude. He may realize, as never before, that he is responsible for his moral choices, that—with dissonance afflicting him and no one to run to for a resolution—he is dreadfully free. . . . (1973, p. 183)

Researchers may recoil from such freedom, seduced by safe and relatively simple questions that assure career success, that are easily measurable; or they may embrace freedom in such a way that the academic life becomes a shared encounter with the unknown and not merely a scholastic's quest for professional standing or a journalist's quest for stories that will sell. Robert Coles (1989) observes that the "critical root" of the word "theory" is "'I behold, as in what we see when we go to the theater" (p. 20). In beholding, data (the " 'things' of the world") are created; and, by *re*-searching in ways suggested by Mayes's work, new data are beheld and old questions reconceived (Popkewitz, 2004, p. 72).

New forms of beholding, of interpreting the world, not only create new data but also alter practice by changing researchers' understandings of themselves.

Remarkably little educational history or philosophy are read these days. It is worth noting that it was David Tyack, in his landmark book *The One Best System* (1974), who warned of the dangers of single and simple solutions to complex educational problems. Education researchers fixated on finding "best practices" would do well to read this book, even as government-sponsored orthodoxies grow in influence and power and ever more researchers line up for service. I was amazed a few years ago to discover that not a single faculty member in my department (Ph.D.s all) had ever read Dewey's *Democracy and Education* (1916), a book that argues that democracy *is* a theory of education and has long been a fountainhead of profound questions. Books of this sort, which challenge and provoke, must find a prominent place in graduate education at its *core.* Too few of us who teach graduate education courses read broadly, but we must. Perhaps, like our students, we need to learn how to read.

Kaufmann (1977) argues for learning to read dialectically, an approach that fuses three elements. The first element is *Socratic:* We enlist the text in a process of examining our own "life, faith, and values." The second is *dialogical:* The "text is treated as a You and allowed to question us, as we question the text" (p. 62)—here we are committed to hearing and understanding what the author intended to say even when there is strong disagreement. The third is *historical-philosophical:* We attempt to understand the work and the author broadly and contextually, reaching beyond the minutiae that capture the scholastic mind. The argument Kaufmann makes is helpful for thinking about the nature of research training in education and the need to "read" not just texts, but also education, dialectically. A researcher ought to know why one or another research question is found to be compelling—what it promises for the researcher and for those the researcher serves, and what is missed by choosing to ask this question rather than another. Before research begins, one ought to develop a broad understanding of the problem. Doing so requires considering contrasts and comparisons of the sort that Feyerabend defends (an effort that is often missing in literature reviews); it also requires attending to and seeking alternatives, getting beyond oneself and one's position to imagine the problem as others understand and have understood it—and to do this requires engagement with others. Here, the visionary may enter, for visionaries in their wide-awakeness see the world as others do not and in so doing stretch and challenge imagination. In challenging the commonplace, they reveal fresh ways of understanding old problems, and they attack new questions that may involve acts of reclamation—for example, when good ideas have been forgotten or seemed to lose promise because a needed supporting technology was unavailable.

I have argued for an expanded and generous conception of interdisciplinarity, not multidisciplinarity, for graduate education, one that would support the sort of dialectics that Kaufmann envisions between and among researchers and that which is studied and researched. There is no doubt that this is a tall order. It requires the crossing of well-established intellectual divisions and social and institutional boundaries—divisions and boundaries that tend to encourage and reward insularity while often leaving policy analysis to the journalists and their friends. Given the prac-

tical moral intent of education research, crossing the boundaries and doing so with others should prove not nearly as difficult as in the social sciences, although perhaps not as easy as in the hard sciences, where mathematics provides a shared language. In any case, disciplinary boundaries are historical creations, habits of mind, and are subject to change over time despite faculty allegiance to and self-investment in them.

Perhaps more important, I argue for encouraging those who wish to engage in education research to read broadly and with others.[3] Graduate programs in education should be carefully crafted to include encounters with the humanities and to engage students from a wide range of social and intellectual backgrounds on shared and meaningful tasks. Those of us who teach in such programs will face a daunting challenge, for we may discover that we are not fully able to guide our students and are increasingly dependent on "interdisciplinary networks" (National Research Council, 2004, p. 67) and their collective expertise. The challenge brings with it rich opportunities to learn, relearn and—perhaps most important—unlearn our worlds, and to form new, more expansive visions.

NOTES

[1]A century ago, practical studies, for example, were defended as reflecting "scientific training rather than . . . practical applications" (Hinsdale, 1910, p. 400). Then, as now, and despite William James's warning, psychology in its various—and often narrowest—forms continues to enjoy first position as the avenue to a science of education. James said, "Psychology is a science, and teaching is an art: and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality" (1899, pp. 8–9). The prominence of psychology as a field has had many effects, including the reversal of the long-established relationship of curriculum and instruction and the near death of curriculum studies.

[2]Garrison's discussion of the prophetic in teaching is equally provocative: "Prophets are the finest poets and philosophers, for it is their task to call into existence the novel values that, if we truly desire them, will lead us toward a better destiny" (1997, p. 136).

[3]John Goodlad's Associates Program may provide a model for work of this kind (see Smith, 1999; Patterson & Hughes, 1999).

REFERENCES

Apple, M. (1979). *Ideology and the curriculum.* London: Routledge & Kegan Paul.

Broudy, H. S. (1988). *The uses of schooling.* New York: Routledge.

Broudy, H. S., Smith, B. O., & Burnett, J. R. (1964). *Democracy and excellence in American secondary education.* Chicago: Rand McNally.

Bullough, R. V., Jr., Goldstein, S. L., & Holt, L. (1984). *Human interests in the curriculum: Teaching and learning in a technological society.* New York: Teachers College Press.

Bullough, R. V., Jr., Patterson, R. S., & Mayes, C. T. (2002). Teaching as prophecy. *Curriculum Inquiry, 32*(3), 311–329.

Coles, R. (1989). *The call of stories: Teaching and the moral imagination.* Boston: Houghton Mifflin.

Counts, G. S. (1932). *Dare the school build a new society?* New York: John Day.

Dewey, J. (1916). *Democracy and education.* New York: Macmillan.

Dewey, J. (1929). *The quest for certainty.* New York: Minton, Balch & Company.

Dewey, J. (1938). *Experience and education.* New York: Macmillan.

Eisenhart, M. & DeHaan, R. L. (2005). Doctoral preparation of scientifically based education researchers. *Educational Researcher, 34*(4), 3–13.

Ellsworth, E. (1989) Why doesn't this feel empowering? Working through the repressive myths of critical pedagogy. *Harvard Educational Review, 59*(3), 297–324.

Erickson, F. (2005). Arts, humanities, and sciences in educational research and social engineering in federal education policy. *Teachers College Record, 107*(1), 4–9.

Feyerabend, P. (1975). *Against method.* London: NLB.

Garrison, J. (1997). *Dewey and Eros: Wisdom and desire in the art of teaching.* New York: Teachers College Press.

Gitlin, T. (1995). The rise of "identity politics": An examination and a critique. In M. Berube & C. Nelson (Eds.), *Higher education under fire* (pp. 308–318). New York: Routledge.

Goodlad, J. I. (2004). *Romances with schools.* New York: McGraw-Hill.

Greene, M. (1973). *Teacher as stranger.* Belmont, CA: Wadsworth Publishing.

Habermas, J. (1971). *Knowledge and human interests.* Boston: Beacon Press.

Hamilton, R. F. (1996). *The social misconstruction of reality: Validity and verification in the scholarly community.* New Haven, CT: Yale University Press.

Hinsdale, B. A. (1910). The training of teachers. In N. M. Butler (Ed.), *Education in the United States* (pp. 359–407). New York: American Book Company.

Hoffman, M. (2005). Music's missing magic. *Wilson Quarterly, 29*(2), 28–38.

Hostetler, K. (2005). What is "good" education research? *Educational Researcher, 34*(6), 16–21.

James, W. (1899). *Talks to teachers.* London: Longmans, Green, and Co.

Johnson, M. (1993). *Moral imagination: Implications of cognitive science for ethics.* Chicago: University of Chicago Press.

Kaufmann, W. (1977). *The future of the humanities.* New York: Reader's Digest Press.

Kestenbaum, V. (2002). *The grace and the severity of the ideal: John Dewey and the transcendent.* Chicago: University of Chicago Press.

Kridel, C., & Bullough, R. V., Jr. (in press). *Stories of the Eight-Year Study: Reexamining secondary education in America.* Albany: State University Press of New York.

Kuhn, T. (1962). *The structure of scientific revolutions.* Chicago: University of Chicago Press.

Lucas, C. J. (1999). *Teacher education in America.* New York: St. Martin's Press.

Mayes, C. T. (2005a). *Jung and education: Elements of an archetypal pedagogy.* Lanham, MD: Rowman & Littlefield.

Mayes, C. T. (2005b). *Teaching mysteries.* Lanham, MD: University Press of America.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform.* Washington, DC: U.S. Department of Education.

National Research Council. (2004). *Advancing scientific research in education.* Washington, DC: National Academies Press.

Noddings, N. (1984). *Caring: A feminine approach to ethics and moral education.* Berkeley: University of California Press.

Patterson, R. S., & Hughes, K. H. (1999). The Utah associates program for leaders. In W. F. Smith & G. D. Fenstermacher (Eds.), *Leadership for educational renewal* (pp. 271–288). San Francisco: Jossey-Bass.

Peters, R. S. (1967). What is an educational process? In R. S. Peters (Ed.), *The concept of education* (pp. 1–23). New York: Humanities Press.

Pinar, W. (1975). *Curriculum theorizing: The reconceptualists.* Richmond, CA: McCutchan Publishing.

Polkinghorne, D. E. (1988). *Narrative knowing and the human sciences.* Albany: State University Press of New York.

Popkewitz, T. S. (2004). Is the National Research Council Committee's Report on Scientific Research in Education scientific? On trusting the manifest. *Qualitative Inquiry, 10*(1), 62–78.

Schneider, B. (2004). Building a scientific community: The need for replication. *Teachers College Record, 106*(7), 1471–1483.

Scott, J. (1995). The rhetoric of crisis in higher education. In M. Berube & C. Nelson (Eds.), *Higher education under fire* (pp. 293–304). New York: Routledge.

Smith, W. F. (1999). Developing leadership for educational renewal. In W. F. Smith & G. D. Fenstermacher (Eds.), *Leadership for educational renewal* (pp. 29–46). San Francisco: Jossey-Bass.

Snow, C. P. (1959). *The two cultures and the scientific revolution.* New York: Cambridge University Press.

Tyack, D. (1974). *The one best system.* Cambridge, MA: Harvard University Press.

Toulmin, S. (2001). *Return to reason.* Cambridge, MA: Harvard University Press.

Willinsky, J. (2005). Scientific research in a democratic culture: Or what's a social science for? *Teachers College Record, 107*(1), 38–51.

Zenderland, L. (2001). *Measuring minds: Henry Herbert Goddard and the origins of American intelligence testing.* New York: Cambridge University Press.

AUTHOR

ROBERT V. BULLOUGH, JR., is a Professor of Teacher Education, Brigham Young University, and Associate Director, Center for the Improvement of Teacher Education and Schooling (CITES), 149 McKay Building, Provo, UT 84602; *bob_bullough@byu.edu.* His research interests include teacher education and development.

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education aster Plan
Information Submission Form

The GCCCD is starting a ear long process to develop an Educational aster Plan that will serve as the blueprint for our future. The Educational aster Plan is a long range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational aster Plan will serve to guide College and District decisions about growth, development and resource allocation.

As the first step in this planning process, ever one in the GCCCD communit facult , staff, students and communit members are invited to identif and submit information sources to be reviewed for the trend anal sis in one of si ta onom areas societ , technolog , econom , environment, politics, and education. e are not as ing ou to do new research onl to identif information ou alread have or that ou encounter during the search period arch 21 April 25 and bring it to the attention of the can Teams for review.

Please feel free to submit as man of these forms as ou would li e. Please answer the following uestions for each submission:

1   hat is the document we should review : | A Guide to Pervasive Wireless in Higher Education

2 Author: |

3 ource: | Campus Technology

hich of the following ta onom areas does it fit into Please select onl one :

- ☐ ociet
- ☒ Technolog
- ☐ Econom
- ☐ Environment
- ☐ Politics and Legal Issues
- ☐ Education
- ☐ Other: |

5 Relevance: | To help make a case for further investment of wireless bandwidth on campus.

6 Page / ection: |

Add Attachment Hyperlin Here: | http://campustechnology.com/whitepapers/2011/03/brocade_techspotlight_guide_pe

To attach a document use **ools Comments and ar ups Attach A ile As A Comment**

Submit *this document by scrolling to the top of the page and clicking on the Submit button at the top right corner. You cannot print once the document is submitted.*

uestions: l nne.davidson gcccd.edu *Research, Planning and Institutional Effectiveness*

tech
spotlight

Wireless in the House

By Bridget McCrea

When Springfield College's 2,000 resident students arrived on the school's Springfield, MA campus for the fall semester, they got a nice surprise: Over the summer, all of the institution's residence halls—along with other areas of the campus—had been equipped with 802.11n wireless Internet access.

Danny Davis, CIO, said the initiative has been on his IT team's agenda for several years and was formally launched when he came on-board in May 2010. "The college had looked at wireless and knew there was a demand for it from the student population," Davis explained. "Today's students use laptops and want the flexibility to be able to move around and use their devices without having to tether themselves to a wall outlet."

A Quick and Effective Rollout

Davis said Springfield College's senior administration supported the initiative but wanted to see a comprehensive plan outlining the move from wired to wireless access in the dorms. "We put a plan together pretty quickly," said Davis. "The catalyst for the project was the students and their needs, so we focused on those points and got approval to go ahead with the initiative."

As it happened, the college was already in a "pretty good position" in terms of Internet access infrastructure, said Davis. The institution had revitalized its cable television network several years prior, he said, and "pulled in some [Cat-5] lines in the process."

The college also had the necessary networking-switching equipment in place and required just a few new Cat-5 and Cat-6 lines to be connected to new access points across its campus. Davis said existing routers were assessed for their usage levels, with some being reallocated to the residence halls. "We took existing areas that were underutilized," he said, "and used those existing facilities to bring up the new WiFi capabilities."

Wireless access in residence halls now serves the full range of WiFi electronic communications devices, such as iPads, iPhones, laptop computers, cell phones, and other technologies. Students can register an unlimited number of devices. "We really don't mind what type of device they're using because these dorms are their homes," said Davis. "That's how we look at it."

For students who are using desktops, the residence halls' wired access points were left intact. So far, Davis said, reaction to the WiFi access has been positive, with anywhere from 70 percent to 85 percent of the students using it. "We've already received a significant amount of positive feedback from students who are back on campus," said Davis.

In all, the initiative took about six weeks to complete and posed few challenges for the school's IT team. Additional wireless zones on campus include Cheney Dining Hall, Schoo-Bemis Science Center, the Wellness and Recreation Complex, Babson Library, the Richard B. Flynn Campus Union, and the foyer of the Allied Health Sciences Center.

Security Concerns

The move from a wired to a WiFi Internet platform did bring up some issues among users, said Davis, who added that a few of them were concerned about the new system's "open" environment. "It was a bit of a cultural shift and required new anti-virus and spam filtering software," said Davis. "We were pro-active about putting those elements in place, knowing that we not only need to provide access, but we also have to protect the users."

Davis said the school has taken other steps to ensure that students don't download spyware and viruses when surfing the Web on the WiFi network, which is encrypted and requires registration and a password to access. "With federal mandates [governing] issues like identity theft and protection," said Davis, "we are taking great strides to make sure we're safeguarding users on all fronts."

Davis and his team are also paying attention to issues like iPad security, a concern that has many colleges up in arms over whether to allow the devices on their networks. "We've followed that debate closely, but haven't settled on a particular stance or solution at this time," said Davis. "We want and expect our wireless networking to be as secure as possible, regardless of the platforms. We have a couple of iPads using our networking and haven't had any problems with them."

The Future Is Layered

Looking to the future, Davis said the school's 802.11n WiFi system is well equipped to handle growth in student population and residence halls. It will also be able to accommodate a possible move to a virtualized computing environment—an initiative that Springfield College is looking to implement "in the near term," according to Davis.

"We built this network with the goal of being able to layer other elements on top of it, including new and evolving technologies," said Davis, whose IT team is working on several other initiatives right now, including a new college admissions system. "We have a lot going on right now, and will be introducing even more technology as the school year progresses."

- -

Bridget McCrea is a business and technology writer in Clearwater, FL. She can be reached at bridgetmc@earthlink.net.

U São Paulo Upgrades Massive Wireless Network

By Dian Schaffhauser

One of the largest public universities in Brazil has built up its wireless infrastructure using routing gear from Brocade. The network at the University of São Paulo in Brazil hosts 41,000 computers and thousands of other devices in use by 80,000 students and 6,000 faculty members on seven campuses.

U São Paulo traditionally used a combination of Cisco and 3COM equipment. When the latest purchase was put out for bid, the university said in a statement, it selected Brocade® technology owing to a combination of performance and overall cost-efficiency advantages.

"After evaluating various vendors, Brocade was able to provide us the best overall price-for-performance, high reliability, and one of the lowest total costs of ownership," said Tereza Cristina Carvalho, director of CCE-USP, the campus computing center.

The university has deployed 25 Brocade MLX routers, which provide 10 gigabit Ethernet data transport and 1 gigabit port density. The company says these routers are best suited for metropolitan area networks, Internet edge/aggregation routing, virtualized data centers, large enterprise core, and high-performance computing environments.

- - - - - - - - - - - - - - - - - - -

Dian Schaffhauser is a writer who covers technology and business. Send your higher education technology news to her at dian@dischaffhauser.com.

A Growth Spurt of Wireless and Bandwidth
By Campus Technology Staff

Wireless is a top priority among private four-year college IT leaders, according to a recent survey by Xwires Communications, formerly X-Wires Broadband, a newly acquired division of satellite cable television and telecommunication services provider Campus Televideo.

The study further suggests that these same colleges are growing their bandwidth at accelerated rates. The survey, conducted in early 2010, queried 1,443 IT professionals at private four-year colleges on a range of technology topics. About 10 percent, or 142 people, participated (including IT professionals from four small public universities). While that number of respondents represents less than 10 percent of all private four-year schools, the data may be suggestive of trends across the larger universe of private four-year higher learning institutions.
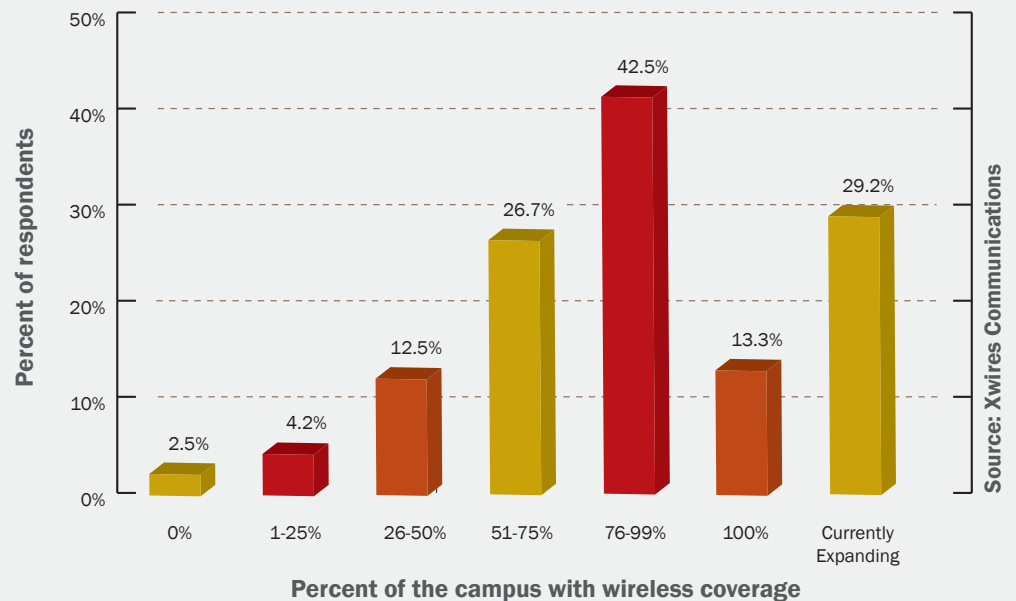
In its second year, the survey found that wireless deployment continues to be a top priority among private college IT professionals, second only to network integrity/virus protection (in 2010 receiving scores of 4.19 and 4.33, respectively, on a five-point scale; results from 2009 were about the same). Wireless has become pervasive at many respondents' campuses, and deployments continue to expand (see chart at right).

According to survey participants, bandwidth is also increasing rapidly on private college campuses. More than 88 percent of respondents said they have added bandwidth within the previous two years, and more than half (52 percent) reported adding 46 Mbps or more within the past year.

"Reacting to accelerating demand, private colleges are adding new bandwidth at a very high rate," the report authors conclude. Furthermore, they say, "The study confirm[s] the importance of wireless networks. Today's students expect high-tech environments and colleges are aggressively meeting that expectation."

A free copy of the report is available to school faculty and staff by contacting Rick Nixon, director of sales and marketing at Campus Televideo, at 203-983-5400 x119 or rnixon@campustelevideo.com.

Pervasive Wireless on Private College Campuses

Y-axis: Percent of respondents (0% to 50%)
X-axis: Percent of the campus with wireless coverage

- 0%: 2.5%
- 1-25%: 4.2%
- 26-50%: 12.5%
- 51-75%: 26.7%
- 76-99%: 42.5%
- 100%: 13.3%
- Currently Expanding: 29.2%

Source: Xwires Communications

More than half (55.8%) of the IT directors at private colleges responding to an online survey reported that they have deployed wireless coverage across more than three-quarters of their campuses. Thirteen percent said their campus is completely wireless and another 29% said they are in the process of expanding their wireless deployments.

Enabling the Pervasive Wireless Campus for Higher Education

Institutions of higher education are leveraging the Internet to enrich the learning experience for today's university and college students. Many professors now administer tests online and use Webinars and podcasts to disseminate supplemental information on a variety of subjects. In addition, teachers and administrators post assignments, grades, and study guides online, helping to ensure student success.

Growing up in a wireless world, today's students expect "anywhere, anytime" access to whatever information they need, on whatever device is in their hands. At the same time, the increasing emphasis on campus safety is forcing security personnel to rely on new wireless technologies—from video surveillance to crisis notification systems—to extend their reach and work more efficiently. Given these challenges, universities and colleges must determine how to cost-effectively provide the high-speed wireless access and applications required to meet the needs of both students and campus staff.

Brocade® Mobility enterprise Wireless LAN (WLAN) solutions, featuring support for 802.11n-based wireless networking, can help institutions of higher education efficiently meet these requirements while containing costs and laying the foundation for future growth. Fully integrated with Brocade wired campus networking solutions, Brocade Mobility solutions enable higher education IT departments to unify their wired/wireless communications, providing a seamless edge networking infrastructure to support next-generation applications.

THE PERVASIVE WIRELESS CAMPUS

Leveraging best-in-class wireless networking technologies, colleges and universities can address today's challenges by enabling pervasive wireless networking across the entire campus. High-performance 802.11n WLANs allow the reliable delivery of high-speed wireless voice, video, and data inside buildings as well as throughout the campus grounds.

This provides support for applications that greatly improve the learning environment, campus security, and the overall productivity of faculty and staff—while providing value-added services that strengthen communications with both students and their parents. These wireless applications include:

- Real-time faculty and administrative applications
- Distance learning
- Video surveillance
- Security and regulatory compliance

Real-time Faculty and Administrative Applications

A wireless network can deliver applications that enable teachers to spend more time on teaching and less time on administrative tasks, helping to improve the quality of education. Wireless attendance applications, for example, can eliminate paper forms, saving time, eliminating errors, and enabling rapid identification of missing students. The ability to send wireless work orders to mantenance staff not only improves productivity, but also enables faster repair—from a leaky faucet or faulty heating unit to the removal of broken glass in the parking lot—helping to maintain a safer and cleaner environment for all.

Distance Learning

A high-speed wireless network provides a vehicle to enhance and extend the learning environment. In higher education, students can access learning portals, course information, and online libraries as well as collaborate with classmates and professors on other campuses.
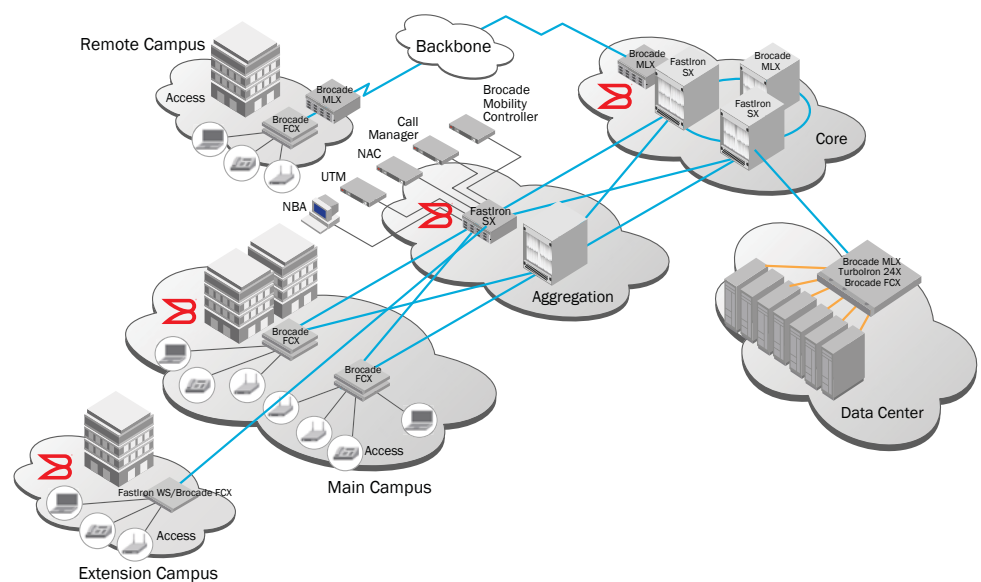
Brocade Mobility solutions provide the foundation for pervasive wireless campus deployments.

High-performance wireless networks can give students online access to class and individual lessons as well as homework assignments, library services, and more.

Video Surveillance

The ability to wirelessly connect video cameras both indoors and outdoors eliminates the high cost of wiring, enabling educational institutions to blanket the campus with video cameras. The result is real-time streaming video, providing visibility into every inch of the campus, enabling security personnel to immediately discover and respond to virtually any type of on-campus incident. The digital video is easy to archive and retrieve, and sophisticated analytics help security personnel proactively identify potential problems. The wireless network allows personnel anywhere on campus to watch the video, enhancing overall campus security.

Security and Regulatory Compliance

Because higher education institutions house volumes of financial, health, and other personal information about students, alumni, donors, faculty, and staff, they must keep this data confidential. Wireless networks have multiple layers of security to help ensure airtight data protection, prevent security breaches, and help ensure compliance with regulatory standards, including those set forth by the Payment Card Industry (PCI) and the Health Insurance Portability and Accountability Act (HIPAA).

Brocade Mobility Solutions: Making the Pervasive Wireless Campus a Reality

Brocade 802.11n wireless networks are helping higher education institutions of all sizes around the world realize the promise of the pervasive wireless campus. With speeds up to six times the bandwidth of 802.11a/g, Brocade indoor/outdoor 802.11n wireless networks offer the performance, scalability, coverage, resiliency, and security required to enable cost-effective delivery of some of the most demanding applications.

Brocade offers the unmatched reliability and gap-free security required for successful wireless deployment in educational environments. As a networking industry leader, Brocade can deliver the breadth of experience and proven, integrated wired and wireless products universities and colleges need to maximize the success of their wireless solutions.

Expansive Reach with Indoor and Outdoor Coverage

Brocade Mobility Solutions seamlessly integrates with industry-leading Brocade wired access and aggregation solutions, enabling the extension of secure and ubiquitous wireless access to every corner of the campus—including in (and between) remote buildings, in sports arenas, and even in off-campus housing. The pervasive campus-wide connection provides students with the anywhere, anytime high-speed access they expect while

providing the process automation that faculty and campus staff need to improve productivity and efficiency. In addition, it provides the constant video connection required to improve campus security and situational awareness.

Superior WLAN Performance with 802.11n

The Brocade WLAN product family helps institutions of higher education deliver quality mobile video, voice, and data. Enterprise-class Quality of Service (QoS), pre-emptive roaming, load balancing, WMM Admission Control, and seamless Layer 3 mobility combine to provide users with toll-quality voice and a resilient connection as they roam throughout campus—from classroom to dormitory halls to outdoor common areas, sports arenas, and more—ensuring continuity of service for phone calls and data applications. Virtual AP enables broadcast domain separation for secure hotspot enablement.

Gap-free Security

Brocade Mobility solutions offers comprehensive best-in-class wireless security that rivals

that of the wired network. A tiered approach protects and secures every point in the network—wired and wireless. This complete suite of tools includes a role-based wired/wireless firewall that provides protection against attacks and unauthorized access right at the wireless edge—including Layer 2 and Layer 3—using advanced encryption and authentication technologies.

Optimization for Dense Deployments in Indoor Areas

Many university and college campuses require support for high-bandwidth applications in small areas, such as conference rooms and lecture halls. Brocade Mobility SMART RF technology increases capacity in these dense areas by automatically self-tuning the network for optimal performance. In addition, Brocade Mobility solutions adaptive architecture allows local traffic such as video streams from faculty computers to be bridged locally, eliminating potential network bottlenecks.

Interoperability

Faced with limited budgets, institutions of higher education need to be able to leverage their existing technology investments as much as possible. Brocade standards-based wireless networks easily integrate into the existing technology environment, allowing colleges and universities to preserve their current wired and wireless networking infrastructures.

Education Master Plan
Information Submission Form

The GCCCD is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resource allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six taxonomy areas - society, technology, economy, environment, politics, and education. We are not asking you to do new research - only to identify information you already have or that you encounter during the search period (March 21 - April 25) and bring it to the attention of the Scan Teams for review.

Please feel free to submit as many of these forms as you would like.   Please answer the following questions for each submission:

1) What is the document we should review? :   2011 Distance Education Accessibility Guidelines

2) Author: Distance Education Accessibility Guidelines Task Force

3) Source: California Community Colleges

4) Which of the following taxonomy areas does it fit into? (Please select only one):

☐ Society

☒ Technology

☐ Economy

☐ Environment

☐ Politics and Legal Issues

☐ Education

☐ Other:

5) Relevance: To ensure we are planning appropriately in terms of providing accessible distance education

6) Page / Section:

7) **Add Attachment/Hyperlink Here**: http://www.cccco.edu/SystemOffice/Divisions/AcademicAffairs/DistanceEducation/Regu

To attach a document use **Tools-Comments and Markups-Attach A File As A Comment**

Submit *this document by scrolling to the top of the page and clicking on the Submit button at the top right corner. You cannot print once the document is submitted.*

Questions: lynne.davidson@gcccd.edu *Research, Planning and Institutional Effectiveness*

Distance Education:

**Access Guidelines for
Students with Disabilities**

August 1999

Chancellor's Office
California Community Colleges

Distance Education:
Access Guidelines for
Students with Disabilities

August 1999

Developed By:

The High Tech Center Training Unit
In Collaboration with the
Distance Education Accessibility Workgroup

Chancellor's Office
California Community Colleges

Distance Education and Accessibility Guidelines Task Force Members

Name: Ralph Black, Esq.   Name: Carl Brown
Title: General Counsel   Title: Director, High Tech
Center Training Unit
Affiliation: Chancellor's Office, CCC   Affiliation: De Anza College

Name: Laurie Vasquez
Title: Assistive Technology Specialist
Affiliation: Santa Barbara City College

Name: Cris Mora Lopez
Title: Distance Education Coordinator
Affiliation: Chancellor's Office, CCC
                Instructional Resources and Technology Division, Distance Education

Name: Brain Haley
Title: Dean of Library/Learning Resource Center
Affiliation: Sierra College

Name: Jay Thompson
Title: Executive Director
Affiliation: Consortium for Distance Learning

Name: Nancy Glock-Gruenich
Title: Specialist in System Advancement
Affiliation: California Virtual University/COCCC

Name: Catherine McKenzie
Title: Telecommunications Mgr. - Specialist
Affiliation: Chancellor's Office, CCC
                Instructional Resources and Technology Unit, Office of
Telecommunications and
                Technology

Name: Cheryl Chapman
Title: Instructor, Faculty Trainer, Academic Senate
Affiliation: Coastline College

Name: Catherine Campisi   Name: Jose Michel

Title: Dean, Student Support Programs Title: Senior Coordinator
Distance Education
Affiliation: Chancellor's Office, CCC Affiliation: Chancellor's Office,
CCC

Table of Contents

Preface

In March 1996, the U.S. Department of Education, Office of Civil Rights notified Chancellor Thomas J. Nussbaum that it was about to begin a statewide compliance review under Title II of the Americans with Disabilities Act of 1990. The compliance review would focus on the status of community colleges in meeting their obligation under Title II and Section 504 to provide students with visual impairments access to print and computer-based information. The review was to examine whether students with visual impairments, particularly blind students, were accorded an equal educational opportunity by California Community Colleges or whether they were being discriminated against on the basis of their disability. Specifically, OCR wished to consider whether the Chancellor's Office employed "methods of administration" which substantially impaired accomplishment of the objectives of the California Community College educational programs with respect to students with visual impairments.

As an outcome of this review, OCR offered nine suggestions for addressing areas of concern identified by the review. Among the suggestions/concerned voiced by OCR was the need for development of system-wide access guidelines for distance learning and campus Web pages. In a January 22, 1998 letter to Chancellor Nussbaum, Stefan Rosenzweig, Regional Director of OCR stated:

> *"California Community Colleges, individually and collectively as part of the California Virtual University, are rapidly developing their capacity to deliver educational programs to offsite students through technology. Little attention is being given to ensure that these distance learning programs are accessible to students with disabilities, especially students with visual impairments."*

He further added:

> *"The need for guidelines regarding distance learning has been recognized by several different entities in the California Community College system, including the Academic Senate which in Fall 1997, adopted "Guidelines for Good Practice: Technology Mediated Instruction." It is OCRs understanding that four regional distance learning centers to assist in development of program and course materials will be set-up in 1998-99. The concept of accessibility should be firmly integrated into such development."*

In responding to the Regional Director's suggestions regarding development of system-wide access guidelines for distance learning and campus Web pages, in a letter dated March 13, 1998, Chancellor Nussbaum replied:

> *"We concur with the strategies related to this issue. I will immediately direct that the Chancellor's Office Task Forces related to distance learning as well as California Virtual University have persons on them to specifically address access*

issues for persons with disabilities...To assure that the necessary guidance to colleges is available, I will specifically ask Vice Chancellor of Educational Services and Economic Development, Rita Cepeda, whose staff oversees the distance learning issues, to develop in cooperation with the DSP&S Unit and the High Tech Center Training Unit (HTCTU), guidelines for distance learning to assure it is accessible to and usable by persons with disabilities."

The guidelines which follow are the result of Chancellor Nussbaum's directive.

Legal Requirements

Both state and federal law require community colleges to operate all programs and activities in a manner which is accessible to students with disabilities. Accordingly, as the system develops its capacity for creation of technology based instructional resources and the delivery of distance learning; it must proceed with the needs of all students in mind, including the unique needs of students with disabilities.

At the federal level, requirements for access for persons with disabilities were first imposed on recipients of federal funding by Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794) and its accompanying regulations set forth at 34 C.F.R. 104. Similar requirements were later imposed on all public entities, regardless of whether or not they receive federal funding, by the Americans with Disabilities Act (42 U.S.C. Sec. 12100 et seq) and the regulations implementing Title II of the ADA which appear at 28 C.F.R. 35.

In particular, the Section 504 regulations and the regulations implementing Title II of the ADA contain nearly identical provisions stating that recipients of federal funds and public entities in providing any aid, benefit or service, may not afford a qualified individual with a disability an opportunity to participate that is not as effective as that provided to others. (See 34 C.F.R. 104.4 (b)(1) (iii) and 28 C.F.R. 35.130(b) (1) (iii)). Title II recognizes the special importance of communication, which includes access to information, in its implementing regulation at 28 C.F.R. 35.160 (a). The regulation requires that a public entity, such as a community college, take appropriate steps to ensure that communications with persons with disabilities are as effective as communications with others.

The United States Department of Education, Office for Civil Rights (OCR) is responsible for ensuring that all educational institutions comply with the requirements of all federal civil rights laws, including Section 504 and Title II of the ADA. As a result, the opinions of OCR are generally accorded considerable weight by the courts in interpreting the requirements of these laws. OCR has had occasion to issue several opinions applying the requirements of the Section 504 and ADA regulations to situations involving access to distance education and/or computer-based instruction.

In responding to a complaint by a student with a disability alleging that a university had not provided access to the Internet, OCR noted that:

[T]he issue is not whether the student with the disability is merely provided access, but the issue is rather the extent to which the communication is actually as effective as that provided to others. Title II [of the Americans with Disabilities Act of 1990] also strongly affirms the important role that computer technology is expected to play as an auxiliary aid by which communication is made effective for persons with disabilities.
(OCR Docket No. 09-95-2206, January 25, 1996)

Adding additional clarity to the meaning of "effective communication," OCR has held that the three basic components of effective communication are: "timeliness of delivery, accuracy of the translation, and provision in a manner and medium appropriate to the significance of the message and the abilities of the individual with the disability."

(OCR Docket No. 09-97-2145, January 9, 1998)

OCR also points out that the courts have held that a public entity violates its obligations under the ADA when it only responds on an ad-hoc basis to individual requests for accommodation. There is an affirmative duty to develop a comprehensive policy in advance of any request for auxiliary aids or services.

Finally, in considering the magnitude and responsibility of this task, OCR states:

[T]he magnitude of the task public entities now face in developing systems for becoming accessible to individuals with disabilities, especially with respect to making printed materials accessible to persons with visual impairments, is comparable to the task previously undertaken in developing a process by which buildings were to be brought up to specific architectural standards for access. Buildings in existence at the time the new architectural standards were promulgated are governed by "program access" standards. However, buildings erected after the enactment of the new architectural standards are strictly held to the new standards on the premise that the builder is on-notice that such standards apply. One who builds in disregard of those standards is ordinarily liable for the subsequent high cost of retrofitting.

Similarly, from the date of the enactment of Title II onwards, when making purchases and when designing its resources, a public entity is expected to take into account its legal obligation to provide communication to persons with disabilities that is "as effective as" communication provided to non-disabled persons. At a minimum, a public entity has a duty to solve barriers to information access that the public entity's purchasing choices create, particularly with regard to materials that with minimal thought and cost may be acquired in a manner facilitating provision in alternative formats. When a public institution selects software programs and/or hardware equipment that are not adaptable for access by persons with disabilities, the subsequent substantial expense of providing access is not generally regarded as an undue burden when such cost could have been significantly reduced by considering the issue of accessibility at the time of the initial selection.

(OCR Docket No. 09-97-2002, April 7, 1997)

There are also state laws and regulations which require community colleges to make their distance education offerings accessible to students with disabilities.

Government Code Section 11135 et seq. prohibits discrimination on various grounds, including mental or physical disability, by entities receiving funding from the State of California. The Board of Governors has adopted regulations at Title 5, California Code of Regulations, Section 59300 et seq. to implement these requirements with respect to funds received by community college districts from the Board of Governors or Chancellor's Office. These regulations require

community college districts and the Chancellor's Office to investigate and attempt to resolve discrimination complaints filed by students or employees.

In addition, the Board of Governors has adopted Title 5 regulations setting forth the general requirements applicable to all independent study (Sections 55300 et seq.) and those requirements specific to distance education courses (Sections 55370 et seq.). Section 55370 expressly states that the requirements of the Americans with Disabilities Act are applicable to distance education courses.

The remainder of this document sets forth guidelines developed by the Chancellor's Office to address specific issues community college districts will face in meeting their legal obligation to make distance education courses accessible to students with disabilities. These guidelines are not legally binding on districts, but the Chancellor's Office will apply these guidelines in determining whether a district has met its obligations under Title 5, Section 55370 and 59300 et seq. Districts which follow these guidelines will generally be regarded as having met those obligations. Districts which do not follow these guidelines will bear the burden of demonstrating that they have achieved compliance with their legal obligation to provide access to distance education for students with disabilities by other means.

Basic Requirements for Providing Access

The following are general principles that should be followed in ensuring that distance education courses are accessible to students with disabilities. They represent the general concepts of the ADA and its regulations but do not provide a detailed legal analysis of the ADA requirements. Persons utilizing this document who are unfamiliar with the ADA may wish to consult the campus ADA Coordinator or DSP&S Coordinator for further interpretation. In the remainder of this document, specific guidelines will be provided for resolving access issues with respect to particular delivery modes commonly used in distance education.

1. One of the primary concepts of distance education is to offer students "Learning anytime, anywhere." Therefore, all distance education resources must be designed to afford students with disabilities maximum opportunity to access distance education resources "anytime, anywhere" without the need for outside assistance (i.e. sign language interpreters, aides, etc.).

2. Distance education resources must be designed to provide "built-in" accommodation where possible (i.e. closed captioning, descriptive narration) and/or interface design/content layout which is accessible to "industry standard" assistive computer technology in common use by persons with disabilities.

3. Whenever possible, information should be provided in the alternative format preferred by the student (i.e. sign language interpreter, closed captioning, descriptive narration, Braille, audio tape, large print, electronic text). When choosing between possible alternative formats or methods of delivery, consideration should be given to the fact that methods which are adequate for short, simple or less important communications may not be equally effective or appropriate for longer, more complex, or more critical material (Example: Use of a telephone relay service may be an acceptable method for a faculty member to respond to a brief question from a deaf student during his/her office hours, but probably would not be appropriate as a means of permitting that same student to participate in a class discussions in a course conducted by teleconference.) Issues concerning accommodation should be resolved through appropriate campus procedures as defined under Title 5, Section 56027.

4. Adoption of access solutions which include assigning assistants (i.e. sign language interpreters, readers) to work with an individual student to provide access to distance education resources should only be considered as a last resort when all efforts to enhance the native accessibility of the course material have failed.

5. Access to distance education courses, resources and materials include the audio, video and text components of courses or communication delivered via satellite, Instructional Television Fixed Services (ITFS), cable, compressed video, Local Area Network/Wide Area Network (LAN/WAN networks), Internet, telephone or any other form of electronic

transmission. Access to resources and materials include the audio, video, multimedia and text components of Web sites, electronic chat rooms, e-mail, instructional software, CD-ROM, DVD, laser disc, video tape, audio tape, electronic text and print materials. Where access to Web sites not controlled by the college is required or realistically necessary to completion of a course, the college must take steps to ensure that such sites are accessible or provide the same material by another means that is accessible.

6. Distance education courses, resources and materials must be designed and delivered in such a way that the level of communication and course taking experience is the same for students with or without disabilities.

7. After the adoption date of these guidelines, any distance education courses, resources or materials purchased or leased from a third-party provider or created or substantially modified "in-house" must be accessible to students with disabilities unless doing so would fundamentally alter the nature of the instructional activity or result in undue financial and administrative burdens on the district.

8. Colleges are encouraged to review all existing distance education curriculum, materials and resources as quickly as possible and make necessary modifications to ensure access for students with disabilities. At a minimum, the Chancellor's Office will expect that the curriculum for each distance education course and its associated materials and resources will be reviewed and revised as necessary when the course undergoes curriculum review pursuant to Title 5, Sections 55002 and 55378, every six years as part of the accreditation process. In the event that a student with a disability enrolls in an existing distance education course before this review is completed, the college will be responsible for acting in a timely manner to making any requested modifications to the curriculum, materials or resources used in the course, unless doing so would fundamentally alter the nature of the instructional activity or result in undue financial and administrative burdens on the district.

9. In the event that a discrimination complaint is filed alleging that a college has selected software and/or hardware that is not accessible for persons with disabilities, the Chancellor's Office and the U.S. Department of Education , Office for Civil Rights will not generally accept a claim of undue burden based on the subsequent substantial expense of providing access, when such costs could have been significantly reduced by considering the issue of accessibility at the time of initial selection.

10. In all cases, even where the college can demonstrate that a requested accommodation would involve a fundamental alteration in the nature of the instructional activity or would impose an undue financial and administrative burden, it must nevertheless provide an alternative accommodation which is equally effective for the student if such an accommodation is available.

11. Ensuring that distance education courses, materials and resources are accessible to students with disabilities is a shared college responsibility. All college administrators, faculty and staff who are involved in the use of this instructional mode share this

obligation. The Chancellor's Office will make every effort to provide technical support and training for faculty and staff involved in the creation of accessible distance education courses, resources and materials through: campus representative(s) to the California Virtual University (CVU) Regional Distance Education Center, staff from the local Regional Distance Education Center(s), campus High Tech Center staff and High Tech Center Training Unit staff.

Access Guidelines for Specific Modes of Distance Education Instructional Delivery

1.   Print Media

The use of "correspondence" has a long history in distance education and will likely continue as an element of some courses. Print-based materials are easy to handle, modify, distribute and store. Print materials allow students to work at their own pace.

Delivery Medium - Print Medium

Access Issue

Students who are blind or have low vision will be unable to read print material. Some students with severe learning disabilities may also be unable to effectively read print materials.

Remedies

Provide print material in alternate formats including: Braille, large print, audiotape, digital sound files and e-text. Whenever possible, information should be provided in the alternative format preferred by the student.

Analysis:

Braille

Braille can be produced in a variety of formats designed to accommodate specialized needs such as scientific notation and music scores. For general text production, materials should be provided in Grade 2 Braille. Grade 2 Braille is the format most commonly used by persons who are blind.

Braille can be produced "in-house" using readily available Braille translation software and specialized Braille printers or out-sourced to agencies and organizations which produce Braille documents commercially. As of 1999, colleges wishing to produce Braille documents in-house should expect to pay around $5000 for the necessary printer hardware and software. Commercial production costs average about one dollar per

Braille page with one single spaced print page equaling approximately two print Braille pages. Production time through commercial providers can vary from days to weeks.

In either case, Braille documents should be formatted to preserve critical page layout elements (i.e. columns, tabular data, etc.) and proofed for accuracy.

Large Print

Large print documents printed from electronic files should be produced using a font size of 14 point (or larger) and sans serif type faces such as Helvetica for visual clarity. Documents should be reformatted as necessary to preserve critical page layout elements. All colors should be set for maximum print contrast.

Audio Tape

Audio taped materials can be produced in-house if recording studio resources are available or outsourced to commercial providers such as Recordings for the Blind and Dyslexic. For in-house recording, readers should be familiar with the vocabulary of the source material and the taped material proofed for accuracy. These media are typically used by both visually impaired and learning disabled students.

Electronic Text

Electronic text should be available in multiple operating system formats (i.e. Windows, Macintosh), plain text, and industry standard word processing formats (i.e. Word, WordPerfect, etc.). These media are typically used by both visually impaired and learning disabled students.

Resource Material

Please see Appendix I for supplemental information about copyright issues, Braille and large print.

---

2. Audio Conferencing

Telephones remain the technology of choice for simple phone calls between a teacher and a student as well as for scheduled, multi-point sessions between a teacher and students at many locations. Telephones are also used in "one-way video, two-way audio" teleconferencing/instructional delivery systems often used by community colleges for microwave delivery of courses to surrounding community sites. The telephone system is ubiquitous, reliable, easy to use and of sufficient quality for delivery of voice content.

Delivery Medium - Audio Conferencing

Access Issue

Students who are deaf or hard-of-hearing will not be able to hear conversations. Students with speech impediments will not be able to respond to conversations.

Remedies

Provide a text telephones (TTY) link in the studio or classroom, provide TRS service, provide a dedicated, electronic chat room and real-time transcription of conversations, provide on-site interpreter at the student's location.

Analysis:

Text Telephones (TTY), sometimes called a TDD or Telecommunication Devices for the Deaf, are widely used by people who are deaf or have speech impediments. A TTY is a combination telephone, keyboard and display which allows for direct, point-to-point text based communication between two people. Communication rates are only constrained by typing speed of the two users. TTYs work over ordinary phone lines and require no set-up or configuration. TTYs may be used for one-on-one telephone conversations between faculty and student.

Faculty can communicate with students who are deaf, hard of hearing, or speech-impaired using the Telecommunications Relay Service (TRS). A TRS special operator types whatever the instructor says and the words appear on the students TTY display. Student responses are typed back to the TRS operator who reads them aloud to the instructor. Toll free TRS services are available 24 hours a day, 365 days a year. Use of a TRS may be an acceptable method for a faculty member to respond to a brief question from a deaf student during his/her office hours, but probably would not be appropriate as a means of permitting that same student to participate in a class discussions in a course conducted by teleconference.

A variety of commercial and public domain Web-based "chat" software is presently available. Using these tools, the college may create a private chat room where deaf, hard-of-hearing or speech impaired students can read, and type responses to, the content of the conversation as it is input by a "real-time" transcriptionist. The instructor also views the transcribed text and shares with the telephone audience any comments typed by students using the chat room. Chat rooms may be used for one-on-one conversations between faculty and student as well as for multi-point group conversations.

In keeping with the basic requirements defined earlier, in the event that all other efforts to make the distance education resource accessible as delivered have failed, as a last resort, colleges may provide an on-site interpreter(s) at the student's location.

Please see Appendix II for supplemental information about TRS, TTY, chat, real-time transcription and interpreter services.

---

3. Video Conferencing/Video Transmission (Live)

Video conferencing can include satellite broadcast, TV cable, Instructional Television Fixed Service (ITFS) or compressed video (ISDN). It may include real-time, two-way video and audio or one-way video/two-way audio. Pre recorded video transmission, described in Item 4, generally involves the rebroadcast of a course segment which has been videotaped and includes no real-time interaction between student and instructor.

Delivery Medium - Video Conferencing/Video Transmission (Live)

Access Issue

Students who are deaf or hard-of-hearing will not be able to hear conversations. Students who are blind or have low vision will not be able to see instructional materials.

Remedies

Provide real-time closed or open captioning, an on-screen interpreter or (as a last resort) an interpreter at the student's location. To facilitate communication from the student, provide a TTY link in the studio or classroom, provide TRS service or provide a dedicated, electronic chat room for real-time conversation exchange.

For blind and low vision, provide all print materials in alternative formats and include descriptive video narration as needed.

Analysis:

On August 7th, 1997, the Federal Communications Commission (FCC) unanimously approved a new law which mandates captioning on virtually all television programming in the United States. Section 305 of the Telecommunications Act of 1996 is being implemented as a new section (Section 713) of the existing Communications Act. There are a variety of existing technologies which will allow colleges transmitting via satellite Ku or C band, microwave (ITFS) or cable and with moderately sophisticated video editing and broadcast capabilities to add captioning to live broadcasts in real-time in

closed or open format. Average cost for these systems is about $10,000. Hourly rates for real-time transcriptionists average $75 to $100/hour. Real-time captioning can also be provided through outsourcing to commercial services.

Colleges may also provide access to the audio component of live broadcasts for deaf or hard-of-hearing students by including a sign language interpreter in a small video window superimposed over the main video.

To facilitate communication from the student, the college may employ:

Text Telephones (TTY), a combination telephone, keyboard and display which allows for direct, point-to-point text based communication between two people. TTYs work over ordinary phone lines and require no set-up or configuration and may be used for one-on-one telephone conversations between faculty and student. The faculty would read the student's response from the TTY to the listening audience.

Deaf, hard of hearing, or speech-impaired students can also communicate with the faculty member using the Telecommunications Relay Service (TRS). Student responses are typed back to the TRS operator who reads them aloud to the instructor. The faculty would share the student's response with the listening audience. Toll free TRS services are available 24 hours a day, 365 days a year. Use of a TRS may be an acceptable method for a faculty member to respond to a brief question from a deaf student during his/her office hours, but probably would not be appropriate as a means of permitting that same student to participate in a class discussions in a course conducted by teleconference.

A variety of commercial available and public domain Web-based "chat" software is presently available. Using these tools, the college may create a private chat room where deaf, hard-of-hearing or speech impaired students can type responses to the content of the video as presented via captioning or on-screen interpreter. The instructor monitors the chat room and shares with the audience any comments typed by students using the chat room. Chat rooms may be used by one or more students simultaneously. Colleges may also provide an on-site interpreter(s) at the student's location as an alternative to captioning, TTY, TRS or chat rooms.

Supplemental course material in print media must also be provided in alternative formats (Braille, large print, audio tape and/or electronic text) to provide access for students who are blind or have low vision. Please see the discussion of Print Media for details.

Descriptive narration on the Second Audio Programming (SAP) channel provides a mechanism through which students who are blind or have low vision can receive auditory descriptions of important visual elements of the video presentation. Real time descriptive narration requires the services of a trained narrator and the ability of the college to transmit a SAP channel. As an alternative, colleges should train faculty who teach via real-time broadcast to include descriptions of visual objects which have significant instructional content in their course dialogue.

Please see Appendix III for supplemental information about real-time captioning.

---

4. Video Transmission (Pre Recorded)

Passive video transmission generally involves the rebroadcast of a course segment which has been videotaped and includes no real-time interaction between student and instructor.

Delivery Medium - Video Transmission (Pre Recorded)

Access Issue

Students who are deaf or hard-of-hearing will not be able to hear conversations. Students who are blind or have low vision will not be able to see instructional materials.

Remedies

Provide closed or open captioning, an on-screen interpreter or (as a last resort) an interpreter at the student's location.

For blind and low vision, provide all print materials in alternative formats. Provide real-time descriptive narration of significant visual elements

---

Analysis:

As mentioned in Item 3, on August 7th, 1997, the FCC unanimously approved a new law which mandates captioning on virtually all television programming in the United States. Section 305 of the Telecommunications Act of 1996 is being implemented as a new section (Section 713) of the existing Communications Act. There are a variety of existing technologies which will allow colleges to provide "off-line" captioning to existing libraries of instructional video and course materials. There are a variety of technologies available for off-line addition of captioning in closed or open format. Average cost for these systems is about $10,000. Costs for keying in of captioning are comparable to clerical word-processing rates. Off-line captioning can also be provided through outsourcing to commercial services for reasonable rates.

Colleges may also provide access to the audio component of a video for deaf or hard-of-hearing students by adding a sign language interpreter in a small video window superimposed over the main video as a post-production activity.

Supplemental course material in print media must also be provided in alternative formats (Braille, large print, audio tape and/or electronic text) to provide access for students who are blind or have low vision. Please see the discussion of Print Media for details.

Descriptive narration on the Second Audio Programming (SAP) channel provides a mechanism through which students who are blind or have low vision can receive auditory descriptions of important visual elements of the video presentation. Post-production descriptive narration requires the services of a trained narrator and the ability of the college to encode a SAP channel on the videotape. Colleges should train faculty who teach via videotaped courses to include descriptions of visual objects which have significant instructional content in their course dialogue.

Please see Appendices I for supplemental information about copyright issues, Braille, large print, audiotape and electronic text and III for supplemental information about real-time captioning.

---

5.   World Wide Web

The Web is rapidly becoming one of the most widely used media for delivery of distance education. The relatively low cost of delivery, ease of resource development and wide availability of student access make it an ideal instructional delivery resource. Although presently constrained by bandwidth considerations, the Web is fully capable of delivering a variety of multimedia and interactive instructional resources including audio, video and real-time chat services.

Delivery Medium - World Wide Web

Access Issue
Students who are blind will be unable to access graphic images, text formatted in complex ways, Java applets and video clips. Students who are deaf or hard-of-hearing will not be able to hear the auditory content of the Web site. Some students with severe learning disabilities may be unable to process large amounts of text information without the use of assistive technologies.

In addition, documents created using Adobe Portable Document Format (PDF) are difficult, if not impossible, to read using screen readers and/or refreshable braille displays. Thus, if materials are provided on a website in PDF format, an alternative version should also be available in plain text or HTML format. Of course, this is only feasible for textual information and would not apply to materials, or portions of materials, that are inherently graphic in nature such as pictures, graphs and maps.

Remedies

A comprehensive set of guidelines for meeting the Web access needs of persons with disabilities have been developed by the Web Accessibility Initiative (WAI) (http://www.w3.org/WAI/) as a working group of the World Wide Web Consortium (W3C).

Analysis:

The intent of these guidelines is to foster the creation of Web sites which provide equal access to information when viewed using typical, industry standard assistive computer technologies in wide use today by students with disabilities. Over the past two years, the international body of the World Wide Web Consortium (W3C) has sponsored the work of the Web Accessibility Initiative (WAI) in developing a set of international access guidelines for the Web. Although the WAI guidelines remain in draft format, they satisfy the access requirements identified under Title II of the Americans with Disabilities Act (ADA). In order to resolve compliance issues raised by OCR and to comply with Title II of the ADA, these guidelines have been adopted by the California Community Colleges Chancellor's Office. They apply to use of Web based instructional resources created by the college or other Web-based resources students are required to use for course completion. They will be reviewed/modified as necessitated by future revisions of the WAI guidelines by W3C.

The WAI guidelines excerpted below fall into three priority levels:

Priority 1

This guideline must be followed by an author, or one or more groups of users will find it impossible to access information in the document. Implementing this guideline is a basic requirement for some groups to be able to use Web documents.

Provide alternative text for images, applets, and image maps.
Provide descriptions for important graphics, scripts, or applets if they are not fully described through alternative text or in the document's content.
Provide textual equivalents for audio information (captioning).
Provide verbal descriptions of moving visual information in both auditory and text form.
Ensure that text and graphics are perceivable and understandable when viewed without color.
Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or frozen.
Ensure that pages using newer HTML features (i.e. style sheets, forms, tables) will transform gracefully into an accessible form.
Use features that enable activation of page elements via input devices other than a pointing device (e.g., via keyboard, voice, etc.).
For frames, provide sufficient information to determine the purpose of the frames and how they relate to each other.
Ensure that tables (not used for layout) have necessary markup to be properly restructured or presented by accessible browsers and other user agents.
Only use technologies defined in a W3C specification and use them in an accessible manner. Where not possible, provide an accessible alternative page that does.

Priority 2

This guideline should be followed by an author, or one or more groups of users will find it difficult to access information in the document. Implementing this guideline will significantly improve access to Web documents.

Indicate structure with structural elements, and control presentation with presentation elements and style sheets.
Provide supplemental information needed to pronounce or interpret abbreviated or foreign text.
Elements that contain their own user interface should have accessibility built in.
Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly.
Group controls, selections, and labels into semantic units.
Wherever possible, create good link phrases.

Priority 3

This guideline may be followed by an author to make it easier for one or more groups of users to access information in the document. Implementing this guideline will improve access to Web documents.

Provide mechanisms that facilitate navigation within your site.
Create a single downloadable file for documents that exist as a series of separate pages.

Complete text of the WAI accessibility guidelines as well as useful tutorials and extensive technical support can be found at: http://www.w3.org/WAI/

Additionally, a fully automated Web accessibility evaluation tool called BOBBY is available for use by California community colleges. BOBBY will evaluate a local Website incorporating the current WAI guidelines in its Website accessibility analysis and provide a detailed report of accessibility problems and recommended changes arranged by priority of importance.

It is required that all California community college instructional Web sites created or substantially modified after adoption of these guidelines be Priority 1 compliant. It is strongly recommended that all California community college instructional Web sites created or substantially modified after adoption of these guidelines be Priority 2 compliant.

BOBBY can be found at: http://www.cast.org/bobby/

Please see Appendix IV for supplemental information about development of accessible Web pages.

6. Instructional Software, Laser Video Disc, CD ROM, DVD

Courses presented through distance education may also include supplemental materials offered in a variety of electronic formats including computer assisted instruction (CAI) software, materials on video disc, CD ROM or DVD.

Delivery Medium - CAI software, video disc, CD ROM, DVD

Access Issue
Students who are blind will be unable to access graphic images, text formatted in complex ways, Java applets and video clips. Students who are deaf or hard-of-hearing will not be able to hear the auditory content of these resources. Students with physical disabilities may have difficulty using a touch screen video disc interface. Some students with severe learning disabilities may be unable to process large amounts of text information without the use of assistive technologies.

Remedies

The Trace Research & Development Center at the University of Wisconsin-Madison has designed a comprehensive set of software development guidelines which address these issues.   These guidelines should be used in combination with the guidelines for multimedia access developed by the Web Accessibility Initiative.

Analysis:

The California Community Colleges Chancellor's Office gratefully acknowledges the work of Dr. Gregg C. Vanderheiden, Ph.D. and the Trace Research & Development Center at the University of Wisconsin-Madison for the development of the following software accessibility development guidelines which have been excerpted for inclusion.

In order to comply with Title II of the Americans with Disabilities Act (ADA), the Chancellor's Office strongly recommends that California community colleges abide by the guidelines excerpted below when purchasing existing software, contracting for the development of software or developing software in-house.

Excerpted from the Trace Research & Development Center Accessibility Guidelines

There are many people who need to be able to use standard software programs in their jobs, schools or homes but are unable to because of the design of the programs or their interfaces. These people, because of accident, illness, congenital condition or aging have reduced visual, hearing, physical or cognitive/language abilities. The current estimate of people with disabilities is over 40 million people - a sizable portion of our population.

Purpose of the guidelines

The purpose of these guidelines is to document what application developers can do (or need to do) in order to make their software accessible and usable by people who have disabilities or reduced abilities due to aging.

The guidelines document does this by providing information on the problems faced by people with disabilities in using current software and documenting ways in which application software can be made more accessible and usable by them.

Basic Components

Basically, making application software more accessible consists of three complementary components:

1.   Designing your software so that it is as usable as possible to the greatest number of people - without requiring them to use special adaptive software or hardware. (This is referred to as Direct Accessibility).

2.   Designing your software in such a way that it will work with special access features built into the operating system or attached to it by users who require them. (i.e., Compatibility with operating system or third-party access features / software / devices for those people who will not be able to use your software directly.)

3.   Making sure that your documentation, training, and customer support systems are accessible.

A brief summary of the guidelines by disability area follows.

For people with physical disabilities

People with physical disabilities can have a wide range of abilities and limitations. Some people may have complete paralysis below the waist but may have no disability at all with their upper body. Others may have weakness overall. Some may have very limited range of motion, but may have very fine movement control within that range. Others may have little control of any of their limbs, or may have uncontrolled, sporadic movements which accompany their purposeful movements. Some with arthritis may find that hand and other joint movement is both physically limited and limited by pain.

A physical disability, by itself, does not usually affect a person's ability to perceive information displayed on the computer screen. Access is generally dependent on being able to manipulate the interface.

Therefore, you can increase the accessibility of your software (both direct and via access features/software and hardware):

by avoiding timed responses (less than 5-8 sec.) or allowing the response time to be changed;
by providing keyboard access to all toolbars, menus, and dialog boxes (whose functions are not also in the menu);
by not interfering with access features built into the operating system (e.g. StickyKeys, SlowKeys, Key Repeating etc.).

For people who are hard of hearing or deaf

Many users with hearing impairments need to have some method for adjusting the volume or for linking sounds more directly to their hearing aids. Both of these are hardware considerations and can be met with systems having volume controls and headphone or audio jacks. Users who have more severe hearing impairments may also use a combination of these techniques, as well as techniques for people who are deaf. Such techniques generally involve the visual display of auditory information.

Therefore, you can increase the accessibility of your software to users with hearing impairments:

by providing all auditory information in a visual form as well;
by ensuring that all visual cues are noticeable if one is not looking at the screen;
by having a mode of operation that will work in noisy environments or if sound is turned off;
by using the ShowSounds feature of the operating system of your computer, the user can specify that all sound should be accompanied by a visual event including a caption for any spoken text which is not already presented on screen.

In addition, you should make sure that product support people are reachable via Text Telephones (also called TDD's or Telecommunications Devices for the Deaf).

For people with color blindness

You can increase the compatibility of your software with access features/software:

by making color coding redundant with other means of conveying information;
by making sure that your program can operate in monochrome mode;
by using colors which differ in darkness so that they can be distinguished by this as well as color.

For people with low vision

People with low vision may have any one of a number of problems with their vision ranging from poor acuity (blurred or fogged vision) to loss of all central vision (only see with edges of

their eyes) to tunnel vision (like looking through a tube or soda straw) to loss of vision in different parts of their visual field, as well as other problems (glare, night blindness, etc.).

For people with low vision, a common way to access the information on the screen is to enlarge or otherwise enhance the current area of focus. Given this, you can increase the direct accessibility of your software:

by allowing the user to adjust the fonts, colors and cursors used in your program to make them more visible;
by using a high contrast between text and background;
by not placing text over a patterned background where the two might interfere with each other;
by using a consistent or predictable layout for screens and dialogs within the program;
by providing access to tools, etc., via menu bar;
by using recommended line width information when drawing lines (if such information is provided by the system).

In addition, you can increase the compatibility of your software with low vision access features/software by using the system pointers wherever possible, as well as the system caret or insertion bar if one is available.

If you use your own highlight/focus indicator, drag the system cursor with you even if it is invisible. This makes tracking the focus much easier for screen enlargement or "pan and zoom" features. If the operating system has a High Contrast setting, support it.

For people who are blind

Many people who are legally blind have some residual vision. This may vary from just an ability to perceive light to an ability to view things that are magnified. The best design is for this group is therefore one that doesn't assume any vision but allows a person to make use of whatever residual vision they may have.

Access by people who are blind is usually accomplished using special screen reading software to access and read the contents of the screen, which is then sent to a voice synthesizer or dynamic Braille display.

On computers which use a graphic user interface this is a bit tricky, but there are a number of things that application software developers can do to make it possible for people using screen readers to detect and figure out what is on the screen. These include:

using the system tools wherever you can to; 1) draw and erase all text on the screen; 2) display all cursors and pointers;
using the system standard controls whenever possible;
drawing tools in tool bars, palettes and menus that are separate items (rather than one big graphic of toolbar) as this makes it possible for screen readers to identify the number, location and shape of the individual tools so that they can be identified and named.

You can also increase the compatibility of your software with screen readers using the following considerations:

if text is embedded in a graphic image, using a special technique to make the text known to screen reading software (see detailed notes);
if you use your own highlight or focus techniques, dragging system cursors with you (even if invisible);
using consistent or predictable screen and dialog layouts;
not using popup help balloons that disappear if the focus changes unless there is a way to lock them in place so that the focus (e.g., cursor) can be moved there to read them;
using single column text whenever possible;
giving controls logical names, even if the name is not visible on screen (screen readers can access this information and use it to describe the type and function of the control on the screen);
providing keyboard access to all tools, menus, and dialog boxes.

Since screen readers can only read text (or give names to separately identifiable icons or tools) it is a good idea to:

avoid unlabeled "hot spots" on pictures as a control scheme (unless redundant with menu selection);
avoid non-text menu items when possible or incorporate cues (visible or invisible) (screen readers can 'see' text that is written to screen in an invisible color);
avoid non-redundant graphic tool bars if possible.

Finally, you can make your documentation and training materials more accessible:

by designing all documentation and on line help so that it can be understood by reading the text only (e.g. information presented in pictures and graphics is also presented with a description in text);
by providing synchronized running audio descriptions for all information presented as an animated graphic or movie (descriptive narration).

<u>For people with language or cognitive disabilities</u>

This is perhaps one of the most difficult areas to address. Part of the difficulty lies in the tremendous diversity that this category of persons with disabilities represents. It includes individuals with general processing difficulties (developmental disabilities, brain injury, etc.), people with very specific types of deficits (short term memory, inability to remember proper names, etc.), learning disabilities, language delays, and more. In addition, the range of impairment within each of the categories can (like all disabilities) vary from minimal to severe, with all points in between. In general, software that is designed to be very user friendly can facilitate access to people with language or cognitive impairments.

Somewhat more specifically, you can increase the accessibility of your software without reducing academic rigor:

by making sure that all messages and alerts stay on screen until they are dismissed;
by making language as straightforward as possible, both on screen and in the documentation;
by using simple and consistent screen layouts.

In addition, because print disabilities are more common among people with language and cognitive impairments, you can increase the accessibility of your software by ensuring that it is compatible with screen reading software.

<u>For people with disabilities in general</u>

Finally, you can increase the overall accessibility of your software without reducing academic rigor:

by making sure that your documentation is available in electronic form (that can be accessed by screen reading software) so that it is available to people who cannot handle or read your printed manuals;
by making sure that your product support people are aware of disability access issues and are aware that people with disabilities routinely use your products;
by having particular product support people identified who specialize in handling any incompatibility associated with the use of your product with disability access products (all support people should be able to handle regular product use questions of people who have disabilities, but it is usually helpful to focus incompatibility problems to a few people who can become more familiar with the issues and work arounds);
by forwarding any access or compatibility problems identified by product support people to product designers (and setting lower trigger levels for incidence vs. priority for fixing).

The complete text of these guidelines can be found at: http://www.trace.wisc.edu/docs/software_guidelines/toc.htm

Please see Appendix V for supplemental information about development of accessible software.

Appendix I

Copyright Issues

Copyright Law Amendment, 1996:
PL 104-197
December 1996

Background

The free national library program of reading materials for visually handicapped adults administered by the National Library Service for the Blind and Physically Handicapped (NLS), Library of Congress, was established by an act of Congress in 1931. The program was expanded in 1952 to include blind children, in 1962 to include music materials, and in 1966 to include individuals with physical impairments that prevent the reading of standard print.

From the beginning, this program was dependent upon the cooperation of authors and publishers who granted NLS permission to select and reproduce in special formats copyrighted works without royalty. Although many factors influence the length of time it takes to make a print book accessible in a specialized format, the period required to obtain permission from the copyright holder has sometimes been significant.

Public Law 104-197

Under the Legislative Branch Appropriations Bill, H.R. 3754, Congress approved a measure, introduced by Senator John H. Chafee (R-R.I.) on July 29, 1996, that provides for an exemption affecting the NLS program. On September 16, 1996, the bill was signed into law by President Clinton.

The Chafee amendment to chapter 1 of title 17, United States Code, adds section 121, establishing a limitation on the exclusive rights in copyrighted works. The amendment allows authorized entities to reproduce or distribute copies or phonorecords of previously published nondramatic literary works in specialized formats exclusively for use by blind or other persons with disabilities.

The act making appropriations for the Legislative Branch for the fiscal year ending September 30, 1997, sets forth the Chafee amendment as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that .
. . and for other purposes, namely:

(a)   IN GENERAL—Chapter 1 of title 17, United States Code, is amended by adding after section 120 the following new section:

"SEC.121. Limitations on exclusive rights: reproduction for blind or other people with disabilities

"(a) Notwithstanding the provisions of sections 106 and 710, it is not an infringement of copyright for an authorized entity to reproduce or to distribute copies or phonorecords of a previously published, nondramatic literary work if such copies or phonorecords are reproduced or distributed in specialized formats exclusively for use by blind or other persons with disabilities.

"(b)

(1) Copies or phonorecords to which this section applies shall—

"(A) not be reproduced or distributed in a format other than a specialized format exclusively for use by blind or other persons with disabilities;

"(B) bear a notice that any further reproduction or distribution in a format other than a specialized format is an infringement; and

"(C) include a copyright notice identifying the copyright owner and the date of the original publication.

"(2) The provisions of this subsection shall not apply to standardized, secure, or norm-referenced tests and related testing material, or to computer programs, except the portions thereof that are in conventional human language (including descriptions of pictorial works) and displayed to users in the ordinary course of using the computer programs.

"(c) For purposes of this section, the term—

"(1) 'authorized entity' means a nonprofit organization or a governmental agency that has a primary mission to provide specialized services relating to training, education, or adaptive reading or information access needs of blind or other persons with disabilities;

"(2) 'blind or other persons with disabilities' means individuals who are eligible or who may qualify in accordance with the Act entitled 'An Act to provide books for the adult blind,' approved March 3, 1931 (2 U.S.C. 35a; 46 Stat. 1487) to receive books and other publications produced in specialized formats; and

"(3) 'specialized formats' means Braille, audio, or digital text which is exclusively for use by blind or other persons with disabilities."

(b)   TECHNICAL AND CONFORMING AMENDMENT—The table of sections for chapter 1 of title 17, United States Code, is amended by adding after the item relating to section 120 the following:

"121. Limitations on exclusive rights: reproduction for blind or other people with disabilities."

Braille

Braille is a system of reading and writing for blind individuals. The basic unit of Braille is the Braille cell. It is composed of six dots: the upper left dot is dot 1, the middle left dot is dot 2, the lower left dot is dot 3, the upper right dot is dot 4, the middle right dot is dot 5, and the lower right dot is dot 6. From these six dots you can get 64 possible combinations.

dot 1 ** dot 4
dot 2 ** dot 5
dot 3 ** dot 6

There are many more inkprint symbols than the 64 Braille symbols. For example, most computer systems handle about 96 different inkprint symbols. Braille can show a wide number of different inkprint symbols by using one or more Braille cells for each inkprint symbol.

Braille only has one set of letters. By itself, a Braille letter is assumed to be in lower case. To show an uppercase letter, put the capitalization indicator (dot 6) in front of a Braille letter. To show an uppercase word, you put two capitalization indicators in front of the word. The number sign (used to indicate a number) is dots 3-4-5-6. This symbol comes just before the number.

An important thing to realize about Braille is that you cannot write the dot patterns smaller or larger. An 11-1/2 by 11 inch piece of Braille paper contains about 900 Braille cells. The Braille Planets cause Braille volumes to be much bulkier than inkprint.

To reduce the bulkiness of Braille there is a system of Braille contractions, or abbreviations. A Braille contraction is a combination of one or more cells used to shorten the length of a word. For example, to write the word "mother", you would use a two-cell contraction rather than spelling out the word "mother". Just because a contraction can be used does not mean it should be used. The word "chemotherapy" contains the sequence "mother". Some Braille translation programs are smart enough to know not to use the contraction for "mother" in "chemotherapy" (most of the Braille rules are based on pronunciation; you do use the "mother" contraction in "smother", since this is pronounced like "mother").

In Braille, if you have the letter "d" with a space or punctuation on either side, the "d" stands for the word "do". To show you really mean the isolated letter "d", precede it with a Braille cell called the letter sign, dots 5-6. This alerts the Braille reader to the fact that the next letter is to be read as a letter of the alphabet rather than an abbreviation.

Decoding Braille by comparing inkprint and Braille sequences can be tricky. The words "to", "into", and "by" are jammed up against the next word in Braille. The words "a", "the", "for", "of", and, "and" within Braille are single cells which can be jammed up against each other. For example, "with" is a single cell with spaces on either side, but "withthe" comes out as two cells

jammed together. Numbers use the number sign followed by the letters a-j (312 comes out as #cab). One Braille cell means "dis" if it shows up in the beginning of a word, means "dd" if it shows up in the middle of a word, and is used for the period punctuation symbol if it shows up at the end of a word.

There are several grades of Braille. Grade I Braille does not contain any contractions (abbreviations), but it does represent capitalization, numbers, and punctuation with the correct Braille symbols. Grade I Braille is used only for specialized applications where the Braille contractions might be confusing, such as in spelling lists. Grade II Braille is the most commonly used in North America. It not only represents capitalization, numbers, and punctuation marks with the proper symbols, but it uses the various contractions.

Braille Format

Another component of Braille is format. When material is laid out on paper for the sighted reader, it is done so for visual effect. The reader is attracted to what is pleasing to the eye. However, in Braille the object is maximization of space. Due to the bulkiness of Braille volumes, you want to put as much material as possible on the page, while at the same time maintaining readability.

According to the Library of Congress, which oversees standards and trains Braille transcribers for Braille production, there are certain criteria for the output page. A page of Braille contains a maximum of about 40 characters per line and 25 lines per page. For normal literary format (style sheet LITERARY) the Braille page number appears at the upper right-hand corner of each page. However, you may need to change these values according to the specifications of your Brailler.

Because of the physical (rather than visual) nature of Braille, format standards are especially important. Small differences in where text is placed on the page can tell the Braille reader a lot about what they are reading. In any Braille format, with or without a Braille translation program, certain elements are especially crucial components of page layout. These include treatment of indent and runover, Braille page numbers, inkprint page indicators, and running heads.

One of the major differences between Braille and print format pertains to paragraphs. Rather than having an indent of five spaces, Braille paragraphs have a two cell indent. The first character of the paragraph begins in cell three. There are no blank lines between paragraphs. Except in special circumstances, you do not put two or more spaces in a row in Braille. Thus only one space is used between sentences.

When material is underlined or emphasized in print, there are different ways of indicating it. In Braille there are italics marks which indicate something is being emphasized. A special symbol of dots 4-6 is placed before each word to be emphasized if there are three or fewer words in a row. If four or more words are emphasized, a double italics sign (dots 4-6, dots 4-6) is placed before the first word. A single italics sign (dots 4-6) is placed in front of the last emphasized word. Please note that you do not show all uses of inkprint emphasis in Braille. Emphasis is only used in headings when it is necessary to preserve the distinctions shown in inkprint.

Indent and Runover

Instructions for Braille transcribing often say indent to cell #. The farthest left position in which a cell may appear is cell 1. The farthest right position ranges from cell 30 to cell 40, depending on the carriage width of your Brailler.

The placement of the first cell in a paragraph is called the indent. When transcribing instructions say, Indent to cell 3, put the first cell of that segment in cell 3, regardless of where the preceding line began. The position at which all subsequent lines of the same segment begin is the runover. When instructions say, Runover to cell 1, begin all subsequent lines of that segment in cell 1. If instructions say, Indent to cell 7, runover to cell 5, begin the first line of that segment of text in cell 7, and all subsequent lines in cell 5.

Sometimes, the indent is a smaller number than the runover, as in, Indent to cell 1, runover to cell 5. In print, this is called outdenting, or a hanging indent. In Braille, the position of the first cell of a segment of text is always called the indent, regardless of whether it is to the left or the right of the remaining text.

Another common Braille instruction is block, as in, Block to cell 5. This simply means that the indent and the runover are equal to each other. It is the same as saying, Indent to cell 5, runover to cell 5.

Headings

There are three kinds of headings in Braille: major headings, minor headings, and paragraph headings.

A major heading is centered, with a blank line before the heading, and a blank line after it. Some Braille groups do not put a blank line after a major heading. Technically, this is a violation of the rules for Braille.

A minor heading is blocked to cell five. This means that the heading starts on the fifth cell of the line. Any runover also starts on the fifth cell of the line. Usually, there is a skipped line before a minor heading, but not after a minor heading.

A paragraph heading is a line or phrase in italics (or some other emphasis) that labels a paragraph and is immediately followed by text on the same line. If this is done in inkprint, do the same in Braille, using italics.

Braille rules require that there be at least one line of body text after a heading or headings on the same page. If there is not enough room on the page for the heading(s) and a line of body text, then the heading(s) need to be postponed to the top of the next Braille page.

Before you start a Braille project, you need to structure the document. You need to analyze how many levels of headings there are. You need to decide which of these should be done as a major heading, and which should be done as a minor heading.

Braille Page Numbers

As in print, each physical page in a Braille volume is given a sequential page number. This Braille page number merely orders the pages in the book. It does not provide the reader with any information about the pagination of the inkprint original. The Braille page numbers appear in different spots in different formats.

Print Page Indicators

Many Braille formats consider the Braille reader's need to know where each inkprint page begins. When required, inkprint page indicators appear in addition to the sequential Braille page numbers. Textbooks are one instance where this information is essential. With it, the Braille reader can follow class discussion, locate homework assignments, and generally keep up with the users of the inkprint original.

A single print page usually occupies several Braille pages. For example, if inkprint page 87 is found on three Braille pages, then these are marked with inkprint page indicators 87, a87, and b87.

Inkprint page indicators are also extremely useful when transcribing anything that has a table of contents or an index. When inkprint page indicators are not included on the Braille page, indexes and such must be completely rewritten to refer to the Braille page numbers. When inkprint page indicators are included, then page numbers may be transcribed exactly as they appear in print.

Running Heads

Many Braille formats require that the title of the work being transcribed appear on the first line of every page, with an appropriate page number. When the title is too long to fit on one line, it is abbreviated. The running head never uses more than one line.

Literary vs. Textbook Format

Whenever you begin a new transcribing project, with or without a Braille translation program, there is some planning to do before you start data entry. There are a number of things to look for in the first scan through the book: Check to see if there are a large number of foreign words, a table of contents or index, and graphs or pictures in the book.

One of the first things you must decide is whether to use textbook or literary format. Sometimes, the agency that assigns the transcribing job makes this decision for you. Here are some guidelines for when you have to decide yourself. Textbook format uses inkprint page indicators; literary format does not. When there is any possibility that the Braille reader needs inkprint page

indicators, use textbook format. Both formats may be used with or without running heads. Textbook and literary formats are also different from each other in the way they handle preliminary pages, indexes, and certain special cases such as tables and graphs.

In general, literary format allows the transcriber a certain amount of latitude. The overriding concern of textbook format is to represent things in Braille EXACTLY as they appear in print. Anything added or omitted in the transcribing process must be explained in a transcriber's note.

Literary Format

In literary format without a running head, text appears on every line of the Braille page. The Braille page number appears in the rightmost cells of the first line, with at least three blank cells before the number. Text on the first line must break to allow room for this.

Literary format with a running head has text on lines 2 through 25. Line 1 begins with at least three blank cells, followed by the running head, at least three more blank cells, and the Braille page number.

Textbook Format

The major difference between textbook and literary formats in the main body of text is inkprint page indicators. Textbook format has them; literary format doesn't. For textbook format with no running head, text appears on every line. On line 1, the inkprint page indicator appears in the rightmost cells with at least three blank cells before it. The Braille page number appears in the rightmost cells of the last line on the page. Again, at least three blank cells are placed before the Braille page number.

Textbook format with a running head has text on lines 2 through 25. Line 1 begins with at least three blank cells, followed by the running head, at least three more blank cells, and the inkprint page indicator. Line 25 breaks the text to allow room for three blank cells and the Braille page number at the end of the line.

The California Community Colleges Chancellor's Office gratefully acknowledges the work of Braille Planet in creating this excellent overview of Braille.

Braille Production Facilities

Dozens of commercial Braille production companies are available to colleges wishing to outsource. The majority of these resources have Web addresses and accept electronic submission of materials to be Brailled. Prices, production times and quality vary. Three of the largest are:

National Braille Press

88 St. Stephen Street
Boston, MA 02115
Phone: (617) 266-6160
Toll-free: (800) 548-7323
Fax: (617) 437-0456
http://www.nbp.org/

The American Printing House for the Blind, Inc.
1839 Frankfort Avenue
Mailing Address: P.O. Box 6085
Louisville, Kentucky 40206-0085
U.S.A.
Phone: 502-895-2405
Toll Free Customer Service: 800-223-1839 (U.S. and Canada)
Fax: 502-899-2274
http://www.aph.org/contact.htm

Braille Institute
741 N. Vermont Avenue
Los Angeles, CA 90029
(323) 663-1111
FAX: (323) 663-0867
http://www.brailleinstitute.org/Press.html

Other Braille Transcriber Services

Braille Transcribers
http://www.spedex.com/directories/braille.htm

Braille Jymico Inc.
http://www.braillejymico.qc.ca/products.htm

NMSU List of Braille Transcription Resources
http://www.nmsu.edu/Resources_References/access/public_html/trans.html

Quik-Scrybe
http://www.quikscrybe.com/

BRAILLE INSTITUTE
EDUCATION AND AWARENESS

A Guide To Large Print For People With Low Vision
Many people with visual impairments beyond those correctable by prescription lenses
still read, often with the assistance of special aids such as lighting or magnification

devices. People with reduced sight often find that conventional print appears blurred, dim and very difficult, if not impossible, to read. Central damage to the retina, for example, prevents some people from seeing small print clearly and reduces their ability to move their eyes in the ways needed for reading. Text can be made more legible for some of these readers through the use of large print. There are many factors to consider when producing large-print material, and it is important to note that the variety of visual impairment and subsequent impact on the ability to read is extensive.

CONTRAST: Text should be printed with the highest possible contrast. Use of boldface type generally provides greater legibility, as the letters are darker and thicker. Black or dark blue inks are preferable to lighter colors. Color backgrounds generally should be avoided, although some studies suggest that black ink on a bright yellow background is easy to read. Buff, cream or light yellow backgrounds usually are acceptable, but not dark or bright color backgrounds. Some visually impaired people are unable to distinguish type at all with black ink on a dark red background.

REVERSE type—"white" type on a dark background-improves readability for some. Reverse type often is an available option with some computers and special closed-circuit cameras used for reading, and might be good for some signs or other items with limited text. Backgrounds should be solid.

SIZE: Type often is measured in points and should be as large as practical. Text should be 14 points or larger, preferably 18 points. Headlines should be at least 24 points, larger if possible.

LEADING: The spacing between lines of text, called leading, should be greater than that traditionally used in regular text. Many people with low vision have difficulty finding the beginning of the next line when reading if the lines of type are too close together. A ratio of 150 percent (12-point type receives 18-point leading) is a good guideline for text.

STYLE: An ordinary typeface, such as this one (Helvetica), a sans-serif font (one without the fine lines projecting from the main strokes of letters found on some fonts, such as Palatino or Times, usually is the best choice for large print. Other styles of type frequently used in regular print are not easily read by people with low vision. These include ALL CAPS, SMALL CAPS, *italics* and `ornate, decorative fonts like this`. Text should be in Upper and Lower Case, with wider spacing between lines, for maximum readability.

LETTER SPACING: The spacing (track) between individual letters on each line should be wider than usual whenever possible. Text with close letter spacing is particularly difficult for partially sighted readers who have central visual field defects.

MARGINS: Extra-wide binding margins are very helpful in large-print books and other bound material because they make the volumes easier to hold flat. Many visual aids, such as stand and video magnifiers, are easier to use on a flat surface.

PAPER: Paper with a glossy finish can interfere with legibility because it tends to catch and reflect the glare of lights in a room. Glare is a common problem for many readers who are partially sighted. Print on paper with a matte (dull) finish whenever possible. Those wishing to use recycled paper will find a good selection of paper stock. Ink type—petroleum-based versus soy-based—is not a factor.

ALIGNMENT of text, hyphenation of words and other factors can slow a reader who is visually impaired and are worth considering when producing materials for this audience. Text created "flush left" is easiest to read. Paragraphs indented too far (.125 inches is a suggested maximum) might be replaced by paragraphs with extra space between them.

Text that is centered is harder to follow because
the reader must search for the start of each line.
Text created "flush right" also is a potential problem.

Text that is "justified" appears to create no special problems, although many computer programs typically compact some type when this alignment is used, which can reduce the readability. Justified type also uses a lot of hyphenation, which can slow the reading process for someone who is visually impaired to a greater degree than it does for sighted readers.

When producing large-print materials for people with reduced sight, keep the above principles in mind and your readers will be able to make full use of their remaining vision.

Los Angeles Sight Center (213) 663-1111•Desert Center (760) 321-1111
San Diego Center (619) 452-1111•Santa Barbara Center (805) 682-6222
Orange County Center (714) 821-5000•Youth Center (213) 851-5695
www. brailleinstitute.org

Appendix II

<u>Telephone Relay Services</u>

Telephone Relay Services (TRS) link people using a standard (voice) telephone with people using a device called either a Text Telephone (TTY) or Telecommunications Device for the Deaf (TDD). This device generally consists of a keyboard and display screen. Calls are routed through a communications operator who has both sets of equipment and who acts as the intermediary between callers. Such services eliminate communications barriers between people with and without hearing/speech impairments, and between the different telephone equipment they typically use. Tip: Relay service calls take longer due to the communications operator's "translation" to/from voice and text. It helps to organize your thoughts and any material you will need, beforehand.

Dialing Instructions:

TTY/TDD Origin

Dial the TTY/TDD number of the relay services.
The communications operator will answer by typing his/her personal ID number. (relay call conventions will be explained if you have not used them before).
Type the voice number you wish to call. The operator will connect you.

Voice Origin

Dial the voice number of the relay service.
The communications operator will answer by speaking his/her personal ID number. (relay call conventions will be explained if you have not used them before).
Speak the TTY/TDD number you wish to call. The operator will connect you.

Nationwide Long Distance Relay Services

AT&T
800-855-2880 (TTY/TDD)
800-855-2881 (Voice)
800-855-2882 (Computer)
800-855-2883 (Telebraille)
800-855-2884 (Spanish-TTY/TDD)
800-855-2885 (Spanish-Voice)
800-855-855-2886 (Spanish-Computer)
MCI
800-688-4889 (TTY/TDD)
800-947-8642 (Voice)
Sprint
800-877-8973 (Voice & TTY/TDD)

Real-Time Transcription

On-Site Classroom Captioning

Rapidtext is a leading provider of qualified classroom captioning or interpreting. Transcribers attend class and write the spoken word on a steno machine. This process instantly creates English text so that one or more hearing impaired students may not only see what is being said, but non-oral students can utilize the keyboard to ask questions. These questions are usually read aloud by the Rapidtext captionist. At the end of the class session, the hearing impaired students can have a diskette or hard copy of the class notes. This solution is unparalleled for even the most technical classes and graduate studies. This meets ADA requirements for the hearing impaired and is extremely effective for learning disabled and English as a Second Language (ESL) students.

Remote Captioning

The benefits are identical to the Classroom Captioning description except that the captionist/steno interpreter is located remote to the class setting. The captionist can be located in another building, another city, or in our office. The captionist hears what is being said via a telephone line, and sends back the captions to a computer in the classroom or to the Rapidtext Infosign for the instant display of the spoken work. This can work very simply by using a speakerphone in the classroom or a lapel microphone on the teacher. Also, the class notes are available at the end of the class session. This solution meets ADA requirements for the hearing impaired and can be very easy to staff for the erratic class schedule by dealing only with Rapidtext.

Captioning for Public Events, Seminars, Meetings

Rapidtext can provide either on-site or remote captioning/interpreting for any event. Captions can be displayed on one or more computer monitors, video monitors, projection televisions, or Rapidtext Infosigns. Even special interfaces can be developed for sports arena scoreboards or special display devices. Rapidtext has captioned events of all sizes, including our president's speech, and that was outdoors. Transcripts can be provided of the events or seminars. Ensure that you meet ADA requirements for your next event.

RapidText
http://www.rapidtext.com/

Interpreter Services

What is Interpreting?

Interpreting, simply stated, is receiving a message in one language and delivering it in another. Not as simple as it sounds, interpreting is a complex process that requires a high degree of linguistic, cognitive and technical skills.

Professional sign language interpreters develop interpreting skills through extensive training and practice over a long period of time. Interpreters continue to actively improve their skills, knowledge, and professionalism through membership in RID. An increasing number of interpreters have completed college or university interpreter education programs, earning associates, bachelors, and/or masters degrees in interpreting. Some interpreters have also obtained advanced degrees in related fields such as linguistics or cultural studies.

Sign language interpreting is a highly specialized field; simply knowing both sign language and English does not qualify a person as an interpreter. The professional sign language interpreter is able to adjust to a broad range of deaf consumer preferences and/or needs for interpretation. Some deaf individuals use American Sign Language, a natural language with its own grammar and structure that is distinct from English. Others prefer a form of signing that more closely follows the grammar and structure of spoken English. The professional interpreter is expected to work comfortably along this wide spectrum. Sometimes it is necessary to have two or more interpreters working simultaneously in order to satisfy the preferences and needs of a varied audience. On occasion, one of the interpreters may be a deaf individual or a person fluent in a language other than English or American Sign Language. Interpreters should be aware of and sensitive to ethnic/cultural and linguistic concerns.

Where professional interpreters work

Interpreters work in a variety of settings and situations. Many interpreters work in private practice; they are self-employed. From scheduling assignments to handling billing, the interpreter is responsible for all business aspects. The private practice interpreter may also receive assignments through interpreter service agencies. Other interpreters are salaried staff of an agency, institution, or corporation. Still others interpret in educational settings from pre-school to graduate school and any level in between. Interpreters work in settings as intimate as a private therapy session or as public as a televised address at a national political convention. The interpreter must be a versatile, flexible, skilled professional.

Interpreter Ethics

The Registry of Interpreters for the Deaf, Inc. has set forth the following principles of ethical behavior to protect and guide interpreters and transliterators and hearing and deaf consumers. Underlying these principles is the desire to insure for all the right to communicate.

This Code of Ethics applies to all members of the Registry of Interpreters for the Deaf, Inc. and to all certified non-members.

Interpreters/transliterators shall keep all assignment-related information strictly confidential. Interpreters/transliterators shall render the message faithfully, always conveying the content and spirit of the speaker using language most readily understood by the person(s) whom they serve. Interpreters/transliterators shall not counsel, advise or interject personal opinions. Interpreters/transliterators shall accept assignments using discretion with regard to skill, setting, and the consumers involved.

Interpreters/transliterators shall request compensation for services in a professional and judicious manner.

Interpreters/transliterators shall function in a manner appropriate to the situation.

Interpreters/transliterators shall strive to further knowledge and skills through participation in workshops, professional meetings, interaction with professional colleagues, and reading of current literature in the field.

Interpreters/transliterators, by virtue of membership or certification by the RID, Inc., shall strive to maintain high professional standards in compliance with the Code of Ethics.

Interpreting Credentials

In the field of interpreting, as in other professions, appropriate credentials are an important indicator of an interpreter's qualifications. The Registry of Interpreters for the Deaf (RID) awards certification to interpreters who successfully pass national tests. The tests assess not only language knowledge and communication skills, but also knowledge and judgment on issues of ethics, culture and professionalism. An interpreter may hold one or more certifications. Information on certifications is available from RID.

Some common sign language interpreting certifications are:

CI—Certificate of Interpretation
CT—Certificate of Transliteration
CSC—Comprehensive Skills Certificate
SC:L—Specialist Certificate: Legal
IC—Interpretation Certificate
TC—Transliteration Certificate
CDI—Certified Deaf Interpreter

Appendix III

Captioning

FEDERAL COMMUNICATIONS COMMISSION ADOPTS RULES FOR VIDEO CLOSED CAPTIONING
(MM DOCKET 95-176)

The Commission has adopted an order (FCC 97-279) establishing rules to implement the closed captioning requirements of the Telecommunications Act of 1996. The 1996 Act required the Commission to adopt, by August 8, 1997, rules and implementation schedules for captioning of video programming ensuring access to video programming by persons with hearing disabilities. This order implements Section 305 of the 1996 Act which added a new Section 713, Video Programming Accessibility, to the Communications Act. These rules will increase the amount of closed captioned video programming available to the more than 22 million Americans with hearing disabilities.

Congress generally required that video programming be closed captioned, regardless of distribution technology, to ensure access to persons with hearing disabilities. Congress also recognized that in some situations requiring that programming be closed captioned might prove to be an undue burden on video programming providers or owners and authorized the Commission to exempt classes of programs or services for which provision of video programming would be economically burdensome.

Some of the key elements in the order adopted today include:

Video programming distributors will be responsible for compliance with captioning requirements. This is the most efficient and focused way to ensure compliance.

Video programming distributors include all entities who provide video programming directly to customers' homes, regardless of distribution technology used (i.e., broadcasters, cable operators, MVPDs and other).

That new programming (video programming first published or exhibited on or after January 1, 1998) is made "fully accessible," as required by Section 713. The rules establish an 8 year transition period and define full accessibility as the closed captioning of 95% of nonexempt new programming. Compliance will be measured on a channel-by-channel basis for MVPDs and will be measured over each calendar quarter. Three benchmarks are established during the transition period. These benchmarks are based on average amounts of required captioning of approximately 5 hours per day after 2 years, 10 hours per day after 4 years and 15 hours per day after 6 years. During this transition period if these closed captioning requirements exceed the number of hours of nonexempt new programming on a channel during the calendar quarter, 95% of the nonexempt new programming on a channel must contain captions. The Commission will also require video programming providers to continue to provide closed captioning at a level

substantially the same as the average level of captioning that they provided during the first six months off 1997, even if the amount of captioned programming exceeds that required under the benchmarks.

That the accessibility of pre-rule programming (video programming first published or exhibited before January 1, 1998) is "maximized" through the provision of closed captions, as required by Section 713. With respect to pre-rule programming that does not meet any of our criteria for exemption, at least 75% of such programming must contain closed captions at the end of a ten year transition period. Compliance will be measured on a per-channel, quarterly basis. The Commission expects that the amount of captioning of such programming will increase incrementally over the transition period and does not set specific benchmarks for pre-rule programming. During the transition period the Commission will monitor distributor's efforts to increase the amount of captioning to determine whether channels are progressing toward the 75% requirement. The Commission also will reevaluate its decision to determine whether specific benchmarks are necessary to increase captioning and whether the 75% threshold for maximizing the accessibility of pre-rule programming is the appropriate amount to meet the goals of the statute.

Exemptions based on economic burden:

The rules exempt from our closed captioning requirements several specific classes of programming for which such requirements would be economically burdensome. These include: non-English language programming, primarily textual programming, programming distributed late at night, interstitial announcements, promotional programming and public service announcements, certain locally-produced and distributed programming, non-vocal musical programming, ITFS programming and programming from new networks.

The rules further exempt any video programming provider from closed captioning requirements where the provider has annual gross revenues of less than three million dollars. Advertisements of less than 5 minutes are not included in the definition of covered programming here. The rules also permit some smaller video programming providers to caption less than the specified benchmark amounts of their programming by permitting them to cap their spending on closed captioning based on their gross revenues.

Exemptions based on existing contracts:

The rules will exempt any programming subject to a contract in effect on February 8, 1996, for which compliance with the closed captioning requirements would constitute a breach of contract.

Exemptions based on undue burden:

The Commission will consider petitions for exemption from the closed captioning rules if the requirements would impose an undue burden based on statutory criteria.

Standards for quality and accuracy:

Video programming distributors will be required to deliver intact the closed captioning they receive as part of the programming they distribute to viewers, where the captions do not require reformatting. Video programming distributors must maintain and monitor their equipment to ensure the technical quality of the closed captioning they transmit. The Commission will not adopt standards for the non-technical aspects of quality at this time.

Enforcement process:

The rules will be enforced through a complaint process. Complaints alleging violation of the closed captioning rules must first be directed in writing to the video programming distributor responsible for distribution of the programming. If a video programming distributor fails to respond to a complaint or a dispute remains following this initial procedure, a complaint may then be filed with the Commission.

Action by the Commission August 7, 1997, by Order (FCC 97-279). Chairman Hundt, Commissioners Quello, Ness and Chong, with Chairman Hundt and Commissioner Chong issuing separate statements.

Basic Captioning Terms

If you are unfamiliar with the process of captioning, this glossary can help you understand the most basic terms:

Off-line captioning:

Captioning that is produced after a video segment has been recorded. A captioner watches the video recording and creates captions, paying attention to the timing and screen placement of each caption. The captions are usually then recorded on videotape with the program picture and sound before the program is broadcast or distributed. Most captioned programming is produced off-line.

Realtime captioning:

Captions which are simultaneously created and transmitted during a video program or conference. This type of captioning is most frequently used for live programs, including news shows and sporting events. A trained stenotypist, acting in much the same way as a courtroom reporter, enters the spoken content by typing phonetic codes on a special keyboard that permits high-speed transcription. A computer, using custom software, then very quickly translates the phonetic codes into proper words. In order to display the words as quickly as possible after they are spoken, most realtime captioning is shown in a scrolling style.

Closed captions:

Captions that appear only when special equipment called a decoder is used. Closed captioning is typically used for broadcast television and for videocassettes of movies which are widely distributed. Closed captioning allows caption users (people who are deaf or hard of hearing) to enjoy the same broadcast and pre-recorded video materials that other television viewers enjoy.

Open captions:

Captions that are visible without using a decoder. When a video is open captioned, the captions are permanently part of the picture. Open captions are advised for any situation where a decoder may be difficult to obtain or operate (for example, in a hotel, convention center, or museum). For this reason, open captioning is recommended for training and promotional videos.

Closed caption decoder:

Equipment that decodes the captioning signal and causes captions to appear on the screen. In the 1980s and early 1990s, closed caption decoders were usually separate appliances that connected to the television set, VCR, and/or cable converter box. Since July 1, 1993, all television receivers with screens 13 inches or larger manufactured for sale in the United States must have built-in closed caption decoders, and the additional appliance will not be needed for these sets.

Roll-up and Pop-On captions:

These are the two main styles in which captions may appear. Roll-up captions scroll onto and off the screen in a continuous motion. Pop-on captions do not scroll; the words display and erase entirely together. Pop-on captions are used for most off-line captioning. Roll-up captions are used for most realtime captioning.

Captioning Service Providers

These are links to captioning and subtitling service providers. There are no licensing requirements or tests a captioner must meet in order to call themselves a captioning service provider.

The National Association of the Deaf in cooperation with the Department of Education operates a Captioned Films/Videos program; and the NADCFV has a list of vendors evaluated by the

NAD and approved by the U. S. Department of Education for CFV captioning. In order to be listed, a captioning vendor must submit samples to the NAD for approval. Some of the vendors on the NAD/DOE list are represented here:

©Captionmax, Inc.
530 N. 3rd St.
Minneapolis, MN 55401
http://www.captionmax.com/

Caption Perfect
P.O. Box 12454
Research Triangle Park, NC 27709-2454
919-942-0693 (v)
919-942-0435 (fax)
http://members.aol.com/captioning/index.html

Henninger Digital Captioning
2601-A Wilson Boulevard
Arlington, Virginia 22201
phone 703-243-3444
fax 703-243-5697
http://www.henninger.com/hcap.html

National Captioning Institute
NCI California Office
303 North Glenoaks Boulevard, Suite 200
Burbank, CA 91502
V/TTY (818) 238-0068
http://www.ncicap.org/

VITAC
4450 Lakeside Drive, Suite 250
Burbank, California 91505
(888) 528-4822
(818) 295-2490
(818) 295-2494 Fax
http://www.vitac.com/

Appendix IV

WAI Guidelines for Accessible Web Site Design
(http://www.w3.org/WAI/)

A. Transform Gracefully

Make sure pages transform gracefully across users, techniques, and situations.

To "transform gracefully" means that a page remains usable despite user, technological, or situational constraints. In order to use the page at all, some users may need to "turn off" features specified by the author (font size, color combinations, etc.). For example, a person with low vision might need to display all text in 36-point font, so any formatting based on an author-determined font size will fall apart.

To create documents that transform gracefully, authors should:

Ensure that all the information on the page may be perceived entirely visually and entirely through auditory means, and that all information is also available in text.
Always separate the content on your site (what you say), and the way you choose to structure that content (how you organize it), from the way the content and structure are presented (how you want people to "see" it).
Ensure that pages will be operable on various types of hardware, including devices without mice, with small, low resolution, or black and white screens, with only voice or text output, without screens, etc.

Guidelines A.1—A.12 address these issues.

A.1. Provide alternative text for all images, applets, and image maps [Priority 1]

This includes images used as submit buttons, bullets in lists, and all of the links within an image map as well as invisible images used to layout a page. Alternative text does not describe the visual appearance of an image, applet, or image map. Rather, it is used to represent the function that the image, applet, or image map performs whether it be decorative, informative, or for purposes of layout. If alternative text is not provided, users who are blind, have low vision, or any user who cannot or has chosen not to view graphics will not know the purpose of the visual components on the page. Since "bare" ASCII art (characters that form images) does not allow alt-text, it must be marked up especially for this purpose.

Techniques:

For all images (IMG) provide alt-text (via the "alt" attribute).[Priority 1]. Note: This includes images used as image maps, spacers, bullets in lists, and links.

For all applets (APPLET) provide alt-text (via the "alt" attribute) and content [Priority 1].

For all image map links (AREA) Provide alt-text (via the "alt" attribute) [Priority 1]. Also provide redundant links [Priority 2].

If server-side image maps must be used, provide text links for each hotspot in the image map [Priority 1].

For all graphical buttons (INPUT type="image"), 1. Provide alt-text (via the "alt" attribute) [Priority 1], 2. Do not use an image map to create a set of buttons in a form. Instead, use separate buttons or images (accompanied by alt-text) [Priority 2].

Replace ASCII art with an image and alt-text [Priority 1 or 2 depending on the importance of the information (e.g., an important chart)]. Note: If the description of (important) ASCII art is long, provide a description in addition to alt-text (see A.2).

If OBJECT is used to incorporate an image, applet, or script into a page, use any of the many ways to convey that information in cases where the OBJECT cannot be perceived (e.g., with "title" or within the body of the OBJECT element) [Priority 1].

A.2. Provide descriptions for important graphics, scripts, or applets if they are not fully described through alternative text or in the document's content [Priority 1]

Otherwise, important information presented graphically (charts, billboards, diagrams) will not be perceivable to people with blindness, some people with low vision, and users who have chosen not to view graphics, scripts, or applets or whose browser does not support scripts or applets.

Techniques:

Provide a long description of all graphics that convey important information. To do so: Use "longdesc" [Priority 1]. Until most browsers support "longdesc", also use a d-link (or invisible d-link) [Priority 1].

If OBJECT is used to incorporate an image, applet, or script into a page, and it presents important information, use any of the many ways to provide a long description of the information in cases where the OBJECT cannot be perceived (e.g., within the body of the OBJECT element) [Priority 1].

A.3. Provide textual equivalents (captions) for all audio information [Priority 1]

If the audio is associated with a visual presentation (movie or animation), synchronize the textual equivalents with the visual presentation. Otherwise, users who are deaf, or hard of hearing, or any user who cannot or has chosen not to hear sound cannot perceive the information presented through speech, sound effects, music, etc.

Techniques:

For stand-alone audio files provide a textual transcript of all words spoken or sung as well as all significant sounds [Priority 1].

For audio associated with video, provide a textual transcript (of dialog and sounds) synchronized with the video (e.g., captions) [Priority 1].

Where sounds are played automatically, provide visual notification and transcripts [Priority 1 or 2 depending on the importance of the sound].

A.4. Provide verbal descriptions of moving visual information in both auditory and text form (for movies, animations, etc.) [Priority 1]

If the visual presentation is associated with an auditory presentation (e.g., for a movie), synchronize the audio version of the descriptions with the existing auditory presentation and collate the text version of the descriptions with the text transcript (captions) of the primary audio track. Otherwise, if actions, body language, or other visual cues present information that is not expressed through auditory means as well (through dialogue, sound effects, etc.), users who cannot see (or look at) the page will not be able to perceive it. The collated text version allows access to the information by devices that do not play movies and by people who are deaf-blind.

Techniques:

For short animations such as animated "gifs" images, provide alt-text (see A.1) and a long description (see A.2) if needed [Priority 1].
For movies, provide auditory descriptions that are synchronized with the original audio [Priority 1].
Provide a text version of the auditory description that is collated with the text transcript (captions) of the primary audio track [Priority 2].

A.5. Ensure that text and graphics are perceivable and understandable when viewed without color [Priority 1]

Otherwise, if color is used to convey information, users who cannot differentiate between certain colors (and users with devices that have non-color or non-visual displays) will not receive the information. When foreground and background colors are too close to the same hue, they may not provide sufficient contrast when viewed using monochrome displays or by people with different types of color blindness.

Techniques:

Don't use color to convey information unless the information is also clear from the markup and/or text [Priority 1].
Use foreground and background color combinations that provide sufficient contrast when viewed by someone with color blindness or when viewed on a black and white screen [Priority 1].

A.6. Indicate structure with structural elements, and control presentation with presentation elements and style sheets [Priority 2]

When structural elements and attributes are used to create presentation effects, user agents that allow users to navigate through the structure will be unable to do so properly. Such practices also make it difficult to render the page on other media and devices. For instance, don't use H1 to create large, bold face text unless that text is actually a top-level heading.

Techniques:

Nest headings properly (H1—H6) [Priority 2].
Encode list structure and list items properly (UL, OL, DL, LI) [Priority 2].
Mark up quotations with the Q and BLOCKQUOTE elements. Do not use them for formatting effects such as indentation [Priority 2].
Use style sheets to control layout and presentation wherever possible as soon as a majority of browsers in use support them well (see A.9). Until then, simple tables (to control layout) and bitmap text with alt-text (for special text effects) may be used, with alternative pages used as necessary to ensure that the information on the page is accessible [Priority 2].
Use relative sizing and positioning (e.g., percent) rather than absolute (e.g., pixels or point) [Priority 2].

A.7. Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or frozen [Priority 1]

This is particularly important for objects that contain text and does not apply to instant redirection. Some people with cognitive limitations or visual disabilities are unable to read moving text quickly enough or at all. Movement can also cause such a distraction that the rest of the page becomes unreadable for people with cognitive disabilities. Screen readers are unable to read moving text. People with physical disabilities might not be able to move quickly or accurately enough to interact with moving objects. People with photosensitive epilepsy can have seizures triggered by flickering or flashing in the 4 to 59 flashes per second (Hertz) range with a peak sensitivity at 20 flashes per second.

Techniques:

Movement should be avoided when possible, but if it must be used, provide a mechanism to allow users to freeze motion or updates in applets and scripts or use style sheets and scripting to create movement (see also A.10) [Priority 2].
For auto-refreshing or timed response pages, provide a second copy of the page where refresh only happens after a link has been selected (until user agents provide this ability themselves) [Priority 1].
Avoid any blinking or updating of the screen that causes flicker [Priority 1].

A.8. Provide supplemental information needed to pronounce or interpret abbreviated or foreign text [Priority 2]

Unless changes between multiple languages on the same page are identified, and expansions for abbreviations and acronyms are provided, they may be indecipherable when spoken or Brailled.

Techniques:

Use the "lang" attribute to clearly identify changes in the language of text [Priority 2].

For abbreviations and acronyms use either ABBR or ACRONYM with the "title" attribute to specify the expansion [Priority 2].

A.9. Ensure that pages using newer W3C features (technologies) will transform gracefully into an accessible form if the feature is not supported or is turned off [Priority 1]

Some more recent features that are not completely backwards compatible include frames, scripts, style sheets, and applets. Each release of HTML has included new language features. For example, HTML 4.0 added the ability to attach style sheets to a page and to embed scripts and applets into a page. Older browsers ignore new features and some users configure their browser not to make use of new features. These users often see nothing more than a blank page or an unusable page when new features do not transform gracefully. For example, if you specify an image as the source of a frame (via the "src" attribute), then there is no simple way to attach alt-text (see A.1) to that image.

Techniques:

Frames: 1. Provide a fallback page for pages that contain frames (e.g., by using NOFRAME) [Priority 1], 2. Ensure that the source of each frame is an HTML file [Priority 1].
For scripts that present critical information or functions, provide an alternative, equivalent presentation or mechanism (e.g., by using NOSCRIPT) [Priority 1].
For pages that use style sheets, ensure that the contents of each page are ordered and structured so that they read appropriately without the style sheet [Priority 1].
Applets: (embedded using OBJECT or APPLET). At a minimum, provide alternative text for applets (see also A.1.2) [Priority 1] where needed, provide a description [Priority 1]. If possible, provide an alternative function or presentation in a format other than an applet. For example, a canned "mpeg" movie of a physics simulation (written in Java) or a single frame of the animation saved as a "gif" image [Priority 2].

A.10. Elements that contain their own user interface should have accessibility built in [Priority 2]

The accessibility of objects with their own interface is independent of the accessibility of the user agent. Accessibility must therefore be built into the objects or an alternative must be provided (see A.11.4).

Technique:

Where possible make applets directly accessible (see also A.9.4) [Priority 1 if information or functionality is important, and not presented elsewhere, otherwise Priority 2].

A.11. Use features that enable activation of page elements via input devices other than a pointing device (e.g., via keyboard, voice, etc.) [Priority 1]

Someone who is using the page without sight, with voice input, or with a keyboard (or input device other than a pointing device, e.g., a mouse or Braille display) will have a difficult time navigating a page if operation requires a pointing device. If a page is usable via a keyboard, it is

more likely that it should also be operable via speech input, or a command line interface. Access to image maps is impossible for these users if alternatives are not provided.

Techniques:

For image maps, provide alternative text for links (see also A.1) [Priority 1].
If possible, ensure that all elements that have their own interface are keyboard operable (see also A.11) [Priority 2].
Create a logical tab order through links, form controls, and objects (via the "tabindex" attribute or through logical page design) [Priority 3].
Provide keyboard shortcuts (via the "accesskey" attribute) to links (including those in client-side image maps), form controls, and groups of form controls) [Priority 3].

A.12. Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly [Priority 2]

Older browsers are unable to "Tab" to edit boxes, text areas and lists of consecutive links, making it difficult to impossible for users to access them. Users not operating in a graphical environment are disoriented by being transferred to a new window without warning.

Techniques:

Until most users are able to secure newer technologies that address these issues:

Include default, place-holding characters in edit boxes and text areas [Priority 3].
Include non-link, printable characters (surrounded by spaces) between links that occur consecutively [Priority 3].
Do not use pop-up windows, new windows, or change active window unless the user is aware that this is happening [Priority 2].
For all form controls with labels, ensure that the label that is either: immediately following its control on the same line (allowing more than one control/label per line) [Priority 2] or on the line before the control (with only one label and one control per line) [Priority 2].
Until user agents and screen readers are able to handle text presented side-by-side, all tables that lay out text in parallel, word-wrapped columns require a linear text alternative (on the current page or some other) [Priority 2].

B. Context and Orientation

Provide context and orientation information for complex pages or elements.

To provide context and orientation information means that additional information is provided to help users gain an understanding of the "big picture" presented by a page, table, frame, or form. Oftentimes users are limited to viewing only a portion of a page, either because they are accessing the page one word at a time (speech synthesis or Braille display), or one section at a time (small display, or a magnified display).

To create documents that provide context and orientation information, authors should:

Structure and group information.
Clearly label the structure and groups.

Guidelines B.1—B.3 address these issues.

B.1. For frames, provide sufficient information to determine the purpose of the frames and how they relate to each other [Priority 1]

Users with blindness and low vision often access the screen with "tunnel vision" and are unable to get an overview understanding of the page. Complex relationships between frames may also be difficult for people with cognitive disabilities to use.

Techniques:

Provide titles for frames (via the "title" attribute on FRAME) so that users can keep track of frames by name [Priority 1].
Use "longdesc" (where needed) to associate a more complete description (than is provided by the title) directly with the frame. Until "longdesc" is widely supported, also use a d-link or invisible d-link [Priority 2].

B.2. Group controls, selections, and labels into semantic units [Priority 2]

This provides contextual information about the relationship between controls, which is useful for all users.

Techniques:

Group form controls (using the FIELDSET and LEGEND elements) [Priority 2 for radio buttons and checkboxes, Priority 3 for other controls].
Associate labels to their controls (using LABEL and its "for" attribute) [Priority 2].
Create a hierarchy of long lists of choices (with OPTGROUP) [Priority 2].

B.3. Ensure that tables (not used for layout) have necessary markup to be properly restructured or presented by accessible browsers and other user agents [Priority 1]

Many user agents restructure tables to present them. Without appropriate markup, the tables will not make sense when restructured. Tables also present special problems to users of screen readers.

These guidelines benefit users that are accessing the table through auditory means (e.g., an Automobile PC which operates by speech input and output) or viewing only a portion of the page at a time (e.g., users with blindness or low vision using speech or a Braille display, or other users of devices with small displays, etc.).

Techniques:

Provide summaries for tables (via the "summary" attribute on TABLE) [Priority 3].
Identify headers for rows and columns (TD and TH) [Priority 2].
Where tables have structural divisions beyond those implicit in the rows and columns, use appropriate markup to identify those divisions (THEAD, TFOOT, TBODY, COLGROUP, the "axis" and "scope" attributes, etc.) [Priority 2].
Provide abbreviations for header labels (via the "abbr" attribute on TH) [Priority 3].

B.4. Wherever possible, create "good" link phrases [Priority 2]

"Good" link phrases:

do not repeat on a page,
are meaningful when read out of context,
are terse

"Auditory users," people who are blind, have difficulty seeing, or who are using devices with small or no displays are unable to scan the page quickly with their eyes and often use a list of links to get an overview of a page or to quickly find a link. When links are not descriptive enough, do not make sense when read out of context, or are not unique, the auditory user must stop to read the text surrounding each link to identify it.

Wherever possible:

If more than one link shares the same textual phrase, all those links should point to the same resource [Priority 2].
Avoid phrases that are not meaningful on their own such as "click here" [Priority 2].
Avoid creating link phrases that contain full sentences [Priority 2].

Appendix V

Microsoft's Checklist of Accessibility Design Guidelines
(Reprinted with permission from Microsoft Corporation)

Basic Principles

You should follow these basic principles when designing an accessible application:

Flexibility.   Provide a flexible, customizable user interface for your application that can accommodate the user's needs and preferences. For example, you should allow the user to choose font sizes, reduce visual complexity, and customize the arrangement of menus.

Choice of input methods. Support the user's choice of input methods by providing keyboard access to all features and by providing access to common tasks using simple mouse operations.

Choice of output modalities. Support the user's choice of output methods through the use of sound and visuals and of visual text and graphics. You should combine these output methods redundantly or allow the user to choose his or her preferred output method.

Compatibility with accessibility aids. Use programming techniques and user-interface elements that are compatible with accessibility aids, such as blind access, screen magnification, and voice input utilities.

Consistency.   Make your application's behavior consistent with other Windows-based applications and with system standards. For example, you should support Control Panel settings for colors and sizes and use standard keyboard behavior.

Keyboard Access

Providing a good keyboard user interface is key to designing an accessible application.

Provide keyboard access to all features.

Fully document your keyboard user interface.

When possible, model your keyboard interface on a familiar application or control.

Provide underlined access keys for all menu items and controls.

Use logical keyboard navigation order.

If you normally hide some keyboard user interface elements, display them when the Keyboard Preference flag is set.

Allow the user to select text with the keyboard.

Avoid using the GetAsynchKeyState function.

If possible, provide customizable keyboard shortcuts.

Exposing the Keyboard Focus

Many accessibility aids need to know where the user is working.

Expose the location of the keyboard focus within a window, either by moving the system caret or by using ActiveAccessibility.

Exposing Screen Elements

Many accessibility aids need to identify or manipulate the objects on the screen.

Allow other software to identify and manipulate all screen elements that the user interacts with, using Microsoft Active Accessibility (which is already supported by standard window classes and controls).

Ensure that every object, window, and graphic is properly named. Define correct text labels for all controls, and give every window a user-friendly caption, even if the text is not visible on the screen.

Support the WM_GETDLGCODE message in all custom controls that have their own window, to identify your control type and keyboard interface.

Provide an alternative to any owner-drawn menus.

Display text using appropriate read-write edit, read-only edit, status, static, or HTML controls.

Make sure that dialog boxes define the correct tab order.

Uniquely identify every type of window.

Expose names or descriptions for all images and bitmapped text.

Give objects labels that are unique within their context and are unambiguous when taken out of context.

If screen contents are not exposed in other ways, support standard drawing techniques that can be monitored and recorded. Provide alternatives to operations that directly manipulate bitmap or screen pixels.

Color

Color should be used to enhance, emphasize, or reiterate information.

The application must respond properly when the High Contrast option is True.

Use only colors that the user can customize, ideally through Control Panel.

Use colors in their proper foreground/background combinations.

Omit background images drawn behind text.

Where possible, allow the use to customize all colors through Control Panel or through its own user interface.

When screen elements correspond with standard elements, use the appropriate system colors chosen in control Panel.

Always use colors in their proper foreground/background combinations.

If possible, be prepared to draw monochrome images that contrast with the background color.

Avoid conveying important information by color alone, or make it optional.

Draw graphic objects to contrast with the current background color.

Provide an option to omit complex or shaded backgrounds drawn behind text.

Size

The size of text and graphics affects usability as well as accessibility.

The application must be compatible with system settings for sizes and fonts.   (Logo Requirement).

Avoid hard coding any font sizes smaller than 10 points.

If you draw lines, determine the proper width rather than using a fixed value.

Allow the user to select font and font sizes for displayed information.

Allow the user to adjust the size of non-document elements such as toolbars.

Make sure the application is compatible with changes to the system font size and the number of pixels per logical inch.

If feasible, provide a draft mode, zoom, and wrap to window features.

Stretch, shrink, pad, or crop images appropriately when their space changes.

Avoid tuning your application too tightly to a single font.

Sound

Do not convey important information by sound alone, or if you do, provide an option to convey this information by visual means.

Display important information visually when the ShowSounds option is True.

Provide closed captions for all audio content rendered through DirectPlay.

Define many custom sound events, even if they are silent in the default sound scheme.

Trigger standard sound events when carrying out equivalent actions.

If you generate sounds, provide a way to turn them off.

Timings

Allow the user to customize all user interface timings.

Allow the user to avoid having messages time out.

Allow slowing down or disabling any rapid screen updates or flashing.

Unexpected Side Effects

Moving the mouse should not trigger unexpected side effects.

Navigating with the keyboard should not trigger unexpected side effects.

Mouse Input

Applications must be compatible with specified system settings for mouse input.

Provide mouse shortcuts for commonly used features.

Make toolbars customizable.

Emphasize simple mouse operations that require only single clicks.

Customizable User Interface

If possible, allow the user to administrator to customize the application to meet specific needs.

Layout

Visual design and layout can make an application more usable and more accessible for people with cognitive or visual impairments.

Make it easy to recognize the label for each control or object.

Place a text label immediately to the left of or above its control.

Do not separate a control and its label by too great a distance.

Do not place unlabeled controls both to the left of and beneath a label.

All text labels should end with colons, and static text controls that do not label other controls should not end in colons.

Follow conventions for labeling icons, with text below or to the right of the icon, or displayed as a tooltip.

Try to position related objects near each other.

Verifying Accessibility

Test the application against this guidelines checklist.

Test with the High Contrast option and high contrast appearance schemes.

Test compatibility with extra-large appearance schemes.

Verify that all features can be used without a mouse.

Verify that all keyboard user interface methods are documented.

Test with the Inspect Objects tool to verify that all screen elements are exposed and properly labeled.

Test with the Microsoft Magnifier to verify that the keyboard focus location is properly exposed during navigation and editing.

Test with commercial accessibility aids.

Test with changes to the system font size and number of pixels per logical inch.

Include people with disabilities and accessibility software vendors in your beta tests.

Include people with disabilities in your usability tests.

Conduct surveys of your users who have disabilities.

Distribute free evaluation copies of your product to individuals with disabilities, disability organizations, and accessibility software vendors.

Documentation

Provide documentation in accessible format, such as ASCII text or HTML.

Accessible documentation should contain descriptions of illustrations and tables.

Do not convey important information by color or graphics alone. Use color and graphics redundantly to the text.

Maintain high contrast between the text and its background.

Do not use text smaller than 10 points in size.

If possible, bind printed documentation to lie flat.

Software Design Guidelines (TRACE Research Center)

General Design Guidelines

There are a few general themes that you'll notice occurring repeatedly in the specific guidelines in the next section. They are worth noting since they provide the rationale for many of the specific guidelines and can be used to help make decisions when options exist for a given design.

Use system tools whenever possible.
Maintain consistent, predictable layout & behavior and adhere to system standards/style guides.
Provide keyboard access to all dialogs, menus, and tools.
Design software to minimize the skills and abilities needed to operate it.
Be sure software cooperates with (or at the least, does not break) special access features in the OS and third party access software.
Use an open systems approach.

1. Use system tools whenever possible

Many software based access programs provide their alternate input and display capabilities by tapping into the system software. These access systems depend on the application program using

the system tools provided for input and output. Application programs which do not use the system tools may not be accessible to people using special access software or features in the operating system.

For example, alternate input software may take Morse code in and convert it into alternate or "counterfeit" keystrokes which it then puts into the input cue or buffer just as if they came from the keyboard. Application software that takes its keystrokes from the input buffer will find these alternate keystrokes and treat them just like regular keystrokes. If your application program bypasses the input buffer and takes its keystrokes directly from the input hardware, then the alternate keystrokes will not be seen and the person will not be able to use it.

Similarly, screen reading software for people who are blind works by watching the activity of the text drawing routines in the operating system. By watching commands sent to the operating system telling it to draw text on the screen, the screen reading software can keep track of everything that is written to the screen. If application software writes text directly to the screen, then the screen reading software will not know that it is there.

Alternate mouse or pointer routines would also depend on the ability to make system and application software think that a person was moving the mouse when in fact they were operating a mouse simulation program.

2. Maintain consistent, predictable layout & behavior and adhere to system standards/style guides

Wherever possible, follow system standards and style guides. For people with cognitive disabilities it makes it easier to predict and understand how things should operate and what they mean. For people who are blind and use screen readers to find out what is on the screen, predictable layouts and controls are easier to figure out. Also, adaptive software manufactures can build techniques into their software to handle the standard objects and appearances, but not unique or one of a kind implementations. If you do something different, be sure it is accessible (see "Product Testing and Developer Support" at the end of Guidelines—Part I.)

3. Provide keyboard access to all dialogs, menus, and tools

Application programs which provide the ability to access all of the menus by using the keyboard greatly facilitate access by individuals who cannot use the standard mouse. It also makes access easier (or possible) for people with poor eye hand coordination or those who are blind. This access may be provided either by use of the arrow keys to move around through the menu structure, or through use of keyboard equivalents for ALL menu items.

4. Design software to minimize the skills and abilities needed to operate it

The best way to view people who have disabilities is to think of them simply as individuals with reduced abilities rather than as people without an ability. The reduction in their abilities may vary from slight to severe. The more you can reduce the sensory, physical, or cognitive skills necessary to operate the program, the more people will be able to directly use the program. It also makes it easier for everyone else to use the program. Some examples: using a slightly larger or clearer type, using menus which can be scanned rather than commands which must be memorized, keeping menus short and dialog boxes uncluttered, reducing or eliminating the need for fine motor control.

It is also helpful to provide multiple ways of accomplishing functions in order to adapt to different needs or weaknesses. For example, having pull-down menus reduces the cognitive load and makes it easier to operate computers. While providing hot keys reduces the motor load and makes it easier and faster for individuals with physical disabilities to use computers, providing both addresses the needs of both groups and gives all users more options to meet their preferences. A second example would be the ability to use either the scroll bar or the keyboard to select position within a document.

The third general strategy is to provide layering to reduce visual and cognitive complexity. One example of this are programs which provide both short and long forms of their menus. The use of option buttons in dialog boxes or other techniques for nesting complexity would be a second example of this.

5. Be sure software cooperates with (or at the least, does not break) special access features in the OS and third party access software

Using system tools and conventions/standards

As mentioned above, the most important and easiest mechanism for ensuring greater compatibility with access software is to use the tools and conventions which have been established for the operating system. Most access software works through modifications to the system tools, or bases its operation on assumptions that the standard conventions for the system will be followed.   As long as application software programs use the system tools and conventions, there is generally little problem.

Provide software access to commands

When commands are all executed through the menus, access software has very little trouble in both accessing listings of the available commands and activating the commands. Program commands which are issued in other fashions—such as tool bars, special palettes, etc.—present problems. It is difficult to get a listing of all of the commands (for example, to present to somebody who is blind). It is also difficult to directly activate the various commands (for example, by an alternate access routine for someone with a severe physical disability). Where all of the palette and tool bar commands are available via the standard menus, this is not a problem. When these commands, however, are not otherwise available, it is important that access somehow be achieved.

Access to commands in a program consists of four parts. Fortunately, the movement toward inter-application control is making the commands in a program more accessible electronically. Features like balloon help are also useful for providing descriptions of the commands and buttons on the screen. Eventually, it would be nice to be able to:

Obtain a listing of all of the possible commands
Obtain help text for each of the commands
Be able to execute all of the commands from an external program
Be able to read the status of user-settable parameters (and be able to set all such parameters) from an external program

When these capabilities are all available in a standardized format, it will make the process of developing access programs much simpler and more complete. In the meantime, programs which have most of their commands available for inter-program control may consider making the rest of the program commands available as well.

6. Use an open systems approach

Providing access to people who have disabilities is in many ways just a natural extension of the open systems approach to software design. Support of the open systems through GOSIP, POSIX, and the applications portability profile facilitates compatibility with special access software and hardware within these environments. With the rapid advance of technologies and operating systems, software that is based upon open systems concepts and which retains a stable or similar interface format across platforms greatly facilitates the efforts of third-party accessibility developers in keeping up and adapting their products.

Education Master Plan
Information Submission Form

The GCCCD is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resource allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six taxonomy areas - society, technology, economy, environment, politics, and education. We are not asking you to do new research - only to identify information you already have or that you encounter during the search period (March 21 - April 25) and bring it to the attention of the Scan Teams for review.

Please feel free to submit as many of these forms as you would like.   Please answer the following questions for each submission:

1) What is the document we should review? : Mobile Learning Not Just Laptops

2) Author: Nastu

3) Source: eschoolnews.com

4) Which of the following taxonomy areas does it fit into? (Please select only one):

☐ Society

☒ Technology

☐ Economy

☐ Environment

☐ Politics and Legal Issues

☐ Education

☐ Other:

5) Relevance:

6) Page / Section:

7) **Add Attachment/Hyperlink Here**:

To attach a document use **Tools-Comments and Markups-Attach A File As A Comment**

Submit *this document by scrolling to the top of the page and clicking on the Submit button at the top right corner. You cannot print once the document is submitted.*

Questions: lynne.davidson@gcccd.edu *Research, Planning and Institutional Effectiveness*

http://www.eschoolnews.com/2011/02/25/mobile-learning-not-just-laptops-any-more/?p=57798/?utm_source=website&utm_medium=shorturl&utm_campaign=MobileLearning0311

February 25th, 2011

Mobile learning: Not just laptops any more

New advances in mobile technology could help schools realize the promise of true anytime, anywhere learning
By Jennifer Nastu, Contributing Editor

Leveraging the Power of Mobile Learning
...it's not just laptops anymore.

Technology News for Today's K-20 Educator

eSchool News Live

Last fall, nearly 50 percent of middle and high school students said they carried some type of smart phone.

Not all that long ago, the term "mobile learning" implied laptop computers and mobile carts that were wheeled from classroom to classroom. Now, as a growing number of students carry smart phones, tablets, and other mobile devices that can connect to the internet wirelessly through a cellular as well as a Wi-Fi connection, the definition of "mobile learning" is expanding—and with it, the possibilities inherent in the term.

The rise of mobile technologies small enough to carry in one's pocket, and the increasing power and functionality of these devices, is causing a seismic shift in education technology.

Last fall, nearly 50 percent of middle and high school students said they carried some type of smart phone—a 47-percent increase from fall 2009, according to Project Tomorrow's annual Speak Up survey of students, parents, teachers, and administrators on their uses and views of school technology.

There are now five billion wireless subscribers in the world, and of those, 1 billion are 3G subscribers, according to Wireless Intelligence. By 2014, there will be 2.8 billion 3G subscribers. (3G refers to a third-generation cellular network, which is capable of streaming video and other bandwidth-intensive applications wirelessly. Already, some providers are rolling out 4G services that promise even faster download speeds and more capabilities.)

As mobile learning has come to mean something very different than it once did, the very definition of a mobile device may be changing. Mark Anderson of Strategic News Service, a predictive newsletter covering the computing and telecommunications industries, says there are three categories of today's popular computing devices: the laptop, the carry-along (which includes netbooks, iPads, and other slates), and the mobile.

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas – society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period (March 21- April 25) and bring it to our attention for review.

Please answer the following questions for each document you submit:

(Feel free to submit as many of these forms as you would like)

1) What is the name of the document? USD Installs Solar Panels

2) Author: Roscorta

3) Source: Converge

4) Which of the following areas does this document best address? (Please select only one)

○ Society

◉ Technology

○ Economy

○ Environment

○ Politics and Legal Issues

○ Education

○ Other

5) Relevance:

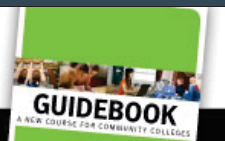6) Page/Section:

7) **Attach Document/Place URL Here:**

Download the free Adobe Reader X: http://www.adobe.com/accessibility/products/reader/

To attach a document: **Reader 9: Use "Tools"-"Comments and Markups"-"Attach a File as a Comment"**
Reader X: Use "Comment" (upper right), then select the paper clip icon under "Annotations"

Questions email: lynne.davidson@gcccd.edu Research, Planning and Institutional Effectiveness

converge

HOME | CONVERGE | ARTICLES | EVENTS | AWARDS | JOBS | PAPERS | GRANTS | SUBSCRIBE

University of San Diego Installs Solar Panels

By Tanya Roscorla
ON JUNE 24, 2010 IT INFRASTRUCTURE

A laptop charging station powered by the sun will be installed at the University of San Diego. | Photo courtesy of AMSOLAR Corp.

PRINT | EMAIL | SAVE

SHARE

Comment
This is a nugget of information. Firstly to see my alma mater preserving precious funds by creating savings through energy costs, typically a whopper to...

show more

2 more comments

This summer, the University of San Diego is breaking ground on a solar energy project — without breaking the bank.

Through a power purchase agreement with a private-sector vendor, the company will own the solar panels, and the school will pay the company, AMSOLAR Corp. based in Solana Beach, Calif., for the electricity the panels generate. As electricity rates keep going up, the university will save more money. Already, the initial estimate of a 15 percent savings on the utility bill has doubled to 30 percent, totaling about $140,000.

"By far the biggest benefit is we don't go out of pocket for any of this," said Michael Catanzaro, the university's director of sustainability. "All we do is pay AMSOLAR now for the electricity we would otherwise be paying the electric company for."

For the next 25 years, the California university will pay for that electricity at a fixed rate.

"It's just super advantageous for us, economically and environmentally," Catanzaro said. "It makes it a really easy sell."

Hurdle financial barriers

Several years ago, the university's electricity bill increased by 20 to 30 percent, and the university raised tuition rates to make up the difference, Catanzaro said. But now, creating budgets for utilities will be much easier.

By the end of September, the university will have a 1.2 megawatt solar system, which will be tied for the eighth-largest system on a U.S. college campus. The roofs of about 10 buildings will hold 5,500 solar panels, and parking lot structures and laptop charging stations will also have panels.

Start a sustainability conversation

Along with economic and environmental benefits, the solar system will impact education. Through the company's support, a group of student leaders on the Green Team will educate the campus about the importance of renewable energy.

"We think it is a fundamentally critical teachable moment, a moment that should inspire students and inspire faculty members — whether they're kindergartners at one school or graduate students at another — to think more carefully about their choices with respect to how they treat the environment and how we collectively consume resources," said Joshua Weinstein, managing partner at AMSOLAR.

You May Also Like

Arizona Pushes for Affordable Solar Energy in Schools

Solar Array Provides Energy to Victor Valley College

Related to IT Infrastructure

IT Directors Increase Network Stability

2011 Poll Shows Unified Communications Progress

Old 911 Tech Presents Safety Issues on Campus

During intercession in January, Catanzaro hopes to set up a class on solar energy. e's working with the dean of the College of Business on the inter-disciplinary class, which will cover the legal aspects of power purchase agreements and the environmental impacts of solar power, among other topics. Company representatives will help teach the class.

Installing solar panels will benefit the university and the community in a huge way, Catanzaro said.

"Why wouldn't you save money if you could " he asked. " ou get to save money and help the environment, I love it."

You may use or reference this story with attribution and a link to
http://www.convergemag.com/infrastructure/University-of-San-Diego-Solar-Panels.html

tweets

retweet

👍10

You
Like this.

f Like

Confirm

Comments

ADD A COMMENT

From Rev. Rita Townsend
ON JUN 30, 2010

This is a nugget of information. Firstly to see my alma mater preserving precious funds by creating savings through energy costs, typically a whopper to any university's budget. Secondly, that the environment is safe-guarded through clean-burning, renewable, abundant energy. Thanks USD and AMSOLAR.

From Vince Leone
ON JUL , 2010

Thank you Mike Catanzaro   Super Duper job

Top Site Stories

D Animated Animals Hel inder artners Read

READ   DISCUSS

Boise State Mi es Emer in Tech into Education

READ   DISCUSS

Universities Use Social Networks to En a e Community

READ   DISCUSS

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community faculty, staff, students and community members are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas   society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period March 21- April 25 and bring it to our attention for review.

Please answer the following   uestions for each document you submit
 Feel free to submit as many of these forms as you would like

1   What is the name of the document   Emerging Technology Trends Finding the Next Big Thing

2   Author   Michael Bowman

3   Source

4   Which of the following areas does this document best address   Please select only one

- ◯ Society
- ⦿ Technology
- ◯ Economy
- ◯ Environment
- ◯ Politics and Legal Issues
- ◯ Education
- ◯ Other

5   Relevance

Page Section

Attach Document Place URL Here

Download the free Adobe Reader   http   www.adobe.com accessibility products reader

To attach a document   **Reader   Use   Tools   Comments and Marku s   Attach a ile as a Comment**
Reader   Use   Comment   u   er ri ht   then select the a er cli icon under Annotations

 uestions email   lynne.davidson   gcccd.edu Research, Planning and Institutional Effectiveness

Emerging Technology Trends—
Finding the Next Big Thing

Michael Bowman, PhD
Murray State University

Organizations and individuals around the world spend billions of dollars each year providing and using information technology. New capabilities, standards, and products appear every day. Many involve incompatible or even competing specifications and interfaces. Remember VHS versus Betamax? How about Blu-ray versus HD DVD? Which technology is the right choice for you or your organization? Working with ACUTA, researchers at Murray State University (MSU) collected and analyzed scientific, academic, industry, and popular data in order to predict technology trends. The target timeframe for the predictions was two to five years.

If this were an easy task, readily approachable with a standard scientific method, making IT investments would be much simpler. There have been many famous technology forecast blunders, such as Tom Watson, chairman of IBM, stating in 1943, "I think there is a market for maybe five computers," and Bill Gates, Microsoft, in 1981 saying, "640K ought to be enough for everyone." The predictions that follow are personal opinion about the most important technology trends for the next two to five years (your results may vary).

Methodology

Before describing what was done, it is important to stress what the methodology was not. This project was not a formal, highly funded modeling or simulation-based effort such as would typically be done by government, military, or investment/market researchers. In this case, a variety of relatively informal approaches was used to collect and assess information to forecast the most important emerging technology trends based on a fairly rigorous review of available information, including forecasts made by industry sources, such as Gartner Inc.[1]

A basic but essential analytical assumption was that the more often a technology term appeared in literature, on the Web, or in a conversation, the more likely it was to be a viable and important technology trend. As an example, the concept of cloud computing appeared in one or two articles in technology publications more than five years ago. One or two years later, it might have been in 10 articles per year. Currently, the phrase *cloud computing* probably appears in 100 articles per week. This kind of progression is a clear indicator of emerging importance. The trick is to identify the emerging trends early and know which are important.

The three student research assistants—Josh Stump, Stefan Bischoff, and Jeffrey Kaleta—were challenged with proposing and developing their own innovative approaches to supporting, improving, or refuting the author's predictions. Each student designed and implemented an approach that took the lead researcher's input and generated some level of confirmation or rejection of the predictions.

In addition to my own literature review, about 75 students in MSU computer science and networking classes were asked to nominate and vote on proposals for "the next big thing" in IT. Their opinions are factored into the predictions that follow.

Technology Trend Predictions

The fifteen items listed are the top new technologies, approaches, standards, or issues identified by the project. They are listed in their relative order of importance based on either their expected impact or how quickly they will become a current hot topic.

1. Cloud computing and its variations. Cloud computing is the concept of computing and IT resources being positioned in the Internet or an intranet "cloud," rather than owned and oper-

ated locally. This topic cannot be discussed without an introduction of the many variations, such as private clouds, public clouds, hybrid clouds, open cloud, cloud storage, agile infrastructure, and real-time infrastructure.

2. Virtualization. Running multiple iterations of one or more operating systems on or from a single powerful computing platform is the modern, popular definition of virtualization. Multiple virtualization systems, software, and approaches exist, and many organizations are moving quickly to virtualize their computing environments.

3. Mobile computing. Mobile computing is the use of mobile and handheld devices as the primary computing platform of choice. Mobile devices combine communications and computing power in a single device, and whether we use a cellular network, WiFi, or Bluetooth, many more of us are staying connected to the world through mobile computing. Mobile computing is also how advertisers and cyber criminals want to connect with us!

4. Social networks and their application. Social networking, and all the related interaction, advertisement, gaming, and cybercrime, appears to be the killer app of the Internet age. Everyone, from preteens to 80-year-old seniors, is staying involved with friends, family, and communities through social networks.

5. Wireless networks. End users expect wireless access to the Internet from everywhere, and IT providers are working hard to deliver it. This includes the family of IEEE 802.11 WiFi standards, 802.16 WiMAX, and the emerging Long Term Evolution (LTE) standard.

6. Collaborative computing and collaboration tools. Like a trip down memory lane back to the days of Lotus Notes,[2] many product developers, service providers, and endusers are again talking about the importance of collaborative effort now supported by mobile computing and communications platforms.

7. Green IT. Green IT is providing and using computing and communications with a focus on being environmentally friendly. With rising energy and environmental costs, Green IT is (and always has been) a smart business move.

8. Computer games and online gaming. Game play on computers, game consoles, and the Internet now rivals industry profits from movies/motion pictures.[3] Even the simplest, single-player games on the market today usually require Internet connectivity for license verification and sale of extra content before a game can be played. This is an important topic for both the time and network bandwidth consumed. It is also an emerging venue for cybercrime.

9. Context-aware computing. Context-aware computing is a concept that combines many of our top 15 topics. The primary idea is that our mobile computing devices will know our location, our interests, our typical activities, and the current time and will automatically prompt us about opportunities or issues in a timely and context-aware manner. Imagine walking down the street and having your cell phone remind you it is lunch time, offering directions to a local restaurant, and offering a discount coupon for your favorite meal at the restaurant.

10. E-health records. Mandated by a variety of national and local laws and regulations, our medical records are being digitized and made available for collaborative medical efforts via networks. Along with the opportunity for portability and collaboration come requirements to ensure security, accuracy, and privacy.

▶

11. eDiscovery. The more that official documentation and records go digital, the more likely it is that these e-records will be required by courts. eDiscovery is the formal retrieval and presentation of electronic records, such as text messages and e-mail, for use by the legal system.

12. Cybercrime. All of our computing and communications topics include an increased exposure to cybercrime. Crooks go where the money is, and today money and opportunity are online and mobile.

13. Mobile ad hoc networks (MANETs). A topic long researched by the military, MANET is coming to commercial products. Rather than rely on dedicated wireless access points and other dedicated networking devices, end-user mobile devices will interact and cooperate to extend communications services out to remote users.

14. Software-defined radios (SDRs). Another topic long researched by the military, SDR could revolutionize communications interfaces and interoperability. Rather than a communica-

tions device having a limited, hardwired capability to communicate on certain frequencies with certain protocols, SDR would permit a single device to communicate in a much broader range of formats and protocols by switching between software components.

15. Solid-state memory and storage. The era of rotating-disc-based mass storage is rapidly coming to a close. The solid-state technology that makes USB thumb drives possible and affordable is becoming less expensive and denser and will soon replace the much less reliable disc-based storage that we have used for six decades.

Summary of Recommendations

Each of these topics is likely to have some importance for every ACUTA member. While all the data collection, analysis, and reporting done within this project has been done with ACUTA members in mind, the following paragraphs summarize advice and forecasts specifically for the ACUTA membership.

Wireless access everywhere, with full Internet access to and from handheld and larger devices, will be expected as the mini-

Students and Supporting Projects

This ACUTA project served as a wonderful opportunity to spawn and motivate student-designed and -executed research. While their projects warrant publication of academic papers on their efforts, it is also appropriate to mention them here.

Josh Stump is an MSU undergraduate computer science major. To support this project, he created a series of automated online search programs that, with a single mouse click, would execute multiple complex searches of the Internet for the technology terms that this research produced. Josh's program used advanced features of Google's search engine to indicate how popular a particular term was with regard to how many "hits" it produced. Since the Google search engine does not encourage automated searches, development of these programs required coordination with Google and some complex programming approaches.

Stefan Bischoff and Jeffrey Kaleta were MSU graduate information system students who both recently completed their degrees. Stefan took the initial technology terms the research produced and created a database that stored the terms and their synonyms, as well as the relationships between terms that were identified over time. Stefan also produced the

complex multiline search terms that were used in our automated Google searches.

A search for *cloud computing* provides a powerful example of the importance of doing a proper search of the Internet. Searching for *cloud computing* (without quote marks) results in over 20 million hits—most of which are not useful items. Simply adding quote marks and searching for "*cloud computing*" still produces over 10 million hits. A properly formatted search string that includes synonyms and excludes certain unrelated words reduces the results to 950 hits, which are almost all useful information.

Jeff Kaleta created a relational database of the technology terms and sources that were produced by the project and then developed data-mining routines that examined the information to extract relationships between the terms. An example of a relationship between technology terms that his data mining produced is the link between context-aware applications and mobile computing. A publication that had an article on context-aware computing on a particular date was very likely to have an article on mobile computing in the same edition, and both terms were likely to appear in both articles. Jeff's research also included the development of relationship models that allow forecasting on the rise or decline in popularity of the terms.

mum standard by users. If your campus and service providers do not offer this, you will be at a competitive disadvantage. WiFi variants will continue to get better and cheaper but probably will still not provide the long-range coverage you would like in the next five years. WiMAX (IEEE 802.16) has finally become a viable longer-range wireless option in terms of product availability; but if you go this route now, you may be buying into as dead a standard as Betamax tapes. The emerging LTE wireless standard may kill WiMAX before it is widely adopted.

Your wireless coverage will soon need to support more complex and bandwidth-intensive applications. Wireless access to social networking, context-aware applications, mobile gaming, and electronic wallet capabilities will be expected on every campus within five years.

While expanding your wireless networks, also expect to adopt IPv6 to some extent during the next five years. Most of the IT equipment you buy today is IPv6 ready, and some of your campus IT systems may already be using it, whether or not you are aware of it. You will not be able to acquire significant blocks of IPv4 addresses after 2010.

It won't be common soon, but perhaps by the end of the next five years, your users' mobile devices may be able to help you with your wireless coverage problems. Mobile ad hoc networking (MANET) has been researched and tested for many years, but device manufacturers may soon routinely include this capability in their mobile devices. If you allow it, users' devices that are out of direct range of your wireless access points could be assisted by other users who are within range, facilitating the relay of the distant users' data to and from your wireless access points.

Enhanced computing and network environments will be expected from your users, while your budgets will remain flat—or even go down. Some of the latest technology trends can support doing more with less. Cloud computing, virtualization, green IT, and solid-state memory and storage are all technology trends that have the potential to save you money while enhancing capabilities.

Cybercrime may be one of the most important issues of the 21st century. Although users will demand unlimited wireless access and complex mobile computing and communications capabilities, they will also expect safety, security, and privacy. The criminals of the world know that there is money to be made on the Internet and through your wireless networks.

If you fail to provide safety, security, and privacy in your IT environment, your networks and computers can become crime scenes subject to eDiscovery that can cost you millions of dollars and damage your reputation. Your IT environment and security/privacy requirements will become more complex because of steady progress on e-health records. The government is requiring, and

users are beginning to expect, their medical records to be digital, mobile, and available everywhere, while never having their security and privacy violated.

Michael Bowman, PhD, is an associate professor at Murray State University. Reach him at michael.bowman@murraystate.edu.

References

1. Gartner Inc. (ed.): Press Releases. Gartner Identifies the Top 10 Strategic Technologies for 2010. www.gartner.com/it/page.jsp?id=1210613 10/20/2009, accessed on 11/01/2010.

2. IBM (ed.): The History of Notes and Domino. www.ibm.com/developerworks/lotus/library/ls-NDHistory/ 12/20/2005, accessed on 11/01/2011

3. Crandall, Robert W., and Sidak, J. Gregory, Video Games: Serious Business for America's Economy. Entertainment Software Association Report, 2006. http://ssrn.com/abstract=969728, accessed on 11/01/2011.

◆

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community faculty, staff, students and community members are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas   society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period March 21- April 25 and bring it to our attention for review.

Please answer the following   uestions for each document you submit

 Feel free to submit as many of these forms as you would like

1   What is the name of the document   Six Social Media Trends for 2010

2   Author   David Armano

3   Source   oward Bus Review

4   Which of the following areas does this document best address   Please select only one

( ) Society

(●) Technology

( ) Economy

( ) Environment

( ) Politics and Legal Issues

( ) Education

( ) Other

5   Relevance

    Page Section

    Attach Document Place URL Here

Download the free Adobe Reader   http   www.adobe.com accessibility products reader

To attach a document   **Reader   Use Tools   Comments and Marku s   Attach a ile as a Comment**
                         Reader   Use Comment   u   er ri ht then select the a er cli icon under Annotations

   uestions email   lynne.davidson   gcccd.edu Research, Planning and Institutional Effectiveness

Si Social Media Trends for

In 2009 we saw exponential growth of social media. According to Nielsen Online, Twitter alone grew 1,3 2   year-over-year in February, registering a total of just more than   million uni ue visitors in the US for the month. Meanwhile, Facebook continued to outpace MySpace. So what could social media look like in 2010   In 2010, social media will get even more popular, more mobile, and more exclusive — at least, that's my guess. What are the near-term trends we could see as soon as next year   In no particular order

Social media be ins to look less social

With groups, lists and niche networks becoming more popular, networks could begin to feel more "exclusive." Not everyone can fit on someone's newly created Twitter list and as networks begin to fill with noise, it's likely that user behavior such as "hiding" the hyperactive updaters that appear in your Facebook news feed may become more common. Perhaps it's not actually less social, but it might seem that way as we all come to terms with getting value out of our networks — while filtering out the clutter.

Cor orations look to scale

There are relatively few big companies that have scaled social initiatives beyond one-off marketing or communications initiatives. Best Buy's Twelpforce leverages hundreds of employees who provide customer support on Twitter. The employees are managed through a custom built system that keeps track of who participates. This is a sign of things to come over the next year as more companies look to uncover cost savings or serve customers more effectively through leveraging social technology.

Social business becomes serious   lay

Relatively new networks such as Fours uare are touted for the focus on making networked activity local and mobile.   owever, it also has a game-like   uality to it which brings out the competitor in the user. Participants are incentivized and rewarded through higher participation levels. And push technology is there to remind you that your friends are one step away from stealing your coveted "mayorship." As businesses look to incentivize activity within their internal or external networks, they may include carrots that encourage a bit of friendly competition.

Your com any will have a social media   olicy and it mi ht actually be enforced

If the company you work for doesn't already have a social media policy in place with specific rules of engagement across multiple networks, it just might in the next year. From how to conduct yourself as an employee to what's considered competition, it's likely that you'll see something formalized about how the company views social media and your participation in it.

Mobile becomes a social media lifeline

With approximately   0 percent of organizations banning social networks and, simultaneously, sales of smartphones on the rise, it's likely that employees will seek to feed their social media addictions on their mobile devices. What used to be cigarette breaks could turn into "social media breaks" as long as there is a clear signal and IT isn't looking. As a result, we may see more and or better mobile versions of our favorite social drug of choice.

Sharin   no lon er means e mail

The New   ork Times iPhone application recently added sharing functionality which allows a user to easily broadcast an article across networks such as Facebook and Twitter. Many websites already support this functionality, but it's likely that we will see an increase in user behavior as it becomes more mainstream for people to share with networks what they used to do with e-mail lists. And content providers will be all too happy to help them distribute any way they choose.

These are a few emerging trends that come to my mind — I'm interested to hear what you think as well, so please weigh in with your own thoughts. Where do you see social media going next

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community faculty, staff, students and community members are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas   society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period March 21- April 25 and bring it to our attention for review.

Please answer the following   uestions for each document you submit

 Feel free to submit as many of these forms as you would like

1   What is the name of the document   2011 Trends to Watch Education Technology

2   Author   slideshare.net aarks222 2011-trends-to-watch-education-technology

3   Source

4   Which of the following areas does this document best address   Please select only one

○ Society

○ Technology

○ Economy

○ Environment

○ Politics and Legal Issues

● Education

○ Other

5   Relevance

Page Section

Attach Document Place URL Here

Download the free Adobe Reader   http   www.adobe.com accessibility products reader

To attach a document   **Reader   Use Tools   Comments and Marku s   Attach a ile as a Comment**
Reader   Use Comment u er ri ht then select the a er cli icon under Annotations

 uestions email   lynne.davidson   gcccd.edu Research, Planning and Institutional Effectiveness

2011 Trends to Watch: education technology

Emerging from the worst of the economic crisis, the higher education industry is facing a confluence of events: record enrollments, reduced endowments and public funding, and a surge of technological innovation. Higher education will continue to face unpredictability in 2011 as consumer technology trends create an added strain on the institutions technology infrastructure.

Scope of this research
Offers insight into factors driving higher educations need for technology and how vendors can help institutions overcome market challenges. Explains the state of the education industry and its technology market across various global regions. Highlights new and upcoming consumer technology trends that will influence and change how institutions operate over time.

Research and analysis highlights

IT spending must grow in 2011, but the economic strain is still palpable. Therefore, institutions will squeeze existing IT investments for all they are worth. Cost-conscious institutions will seek open-source solutions to drive down costs in 2011.

Technology that promotes collaboration and interactivity will become a valuable differentiator for institutions in 2011. To that end, uptake of online learning will accelerate in the coming year.

Ubiquitous connectivity will be imperative in 2011 as each incoming class enters with new mobile devices. With the proliferation of new channels, content will surge to unprecedented volumes, urging institutions to ramp up investments in ECM.

Key reasons to purchase this research
Gain insight into the scope of the higher education market and opportunities for market penetration. Understand the market factors influencing investments in technology today and in the future. Develop a deep knowledge of market trends in order to develop more effective product development strategies.

Table of Contents :

Eastern Europe
Cost-conscious institutions will seek open-source solutions to drive down costs in 2011
Adoption of open standards will surpass proprietary technology
INSTITUTIONS WILL SQUEEZE EXISTING IT INVESTMENTS FOR ALL THEY ARE WORTH
Institutions aim to become more agile with technology
Demand for hard-number results will rise in 2011, pushing vendors to prove their worth
FOSTERING COLLABORATION AND INTERACTIVITY WILL BE AN IMPORTANT DIFFERENTIATOR FOR INSTITUTIONS IN 2011
Opening up avenues for discovery
With new channels, content will surge to unprecedented volumes in 2011, urging institutions to ramp up investments in ECM
UPTAKE OF ONLINE LEARNING WILL ACCELERATE 2011
Institutions are building their online presence
Online learning gets personal
CONSUMER ELECTRONICS ARE CHANGING THE WAY STUDENTS LEARN AND ENGAGE
Mobile devices meet student preference for on-demand access
Rise of e-books creates new touch points and will shake up the textbook industry in 2011
RECOMMENDATIONS
Recommendations for institutions
Identify and be responsive to student preferences
Consider technologies that promote collaboration
Be receptive, not defensive, as e-books and the mobile devices proliferate
Recommendations for vendors
Evangelize open standards and "vanilla" implementations
Let the numbers do the talking
Be prepared to capture a deluge of data and transform it into actionable insight
APPENDIX
Further reading
Methodology
Author
Our Consultancy
Disclaimer
TABLES
Table: Business and technology enablers in education technology
FIGURES
Figure: Total cost of annual attendance at a higher education institution broken down into average paid by each source, 2009 and 2010
Figure: Cost-saving measures families are taking to pay for college
Figure: Total IT spending by institution level (North America), 2008–13
Figure: Total IT spending by institution level (Asia-Pacific), 2008–13
Figure: Total IT spending by institution level (Europe), 2008–13
Figure: Major strategic goals of education technology decision-makers
Figure: Content management is a priority in education

For more information, please visit :

Grossmont-Cuyamaca
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas – society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period (March 21- April 25) and bring it to our attention for review.

Please answer the following questions for each document you submit:

(Feel free to submit as many of these forms as you would like)

1) What is the name of the document? Emerging Trends 2011-2015

2) Author:

3) Source: http://www.docstoc.com/docs/9488160/?

4) Which of the following areas does this document best address? (Please select only one)

- ◯ Society
- ● Technology
- ◯ Economy
- ◯ Environment
- ◯ Politics and Legal Issues
- ◯ Education
- ◯ Other

5) Relevance:

6) Page/Section:

7) **Attach Document/Place URL Here:** http://www.docstoc.com/docs/9488160/?utm_source=email&utm

Download the free Adobe Reader X: http://www.adobe.com/accessibility/products/reader/

To attach a document: **Reader 9: Use "Tools"-"Comments and Markups"-"Attach a File as a Comment"**
Reader X: Use "Comment" (upper right), then select the paper clip icon under "Annotations"

Questions email: lynne.davidson@gcccd.edu Research, Planning and Institutional Effectiveness

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas – society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period (March 21- April 25) and bring it to our attention for review.

Please answer the following questions for each document you submit:

(Feel free to submit as many of these forms as you would like)

1) What is the name of the document? Strategic Technology Plan

2) Author:

3) Source: Washington State Board for Community & Technical colleges

4) Which of the following areas does this document best address? (Please select only one)

◯ Society

◉ Technology

◯ Economy

◯ Environment

◯ Politics and Legal Issues

◯ Education

◯ Other

5) Relevance:

6) Page/Section:

7) **Attach Document/Place URL Here:**

Download the free Adobe Reader X: http://www.adobe.com/accessibility/products/reader/

To attach a document: **Reader 9: Use "Tools"-"Comments and Markups"-"Attach a File as a Comment"**
                          Reader X: Use "Comment" (upper right), then select the paper clip icon under "Annotations"

Questions email: lynne.davidson@gcccd.edu Research, Planning and Institutional Effectiveness

Strategic Technology Plan

For Washington State Community
and Technical Colleges

SBCTC
WASHINGTON STATE BOARD FOR
COMMUNITY & TECHNICAL COLLEGES
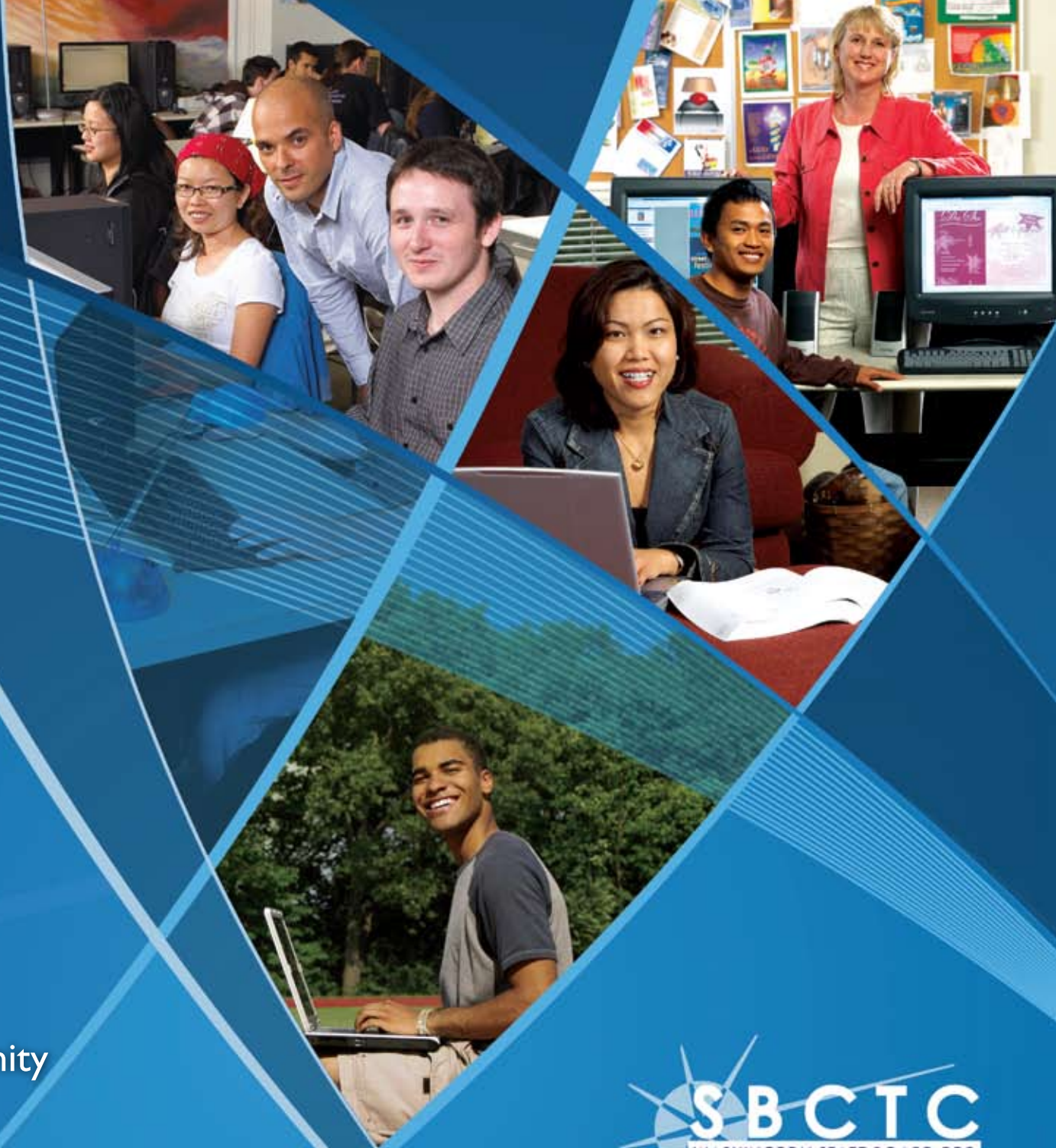
State Board Members

State Board for Community and Technical Colleges

Erin Mundinger, Omak, Chair

Jim Bricker, Coupeville

Reuven Carlyle, Seattle

Sharon Fairchild, Spokane

Jim Garrison, Mount Vernon

Jeff Johnson, Olympia

Tom Koenninger, Vancouver

Lyle Quasim, Puyallup

Beth Willis, Lakewood

State Board for Community & Technical Colleges

1300 Quince St SE
PO Box 42495
Olympia, WA 98504

Table of Contents

Preface

This strategic technology plan is the product of an intense 18-month analysis conducted by the Technology Transformation Task Force of the State Board for Community and Technical Colleges.

The Task Force examined the role and impact of web-based learning and the use of information technology in higher education throughout Washington, across the U.S., and around the world. Task Force members also listened carefully to the experiences and opinions of Washington students, faculty, and staff. It quickly became apparent that this was an exercise in measuring the growing distance between what is and what ought to be.

As the Task Force's work progressed, its sense of urgency about the need for change grew. The gulf between what younger "digital generation" students expect – and what the community and technical college system currently provides – is widening with every passing month. A generational, structural change is taking place in how people learn and what online services they expect. The online, interactive world is second nature to more and more of today's students, and colleges that don't recognize the centrality of this shift face impending irrelevance.

Equally important, online learning has untapped potential to meet educational needs that have gone unmet for generations. The barriers of time, distance, and conventional classrooms prevent far too many working parents, immigrants, high school dropouts, and mid-career professionals from improving their lives and increasing their contribution to our society and economy. And today, rising transportation and energy costs make expanded online learning an even more urgent need.

Outdated, inflexible data systems currently prevent the community and technical college system (and its partners in the P-20 education system) from sharing and analyzing information that could help pinpoint and seal the leaks in Washington's education pipeline.

A similarly outdated patchwork of online learning and student services systems fails to provide the seamless, efficient, and transparent 24/7 online services students and prospective students need to find, enter, and complete the education and training programs that can transform their lives and our state's economy.

The Task Force's conclusion is that we clearly do not have a 21st century information technology system. We are late to recognize the educational impact and potential of the Internet, late to take advantage of the shift to open, student-centered, web-based applications, and late to listen to what our students and faculty are telling us about what they need to thrive in this new era.

What emerged from the Task Force's work is a clear vision of how we can confront this growing crisis, close the distance between what is and what ought to be, and transform our use of technology to help meet the urgent educational needs of our citizens and our state.

We recognize that this plan, like the technology it describes, must be frequently updated to remain relevant and useful. We also recognize that meaningful commitments must be followed with meaningful resources, in the form of funding, time for professional development, and thoughtful and sustained leadership.

The future is already here. It is just not evenly distributed yet.

William Gibson, author

Introduction

Washington needs more people with higher levels of education, and to meet that goal, there is broad consensus that change and innovation are urgently needed. The principles in the community and technical colleges' System Strategic Direction include a clarion call for policy and investments "centered upon student needs, student diversity, *the impact of new technologies*, and enhancing students' knowledge, skills and educational attainment."

Raising educational attainment is also the overarching goal of *Washington Learns*, Governor Gregoire's groundbreaking 2006 examination of cradle-through-career education in Washington, and *Moving the Blue Arrow*, the Higher Education Coordinating Board's 2008 Master Plan for Higher Education in Washington.

To meet the goal of rising educational attainment, Washington must expand educational opportunity not only for young people, but also for adults who are already in our workforce. We need to actively recruit them and to encourage them to reach higher and complete the education and training programs that can transform their lives and the economy of our state.

Community and technical colleges are at the center of this challenge. Our open door policy meets people wherever they are on their educational journey. We serve high school dropouts, new immigrants, mid-career college graduates seeking new skills, and everyone in between. Our missions include workforce training, college degrees and certificates, adult literacy and basic education, English instruction for immigrants, and continuing education for lifelong learners.

Washington's 34 community and technical colleges are already key to Washington's progress and prosperity and to our students' ability to succeed in today's competitive global economy. Today, over 470,000 people are enrolled in one or more of our programs, and over the years, countless Washington residents have launched their careers from one of our campuses.

Still, we know we are not doing enough to meet the needs of this young century. To raise the levels of skill and knowledge needed to sustain economic prosperity, we cannot wait for students to come to us. Research tells us that not all students learn best in a traditional classroom setting. And we certainly cannot serve the people who need education the most by continuing the practices that have left them behind in the past.

To reach out to today's learners, we must dismantle the barriers of geographic isolation, cost, competing demands of work and family life, and past educational failure and frustration. We must create a system for learning that is welcoming to all, easy to enter and use, and tailored to the needs of each learner. Most important, we must create a system that fosters the personal relationships and support all human beings need to learn and thrive.

Today, technologies that can help us achieve these goals are unevenly distributed and under-used in our society and in our college system. Like other organizations, our community and technical college system struggles to keep up with changing technology. And like most other organizations, our system has made misjudgments about where technology was headed and how we should adapt. But we have also had our share of success with technologies that have provided innovative online learning, improved student services and administrative efficiency. This plan represents all we have learned from our successes, from our mistakes, and from the experiences of our peers across the country and around the world.

This plan also represents our sense of extreme urgency about our need to catch up, keep up, and provide all colleges and all students with the technological tools and support services they need to succeed in the 21st century.

Technology, teaching and learning

Our expectations about how technology can support teaching and learning have changed dramatically in the last decade. Little more than ten years ago, sitting at a computer was an isolating, solitary experience. Internet connections were slow and unreliable. Navigation required experience, patience and skill. And competent, confident users of the Internet tended to be mostly young, relatively affluent people.

Today, computer use has penetrated far more deeply into diverse populations. It is also much more focused on social interaction, with applications ranging from web-based phone and video to social networking sites to lifelong portfolios. The online world is vastly easier to navigate, so even beginners quickly gain confidence and skill in online environments.

As the Internet transforms the way we communicate with one another, do business, and entertain and inform ourselves, it is also profoundly changing how people learn. It presents a vast, borderless new opportunity to extend the reach of our educational institutions, to personalize learning, and to dismantle barriers of time, distance, and discomfort with traditional classrooms.

The learning styles and preferences of young people who have grown up online showcase these changes. Today's high school graduates are less linear and sequential, and more likely to multi-task – to chat online, monitor the news, and listen to music while they study. They expect constant interactivity and collaboration. They both consume and build the Internet by writing their own blogs, by maintaining their own social networking pages, and by contributing to sites like YouTube.

For this generation of learners, there is little tolerance for the traditional "I lecture, you listen" method of instruction. Why should they sit in a lecture hall when they could listen to a podcast of a lecture while working out or doing their grocery shopping? In fact, why would they listen to a lecture at all? This generation of learners prefers exploration, conversation, inquiry, and active engagement.

But it is not just the millennial generation that can benefit from technology-enhanced learning. Even those who have never touched a keyboard, and who lack home computers, find that learning online eliminates the performance anxiety of traditional classrooms and allows them to make mistakes and learn at their own pace without the fear of disapproval or ridicule. For adult learners who suffered as children from undiagnosed learning disabilities or other causes of classroom failure, this can be a transformative experience.

Accessible design technology and universal web design can also level the playing field for students with disabilities. New technologies offer an expanding array of benefits to students who are blind or visually impaired, to students who are deaf or hard of hearing, and to students with physical disabilities that preclude the use of a mouse or keyboard.

Still, new technologies are no substitute for good teachers. All students – from the tech-savvy to the tech-neophyte – benefit from the guidance of an expert instructor with deep subject knowledge, a wide array of teaching strategies, and the ability to bolster student motivation, interest, and confidence. Learning is and always will be deeply personal. And today, interactive learning technologies provide teachers and their students with new ways to connect with each other and the world through networked learning communities.

Technology and student services

In recent interviews and focus groups, students asked why they cannot get their financial aid checks electronically deposited. That was a tip-of-the-iceberg question that points to the growing gap between the use of convenient, web-based consumer services in the commercial world and in our colleges.

Student advising requires making appointments, finding a parking place or taking a bus, and sometimes standing in line – all for a transaction that could be handled with online services. For many students, this transaction also requires taking time off work or finding child care.

So providing more convenient, online student services – online advising, online registration, education and career planning, searchable course catalogs, transcripts, library services, tutoring and financial aid management – all through a one-stop student portal – will clearly bolster student recruitment, retention and success. A one-stop portal should serve as a "dashboard" from which students can log in and have access to all their courses, their financial aid accounts, educational plans, and grades.

Online student recruitment and advising can also serve middle and high school students who need to explore their options and plan the education they will need to achieve their dreams. User-friendly online resources can help these students by demystifying college and financial aid, by providing personal e-mail responses to their questions, and by establishing early relationships between students and colleges.
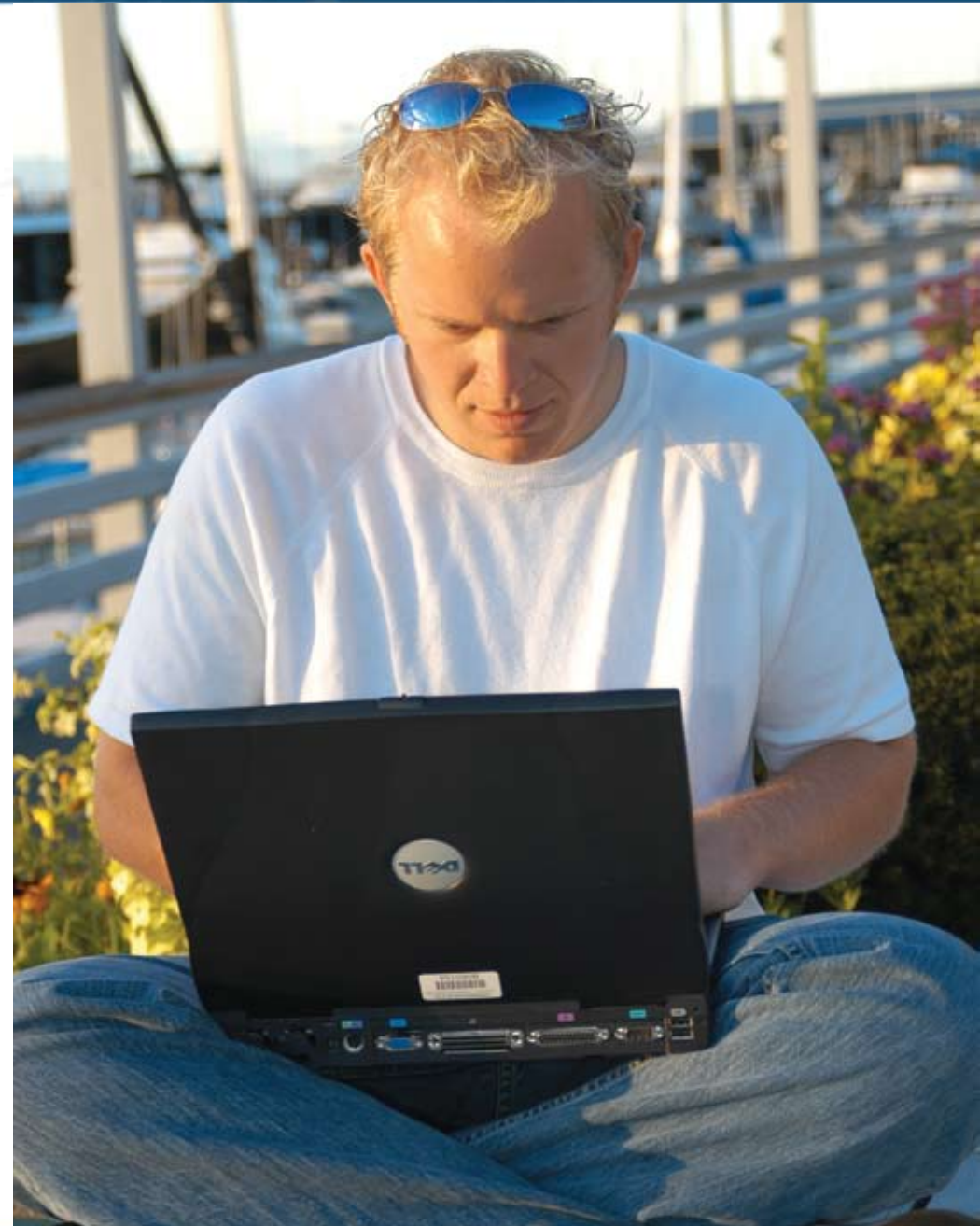
Education technology trends

Online learning growth

Online learning in Washington community and technical colleges has grown 715% in the past eight years.

In fact, the growth of online learning in Washington's community and technical system is outpacing the nation. Nationally, online course-taking has grown by 10%; however, in our system, the rate of growth exceeds 15% per year. Twenty-three of our 34 community and technical colleges offer a total of 86 different degrees and certificates completely online, and 16 colleges offer a completely online AA degree.

Online learning is also becoming a more important part of classroom-based courses. While 11% of community and technical college courses are fully online, an increasing percentage of "hybrid" courses replace some, but not all, classroom or worksite instruction with online learning. "Web-enhanced" courses that use online resources as a supplement to classroom work also continue to grow. Our colleges have done better than many other states in offering online learning, but there is huge untapped potential for growth.

Growth in Online Courses

Fall FTE: 1998-2010

Bar chart showing Fall FTE growth from 1998 to 2010. 1998: 373; 1999: 1,654; 2001: 3,701; 2003: 6,891; 2004: 8,000+; 2005: 9,959; 2006: 11,600+; 2007: 13,473; 2008: 15,500+; 2009: 16,800+; 2010: 18,087. Red arrow labeled "1999-2007 growth = 715%".

Online learning growth, cont.

Today, students expect their instructors to post the course syllabus, reading list, assignments, and grades online, to respond to e-mailed questions, and to encourage collaborative online discussions. Tech-savvy students want more opportunities to learn online and more ways to collaborate and communicate with each other and with students around the world.

Faculty want to be able to lead – not follow – their students' growing use of these new learning tools, but they often lack the training and support they need to do so. Faculty have clearly expressed their desire to be at the center of technology planning and innovation.

In spite of the almost explosive growth in online learning, there are obstacles to full student and faculty access to its benefits. Students must pay an extra fee for each online course they take. In many colleges, there is no specific preparation program for students who have not used computers or the Internet before, and there is often no assessment to measure students' readiness for success in online classrooms.

Many students who could benefit from online, hybrid, or web-enhanced classes may still be intimidated by the technology, shut out by the extra fees, or discouraged by the difficulty of finding and enrolling in the classes they need.

Colleges also face obstacles and disincentives to improving and expanding online learning. Each college must pay fees to participate in WashingtonOnline (WAOL), the community and technical college system's statewide platform for online learning. There is no statewide system of professional development for college faculty and staff who want to master new technologies and tools. And there are no dedicated funds for technology investments, innovations or training.

As the online environment changes the way students learn, it is also changing the nature of teaching. Faculty are becoming facilitators who plan, orchestrate and guide learning rather than sole source providers of knowledge. Recent surveys make it clear that this is a transition that faculty are eager to embrace, but to do so, they will need training and support, time for collaboration with peers, and a voice in technology choices and deployment.

Online Learning Definitions

Online courses are conducted completely on the web.

Hybrid courses replace some – but not all – classroom time with online learning. For instance, a class that would ordinarily meet five days a week might meet three days a week, and substitute online activities to replace the other two class sessions.

Web-enhanced courses meet in regular class sessions, but use online resources for additional student-teacher and student-to-student interaction, posting of assignments, course materials, and student research.

WashingtonOnline (WAOL)
is a system-wide service
provided by the State Board
for Community and Technical
Colleges. WAOL provides a
platform for colleges to share
course content, open textbooks,
and online course enrollments
so that students enrolled in one
college can take online classes
offered by another. Colleges can
also use the WAOL platform to
support their own online, hybrid,
and web-enhanced classrooms
where faculty and students can
read assignments, take quizzes,
post grades, develop and share
ePortfolios, and collaborate
through online class discussions
and webinars.

WAOL also provides 24/7
technical support, and
professional development for
faculty and staff and supports
the NW eTutoring Consortium.

Open access

In 2001, the Massachusetts Institute of Technology launched an OpenCourseWare Initiative that placed all the course materials for 1,800 MIT courses online, free to anyone in the world. This was a defining moment and an immense change in how higher education thinks about its content. Each month, the MIT site receives about 1.8 million visits. A high school student reported that the website "contributed hundreds of hours to my education in physics as well as biology. Discovering and utilizing MIT's OpenCourseWare site was like finding $40,000 sitting on a park bench." MIT is now one of many higher education institutions that share course content. Others include the Open University's OpenLearn, Rice University's Connexions, and collaborations like the Open Educational Resources Commons and the OpenCourseWare Consortium.

All across the world, the trend of sharing resources – curriculum, course materials, textbooks, software, and support services – is growing. This is a vast new frontier for educators and students alike. While many faculty embrace this trend, others fear that posting their work online is somehow giving away the store. After all, if students can learn what they want to know online, what is left for faculty to do? The truth is, of course, that there is plenty for faculty to do to help students learn how to select, analyze, critique and synthesize information from this vast new resource. There is also a continuing need for students to master the age-old skills of clear writing, problem-solving, and logical thinking.

But using open educational resources – and contributing to them – requires significant change in the culture of higher education. It requires thinking about content as a common resource that raises all boats when shared. It requires replacing our "not invented here" attitude with a "proudly borrowed from there" orientation. And it requires a new willingness to share and distribute the best of our own course content and software, and to participate in creating and maintaining open textbooks.

Clearly, MIT's reputation for excellence has not suffered as a result of sharing its course materials. But one can well imagine that in MIT faculty meetings – as in those in our community and technical colleges – it took some time and conversation to change the way faculty think about their intellectual property and their contribution to learning.

Open educational resources make apparent the truth that our course content is not what distinguishes us from our peers. What faculty provide – and what students need and value -- is synthesis, planning, personal interaction, and guided dialogue among learners.

Where we are now

The first focus of information technology (IT) in the community and technical college system was to improve efficiency in college business practices, finances and human resources. In the late 1970s, the colleges established a shared IT organization whose purpose was to "establish service levels and provide for computing resources." The statewide Center for Information Services (CIS) hosted basic administrative applications that all community and technical colleges use for administrative functions. These tools – and the precedent of statewide, shared IT infrastructure – are important assets that continue to serve the system well, but their promise has not been fully realized.

Originally, the primary customers of IT were administrators. While faculty and students benefited from technology-driven increases in administrative efficiency, they were secondary customers.

The advent of online learning in 1997 was a significant turning point in the direct use of technology to benefit students. That use has grown, but it has not been fully integrated with the administrative and student services applications that could – but don't yet – provide a seamless, customer-friendly environment for recruitment, registration, student advising, and financial aid management.

The culture of sharing teaching and learning resources across all 34 community and technical colleges has been nurtured by the growth of WAOL, which now manages 30% of online enrollments from the 34 colleges in the system. But the shift towards sharing is not yet fully realized. Only twelve of the 34 colleges currently use WAOL for all of their online, hybrid, and web-enhanced courses; and many online courses are still offered only to students enrolled in the college that offers them, even though those courses might be needed by students in other parts of the state. This go-it-alone approach is fostered by the requirement that colleges pay to use WAOL.

The lack of a single universally used statewide platform for all online courses means that students often have to learn multiple online course management systems, and use different logins and passwords for each of them. And even now, not all faculty have access to the course management, webinar and ePortfolio software and training they need to offer online, hybrid and web-enhanced courses.

Where we begin: lessons learned

The tension between system-wide vs. college-based technology applications is central to the limitations of the current system.

Originally, developing our own administrative software was a good solution, and CIS provided very successful services. But when the first generation of software and servers became obsolete, our system had a choice: It could purchase software and hosting services from outside vendors, or rewrite software in a newer computer language and expand our own hosting capacity. The system chose to rewrite and re-host our own software, which proved to be an overwhelming, labor-intensive, multi-year task. While that work was underway, individual colleges began to customize or invent more of their own solutions to meet emerging student and faculty needs. And while all this was going on, the IT world changed dramatically.

Today, the IT industry offers packaged, hosted systems for most of the administrative, student services, and teaching and learning needs of community and technical colleges. The total cost of ownership of these systems is often lower than the cost of system-developed and locally hosted solutions. These purchased systems, like most home computer software packages, are sold with automatic updates that continue to add functionality.

Both the community and technical college system's successes and its failures clearly point in the direction of migrating to centrally purchased software solutions and hosting services that provide all colleges with integrated teaching and learning, student services, and administrative systems.

Equitable access to these common, baseline resources will require providing these services to all colleges and all students without extra fees. These technological tools have moved from being "extras" to being a basic part of how colleges do business and how teaching and learning take place.

Colleges' natural desire to preserve their distinct identities will not be compromised by sharing common administrative tools, data analysis systems, teaching and learning tools and online student services. And whatever the colleges may lose in technological autonomy will be more than equaled by what students gain in seamless student services and improved access to the courses they need, when they need them.

The community and technical college system's experiences – along with extensive surveys, conversations and consultations with faculty, students and staff – have led us to seven simple principles that guide where we will go from here.

Guiding principles

1. Our IT solutions will be aligned and funded to meet the learning and service needs of all students and faculty at all 34 community and technical colleges.

2. We will use IT to help both colleges and the State Board make better use of data to drive decision-making and to improve both student success and administrative efficiency.

3. We will pursue a strategy of implementing system-wide software and hosting services that are cost effective, easily integrated, user-friendly, and constantly improving.

4. We will work to integrate our information technology efforts with our partners in public schools and four-year colleges and universities in order to create a seamless P-20 online learning environment for students and services that promote seamless transitions between institutions.

5. We will provide comprehensive professional development for faculty and staff in the use of evolving technologies. Faculty and staff will be involved in directing these efforts.

6. We will create an accountable, open, system-wide governance structure to guide IT strategy and investments.

7. We will cultivate the culture and practice of using and contributing to open educational resources.

Open textbooks are complete texts written by academics that can be used online for free and printed for a small cost. Open textbooks are already used at University of Puget Sound, Caltech, and in many other colleges and universities. Textbooks cost students close to $1,000 a year. Textbook prices are rising faster than inflation, as publishers constantly release new versions, and "bundle" books with supplemental materials such as DVDs that students don't want or need.

Goal and strategies

Most strategic plans have many goals; this plan has only one: <u>to mobilize technology to increase student success</u>.

The value of every investment in technology will be measured by its contribution to achieving this single, fundamental goal. This sounds perfectly obvious, of course, but given the history of technology use in community and technical colleges (and in most other education systems), it represents a new orientation, a new commitment, and the intentional creation of a new culture.

In this new culture, students and prospective students will be the center of the universe, and the entire system will be organized to meet their learning needs. To the greatest extent possible, online learning resources will be open, free, and widely shared. Information technology will be regarded – like electricity in college buildings – as a utility that students, faculty and staff use every day and take for granted.

This shift is consonant with the 2005 Washington Learns Committee report, which calls for a "world class, learner-focused, seamless" education system.

Clearly, creating such a system requires far more than changing the way we use technology. But technology can and must play a central role in the way we pursue that overarching policy direction because web-based technology has the potential to deliver the world to every learner, to help customize and personalize learning for every student, and to erase the seams between disparate parts of our education system.

We will support innovation wherever it occurs. Students, faculty, staff, and global partners are all sources of creative ideas for meeting local community needs and creating pioneering technology solutions. So although this plan clearly calls for centrally provided, system-wide solutions, we also aim to nurture an open, system-wide testing environment and support for local experimentation. We will always need a place to experiment and test new ideas to drive innovation. We will allow people to take risks and develop a culture of support for "idea entrepreneurs" no matter where they are in the system.

Strategy 1: Create a single, system-wide suite of online teaching and learning tools that provides all Washington students with easy access to "anywhere, anytime" learning.

We cannot realize the full value of teaching and learning technologies with today's patchwork of programs. A single, consistent, system-wide set of teaching and learning tools and resources is the first and most essential step toward the seamless, student-centric and customized education system we need.

Action 1: eLearning. Assemble a system-wide suite of online teaching and learning tools, support services, and a central 24/7 help desk through WashingtonOnline to accommodate online, hybrid, and web-enhanced classes in all colleges.

Action 2: Free Textbooks. Wherever possible, eliminate published textbooks in favor of free, open, online materials.

Action 3: Library Resources. Create a rich, easily accessible online library system that includes both global and local learning resources and tutorials on how to use them. Buy statewide licenses for online journals and library reference services rather than individual licenses at each college. Provide a common, robust integrated library operating system through which students can find and check out books and other library resources from libraries across the state and the world. This library system will support seamless sharing of book collections, document delivery and information literacy instruction across the community and technical colleges and with the university system.

Action 4: ePortfolio. Provide a statewide platform that allows students to create lifetime online portfolios of their academic work, from first essays to PhD theses and professional work products. Students' digital portfolios will show what they know and what they've built, and can be used as an online resume to help them get a job.

Action 5: Online Tutoring. Collaborate with other higher education institutions to support the Northwest eTutoring Consortium, a statewide system for online tutoring.

Action 6: Technology Proficiency. Create an assessment that measures students' proficiency in using online technology. Create easy-to-use tutorials and provide personal support to bring those unfamiliar with the online environment up to speed.

Action 7: Access. Investigate the feasibility of providing laptops to students who cannot afford them. Support Washington broadband initiatives to bring high-speed Internet access to every Washington student's home.

Action 8: Universal Design. Ensure that all online, hybrid and enhanced courses and college web sites are fully accessible to students with disabilities. Provide faculty and staff professional development on universal design best practices.

Strategy II: Create a seamless P-20 system for personalized online student services including recruitment, retention, advising, course catalog, transfer, and financial aid management.

It is not enough to simply provide classes for those who enroll in our colleges. We need to reach out to those who have never considered attending a college – to the half million adults in our state who lack a high school diploma, to the working parents stuck in low-wage jobs, to immigrants who need both language and job skills, and to the middle and high school students who think college is beyond their reach.

We also need to increase retention and completion rates among those who do enroll. We lose far too many students before they reach their educational goals, and we must do more to dismantle the barriers to their success.

This will require changes that go beyond the ways we use technology, but technology offers powerful new tools for managing and personalizing the relationships between students and colleges. When anyone makes even the most tentative inquiry about a college, these new tools create a way for colleges to latch on to them, follow up with encouragement, information, and personal responses, and even to remind them periodically that the door to educational opportunity is open to them. Once students enroll, these systems alert college personnel when students are struggling, so they can offer help such as online advising. And if students leave, this system has the capacity to find out why, to encourage them to return, and to analyze data to pinpoint and seal the cracks in the educational pipeline.

Action 1: Online Advising. In partnership with the Higher Education Coordinating Board, provide statewide access to a single online advising and educational planning resource that is simple to use and appealing to people of all ages and education levels.

Action 2: Student Relationship Management. Purchase a single statewide package of student relationship management software that tailors responses to student inquiries and helps college personnel systematically respond via e-mail, phone or in person. Train staff to use this system, and analyze the results to track improved student success.

Action 3: Course Catalog. Create a statewide, online, searchable course catalog and quarterly schedule so students can plan their academic futures and colleges can make in-demand courses available.

Action 4: Electronic Deposit. Purchase software that allows electronic deposit of financial aid checks to students' bank accounts and allows student online tracking and management of financial aid and scholarships.

Strategy III: Create a system of lifelong learning and change management for faculty, staff and college leadership.

To fully execute Strategies I and II, community and technical college faculty, staff and leaders need time to build new skills and collaborate in new ways. They need to learn to use new teaching tools and pedagogies, to explore what it means to truly become student-centered, and to understand the many ways in which web-based technologies are changing our classrooms, our economy and our workplaces. We recognize that the cultural shift this plan calls for will take time, money, and sustained commitment.

Action 1: Professional Development. Strengthen and expand professional development programs and create the expectation that all faculty, staff and college leaders will continue to learn, collaborate, share knowledge and resources, and work together to make the best use of new technologies to improve student learning. Use new methods such as webinars, multi-disciplinary faculty learning communities, and social networking software to extend the reach of professional development.

Action 2: Time to Learn. Make learning to use new technologies an explicit part of job descriptions and duties, and organize time to include professional development and collaboration within regular work schedules.

Action 3: Learning Opportunities. Aggregate the colleges' purchasing power for professional development. Create a statewide fund to support faculty participation in cutting edge conferences (both in person and online) and ask participants to share what they learn with their colleagues with social networking and webinar software. Buy a statewide membership in leading national professional development consortia, and extend benefits to all faculty and staff. Advertise these opportunities to faculty and staff throughout the system.

Action 4: Course Redesign. Develop faculty capacity to continually improve the quality of online courses through collaborative, iterative design. Develop a peer review methodology for evaluating and redesigning existing and new online courses.

Action 5: IT Staff. Create a statewide structure that provides consistent opportunities for IT staff in both colleges and at the State Board to learn, collaborate, and share best practices as they make the transition from software developers to integration experts who tie together best-of-breed applications. Create a process to support career advancement and leadership development.

Action 6: Support Innovation. Establish and fund system-wide innovation and testing projects to pilot emerging technologies. Create a rapid response team that can take innovative ideas and implement them promptly. Partner with corporations and other higher education institutions to seek new ways to make learning more accessible to all Washington residents.

Strategy IV: Use data to drive continuous improvement in both student success and administrative efficiency.

A statewide, integrated set of administrative tools can help make administrative functions simpler, less expensive, and more focused on supporting student success. In addition, there is a need for greater capacity to collect and analyze data, and for more sophisticated use of data to drive improvements in student learning, administrative efficiency, and accountability to the Governor, the Legislature and the public.

Action 1: Administrative Software. Purchase system-wide, centrally supported administrative software that saves money, supports teaching and learning and online student services, and simplifies staff training. Explore using state or vendor hosted systems to minimize or eliminate the need for customized, locally developed software.

Action 2: Business Intelligence. Invest in business intelligence software to analyze data to track student recruitment, retention and success rates, and other metrics of efficiency and effectiveness. Invest in ongoing training to maximize use of data.

Strategy V: Treat information technology as a centrally funded, baseline service in the system budget.

IT is an integral part of the cost of education, and so it must become an integral part of the education system's budget. The investments we make in IT are key policy choices that express our state's values, aspirations, and priorities. These choices should be open to public discussion and legislative debate, so that the opportunities, costs, and savings are clearly understood.

Action 1: Line Item Funding. Make system IT investments a line item in the State Board's budget request to the legislature.

Action 2: Technical Infrastructure. Invest in college infrastructure such as rewiring to provide additional outlets for student laptops and mobile devices. Provide easy to use, 100% wireless coverage on all college campuses.

Action 3: P-20 Integration. Convene a P-20 technology group to explore whether common platforms, software and services could be shared by early learning providers, public schools, community and technical colleges, and four-year public and private colleges and universities in ways that improve system seamlessness and data analysis and save money.

The ultimate interdependence:
global knowledge creation and exchange

Matthew Henson and Robert Peary first reached the North Pole in 1909. It was a heroic feat that required months of arduous travel and hardship. Today, anyone with Internet access can see the North Pole (and the South Pole, too) on a live webcam.

In fact, if Henson and Peary were traveling to the North Pole right now, it's likely that there would be live web coverage of their journey and open sharing of the new knowledge they created along the way. People in every country in the world would be tracking their progress in real time, swapping blog postings and commentary, and making connections between the expedition's discoveries and their own work. There would be a global storm of knowledge creation and sharing – and probably a flurry of pop culture production and art inspired by their ordeal and their ultimate triumph.

That is exactly what is happening now, thousands of times over, on topics ranging from photoelectric engineering to plant genetics.

Today there is a global intellectual commons online. We can be a part of it – and teach the skills needed to participate in it – or we can retreat to the frozen past of Henson and Peary, when time and distance were enormous barriers that required heroic effort to overcome.

The value of information technology investments is, very simply, that they allow us to be active participants in the 21st century. They give our students and faculty access to the global intellectual commons, to the interactive world of knowledge creation and sharing, and to the vast wealth of online human creativity and connection.

The prosaic, practical return on our investment in information technology will be better jobs for our graduates and a stronger economy for our state. But the real value of information technology will be measured on a larger map – the map of the interdependent world today's students and faculty will learn to navigate, and will help to chart.

Technology Task Force Members

Betsy Abts	North Seattle Community College
Kayeri Akweks	State Board for Community & Technical Colleges
John Backes	Shoreline Community College
Kathryn Bauer	Yakima Valley Community College
Russ Beard	Big Bend Community College
Bill Belden	Green River Community College
Bill Bonaudi	Big Bend Community College
David Borofsky	Bates Technical College
Connie Broughton	State Board for Community & Technical Colleges
Reuven Carlyle	State Board for Community & Technical Colleges
William Covington	UW & Edmonds Community College
Charlie Earl	State Board for Community & Technical Colleges
Jim Garrison	State Board for Community & Technical Colleges
Cable Green	State Board for Community & Technical Colleges
Mary Alice Grobins	State Board for Community & Technical Colleges
Tom Henderson	State Board for Community & Technical Colleges
Dick Hol	Community Colleges of Spokane
Jack Huls	Peninsula College
Paul Hutton	Lake Washington Technical College
Glen Jenewein	Clark College
Marc Lentini	Highline Community College
Gene Lipitz	Vashon Island School Board
Todd Lundberg	Cascadia Community College
Janis Machala	Lake Washington Technical College
Rick MacLennan	Olympic College
Thomas Malone	Seattle Community College District
Greg Marshall	Whatcom Community College
Nancy McKinney	South Puget Sound Community College
Erin Mundinger	State Board for Community & Technical Colleges
Tina Prentiss	Olympic College
Chris Reykdal	State Board for Community & Technical Colleges
Michael Scroggins	State Board for Community & Technical Colleges
Jille Shankar	Spokane Falls Community College
Alan Spence	Seattle Community College District
Tim Stokes	Tacoma Community College
Bill Storms	Walla Walla Community College
Larry Susanka	Bellevue Community College
Michael Talbott	Bellevue Community College
Michael Taylor	Seattle Central Community College
Nancy Truitt Pierce	Everett Community College
Sue Wiliamson	Skagit Valley College
Jan Yoshiwara	State Board for Community & Technical Colleges

Photo Credits

Front Cover	Lake Washington Technical College (top three photos)
Page 2	Seattle Central Community College
Page 4	Green River Community College
Page 8	Everett Community College
Page 12	Seattle Central Community College
Page 14	Seattle Central Community College
Page 15	Highline Community College
Page 16	Tacoma Community College
Page 18	Columbia Basin College
Page 20	Tacoma Community College
Page 22	Clark College
Page 27	Seattle Central Community College
Page 28	Green River Community College

Printed on recycled paper with soy-based inks.

GROSSMONT-CUYAMACA
COMMUNITY COLLEGE DISTRICT

Education Master Plan
Information Submission Form

The Grossmont-Cuyamaca Community College District is starting a year-long process to develop an Educational Master Plan that will serve as the blueprint for our future. The Educational Master Plan is a long-range, comprehensive document intended to guide institutional and program development at both the college and district levels. The priorities established in the Educational Master Plan will serve to guide College and District decisions about growth, development and resources allocation.

As the first step in this planning process, everyone in the GCCCD community (faculty, staff, students and community members) are invited to identify and submit information sources to be reviewed for the trend analysis in one of six areas – society, technology, economy, environment, politics, and education. We are not asking you to do research, only to identify information you already have or that you encounter during the search period (March 21- April 25) and bring it to our attention for review.

Please answer the following questions for each document you submit:

(Feel free to submit as many of these forms as you would like)

1) What is the name of the document? IT Strategic Plan

2) Author: Kingsborough Community College

3) Source: CUNY IT Steering Comm

4) Which of the following areas does this document best address? (Please select only one)

○ Society

⦿ Technology

○ Economy

○ Environment

○ Politics and Legal Issues

○ Education

○ Other

5) Relevance:

6) Page/Section:

7) **Attach Document/Place URL Here:**

Download the free Adobe Reader X: http://www.adobe.com/accessibility/products/reader/

To attach a document: **Reader 9: Use "Tools"-"Comments and Markups"-"Attach a File as a Comment"**
Reader X: Use "Comment" (upper right), then select the paper clip icon under "Annotations"

Questions email: lynne.davidson@gcccd.edu Research, Planning and Institutional Effectiveness

CUNY

IT Strategic Plan
2010-2013

Evolution of Technology in Education

COMMITTEE
MEMBERS

Brian Cohen
Associate Vice Chancellor and Chief Information Officer
CUNY Central Office

James Haggard
Deputy Chief Information Officer
CUNY Central Office

Vace Kundakci
Assistant Vice President and Chief Information Officer
City College

Sue Henderson, PhD
Vice President of Institutional Advancement
Queens College

George Otte , PhD
University Director of Academic Technology
Central Office

William Keller
Vice President of Finance and Administration
Kingsborough Community College

Esther R. Chardavoyne
Senior Vice President
Hostos Community College

Ann Kirschner, PhD
University Dean
Macaulay Honors College

Franklin Steen
Chief Information Officer
Hunter College

Michael Kress, PhD
Vice President for Technology Systems
College of Staten Island

Stephen Walsh
Managing Director
Exeter Group

DRAFT

TABLE OF
CONTENTS

I am very pleased to present the CUNY IT Strategic Plan. This five-year plan details the University's comprehensive technology goals in connection with the academic and administrative priorities set forth in CUNY's 2008-2012 Master Plan.

Technology is one of CUNY's highest priorities. We recognize that it is essential to CUNY's continued growth as a premier academic and research institution. Over the last five years, we have invested over $450 million in infrastructure, hardware, software, and other technology to support and advance our educational mission.

Technology enables our faculty, for example, to enhance and develop course offerings through online and hybrid education. In addition, the expansion of our fiber network to all CUNY campuses will enable complex, collaborative research and other high-bandwidth applications across all colleges and support sophisticated projects at the CUNY Advanced Science Research Center currently in construction.

Technology also facilitates communication among our students, faculty, and staff. Wireless service on campuses and the new Live@CUNY e-mail system allow students to connect with each other, share their ideas, and engage in group research and projects. Video teleconferencing is improving productivity within our administration by facilitating meetings across campuses, saving time and travel costs.

During a time of tightening budgets and unprecedented growth in student enrollment, we must rely on technology to help deliver services faster, more efficiently, and in the most cost-effective manner. Enterprise solutions such as CUNYfirst will help eliminate system redundancies and reduce operating costs while allowing the University to enjoy economies of scale. A newly redesigned admissions system, part of CUNYfirst, will support a faster admissions process, expanded college branding, and more effective communication with applicants.

The CUNY IT Strategic Plan is integral to advancing the teaching, research, and service under way at our colleges and professional schools. I commend the work of the IT Strategic Planning Committee in creatively and carefully planning for technology's critical role in supporting our academic mission.

DRAFT

DRAFT

In the fall of 2008, the CUNY IT Steering Committee created the Task Force for an Information Technology Strategic Plan (ITSP). The purpose of the Task Force was to produce an IT Strategic Plan for the next three to five years that would guide, assist and support the University in meeting its diverse challenges in the near term, in concert with the mission and objectives of the 2008-2012 CUNY Master Plan. The CUNY Master Plan details the major strategic goals of the University, as well as specific academic, administrative and research initiatives that are integral to supporting CUNY's mission. The CUNY Master Plan comprises the following high-level priorities:

- **ACADEMIC PRIORITIES**
- **ENHANCING THE LEARNING ENVIRONMENT**
- **EMPOWERING THE STUDENTS FOR SUCCESS**
- **REBUILDING THE CAMPUSES**

The report's appendix includes relevant excerpts from the CUNY Master Plan. The Task Force formally convened eight times and conducted over two dozen interviews, including the Task Force membership, the Vice Chancellors and campus executives in the senior and community colleges. The interview process specifically targeted key challenges face the University, as well as a discussion of how technology could assist, support and/or guide future reengineering efforts, and improve the educational and administrative services provided to the students.

As a result of the interview process, several key "business" challenges and common technology themes emerged. From these identified challenges and themes, the Task Force developed strategic goals and objectives to align technology with the Master Plan, address the challenges identified by University executives and build the foundation for future technology strategic planning efforts, prioritization and funding allocations.

Key challenges and themes identified through the interview process:

Challenges

- Funding
- Enrollment growth
- HR/Recruitment/Staffing
- Procurement process
- Sustaining previous IT investments
- Business Process Reengineering
- Governance process (roles and responsibilities, prioritization and shared decision making)
- Centralized strategy with decentralized flexibility
- Strategic alignment (academic/pedagogical)
- Central IT support
- Communications
- Focus on student-centric services
- Availability of class room space
- Faculty use of Instructional Technology
- Security

Themes

- IT solutions to address enrollment growth and admissions
- Using technology to enhance the educational experience of students and faculty
- Audio/Visual improvements to aid classroom instruction
- Document Management/Electronic Records Management
- Video Teleconferencing
- Implement IT tools to support the collaboration and communication of data and information
- Technology infrastructure improvements
- Enterprise email implementation
- Disaster Recovery/Business Continuity planning and support
- Improvements to IT governance process and decision making
- Management and support of IT resources; improvements to the HR process for the recruitment, training and retention of IT resources

DRAFT

Strategic Areas

The ITSP Task Force categorized all challenges and themes into five strategic areas for immediate (short-term) focus, with each of these areas aligned to the CUNY Master Plan (see Appendix chart). Each of these strategic areas are further supported by specific enterprise goals and objectives. These areas are as follows:

TEACHING, LEARNING, AND RESEARCH
STUDENT SERVICES
ENTERPRISE TECHNOLOGY
SUPPORT SERVICES
PROTECTING TECHNOLOGY ASSETS AND DATA

DRAFT

Teaching, Learning, and Research

A s stated in the CUNY Master Plan, *"focus on core academic priorities is its steadfast attention to providing an environment conducive to effective learning and teaching. The University's work for the next four years therefore also includes sensitivity to the imperatives of academic and instructional technology; redesign of CUNY's administrative systems and processes; maintenance and expansion of library services;…and exploring the potential of new graduate degree programs and paradigms, including online degree programs."*

The CUNY IT Strategic Plan has accounted for all of these strategic objectives within the Master Plan and has appropriately aligned its technology priorities and planning to support and assist the University in meeting its core mission of teaching, learning, and research.

Technology is a vital asset in supporting the University's core mission of teaching and learning, and enables the colleges to communicate and share information efficiently and effectively.

DRAFT

Goal
Extend and enhance student success and access to the academic experience through technology.

OBJECTIVES

- Support University efforts to enhance student services, meet projected enrollment growth and reduce impact on CUNY facilities, through both partial and complete online instruction.

- Support developmental education and learning by assisting the colleges in developing and implementing pilot programs.

- Identify best practices, recommend software solutions, and support requirements for an enterprise e-Portfolio solution.

- Support access to textbooks, course material, and curriculum through electronic and digital alternatives (e-Books).

- Ensure that campus classroom environments have appropriate technology to support and enhance the learning experience and academic success of CUNY students, through a facilities/technology integration strategy.

- Continue to support campus-based efforts to implement and integrate audio/visual technologies for instruction.

- Enhance student academic capabilities through technology services such as virtual labs, application streaming, and simulation to ensure sufficient access to, and support for academic technologies.

- Support University efforts for faculty initiatives and build community through the use(s) of technology in teaching and learning, such as, the online CUNY Academic Commons initiative.

- Support the efforts of libraries to provide CUNY students and faculty with quick and reliable access to electronic resources; as well as to integrate library resources with online course management systems.

- Support the libraries in the planning of an institutional repository that will extend access to CUNY's special collections and archives.

Goal
Provide effective technology for academic research, scholarship, creative development, and collaboration.

OBJECTIVES

- Support academic research in its mission to expand and improve the research profile of the University in the natural and social sciences, engineering, arts, education, and humanities by acquiring the necessary research, library and collaborative software tools and training.

- Assist the development of integrated research and collaboration through the University's Advanced Science Research Center (ASRC), the High Performance Computing (HPC) facility, and various grant initiatives by enhancing the CUNY infrastructure.

DRAFT

Online Instruction

As stated in the CUNY Master Plan, "as the University considers additional online certificate and degree programs for the future, online education has also proven instructive as an innovative means of fulfilling the University's mission in vital ways. Online instruction has expanded the capacity and outreach of established campuses and programs." In some cases, online courses have accommodated a third as many enrollments as there was available classroom space. This provides an important indicator for the University's future enrollment planning and management, and the significant role information technology and online instruction will play in enhancing education and reducing the impact on CUNY facilities.

The CUNY Master Plan also "acknowledges further growth in partially and fully online courses. Over the next four years, most college courses in CUNY will be, at the very least, web-enhanced. Even at this point, by virtue of an enterprise (University-wide) installation of a course management system, every course in CUNY has a potential web presence, and active users now top 100,000 each term. With half of the students and faculty in degree courses already using this system, the time has come for reaping institutional benefits by programmatic means: increased enrollment capacity, standardized expectations for fully online and especially partially online (or hybrid) courses, increased access and convenience for students and faculty, and above all, enhanced teaching and learning. Careful planning and knowledge-sharing will greatly increase benefits to the University, particularly in terms of both student access and institutional capacity." The IT Strategic Plan is committed to supporting advancements in online instruction to reap these benefits.

> " Technology has changed the world and will continue to do so. We must adapt to the changes that have already occurred, and shape those that are yet to be. Thus, we will best teach, learn, and create new knowledge. "
>
> **- Alexandra W. Logue**
> **Executive Vice Chancellor and University Provost**

e-Portfolio

CUNY campuses continue to strive to find new ways of capturing both student and faculty work in web-based interactive formats, such as e-Portfolio. E-Portfolio enables students and faculty to preserve and present the work done through their academic careers, discover cross-curricular connections, engage in reflective self-assessments and present their work to others. Students can create and customize portfolios for academic, career, or personal uses; maintain their plan of study; and share their work, goals, and achievements with advisors, career counselors and employers. Faculty, departments, and institutions can also create portfolio assignments. Assessment committees can randomly select portfolios, score them with rubrics and generate assessment reports. Since several campuses are in the process of piloting or considering e-Portfolio, there is strategic value in assessing whether an e-Portfolio solution can provide cost efficiencies and value at an enterprise level.

e-Books

E-Books are an electronic version of a printed book that can be read on a personal computer or hand-held device designed specifically for this purpose. The University has been researching the cost efficiencies and educational value of electronic textbooks, which can be distributed at a lower cost per student than print versions. Additionally, the campuses each purchase and distribute textbooks via their own specific contracts with publishing companies. There are potential cost-efficiencies for either providing an e-Books solution for each of the campuses or implementing an enterprise approach to purchasing textbooks electronically for the University.

Currently, e-Books can be printed for less than the price of traditional new books using on-demand book printers. E-Readers can also store several books on one device. As a result, potential cost advantages to both students and the University compels further research.

Thus far, CUNY has researched e-Book and textbook publishing markets to identify trends and options, released an RFI for e-Book vendors to explain their products, researched previous trials at universities, and potential applications at CUNY, held initial meetings with vendors and other universities involved in pilots, and solicited and supported proposals for e-Book trials. The information gathered from this research will ultimately lead to developing an enterprise strategy for e-Books.

DRAFT

DRAFT

Instructional Technology Pilot for Developmental Education

CUNY is committed to supporting the colleges in providing remedial and developmental education through new and innovative computer-based learning solutions. As such, CUNY's goal is to pilot approaches that seek to increase student learning outcomes and contain costs by focusing on the redesign of remedial and introductory University courses. Technology can refashion these course activities and increase the amount of active engagement students have with the course materials.

Part of CUNY's challenge is the large number of students requiring additional preparation for college-level work, which in turn has placed a constant strain on University resources and infrastructure. The current developmental course system offers little in the way of modularization, which could allow such students to reduce the amount of time they spend in noncredit courses. Even if a student falls marginally below the acceptable standard, he or she is still required to sit through the full course to satisfy one or two limited or missing competencies. A more tailored approach to developmental education is a necessity.

The key to improving CUNY's developmental course system lies in modularizing the curriculum and, more importantly, the student experience through technology software that will enhance online learning. The difficult task will be the creation of a more individualized curriculum fitted to students with differing skill levels. As a result, CUNY will be developing a pilot program to explore various online and hybrid approaches to developmental education that will benefit all campuses.

Academic Commons

As efforts continue to expand access, innovation, and collaboration in technology-enhanced teaching and learning, the construction of a University support center and an online "academic commons" to serve the entire University is critical. The Academic Commons initiative will not only provide links to model projects and programs but will also foster community and faculty dialogue. Faculty will be able to keep abreast of innovations and ways in which technology is being used to improve students' academic performance and to learn about each other's work and most importantly technology's problem solving potential.

Facility/Technology Integration Strategy

CUNY campus facilities will continue to be renovated and expanded to meet both enrollment growth and classroom expansion. During this process, the University must ensure that campus classroom environments have appropriate technology to support and enhance the learning experience and academic success of CUNY students. CUNY IT management will work closely with CUNY Facilities Planning, Construction and Management, providing the necessary technology program requirements during all facets of the design and planning stages and prior to construction. As a result, the educational and operational needs of campus facilities and classrooms will be enhanced and integrated with the appropriate technologies, as the facilities Master Plan for the campuses comes to fruition.

The University will continue to ensure that campus classroom environments are designed and enhanced with the appropriate technology to support the learning experience and academic success of CUNY students.

DRAFT

Libraries

Campus libraries continue to work to ensure that all CUNY students and faculty have quick and reliable access to the electronic resources subscribed to, licensed or purchased by any CUNY library. As stated in the CUNY Master Plan, "Another important endeavor anticipated for the next four years is the collaboration between library and classroom faculty to more extensively integrate library resources within CUNY's online course management system, with the goal of establishing a strong, high-quality library presence on every course site."

Students and faculty now have access to innovative digital resources, such as blogs, wikis, podcasts, and social networks, virtual worlds, computer simulations, virtual labs, and computer clusters. According to the CUNY Master Plan, "CUNY's libraries have therefore begun planning for an institutional repository that will serve as a home for the digital objects that are created. In addition, work continues to extend access to many of CUNY's rich and unique special collections and archives through digitization projects." Ongoing efforts to rationalize the services and technologies supported centrally will continue over the period of this Enterprise Plan.

Research and Collaboration

As CUNY becomes an increasingly integrated institution, construction on a CUNY-wide Advanced Science Research Center (ASRC) continues. The ASRC will concentrate on the following emerging disciplines: photonics, nanotechnology, biosensing and environmental sensing, structural biology, and neuroscience. The ASRC will provide high-end instrumentation to support the work of many scientists from across the CUNY campuses and it will facilitate the development of integrated research and collaboration through software tools.

As stated in the CUNY Master Plan, "The University will continue to enhance its research environment; this includes sustained support for internal funding programs and leading research and technology development in advancing the University's science agenda. Another example of the University's focus on an enriched research environment is the expanded capacity and reach of CUNY's new High Performance Computing (HPC) facility. Located on the campus of the College of Staten Island, and accessible by all campuses through the CUNY network, the HPC facility comprises three commodity cluster-based supercomputers that support interactive and batch computing and visualization. In brief, the HPC facility supports a vision of an unbounded laboratory, fostering visionary and multidisciplinary research." Although some of this work is limited to faculty research, it is increasingly featured in course-based applications using advanced computing capabilities to understand and solve complex problems through modeling and simulation.

> **❝** A robust information technology infrastructure is integral to the knowledge creation and dissemination underlying CUNY's research mission. Our faculty will increasingly rely on advanced tools to conduct their research and a sophisticated network to share their findings and collaborate. **❞**
>
> **- Gillian Small,** *Vice Chancellor, Research*

Student Services

Student achievement is among the most important markers of any university's success. According to the CUNY Master Plan, *"CUNY is engaged in a Campaign for Student Success whose cornerstones include communicating expectations of success; improving teaching and learning; coordinating services for students; and assessing the campaign's results. Recognizing that educational success involves life not only within but also outside the classroom, CUNY is attending to both realms of student life—and the places where they intersect. Several key initiatives include: a broad focus on the elements of an outstanding undergraduate education; mental health counseling; resources for military veterans, students with families, students with disabilities, and international students; the CUNY Leadership Academy; a co-curricular transcript program; athletics; student health services; career services; and opportunity programs."*

Technology plays a vital role in ensuring that the University stays connected with its students through effective and constant communicatons, provides information access to students, and supports the objectives of key CUNY student initiatives and programs.

DRAFT

Goal Enhance and extend student services through the use of information technology.

OBJECTIVES

■ Support the University's strategy to streamline and improve the admissions decision process, communications with applicants, recruitment efforts and the centralization of admission records by designing and implementing an advanced admissions system.

■ Enhance online communication and collaboration among CUNY's student body by developing and implementing an enterprise email suite of services for students, Live@CUNY, as well as an enterprise communications and collaboration portal.

■ Support students with disabilities through the continued deployment of assistive technologies.

■ Continue efforts to negotiate enterprise licensing agreements that provide educational software at reduced cost to CUNY students.

■ Provide single sign-on functionality and student "self-service" for services such as course registration, catalogue, calendar, advisement services and instructional content.

Admissions System

The University is in the process of redesigning a new admissions system as part of CUNYfirst, the University's Enterprise Resource Planning (ERP) initiative that will improve both centralized and decentralized admissions processes. Current challenges with existing CUNY admissions processes and systems are that the application life-cycle is spread across 50-plus systems, the current processes are not strategically aligned with the University's goals, and the processes that use the mainframe are difficult to adjust to meet the needs of various admissions stakeholders.

THE UNIVERSITY IS COMMITTED TO THE FOLLOWING STRATEGIC GOALS FOR A NEWLY REDESIGNED ADMISSIONS SYSTEM:

▪ Explore the implementation of a standardized Customer Relationship Management (CRM) system

▪ Reduce the number of systems to support

▪ Provide uninterrupted service

▪ Support college branding

▪ Decentralize the admissions decision process

▪ Develop a central database of admissions records

▪ Improve communications with the prospect/applicant

▪ Improve the overall admissions process

It is the University's goal to design a new admissions system that will provide college/program branding, support quick admit processes, provide document management and imaging capabilities, allow for multiple applications for each student, communicate application status and missing requirements, track applicant responses, import and track testing data and generate a unique application for each student.

As a result, it is anticipated that students and prospective applicants will be able to apply directly to a college or program; apply to multiple colleges and programs; auto enroll (quick enroll) upon acceptance; and import various testing scores such as ACT, SAT, TOEFL, GRE, and GMAT.

The new admissions system is anticipated to be phased in over several years during the CUNYfirst implementation.

DRAFT

Live@CUNY

Live@CUNY is a multi-phased project performed partnership with Microsoft to provide a centralized, cost effective, uniform, and sophisticated suite of online email collaboration tools to all CUNY students. To date, campuses have deployed the solution, totaling over 300,000 accounts. The remainder of the University's campuses will adopt this solution during calendar year 2011.

Benefits to STUDENTS include:

- Access to a host of Microsoft services

- Built on Web 2.0 collaborative technology

- Provides e-mail, shared calendaring, instant messenger, shared files, and photo collaborative environment

Benefits to CUNY include:

- Improves student experience and overall satisfaction with school e-mail

- Ensures CUNY campuses are more technologically current

- Eliminates on-going hardware maintenance/ replacement costs

- Eliminates e-mail software license costs

- Previous campus e-mail support staff resources are now available to focus on other mission-centric issues

Assistive Technologies for Disabled Students

CUNY continues to plan for and deploy assistive technologies for students with disabilities. For example, students who are hard-of-hearing use voice recognition software with web conferencing software and "net books" to access lectures. Students who are visually impaired collaborate with a learning specialist and professors by using software in interactive seminars with multiple instruction modes. When students, faculty and staff collaborate, the results have been transformational, qualitatively and quantitatively.

CUNY plans on continuing researching and deploying these assistive technologies to further enhance the education and learning of students with disabilities and one area is through web technology. The web has become a vital portion in the teaching and learning experience. As the University recognizes the importance of its online presence in the academic and research community, and strives to continuously improve and increase that presence, making all of CUNY colleges' websites and online services more accessible to the CUNY community of all ages with physical, cognitive and communication disorders, or a combination of disabilities, will make college experience a lot easier and richer.

One project supporting these objectives is Usable Net Assistive Technology (UA) . UA is an end-to-end web accessibility platform designed to comprehensively improve functional capabilities of individuals with disabilities. It creates a dynamically generated, text-only, and accessible view of an entire website (compliant with standards such as ADA, Section 508 and W3C). As the main site constantly changes, each and every change is dynamically reflected in the accessible view created by the UA platform. UA is a fully managed service that requires no re-coding of a website, client installations, infrastructure, maintenance, updating, administration, or web development resources. Vital portions of websites that were previously not available in text format due to its coding limitations (for example, JavaScript) will now be available to users of assistive technologies.

DRAFT

Enterprise Licensing

The Microsoft Enterprise Campus Agreement provides colleges and other institutions of higher education license rights to the most commonly purchased Microsoft products. The CUNY Enterprise Campus Agreement will provide all CUNY campuses with the Microsoft Windows Core Professional License (Microsoft Windows and Microsoft Office) in addition to licenses for SharePoint, Adobe, and Groove. Access to educational materials and Microsoft premium support services are also included with this subscription license.

Benefits include:

- Substantial discounts for three years, providing significant savings to the University
- Full use for students on all campus PCs
- Free upgrades to licensed products

The University, in conjunction with the colleges, has been purchasing more academic software products than ever before. As new opportunities for software arise, the limited availability of funds often impacts the university's ability to license these products. The site licensing fund would be used to help absorb the initial acquisition of the products. Recommendations and decisions to license products would be a collaborative effort of academic and technology representations.

Benefits include:

- Available funds for software licenses
- Enterprise price negotiations
- Valid license for faculty, students, and staff
- Minimize first year impact on college budgets

Student "Self-Service" Functionality through CUNYfirst

The CUNY portal provides access through a single login to various web-based student applications. Some of the notable improvements that CUNY is seeking to achieve with the new student system as part of CUNYfirst include advancements in student self-service capabilities such as online degree audits, as well as a transition from a paper-focused admissions process to an electronic (web) admissions process.

PLANNED FUNCTIONALITY INCLUDES:

REGISTRATION FOR COURSES AT OTHER CUNY COLLEGES: Select course by name and avoid searching for arcane registration numbers.

SELECTING COURSES: Search, select and add courses from the CUNYfirst catalog to a shopping cart.

CALENDAR VIEW: Display a weekly calendar view of a student's classes that is dynamic from week to week.

SWAP FEATURES: Swap courses without entering in-course registration numbers.

WAIT LIST: View a wait list and know the ranking on that list.

FINANCIALS: View in one place and pay online, all tuition, fees and other charges.

TO DO LIST: Access a "to do" list on the welcome screen that lists key activities that need to be completed.

PLANNER: Forecast several semesters ahead to assist course registration for future semesters.

TRANSFER CREDIT MODELING: Determine what courses taken will transfer to another CUNY institution.

DRAFT

Enterprise Technology

Enterprise information systems provide a technology platform that enables organizations to integrate and coordinate their business processes. They provide a single system that is central to the organization and ensure that information can be shared across all functional levels and management hierarchies. Enterprise systems are invaluable in eliminating the problem of information fragmentation caused by multiple information systems in an organization.

CUNY's Computer Information Services (CIS) is committed to improving the University's enterprise infrastructure, application services and performance and customer services and support, as well as identifying and implementing new technologies that will support the enterprise mission of the University. Additionally, CIS will assist in facilitating technology planning efforts that will provide economies of scale, further reduce implementation and operational costs, and result in better services to our students and faculty.

DRAFT

Goal
Support, enhance and transform education, research, and administration through effective, responsive, innovative, and constituent-focused technology management and leadership.

OBJECTIVES

- Ensure that technology enhances academic process and administrative effectiveness and efficiency.

- Ensure that technology strengthens and nurtures the diverse relationships that sustain the University.

- Facilitate the use of computing technology among faculty, staff, and students.

- Ensure that there is alignment and linkage between the University and college IT planning efforts.

- Provide an IT strategic planning template and framework to support the colleges in their planning efforts.

- Develop an IT action plan to support the University with enterprise planning, scheduling, resource allocation, and prioritization.

Goal
Support the challenges and the evolving needs of the University through cost-effective enterprise technology solutions.

OBJECTIVES

- Provide for and support a University-wide, common infrastructure that will improve network speed, application performance, access, and reliability.

- Continue to meet the demands of projected technology growth by relocating, enhancing and upgrading the University's Data Center.

- Enhance and support University communications through an integrated video teleconferencing system and a mobile technology integration strategy.

- Support the University's email communications through enterprise email for administration and faculty.

- Support the selection and implementation of a University Electronic Content Management (ECM) solution.

- Support and maintain critical main-frame applications through a central CUNY Application Management Services (AMS) model until the final release of CUNYfirst.

- Provide a legacy infrastructure sunset plan.

- Explore and identify IT procurement opportunities and savings for the University.

Goal
Further develop the existing CUNY IT governance model.

OBJECTIVES

- Develop opportunities to further collaborate and align the technology priorities of the various University academic governance organizations with those of the CUNY IT Steering Committee.

- Support the executive leadership of our campuses in the recruitment, retention, and professional development of technology staff.

DRAFT

DRAFT

Enterprise IT Strategic Planning

In an effort to further IT strategic planning across the University and continue the work initiated by the Information Technology Strategic Planning Task Force, the Office of the CIO is committed to providing an IT strategic planning template and framework. An IT action plan will support the University's enterprise planning, scheduling, resource allocation, and prioritization. Additionally, CUNY executives will continue to form strategic alliances with academic and student organizations to ensure that their technology needs are addressed as part of the University's planning process.

Fiber Expansion/Shared Infrastructure

CUNY is in the process of extending its fiber optic network to its campuses in Queens, Brooklyn and Staten Island to integrate the University's campuses into a single unified network and offer the campuses the high-speed internet access that they need for high-bandwidth educational applications.

Many applications and services now require fiber connections in order to provide voice, audio or advanced Internet applications. These services include integrated video conferencing services, the ability to deliver enhanced integrations for online learning, the provision of online library content, Voice over Internet Protocol (VOIP), as well as access to Internet 2 (the next generation Internet for research and educational purposes). CUNY must also replace antiquated technology and equipment that supports critical services to the campuses.

To date, CUNY has successfully secured City capital funds, with State matching funds, for expansion of the network to Bronx Community College and Hostos Community College. To date, CUNY has purchased the equipment required to upgrade the Manhattan\Bronx fiber network to remove the antiquated equipment and expand it to BMCC and Hostos.

Data Center Relocation

The CIS data center serves the 23 CUNY institutions, has been in its current location for more than 30 years and has reached the limits of its power and cooling capacity. Relocating and constructing a new data center is critical to the University's continued operation and service delivery, particularly as CUNY experiences increasing expectations for access and service availability. Central information technologies require an upgrade and expansion in order to meet the growing demands for technology in education, especially as more instructional content is delivered online.

CUNY has selected 395 Hudson Street in Lower Manhattan as the best site for the future data center; completed the engineering and feasibility review process to ensure that the site has appropriate infrastructure and electricity; obtained a signed and approved lease for the space; and completed an RFP to procure the services of a systems integrator to design and implement a new data center.

Video Teleconferencing

CUNY is in the process of re-envisioning and redeveloping systems for integrating video content into the daily instructional and administrative operation of the University. This includes meeting both short-term and long-term needs for video teleconferencing.

Currently, CUNY is engaged in a thorough needs assessment and requirements gathering process to guide the implementation of enterprise video systems and services. The build-out of these systems will require investment in equipment, services and training across the University. Such investments will enhance instruction, enrich resources for students, particularly in online programs, and improve administration effectiveness.

DRAFT

Challenges include potential integration with online course instruction software, as well as point-to-point, broadcast and asynchronous/ synchronous connectivity. In the short term, and as part of its efforts to reduce its carbon footprint, CUNY is implementing a Polycom cross-campus videoconferencing project to support virtual meetings between campus executives and the Chancellor. It is anticipated that virtual meetings will reduce travel time for campus executives, while increasing their availability for other University business.

Enterprise Email for Administration and Faculty

CUNY is currently reviewing the feasibility of providing enterprise email for both administration and faculty. As each campus currently provides separate email systems for both administration and faculty, there are potentially significant cost savings and benefits associated with consolidating and migrating to an enterprise platform, including infrastructure, operational, licensing, hosting, and customer support services costs.

Enterprise Content Management (ECM)

CUNY is in the process of researching and identifying an ECM solution that could potentially provide the following functionalities: document management, imaging, records management, workflow, E-forms, web-content management, digital asset management and document-centric collaboration.

POTENTIAL BENEFITS OF AN ECM SOLUTION:

- Improve customer experience for creating, finding and managing electronic content

- Reduce / eliminate paper and manual processes in order to increase staff productivity / operational efficiencies

- Reduce operating costs and enable cost avoidance

- Increase self-service capabilities

- Comply with State mandates

- Improve data integrity

- Enable a system-wide view of CUNY stakeholders throughout lifecycle (e.g., applicant, student, faculty/staff, alumni, retiree)

- Improve ability to search and locate student records

- Increase access and reuse of content across all campuses

Application Management Services (AMS)

In 2009, CUNY commenced procurement of an Application Management Services (AMS) vendor to support current legacy systems and established a Technical Evaluation Committee to identify a short list of technically acceptable proposals, interview finalists, and make recommendations for an award.

CUNY's goal is to outsource application management services to support its current student administration, admissions, finance, financial aid administration, and procurement processes. All of the applications run on a variety of hardware/software platforms managed and supported by CIS, and are integral and critical for the day-to-day support and operation of the University. These systems must be maintained and supported until the completion of CUNYfirst in order to ensure a smooth transition of application performance, data and interfaces.

Legacy System Sunset Plan

In anticipation of the rollout and completion of all phases of CUNYfirst, CIS must ensure a smooth transition from all legacy system applications to infrastructure replacements. CIS is developing a plan to make sure that all relevant legacy application data are archived and newly developed interfaces are performing well prior to the sunset of the CUNY legacy infrastructure.

The Sunset Plan will include the following activities:

- Gap analysis

- Define transition roadmap

- Identify stakeholders

- Identify specific system and user groups

- Create system transition and operation migration plan

- Validate the plans

Governance

CUNY's IT Steering Committee, comprising representatives across the University (Central Office and the individual colleges), was created to provide strategic direction, an enterprise governance model for IT decision-making, and a forum for "steering" information technology policies, planning, and prioritization. The success of the IT Steering Committee has resulted in improvements to IT strategic planning, standardization of technology policies and cost savings to the University by leveraging economies of scale across the colleges. The IT Steering Committee will continue to identify opportunities that will further align the technology priorities of the various University academic governance organizations with those developed by the enterprise. Additionally, the Information Technology Steering Committee (ITSC) will continue to support the executive leadership of our campuses in the recruitment, retention, and professional development of technology staff.

Support Services

As part of its mission to provide technology support services to the University community, CUNY's Computer Information Services (CIS) is looking at new and innovative ways of ensuring that the technology needs of faculty, students and administration are not only addressed but improved and enhanced through new standards, goals and models of customer service and cutting edge software applications. CUNY has embarked on a multi-year business transformation support initiative, CUNYfirst, an Enterprise Resource Planning (ERP) tool designed to improve financial, human resource and student services, while reducing the burdensome costs of an aging infrastructure. Additionally, CIS is committed to ensuring that new ways of providing technology support services are further explored, such as shared service models and outsourcing of certain operations with the goal of improving customer services while reducing costs to the University.

In order to ensure that technology continues to play a strategic role in supporting the mission and operations of the University, CUNY is committed to establishing the necessary training, recruitment and retention strategies necessary to keep pace with new technologies and the growing challenges of teaching and learning in the higher education marketplace.

> "The CUNYfirst Project will provide a new, University-wide suite of policies, processes, and information systems in order to streamline current practices and help us become more efficient."
>
> **-Matthew Goldstein,** *CUNY Chancellor*

DRAFT

Goal Advance the mission of an integrated University by supporting core administrative functions through the use of enterprise technologies.

OBJECTIVES

■ **Continue the development and implementation of all phases of CUNYfirst, the University's Enterprise Resource Planning (ERP) Project.**

a. CUNYfirst objectives are to streamline and reengineer the University's core business processes, while improving services to students, faculty, and administration. The implementation of CUNYfirst will:

I. Streamline online course registration across the University.

II. Pay adjuncts and contract workers faster.

III. Enable students, faculty and staff to view their records online.

IV. Allow online applications for CUNY employment.

V. Speed up the rehiring of adjuncts via online applications.

VI. Create online requests for financial aid.

VII. Provide more flexibility in all interactive processes

VIII. Reduce new employee processing time by half.

IX. Redeploy staff for the most efficient use.

X. Standardize administrative terminology throughout CUNY.

b. Enhance and maintain CUNYfirst PeopleSoft functionality by developing and implementing an application services support model.

Goal Promote a user-driven information technology services and support model.

OBJECTIVES

■ **Improve the communication, responsiveness, efficiency and effectiveness of technology support services for the University's various constituencies through a shared services support model.**

■ **Enhance the University's technology support functions by exploring and identifying new opportunities for outsourcing services.**

Goal Elevate the importance of critical success factors that support the alignment of technology with the CUNY Master Plan.

OBJECTIVES

■ **In partnership with the University's human resources community, develop a recruitment and retention strategy for both entry level and experienced IT staff.**

■ **In partnership with the University's human resources community, ensure continued skills and professional development of CUNY IT staff through ongoing and recurring education and training.**

DRAFT

DRAFT

CUNYfirst

As stated in the CUNY Master Plan, "Technology is the focus of another initiative designed to enhance the learning environment and support core academic priorities. During the period covered by this Master Plan, CUNY's administrative systems and processes will experience their most significant enhancement in several generations: CUNY's Fully Integrated Resources and Services Tool (CUNYfirst, an Enterprise Resource Planning (ERP) tool, will improve the delivery of services to students, faculty, and staff on every campus. CUNY will, by 2012, have transformed current systems for human resources, finance, and student administration throughout the University."

CUNYfirst ACCOMPLISHMENTS

- Launched CUNYfirst General Ledger on July 1, 2008

- Launched initial components of CUNYfirst Human Resources and Line Items budgeting applications on University-wide basis on June 9, 2009

- Launched Identity Management and single sign-on System for over 30,000 CUNYfirst users on June 9, 2009

- Launched the first part of campus solutions (Course Catalogs and Schedule of Classes) applications for the two vanguard colleges on June 9, 2009

- Trained more than 3,000 users and developers on CUNYfirst

- Converted and reconciled the General Ledger data for the last three years

- Converted current HR data for over 35,000 University employees to PeopleSoft format, and converted over 30 years of historical HR data for University employees

- Launched Faculty Workload and Mass Salary in October 2009

- Launched CUNYfirst Campus Solutions for the two vanguard colleges in November 2010

- Trained over 2,000 users for campus solutions

- Converted over three million records of data for campus solutions representing ten years data for all active students at the two vanguard colleges

- Registered over 32,000 students with the CUNYfirst campus solutions module at the two vanguard colleges

- Initiated project activities for wave 2 colleges, which includes 5 community colleges, one senior college and CUNY Law School with a target launch

CUNYfirst will continue to emcompass the following

- Integration
- Industry best practices
- Standardization without loss of identity
- Self-service
- Accurate and timely information to better serve students, faculty and staff
- Replacement of aging computer systems

DRAFT

Additionally, CUNY will continue to explore alternatives for outsourcing IT services where practicable, to ensure that quality technology services are continually provided at reduced cost. To ensure technology alignment with the CUNY Master Plan, CUNY may need to further leverage private sector products and skill sets. For example, Application Managed Services (AMS), Blackboard, hosting, email and CUNYfirst are areas that may warrant new or continued outsourcing.

Human Resources/ Information Technology Partnership

The CIO/AVP and the Vice Chancellor for Human Resources Management realize the critical importance of enhancing CUNY's information technology resources that support the core mission of the University. To that end, CUNY is committed to developing a recruitment and retention strategy, as well as ongoing and recurring education and training, to ensure ongoing skills and professional development.

Shared Service Model and Outsourcing Services

CUNY is committed to identifying and providing enterprise information technology services more efficiently, while leveraging economies of scale and reducing overall costs to the University. As part of this effort, CIS is exploring alternatives for a shared services model between CUNY central and the colleges, where sharing of responsibilities for customer support services will be further defined. CUNY anticipates that this will provide a more responsive and integrated support model for the entire University, promote efficiency and knowledge sharing and increase savings.

Areas under consideration include:

- Help Desk Services
- Applications Development
- Applications Inventory
- Shadow Systems
- Skill Set Inventory
- Reporting and Reports
- Regulatory and Legal Requirements

CUNY will explore the opportunities for a shared services model through the following activities:

- Conduct IT "gap" analysis at participating colleges
- Provide CUNYfirst HCM flat file reports and extracts to local data stores
- Develop and share a data dictionary
- Pilot business intelligence tool from York College
- Develop assets and skills inventory

Protecting Technology Assets and Data

Information technology (IT) is integral to the teaching, learning, research and operational functions of the University. Safeguarding information and information systems is essential to preserving the ability of the University to perform its mission and meet its responsibilities to students, faculty, and staff. Additionally, New York State and federal statutes, rules, and regulations as well as CUNY internal policies and other explicit agreements with other public and private partners, mandate the security of information and information systems. Failure to protect the University's information technology assets could have financial, legal, and ethical ramifications. CUNY acknowledges its commitment to safeguarding its technology assets and data through the deployment of software tools, security awareness training, identity management solutions and business continuity/disaster recovery planning.

DRAFT

Goal
Leverage Information Security (IS) planning and software tools to protect University data and information technology solutions.

OBJECTIVES

■ Continue to expand the University's end-user Security Awareness Program.

■ Expand the use of security policies, procedures, and methodologies to be utilized in the deployment of new technologies across the University.

■ Develop and provide an enterprise identity management strategy and solution.

■ Continue deploying new IS tools to manage and reduce risk, while ensuring the rapid deployment of new technologies.

Goal
Encourage IT business continuity and disaster recovery planning.

OBJECTIVES

■ Develop and implement a business continuity and disaster recovery plan for all critical central/campus operations and technology infrastructure.

■ Develop and implement a technology pilot to demonstrate the viability of campus disaster recovery.
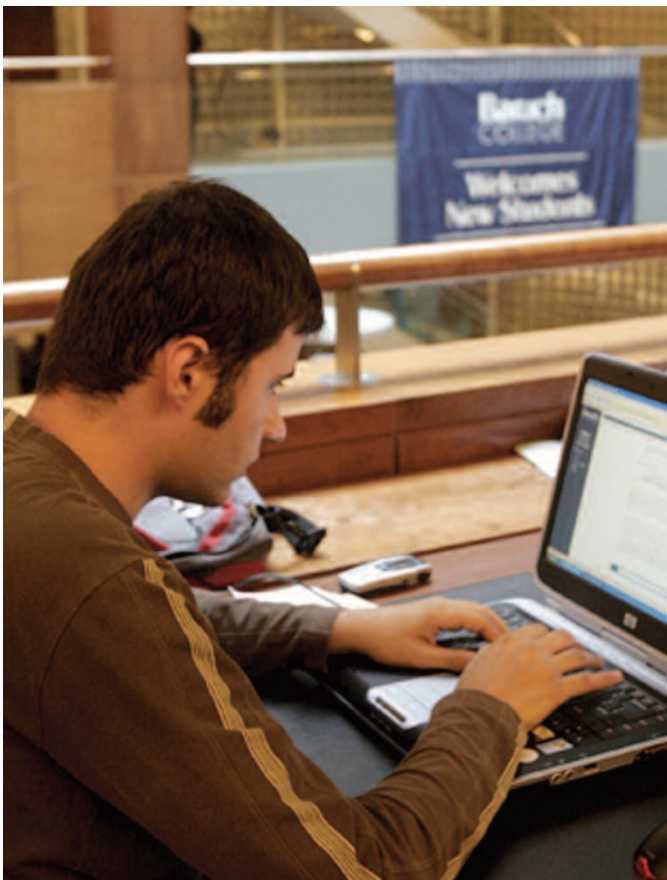
Leveraging Information Security Tools

CUNY is committed to leveraging information security tools to protect information, data and the continued availability and performance of CUNY applications. CUNY will continue to implement Network Behavior Analysis (NBA) systems to proactively monitor the network for malicious and abnormal activity and contain the spread of threats by identifying vulnerability points on the network. This technology is part of an overall information security architecture solution that complements signature-based intrusion detection systems.

Benefits include:

■ Passively monitor and record network communications

■ Detect security threats

■ Identify operational threats

■ Provide an understanding of traffic through network-wide visibility

■ Provide audit trail for forensic analysis

DRAFT

Security Awareness Program

Through the efforts of CUNY's Chief Information Security Officer (CISO), CUNY continues to provide an online training and security awareness program to faculty and staff. As part of this effort CUNY has provided online technical security training for up to 200 technologists with access to over 50 courses from Enterprise Training Solutions.

Additionally, CUNY established an online security awareness program for all students, faculty and staff from Enterprise Training Solutions. These courses cover the following topics: 1. Protecting Information and Counteracting Social Engineering; 2. Maintaining Computer and File Security; and 3. Promoting Email Security and Proper Responses to Security Incidents.

CUNY continues to provide information security advisories and other security information for the University community. It also provides community forums with security training, featuring leading security technologies and services. These forums also offer the opportunity for exchange among University information security managers, the development of a security technology portfolio and negotiations for lower costs, and collaboration on policy standards and recommendations.

Business Continuity and Disaster Recovery Planning

With the rising use of information technology and the reliance on business-critical data, protecting irreplaceable data is now more critical than ever. For example, large computer systems now back up digital information to limit data loss and aid data recovery.

Disaster Recovery (DR) is the process of regaining access to the data, hardware, and software necessary to resume critical business operations after a natural or human-induced disaster. A disaster recovery plan is part of a larger process known as business continuity planning. Given the strategic importance of protecting critical data and information, as well as ensuring the continuity of operations through our enterprise applications, CUNY is expanding its DR efforts.

CUNY is committed to the following objectives:

- Creating a disaster recovery plan that will enable CUNY to continue to operate after a disaster, with minimal disruption in the normal operation of services for students, faculty, and staff.

- Establishing protocols to reduce the need for decision making when disaster happens.

- Ensuring the availability of standby systems, thus minimizing downtime.

- Providing information and document back up in case originals are destroyed.

During the past year, CUNY has made significant progress in its DR planning efforts, including establishing plans for a disaster recovery site for all critical IT functions in Syracuse, NY. CUNY has begun provisioning the new DR site and have begun implementing a strategy for disk backups of all Oracle databases. Additionally, CUNY is planning pilots at the campuses to test, validate and ensure the viability of our joint disaster recovery planning efforts.

DRAFT

DRAFT
APPENDIX

THE 2008-2012 CUNY MASTER PLAN details the major strategic goals of the University, as well as specific academic, administrative and research initiatives that is integral to supporting CUNY's mission. The CUNY Master Plan comprises the following high-level priorities:

ACADEMIC
- Teaching, Scholarship, and Service
- Accountability and Assessment
- Support the Integrated University Model
- Provide a Seamless Education in NY

ENHANCING THE LEARNING ENVIRONMENT

EMPOWERING THE STUDENTS FOR SUCCESS

REBUILDING THE CAMPUSES

Below are specific excerpts from The 2008-2012 CUNY Master Plan relating to these high-level priorities. Also included are technology support statements for each area describing how technology plays a vital role in supporting the University's mission.

ACADEMIC PRIORITIES

Adherence to High Standards of Teaching, Scholarship, and Service
The University acknowledges its responsibility to provide rigorous undergraduate, graduate, professional, certificate, and adult and continuing education programs that meet the needs of the City's residents and respond to the City's social and economic exigencies.

Accountability and Assessment
In order to encourage achievement and track progress, the Chancellor, with the support of the Board of Trustees, instituted a Performance Management Process (PMP) in 2001. The PMP builds from previous state approved Master Plans: Goals elaborated in the Master Plan are considered and translated into annual goals for the University. Within this framework, each campus then sets its own annual goals against which its performance is measured.

Additionally, colleges are of course subject to established measures: Middle States requirements; departmental self-studies and external evaluations; and accreditation reviews by professional accrediting bodies such as those in teacher education and nursing.

Support the Integrated University Model
Through coordinated efforts and intra-institutional collaboration, the University has an opportunity to provide a rich education for its students. CUNY's future strength depends on its continued evolution as an integrated university that maintains the historic identities of the individual colleges while taking advantage of geography that enables faculty and students to view the entire University as their campus. As an integrated university, the University can make administrative and fiscal economies that allow redirection of resources and creation of new revenue streams that increase support for our academic enterprise. This approach protects CUNY's core mission of teaching and learning, builds and supports faculty, and sustains a safety net for the most economically vulnerable students. For example, the Integrated University Model is one in which programs bring together faculty from different campuses to analyze student learning experiences; encourages carefully structured articulation agreements between senior and community colleges which are closely tied to its signature degree programs; coordinates the undergraduate experience in support of student success; and coordinates curricula and training with senior college partners.

Technology planning is an integral part of assisting the campuses in meeting their PMP goals, as well as supporting executives in their decision making and compliance with University measures, policies and procedures.

Technology is a vital asset in supporting the University's core mission of teaching and learning, and enables the colleges to communicate and share information efficiently and effectively.

Providing a Seamless Education in NY

Ultimately, students in New York State should benefit from a seamless educational experience, from preschool through college. Over the next four years the University will continue working to remove the obstacles that too often obstruct that goal. CUNY will continue and expand work in collaborative programs and college preparedness, smoothing the transition to college well before students matriculate on a campus. Additionally, CUNY will implement a comprehensive approach to ensuring college preparedness for graduates of the City's schools and to enact a more consistent and comprehensive sharing of data. For example with the Design through Data Initiative, CUNY will move forward with a comprehensive data-sharing project with the Department of Education that provides the Department, as a whole, with information regarding graduates. Providing a seamless education will mean removing the barriers that too often interfere with students transferring from one CUNY program to another and too frequently slow their progress toward their degrees.

> Technology is a central strategic tool that enables and enhances the communication and sharing of information throughout the University and supports collaboration with external partners.

ENHANCING THE LEARNING ENVIRONMENT

Complementing the Master Plan's focus on core academic priorities is its steadfast attention to providing an environment conducive to effective learning and teaching. The University's work for the next four years therefore also includes sensitivity to the imperatives of academic and instructional technology; redesign of CUNY's administrative systems and processes; maintenance and expansion of library services; a focus on synthesizing and leveraging the creative power of the arts at CUNY; identification and widespread promotion of effective teaching practices; innovations in academic advising; and exploring the potential of new graduate degree programs and paradigms, including online instruction.

> Technology planning will enhance the learning environment and support core academic priorities. During the period covered by this Master Plan, CUNY's administrative systems and processes will experience their most significant enhancement in several generations: CUNY's Fully Integrated Resources and Services Tool (CUNYfirst), an Enterprise Resource Planning (ERP) tool, will improve the delivery of services to students, faculty, and staff on every campus.

EMPOWERING THE STUDENTS FOR SUCCESS

Student achievement is among the most important markers of any university's success. CUNY is engaged in a Campaign for Student Success whose cornerstones include communicating expectations of success; improving teaching and learning; coordinating services for students; and assessing the campaign's results. Recognizing that educational success involves life not only within but also outside the classroom, CUNY is attending to both realms of student life—and the places where they intersect. Several key initiatives include: a broad focus on the elements of an outstanding undergraduate education; mental health counseling; resources for military veterans, students with families, students with disabilities, and international students; the CUNY Leadership Academy; a co-curricular transcript program; athletics; student health services; career services; and opportunity programs.

> Technology plays a vital role in ensuring that the University stays connected with its students through effective and constant communication provides information to students and supports key educational initiatives and programs.

REBUILDING OUR CAMPUSES

Providing safe facilities complete with up-to-date classrooms, labs, libraries, and equipment that allow faculty and students to accomplish their best work, is essential to the University's ability to carry out its mission. The University continues to focus on the burgeoning enrollment, which must be addressed by increased—and effectively utilized—space. It is important that new buildings are as functional as they are beautiful, and that they are designed not only to be attractive and inviting but to meet the many practical needs of the campuses.

> IT will continue to ensure that campus classroom environments are designed and enhanced with the appropriate technology to support the learning experience and academic success of CUNY students.

TECHNOLOGY ALIGNMENT WITH THE 2008-2012 CUNY MASTER PLAN

(DRAFT)

	TEACHING, SCHOLARSHIP, AND SERVICE	ACCOUNTABILITY AND ASSESSMENT	INTEGRATED UNIVERSITY	SEAMLESS EDUCATION IN NY	ENHANCING THE LEARNING ENVIRONMENT	EMPOWERING THE STUDENTS FOR SUCCESS	REBUILDING THE CAMPUSES
TEACHING, LEARNING, AND RESEARCH							
GOAL — Extend and enhance student success and access to the academic experience through technology.	■	■	■	■	■	■	■
OBJECTIVES							
Support online instruction	■	■	■	■	■	■	■
Support developmental education with technology pilot programs	■	■		■	■	■	
Indentify software solutions for enterprise e-Portfolio	■		■	■	■	■	
Ensure electronic access to textbooks, curriculum, and course material (e-Books)	■	■	■		■	■	
Ensure campus class room environments have appropriate technology for instruction	■	■	■	■	■	■	■
Enhance student academic capabilities through virtual labs, application streaming, and simulation		■	■	■			■
Support University faculty initiatives and build community through online applications	■	■	■	■	■		
Support the libraries to provide reliable access to electronic resources and online course management	■	■	■	■	■	■	
Support the libraries in planning of an institutional repository	■	■		■	■		
GOAL — Provide effective technology for academic research, scholarship, creative development, and collaboration.							
OBJECTIVES							
Support academic research by acquiring research, library, and collaborative tools	■	■	■	■			
Assist the ASRC and HPC through enhancements in the CUNY infrastructure	■	■		■			■
STUDENT SERVICES							
GOAL — Enhance and extend student services through information technology.	■	■	■	■	■	■	■
OBJECTIVES							
Support efforts to streamline and improve admissions through new system	■	■	■	■	■	■	■
Enhance online communication and collaboration through Live@CUNY and other portal technologies	■	■	■	■	■	■	
Support students with disabilities through the continued deployment of assistive technologies	■	■	■	■		■	
Continue efforts to negotiate enterprise licensing agreements to reduce costs to CUNY students			■	■	■	■	
Provide software functionality to improve student "self-service" options							

TECHNOLOGY ALIGNMENT WITH THE 2008-2012 CUNY MASTER PLAN

DRAFT

ENTERPRISE TECHNOLOGY

	TEACHING, SCHOLARSHIP, AND SERVICE	ACCOUNTABILITY AND ASSESSMENT	INTEGRATED UNIVERSITY	SEAMLESS EDUCATION IN NY	ENHANCING THE LEARNING ENVIRONMENT	EMPOWERING THE STUDENTS FOR SUCCESS	REBUILDING THE CAMPUSES
GOAL — Support, enhance and transform education, research, and administration through effective, responsive, innovative, and constituent-focused management and leadership.		■	■		■		
OBJECTIVES — Ensure that technology remains a vital asset for academic/administrative processes and efficiency		■	■		■		
Ensure that technology is utilized to strengthen and nurture the University		■	■		■		
Promote collaboration among faculty, staff, and students to facilitate use of computing technology		■	■		■		
Ensure that there is alignment and linkage between University and college IT planning efforts		■	■		■		
Provide an IT strategic planning template and framework to support the colleges in their planning		■	■				
Develop and IT action plan to support the University with enterprise planning efforts		■	■		■		
GOAL — Provide Cost-Effective Enterprise Technology Solutions.	■	■	■	■	■	■	■
OBJECTIVES — Provide a University shared and common infrastructure	■			■	■	■	■
Relocate and enhance the University's Data Center		■	■				
Enhance communications through robust video teleconferencing and mobile technologies	■	■	■	■	■	■	■
Enhance email communication through enterprise email for faculty and administration	■		■	■	■		
Research Enterprise Content Management (ECM) tools and develop strategy	■	■	■			■	
Support the sustainment of main-frame applications through Application Managed Services (AMS)	■	■			■		
Develop a legacy infrastructure sunset plan transitioning to CUNYfirst		■	■				
Explore and identify IT procurement opportunities and savings for the University							
GOAL — Further develop the existing CUNY IT governance model.		■	■				
OBJECTIVES — Ensure alignment of technology priorities of academic governance bodies with CUNY IT Steering		■	■				
Support the campuses in the recruitment, retention, and development of technology staff		■	■				

TECHNOLOGY ALIGNMENT WITH THE 2008-2012 CUNY MASTER PLAN

DRAFT

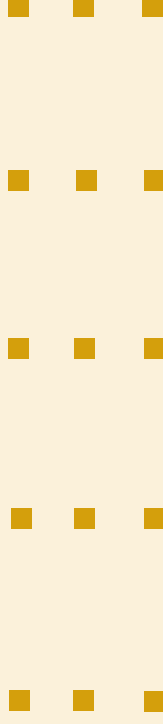|	TEACHING, SCHOLARSHIP, AND SERVICE	ACCOUNTABILITY AND ASSESSMENT	INTEGRATED UNIVERSITY	SEAMLESS EDUCATION IN NY	ENHANCING THE LEARNING ENVIRONMENT	EMPOWERING THE STUDENTS FOR SUCCESS	REBUILDING THE CAMPUSES
SUPPORT SERVICES							
GOAL — Advance the mission of an integrated University by supporting core administrative functions through the use of enterprise technologies.		■	■	■	■	■	
OBJECTIVES — Continue the development and implementation of CUNYfirst for HR, Finance, and Campus Solutions		■	■	■	■	■	
Enhance and maintain People Soft through an application support model		■	■	■	■	■	
GOAL — Promote a user-driven information technology services and support model		■	■				
OBJECTIVES — Improve communications and responsiveness of technology support through a shared services model		■	■				
Identify and explore new opportunities for outsourcing of services		■	■				
GOAL — Elevate the importance of critical success factors that support technology alignment to the Master Plan		■	■				
OBJECTIVES — Develop a recruitment and retention strategy for both entry level and experienced IT staff		■	■				
Support continued skills and professional development through ongoing training							
PROTECTING TECHNOLOGY ASSETS AND DATA							
GOAL — Leverage Information Security (IS) planning and software tools		■	■				
OBJECTIVES — Expand the University's Security Awareness Program		■					
Expand security policies, procedures, and methodologies as necessary		■					
Continue the deployment of new IS tools to manage and reduce risk		■					
Develop and provide an enterprise identity management solution		■					
GOAL — Encourage IT business continuity and disaster recovery planning		■	■				
OBJECTIVES — Develop and implement a BC/DR plan for central/campus critical infrastructure		■	■				
Develop an implementation pilot to demonstrate the viability of campus DR							
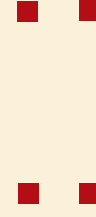
DRAFT

CITY UNIVERSITY OF NEW YORK ENTERPRISE IT INITIATIVES

ENTERPRISE INITIATIVE	IMPACT	STATUS
TEACHING, LEARNING, AND RESEARCH		
Online Education	Transformational	In Progress
Developmental Education Pilot	Transformational	Planned
e-Portfolio	Transformational	Campus Pilot
e-Books	Transformational	Planned
Research and Library Software Tools	Foundational	In Progress
Academic Commons	Transformational	In Progress
Facility/Technology Strategy	Operational	In Progress
Virtual Labs, Streaming and Simulation	Transformational	Planned
Audio/Visual Technologies	Transformational	In Progress
STUDENT SERVICES		
Admissions Systems	Foundational	Planned
Live@CUNY	Foundational	In Progress
Assistive Technologies	Foundational	In Progress
Communications Portal	Foundational	Planned
Enterprise Licensing	Operational	In Progress
ENTERPRISE TECHNOLOGY		
IT Strategic Planning and Campus Alignment	Operational	In Progress
Fiber Expansion/Shared Infrastructure	Foundational	In Progress
Data Center Relocation	Operational	In Progress
Video Teleconferencing	Foundational	In Progress
Enterprise Email for Administration and Faculty	Foundational	In Progress
Enterprise Content Management (ECM)	Foundational	In Progress
Application Manged Services (AMS)	Operational	In Progress
Legacy Systems Sunset Plan	Operational	Planned
Enhanced Governance	Operational	Planned
SUPPORT SERVICES		
CUNYfirst	Transformational	In Progress
Enterprise Application Support Model	Operational	Planned
Shared Services Model	Operational	In Progress
Outsourcing Services	Operational	In Progress
IT Staff Education and Training	Foundational	In Progress
IT Staff Recruitment and Retention	Operational	Planned
PROTECTING ASSETS AND DATA		
Information Security and Planning Software Tools	Foundational	In Progress
Security Awareness Program	Foundational	In Progress
Business Continuity and Disaster Recovery Planning	Operational	In Progress
Enterprise Identity Management	Foundational	In Progress