THE ASU STRATEGIC PLAN FOR COMPUTING SUPPORT

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ABSTRACT

Our College has spent approximately one hundred thousand dollars per year on computing over the last five years. This paper, which developed out of a University-wide strategic planning exercise, speaks to the question: What are we getting for all that money?

The background to this large planning exercise is sketched, the goals of our computing support plan are stated, the strategies aimed at achieving these goals are explained, and the observed outcomes from implementing these strategies are listed.

In evaluating the plan, this paper argues the position that a computer culture must take hold within the College before computer-aided design will have a truly profound effect upon pedagogy. Operationally, this means that every faculty member must have a personal computer and that every student must have free access to a microcomputer facility. Only then does the whole College adopt the new culture.

The fiscal commitment is high, but there are payoffs in office automation that justify the investment even in the short-term. Trivial as it seems, wordprocessing is the first step in seeding this culture. These short term payoffs help make the case for investing in the promise of long-term payoffs in superior design through computer aids.

BACKGROUND

In response to a challenge by the Governor in the Fall of 1987, the Board of Regents directed that each of the State's public universities update and refine their Mission and Scope Statement. This was the first step in the development of a five-year Strategic Plan for Higher Education that will guide the State Legislature in budget and capital funding for the universities. As ASU began this grand planning exercise, each College was directed to develop its own strategic plan, to be forwarded to the central administration for incorporation into the University plan. In turn, the Dean directed that
each of the Chairs and administrators develop a plan for incorporation into the College plan. Thus did a statewide planning process trickle down onto my desk.

Strategic planning is an organization-planning methodology that iteratively sets goals and evaluates their achievement, while projecting long-range changing environmental conditions. It is a formal process that requires forethought on the part of participants, in contrast to the much more widely used informal seat-of-the-pants methodology.

Evaluation should be an annual activity that begins a new planning cycle leading to a refined statement of goals. It is well understood by planners who employ this methodology, that participation in this planning process is ultimately more important than the plans themselves. The process generates plans that change as circumstances warrant, because it assumes continuous change. More importantly, it also generates participants who buy into the process, which is very much a political activity.

ASU employed a formalized strategic planning process, the parts of which could be delegated to different groups and committees:

- Environmental Scan - identification of opportunities and constraints, development of future scenarios, portfolio analysis of existing programs and resources;
- Mission and Scope Statement - formal statement of institution's reason for being;
- Specification of Goals - prioritized and stated in terms of measurable objectives, time and resources required, and person or unit responsible;
- Plans and Proposals - specific budgets, work plan to implement programs; and
- Annual Evaluation - accountability and progress report, mandated by the Regents.

The Environmental Scan, which was prepared by the University Office of Institutional Analysis, is a detailed statistical analysis and projection of demographic, economic, and physical factors impinging on the State educational system. The initial draft of the University Mission and Scope Statement was developed by a relatively small committee reporting to the Provost. It was passed down to the Colleges as their point of departure, so it was important to find strong hooks in this statement on which to hang the College Mission and Scope Statement. And there were strong hooks: the College was picked out as an emphasis area, computers were linked to instruction, and ASU was stated to have an urban mission in this, the metropolitan area with the highest growth rate in the country. A substantial increase in research, with emphasis on engineering and the physical sciences, was also given top priority: tying into this mission is more problematic for our professionally-oriented college.

Although this exercise was mandated from the top down, it came at an historical juncture for the College; it was something we needed to do in any case. Our new Dean became the principal proponent and leading participant in the strategic planning exercise within the College. Two important consequences resulted from this leadership: the planning process was driven forward to completion in a timely and thorough manner, and our agenda meshed with the University's agenda. The plan became the articulation of the College's aspirations for the future.
The ideas presented in this paper are set against the background of the College's strategic plan. This is a mini-strategic plan within the larger plan.

GOALS, STRATEGIES AND OUTCOMES

Strategic planning is an iterative process; it is also a recursive process. The goals of the whole organization generate mission statements for sub-organizations, and so on. And the implementation strategies to achieve specific goals, in turn generate their own sub-goals and strategies.

The computing support mission derives from a cosmic goal of the College of Architecture to use computers in design education and research, because they help! Much like the Objectives Statement in ACADIA's own charter, this goal is put forward in the belief that design education will benefit and research will quicken, the quality of the built environment will get better and the human condition will improve. This underlying belief holds throughout the following review.

The use of computers in design education is not yet universal, although the infusion is well underway. To have faculty use computers and to have students use computers are two goals that are still action items on the strategic planning agenda. To secure budget and to secure computers are two sub-goals that fall directly out of strategies to achieve the first two goals.

The format of the plan that follows is a goal statement, the list of implementation strategies to achieve it, and the outcomes observed so far in this ongoing process.

GOAL: To have all the faculty use computers.

1. Give a computer to every faculty member who requests one in writing. Demanding a written request formalizes the allocation of resources, which is necessary when initially there are not enough computers to go around. Also, there is a paper trace on who got what and why, the natural tendency of faculty to hoard resources is countered, and an expectation is built in that the computer will actually be used. Our Provost employed this strategy at the University level in a microcomputer infusion program that required written proposals from academic units. This strategy is costly; it immediately generates its own sub-goal of securing sufficient budget to buy the hardware and software, and to keep it all operating. As with the other strategies described here, this one has been used for a few years now; consequently, there are observable outcomes to note for further evaluation of the goal:

- almost every faculty person eventually went to the trouble of writing a memorandum to their Chair laying out the reasons why they needed a computer;
- new faculty shrewdly make getting a computer a condition of accepting a position at ASU;
- the democratization of computing ensued as each faculty member came to view themselves as a computer user, and thus competent to participate in the discourse on the impact of this medium on design; and
- the management of this distributed system became enmeshed in the general chaos of daily life in the College, not isolated in a centralized cleanroom.
2. Have someone with a good desk-side-manner available to help. Giving a faculty member a computer, even if they have explicitly asked for it, does not necessarily mean that they will actually learn how to use it. A certain amount of hand-holding is necessary for even the most enthusiastic computer neophyte. Our second strategy had these outcomes:

- every faculty person at least knows how to turn their machine on and how to write a memorandum;
- in a few cases, learning how to use a computer has opened a new world of possibilities for the faculty member and their career has taken a new positive turn;
- a computer culture took root in the College that is based on the universal use of wordprocessing, not computer graphics or CAD; and
- the help-person’s time is not their own, they are over extended and interrupt driven.

3. Make available to faculty a computer that they can learn to use largely on their own. This strategy grew out of limited personnel resources to sustain the previous help-strategy as the number of computer users grew. The outcome of this was a change of computer platforms:

- in a vote-with-their-feet, the faculty overwhelmingly prefer to have a Macintosh over an IBM-PC or an Apollo;
- there is a waiting list to trade IBMs for Macs, and to trade Mac+s for Mac IIs;
- individual faculty have begun to acquire self-taught specialized computer skills appropriate to their research interests and teaching responsibilities; and
- we gave away our old Apollo to the Mathematics Department.

4. Encourage self-sufficiency and subtly discourage old manual methods that use clerical support staff. This strategy has gradually come into play, although it was never official policy. The outcomes have been:

- intensive personal office automation by faculty;
- reduced demand for clerical support by most faculty, who now do routine paperwork themselves on their own computer;
- burgeoning demand for network access to get directly at LaserWriters and the discovery of other unapped resources like the library’s online card catalog and facsimile machines;
- the one remaining senior faculty who did not request a computer finds that he has the clerical staff pretty much to himself;
- machines have replaced people to the extent that there have been very few new clerical staff hired (6% in five years) despite an increase in the number of faculty and students (20% in five years).

5. Put a computer on the Dean’s desk. As a strategy aimed at having the faculty buy into computing, this is an important ceremonial gesture, and it stands as the symbolic strategy responsible for a set of outcomes that reveal a basic cultural change has begun:

- a role model was established at the top administrative level, the persuasiveness of which is unmeasurable but clear in its support of computing (although the Dean, who has an excellent
personal secretary working on a computer, does not often use his computer);  
• a high level of office automation was put in place on the administrative floor of the College  
using the same distributed network as the faculty and students, thus seamlessly merging  
administrative, instructional and research computing;  
• the conventional wisdom (culture) of the College has come to treat computing as a given in how  
we carry out our mission;  
• a new building now under construction was programmed around this conventional wisdom of  
universal distributed computing; and  
• the administration created a new permanent line to support computing.

6. Keep the computers running. After the computers have been acquired, the goal of having faculty  
use them cannot be met if the machines are broken or stolen. This strategy is obvious, but it must  
be implemented explicitly if the relentless operation of the Second Law of Thermodynamics and  
Murphy’s Law is to be countered. Our operations plan is the outcome:

• a distributed microcomputer system has inherent resilience because of redundancy; neverthe-  
less, a reserve computer is held for immediate deployment when a breakage (or theft) occurs,  
so that the affected individual suffers no down time;  
• faculty are self-insured, they do their own data file backups;  
• although our computers live in locked rooms, accessibility prevails over security;  
• as the College passed the one-computer-per-faculty milestone, we were been able to relax on  
the acquisitive plan to simply get more seats, and to begin a paced plan of incremental upgrades  
and specialized enhancements for particular applications;  
• College microcomputers are amortized over their three-year technological life, then surplused  
off to another unit to continue their ten-year service life (this view of computers as consumables  
rather than capital is now understood by our College administration, although they do not like  
it);  
• our local area network is critical to the operation of our distributed system, so this technology  
is closely tracked for cost-effective upgrades as the industry converges on a communication  
protocol and the performance of twisted-pair wiring increases; and  
• there is a systems support operations budget.

SUB-GOAL: To secure sufficient budget to achieve the goal of having faculty use computers.

1. Form a College-wide Computer Advisory Committee to lobby and to advise the administration.  
Keep minutes at the meetings and distribute them widely. In the beginning, this was a College  
standing committee whose members were appointed by their respective Chairs. It had two jobs:  
to develop proposals for new computing resources, and to formulate policy for the distribution  
of those resources. This committee’s routine responsibilities have been largely delegated to staff,  
which is a consequence of its success:

• there is a paper trace on the evolution of computing in the College, which is important to  
legitimize the goal and to guard against the perils of policy change by executive fiat;  
• the conventional wisdom of the faculty holds that computers are a top priority in the allocation

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of resources, and the priority item in which each faculty member now has a personal vested interest; and

- the committee has evolved from primarily a resource-gathering and policy-setting body towards a pedagogical and research applications discussion group.

2. Make the case for computing in writing. Computers, or the budget to buy them, can come from anywhere at the most unexpected times. An in-place, documented plan is essential to exploit all the funding opportunities that arise. It is also a simple truism that we live in a bureaucracy; nothing happens if the paperwork is not in order. Because you win some but you lose most, the documented plan should be generic; it should be the College’s strategic plan from which agency-specific proposals can be derived. Talk is cheap and quickly forgotten; writing is work but indelible:

- as a collective effort of the Computer Advisory Committee, at least one proposal per year has been written to some agency;
- the proposals have been iterative, incremental refinements of this strategic plan, which makes writing them worthwhile exercises in themselves;
- a very strong consensus has been built about the goals for computing and about strategies to advance them; and
- on average, nearly $100,000 per year has been spent on computing within this College, the funds coming from the Provost’s computer infusion program, from the Dean’s end-of-year capital budget, and from matches by vendors.

GOAL: To have students use computers.

1. Make enough computers available to students so that they usually do not have to wait when they need to use one. Achieving this goal is not a matter of tempting or coercing, as it is with faculty to a certain extent. By now, almost all students have had previous experience with computers, sometimes going back to grade school. Getting them to use computers is mostly a matter of accessibility. This strategy also immediately generates its own sub-goal. Its has had successful outcomes:

- there is an open access microcomputer site within the College that currently has thirty Macintoshes and twenty IBM-PCs, all of which are in constant use;
- the case is made for expanded instructional computing facilities in future budget cycles; and
- a ratio of one-computer-per-student is now recognized as enough computers.

2. Encourage the faculty to use computers. This is our first goal above, but in a recursive manner it is also a strategy for achieving the goal of having students use computers. Faculty who do not use computers can send very strong negative signals to students. This is a subtle process that has a great deal to do with traditional studio practices and overcoming inertia, for most faculty were acculturated into the profession before computers came into general use. Faculty are the repository of the conventional wisdom, of the cultural values that will either nurture or neglect design computing. Collectively, students have practically no institutional memory. For these
reasons, the goal to have faculty use computers is a higher priority than to have students use them. When the majority of the faculty do buy in, the outcome is revolutionary:

• the faculty require students to use computers in their course work if only for wordprocessing, and generally encourage computer graphics in design studio work;
• everyone, faculty and students alike, has acquired a vocabulary of computerese with which scenarios for the future can now be discussed; and
• the electronic studio is a reality in prototype form and an aspiration central to the long-term strategic plan of the College.

SUB-GOAL: Secure sufficient seats to support the goal of having students use computers.

1. Participate in University-level computer advisory committees, be civic minded and support other colleges. This strategy is aimed at a political process different from the sub-goal of securing funding to buy computers for faculty. At ASU, computer sites are run by a central administrative unit that reports to an Assistant Vice-president. Thus, the College has no direct control over their facility. Our lobbying efforts, combined with service on their advisory committee and on other University task forces, has consistently paid off:

• a network of personal contacts now extends into all the other colleges, which helps greatly to broaden what was generally a parochial outlook by the College of Architecture and Environmental Design;
• a community of common interest, centered around the use of microcomputers in education, has given rise to intercollegiate alliances, which created a powerful lobbying group for microcomputer resources;
• an active collaboration, based on computer applications in instruction and research, has begun with faculty members from other Colleges; and
• there are a lot computers in our Computing Services site.

2. Take the initiative, walk out on the leading-edge (or bleeding-edge), volunteer the College to be first for a trial of new technology. Although experimentation is central to the university’s mission, this strategy is still risky, for the College's credibility is at stake. It requires that someone assume the professional responsibility of technology management on a more-or-less permanent basis. This adaptable and opportunistic strategy has had mostly good outcomes:

• the College volunteered for the first Macs to go into a public site at ASU;
• one year later we received the first Mac IIs;
• microcomputer networks link most of the Colleges' machines;
• a set of unconventional computing resources requested from around ASU are housed in the College site, including a 24-bit color monitor, a color scanner, a digital video camera and an A/UX Mac II;
• computer-related courses in the College are less machine-dependent and application-specific, but instead more generic and conceptual because the technology keeps advancing;
• the College is generally viewed as "having its act together" with respect to computing and we are held in relatively high esteem by other colleges; and
• the views of our faculty on computing are respected to the extent that we are asked to participate in University-level strategic planning.

3. Require that students buy their own personal computer. The University administration has not stepped up to this idea yet, but it is on the table. ASU is a public university; consequently, there are serious problems of equal opportunity that must be addressed before this strategy is implemented. However, the advantages of owning their own computer are recognized by students:

• many students do buy their own computers through the University discount purchase programs;
• a computer hacker subculture exists within the College;
• software drifts on the electronic wind; and
• in anticipation of universal student ownership, the wire service infrastructure will be in place in our new 100,000 sq.ft. Architecture Expansion building to network computers at every student’s studio workstation.

EVALUATION

Five years ago there was one microcomputer in the Architecture Building; today there are well over one hundred. Our strategic plan anticipates one computer per student within the next five years. When put forward as a goal, as a measurable objective, the raw numbers indicate a phenomenal success. We got a lot of computers, is the superficial answer to the opening question: What are we getting for all that money? But this is a simple administrative question with a quantitative answer.

The tough questions are unanswered. What are we able to do now that is qualitatively superior to what we could do before? How are all these computers supporting the College mission? How are they improving design education? The jury is still out. We have only some provisional answers.

All these computers are setting the stage for something to happen that was never possible before. An analogy can be drawn to the banking industry’s massive investment in electronic data processing over twenty-five years ago. Exactly to what extent banking would benefit from computerization could not be proven before the fact; but the banks knew it had to be done for institutional survival because the existing system had become impossibly ponderous and uncompetitive.

In several scenario-writing evaluations, we have speculated on how the College might now build upon our existing foundation of resources and personnel skills.

• Wordprocessing builds the keyboard skills and confidence that are needed by participants in an electronic mail system. With complete connectivity of everyone in the College, there is the possibility of running a paperless administration through the network. Committees and courses could operate independent of many time and place constraints.
• A gateway from the College network to the Library network would give access to many existing
online catalogs and to future full-text retrieval.

- The slide collection could be scanned and placed online as a student learning resource linked to a cross-referenced database (albeit that serious copyright issues need to be overcome).
- Classroom video projectors online to a digital image database would allow faculty to compose presentation on their personal computers, instead of in slide carousels.
- Interactive urban simulation games could be played on the network with multiple players representing rival communities of interest.
- Design review by multiple raters on multiple criteria could be done interactively on the computer network.
- Student counseling and recruitment could be aided by interactive query and browsing.
- A regional geographic information system could be linked to a large-scale geometric model of the city, providing for studio design problems an extremely rich context that could include demographics, traffic, property ownership, energy costs, and so on.

We have also conducted a counterfactual evaluation. What would probably not be true now if we had never embarked on this computerization adventure?

- The College would not have a national reputation for computer specialization; it would have a has-been reputation as an old energy-crisis-era, passive solar design school.
- We would not have attracted the caliber of faculty that we now have; consequently, the Graduate College would never have approved our Master of Science research degree.
- We would not be be attracting the quality of student that we still do.
- The College would not be looked favorably upon by the University administration as a center of innovation that is investing in the future.
- The new building would not be under construction, it would be on a waiting list.

So, the provisional answer to all the tough questions is: the College has positioned itself very well to follow through on the promise of design computing. If we fail to follow through now, it will not be for lack of resources, it will be for lack of imagination. Ingenuity and fresh thinking is required from faculty on how to use this information handling tool that is now at their fingertips. The strategic plan described here is an administrative plan for computing support, it is patently not an academic plan or a research plan. (When once it proposed an interdepartmental computer course offering, the College Computer Advisory Committee was actually rebuked by a Chair for trespassing on the domain of the Curriculum Committee.)

Universal wordprocessing is the lowest-common-denominator method of computer acculturation. Prior to formulating an academic plan, this is a safe and effective way to diffuse computers throughout the College. Injecting high-performance CAD directly into a design studio is a sophisticated operation, which several ACADIA member schools have tried now. Without the general cultural acceptance of computers, at best an isolated enclave of special privilege is created, at worst a backlash of resentment at the diversion of resources ensues.

To have everyone online is good progress for five years, even if some use only wordprocessing. It is the start of a fundamental change in medium. Considering that the last such change followed the discovery of perspective four centuries ago, progress with computing has been outstanding.
REFERENCES


