

March/April 2006

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NUMBER 2

Facilities Manager

The official publication of APFA: The Association of Higher Education Facilities Officers

DESIGN AND REDESIGN

Also in this issue:

- ▮ Campus Futures
- ▮ An Interview with
Richard Katz and
Diana Oblinger
- ▮ The Impact of Facilities
on Recruitment and Retention

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Facilities Manager

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Global Partner in Learning

From the Editor

by Steve Glazner


The feature articles in this issue are broken out into three categories. The first two features stem directly from the collaborative work of APPA, the National Association of College and University Business Officers, and the Society for College and University Planning in anticipation of our joint conference in Honolulu, Hawai'i, July 8-11.

Jim Dator, author of "Campus Futures," is a futurist who teaches at the University of Hawai'i and who will be on the opening futures panel discussion. And the facilitator of that discussion, Richard Katz, and his EDUCAUSE colleague Diana Oblinger, were interviewed by Terry Calhoun of SCUP on the issues facing our respective professions and our campuses in the future. Both of these articles are also appearing in NACUBO and SCUP's publications as we move closer to the Campus of the Future conference.

The next category of feature for this issue is the magazine's theme of Design and Redesign. We include line articles on the topics of the integrating force of campus student unions, using behavioral research in the redesign of university plazas, the flexibility needed when designing high-tech buildings, and encompassing new and historic elements in a high school renovation.

Finally, we include the first part of a two-part executive summary of a major research project conducted by APPA through our Center for Facilities Research (CFaR). The principal investigators, David Cain of Carter & Burgess and Gary Reynolds of the Colorado College, share their research process and initial findings from their study, "The Impact of Facilities on Recruitment and Retention of Students."

For anyone who remembers the 1980s Carnegie Foundation study, "How Do Students Choose a College?"—which found that a large percentage of high school seniors based their college choice on the appearance of the campuses they visited—this new study will be a long overdue breath of fresh air. In addition, the researchers were able to get solid survey responses from more than 16,000 undergraduate students throughout North America.

Cain and Reynolds will be presenting their findings at the Campus of the Future joint conference in July. For more information and to register, visit www.campusofthefuture.org. 

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by Julie Ecker

Membership Dues

You should have received your annual membership dues in mid-February. Thank you to all those who have already paid for the year. APPA membership makes a great choice for your career and your institution, and since membership is organizational, your entire staff is entitled to discounted rates on APPA programs and products when you renew your membership. This is a good time to let us know if you have any changes to your membership record, especially if you are your organization's primary representative. Accurate contact information ensures that you receive your member benefits, as well as your invoice. If you have any questions, please contact Randel Edwards at randel@appa.org.

Procurement Association Changes Name

To better reflect procurement's strategic role in support of higher education's academic agenda, the National Association of Educational Buyers recently announced that the organization has changed its name to the National Association of Educational Procurement (NAEP). As the nation's largest association dedicated to procurement in education, the new name specifically embodies the organization's mission in advancing accountability, affordability, and accessibility in the industry. More information on the association can be found at www.naepnet.org.

Campus Ecology Yearbook

The National Wildlife Federation (NWF) recently released the 16th edition of the *Campus Ecology Yearbook* for 2004-05. The current edition includes 56 case studies from more than 40 higher education insti-

tutions in the U.S. and Canada focusing on conservation and sustainability projects ranging from finding alternative, eco-friendly sources of energy and transportation, to recycling and waste reduction, to native species restoration. The campuses featured in the *Yearbook* are enrolled in the Campus Ecology program at NWE. Published each year since 1989, the *Campus Ecology Yearbook* is the only publication of its kind in the U.S. The 2004-05 projects are available online along with the previous year's entries sorted by project topic and archived on NWF's Campus Ecology website at www.nwf.org/campusecology.



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THE MINDS

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Register for Campus of the Future

Campus of the Future: A Meeting of the Minds, a joint conference of three leading associations that serve higher education: APPA, NACUBO, and SCUP, will take place July 8-11, 2006 in Honolulu, Hawaii. This conference will provide an opportunity to explore a vision of the trends, challenges, and advancements anticipated for the campus of the future. An exciting lineup of concurrent sessions has been planned, featuring topics such as:

- A Strategic Approach to Finance the 2020 Campus Infrastructure

- Impact of Facilities on Student Recruitment & Retention
- Designing a 2015 Sustainability Plan—Is it Possible?
- Integrating Strategic Planning and Operational Management
- Successful Approaches to Historic Residence Hall Renovations

And many more! Visit www.campusofthefuture.org for more information and to register for this important event!

Hurricane Aid

In January, U.S. Secretary of Education Margaret Spellings announced that \$30 million in unspent federal financial aid funding is being redirected to help colleges and universities directly impacted by Hurricanes Katrina and Rita. Originally, the Department of Education planned to award the funds to institutions only in Louisiana, Mississippi, and Alabama. However, Spellings stated that the funds also would be available to assist the institutions nationwide that enrolled displaced students.

The \$30 million comes on top of the \$200 million in hurricane assistance already appropriated by Congress through the Hurricane Education Recovery Act. The \$200 million includes \$10 million for the 99 postsecondary institutions around the country that enrolled displaced students following the hurricanes, and \$190 million for Louisiana's and Mississippi's boards of higher education. Spellings also said that colleges would be allowed to keep approximately \$100 million in financial aid they did not use when students were not able to enroll when campuses were forced to shut down for the semester.

Continued on page 8

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Continued from page 6

Leadership Academy

APPA's Leadership Academy will be held June 11-16, 2006 at the Starr Pass Marriott Resort & Spa, in Tucson, Arizona. The Leadership Academy enhances and further develops leadership throughout the educational industry. It provides opportunities for professionals to increase their awareness of the issues



affecting them, teaches them the skills they need to handle the resulting changes, and provides opportunities to explore and discover their own leadership potential. The Academy is a four-track learning opportunity, with each track emphasizing a different perspective and type of leadership skill. For more information and to register, please visit www.appa.org/education.

Campus Diversity

According to the *Chronicle of Higher Education*, over the last three years, mainly in response to the two June 2003 landmark U.S. Supreme Court rulings defining the limits of affirmative action, colleges across the country have been concluding that they are in legal jeopardy if they continue to offer some services or benefits solely to minority students. As a result, the institutions have been abandoning the use of race-exclusive eligibility criteria in determining who can be awarded scholarships and fellowships or can participate in recruitment, orientation, and academic-enrichment programs.

Many of the programs have shifted their focus from increasing minority access to education to serving the broader and more abstract goal of promoting campus diversity.

The American Council on Education (ACE) has published two new papers on this topic, *Leadership Strategies for Advancing Campus Diversity: Advice from Experienced Presidents* and *Race-Conscious Financial Aid and Other Diversity-Enhancing Programs: Legal Developments for Colleges and Universities*. Copies of both papers are available from the ACE Bookstore at www.acenet.edu/bookstore. 📖

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Executive Summary

A Strategic Redesign for APPA

by E. Lander Medlin

As part of an ongoing effort to ensure that APPA's strategic direction, programs, and services are effectively targeted and actions are taken to address the members' stated needs, APPA conducted both quantitative and qualitative research surveys of our members last October. Our study goals were to assess perceptions of institutional members regarding APPA and its value to both chief facilities officers and mid-level managers. In addition, we wanted to gauge the perceptions and value of our key educational offerings.

We received a total response rate of 24.3 percent to the surveys and statistically significant responses from both members and nonmembers. There was a distribution of survey responses from chief facilities officer titles totaling 49 percent, and from mid-level managers totaling 44 percent. These numbers far surpassed our expectations.

Equally important, the wealth of information and critical data we received has proven invaluable for our discussions around how to position the association in the future. We greatly appreciate your willingness to engage in this important survey research. The insights we gleaned from the survey data were used in a subsequent strategic planning session by the executive committee and staff to validate the existing strategic plan and to identify tactical changes necessary to keep APPA as the "Association of Choice" for educational facilities professionals.

Lander Medlin is APPA's executive vice president. She can be reached at lander@appa.org.



The survey research firm (Stratton Research) who conducted the surveys prepared an analysis of this data and information and provided a report with their findings and recommendations. In general, they found that APPA's strengths are:

- Education that is leading edge
- Publications that keep members informed and up-to-date
- Networking with a rich peer group of other educational facilities professionals
- Highly "professional" organization

However, given the competitive marketplace of today, they found that APPA could improve in four general areas:

- Provide a clear focus of what we are (as it was considered essential we serve both constituency groups of chief facilities officers and mid-level managers)
- Recruitment and retention (at the grassroots level and to ensure engagement of young facilities professionals)
- Marketing and public relations (to clarify the value proposition)
- Communications and outreach (to ensure brand recognition and identity)

They also identified several high priority opportunities for us to focus our efforts. They were:

- Targeted educational programs
- Increasing importance of facilities
- Certification/credentialing
- Hooks to get people involved and keep them involved
- Use of expertise in state and federal regulations
- Synergy with the regions

Given the comprehensive feedback from our members and an extensive review of several other documents (e.g., our 2005 Magazine Readership Survey and the 2004 Member Opinion Survey), we engaged in a two-day facilitated session to review and clarify APPA's strategic plan and organizational direction and focus. The purpose of this session was to validate the existing strategic plan and to identify tactical changes necessary to keep APPA as the "Association of Choice" for educational facilities professionals. As a result, the group determined that the framework of the present strategic plan remains viable. In particular, our desired outcomes should ensure:

- APPA is the "go to" resource for all educational facilities questions
- The APPA "brand" is clear and well known
- Competence of educational facilities professionals
- Credibility with senior institutional officers
- APPA nurtures and mentors young professionals

However, in order to achieve these important outcomes, it is exceedingly clear that we need to focus our volunteer and staff efforts on several strategies during the next three to five years if we are to remain the association of choice for educational facilities professionals. Therefore, we believe

the following seven strategies will enhance and support our ability to achieve these desired outcomes over the next several years. They are:

- Develop and execute a "branding" program
- Develop and implement a cutting edge web site to provide the "go to" resource and brand clarity
- Expand research to build credibility and visibility
- Engage in symbiotic and collaborative partnerships
- Engage young professionals in the organization
- Provide targeted cutting edge educational programs and "fix" the Forum
- Establish credible and valued credentialing programs for individuals and institutions

APPA's Board of Directors has provided its full support of these seven strategies. In addition, our most recent budget has been developed in

Equally important, the wealth of information and critical data we received has proven invaluable for our discussions around how to position the association in the future.

alignment with these strategies and incorporates the funding necessary to ensure we maintain our momentum toward their achievement over the next three to five years.

As the education environment is rapidly and dramatically changing, so too is the association world. Therefore, we must shift our focus to that of the future, to a model of effectiveness over efficiency, and to a brand identity and clarity that doesn't leave us being the "best kept secret" in facilities management. As time goes on, we will

keep you apprised of the changes occurring around each one of these important strategies.

We hope you are as excited about these focused strategies and targeted outcomes as we are. And, frankly, none of this could have happened as effectively if we had not received your wholehearted support and engagement at this critical juncture. Again, we appreciate your willingness to respond to the research surveys and to offer your candid feedback and advice. Please don't hesitate to do so at any time in the future. 🏢



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Imagine If You Will...

by Jeff Cooper

Paris 1895: Konstantin Tsiolkovsky gazes upward at the Eiffel Tower and like Jack in the classic fairytale, *Jack and the Beanstalk*, he envisions the structure as the anchorage point of a 36,000-meter tether that would, on the outer end, terminate at a "celestial castle." The tether would be the guide system for the "heavenly funicular" (elevator) that served his vision.

Russia July 31, 1960: Yu Artsutanov says, "The electric train gives a last whistle, slowly picks up speed and darts vertically upward on the web of delicate threads. Then the first layer of clouds is left behind. The speed of movement grows ever more...behind are transparent packs of silver clouds." The dream persists.

Flash forward: Imagine if you will, entering an elevator at the lobby landing and as it accelerates away from the floor, a synthetic voice enunciator heralds "second stop solar electric station, third stop solar greenhouses, fourth stop galactic observatory, fifth stop fuel depots, sixth stop interplanetary shuttle docking."

Although sounding far fetched, this is a concept that has evolved from the conceptual to research and development, and in the next 10 to 15 years may become a reality. Peer institutions such as Michigan, Auburn, North Carolina State, Michigan Tech, Virginia Tech, University of Colorado Boulder, Case Western, British Columbia, and the University of Saskatchewan are engaged in the Ele-



vator 2010 competition to develop a vehicle that will ascend a 62,000-mile-long nanotube composite ribbon for delivery of payloads to space.

NASA, Gizmonics, Carbon Designs Inc., American Institute of Aeronautics and Astronautics, United Technologies (Otis Elevator), and many others have devoted resources to the pursuit of this possibility. In fact, NASA has elected to fund Elevator 2010 with \$200,000 in prize money through its Exploration Missions Directorate, Centennial Challenges Program to promote the design of the vehicle that will traverse the tether.

Although not as dramatic, the evolution of elevator technology is producing "outside the box" equipment that is straining conventional prescriptive codes.

Since publication of the first American Society of Mechanical Engineers (ASME) elevator code in 1921, code organizations in other countries began developing their own codes, and by 1993, the number had peaked at nearly 30 different elevator codes globally.

Today, the numbers are dwindling and most of the international market is using either ASME A17.1, EN81, or the Japanese Standard. The introduction of EN81-1 and EN81-2 in 1998 took the European lift market from a prescriptive-based code system toward

a performance-based code, and this as well is the direction in which ASME A17.1 is going. In 2000, efforts toward harmonization of A17.1 and B44 (Canadian Code) laid the foundation for substantial changes in the North American elevator market and confirmed that competition in the global market will require more standardized code requirements that will not present trade barriers and financial exclusion from foreign markets.

The ASME A17 New Technology Committee is actively engaged in drafting a performance-based standard to address analytical methodology for non conventional design. Parallel efforts include a draft suspension standard, which is intended to include synthetic rope and coated steel belts, as well as an array of conventional wire rope. Such issues as suspension means, machine room-less elevators, "self-healing" (assessment and restart after seismic trip), and "self-propelled cabin" elevators, will be a few of the issues addressed.

For a number of years, the preface of A17.1 has stated, "Where present requirements are not applicable or do not describe new technology, the authority having jurisdiction should recognize the need for existing latitude and granting exceptions where

Jeff Cooper is elevator shop supervisor/project manager at Purdue University, West Lafayette, Indiana; he can be reached at jcooper@purdue.edu. This is his first article for Facilities Manager.

the product or system is equivalent in quality, strength or stability, fire resistance, effectiveness, durability, and safety to that intended by the present code requirements." This is being applied literally and could well be the trend from now on.

The draft New Technology Standard proposes that an independently certified and audited third-party assessment of "equivalent safety" will be overseen by the Accredited Elevator and Escalator Certifying Organization. This is, for the most part, already in place.

We are seeing the introduction into the domestic market of machine room-less (MRL) systems, which are addressed by supplement in ASME A17.15-2005. These units are appealing to architects as well as to owners because no area is required for a "machine room." Another appeal is energy conservation, which in some cases is estimated to be 35 percent less than a conventional traction elevator and 75 percent less than hydraulic elevators. Environmental concerns about "direct acting" hydraulic elevators (jacks buried in the ground) have also added to the MRL appeal and helped to promote the use of hole-less hydraulic applications (roped hydraulic and telescopic) that were more of a novelty 10 to 15 years ago.

Some of these systems are already utilizing synthetic and belted rope technology. These products are being heavily marketed by the major elevator companies and are beginning to be requested by owners. As the more exotic control platforms and machines start to appear, owners will need to keep in mind that the proprietary nature of some of these systems seriously limits competitive service contracting.

Some of the products have developed problems in application and are resulting in some apprehension by Authorities Having Jurisdictions (AHJs). As was mentioned earlier in the A17.1 excerpt (Preface/New Tech-

nology), more of the onus will fall on the AHJs. This is causing concern for some from both a liability and resource standpoint. Some jurisdictions may not possess the technical prowess to effectively evaluate all aspects of new elevator systems and as a result will be inclined to limit new technologies. In fact, the possibility exists that a variance(s) may be required for installation which in most cases must be filed/signed by the owner and introduces the possibility of some liability.

A trend that is developing in the United States is adoption of the "Model Elevator Law" (copy available at www.neii.org). Among other requirements, the document focuses on licensing procedures and code and

Although not as dramatic, the evolution of elevator technology is producing "outside the box" equipment that is straining conventional prescriptive codes.

inspection requirements that include licensing for inspectors, mechanics, and contractors. The document defers to inspector requirements (QEI certification) and in sections 23.1, 23.2, and 23.3 the responsibilities of the owner to ensure that proper maintenance and testing is performed. Currently about 12 states have adopted parts of the document. Owners should be aware of its content if their jurisdiction is entertaining thoughts of adoption.

In the jurisdiction that I operate (Indiana) we have come from governance under A17.1, 1987 that ran October 1989 through January 2002 to the adoption of A17.1 2000 with 1C-4-22-2 and 1C 22-13-2.5 (Indiana Code) laying the framework for adoption of future versions. One of the more significant codes slated to be adopted in 2006 is A17.3 (Safety Code

for Existing Elevators and Escalators).

As a point of reference, do you remember the rules so near and dear to our hearts and wallets; A17.1 1996 rule 302.3d and A17.1 2000 rule 8.6.5.8? In a nutshell, these were the combination of rulings that compelled many to change their single bottom jacks and for our institution alone, we will pay between \$500,000 to \$750,000 to reach compliance. Although these requirements came as the result of a few catastrophic jack failures during the 1990s, some of which resulted in serious injury and death, they do little to account for the limited resources many owners have at their disposal.

The application of A17.3 states: "Existing applications, as a minimum, shall meet the requirements of this Code." A specific consideration for owners should be rule 3.11.3 (firefighter's service) which by itself, if adopted, would probably far surpass the expense of hydraulic jack replacements. My best estimate for our university, if the document were adopted in its entirety, could easily exceed \$5 million.

Another aspect of the adoption of code changes in Indiana has been the implementation of affirmations and attestations. The permit for installation/alteration has a section that requires the owner, under penalty of perjury, jail time, and a possible \$10,000 fine to affirm that "the regulated lifting device will be installed or altered in accordance with all applicable rules adopted by the commission...." The same applies to "Notice of Compliance/Completion" and "Safety Test Attestation" forms, which also require qualified elevator inspector oversight. This forces the owner to either assume the liability or obtain the services of a knowledgeable third party whose services are becoming more in demand and whose cost reflects that accordingly.

As we move from the well defined and predictable "prescriptive" code

domain to the less defined "performance" code realm, more of the liability will begin to fall on authorities having jurisdiction and subsequently may be shared by the owners. To stay ahead of events relative to the new changes, owners will have to continually educate themselves and their staffs or ultimately rely on a third party to ensure that all the required issues are addressed. As the global market drives the industry towards global code harmonization and technology stretches the bounds of current design, the changes will come at a rapid pace and the challenge to keep up will require dedicated commitment to the change. As we move toward an interim period that may include installation by variance, the potential result may be difficult to manage by authorities having jurisdiction. At a minimum, the process will be slowed and in many cases overloaded, and many owners will find the process confusing at best.

As we grapple to deal with issues where literally "the sky" may be the limit, it is nice to know that we're not going it alone.

As owners are required to become more proactive, bear in mind that from a legal standpoint ignorance of process and the law will more than likely not be a viable excuse should an issue result in litigation. Like it or not, change, like sweet cream butter on warm French toast, will spread liberally through the industry. The best insurance against ending up as someone's breakfast will be education. We are in the employ of institutions that develop and sell education so the challenges ahead should be something with which we are well equipped to handle.

Over the last eight years efforts have been made in the academic community to stay abreast of changes by annual conferences (VTCCU <http://fmsd.gsu.edu/Vtccu/exhibitors.asp>) which have been hosted by Purdue, Michigan, and Georgia State universities and have focused exclusively on elevator-related issues. Another result of this effort has been the "Highlift" network that addresses a myriad of elevator issues and is an open platform exclusively for colleges and universities.

So, as we grapple to deal with issues where literally "the sky" may be the limit, it is nice to know that we're not going it alone. I personally am leaning toward the viewpoint addressed in a November 16, 2005 article in the *Wall Street Journal* titled, "New Buildings Help People Fight Flab/Designs Encourage Climbing Stairs and a Lot of Walking." 🏢

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Providing a Blueprint for Generational Leadership

by Misti Burmeister, M.A.

Understanding the specific ways Generations X and Y view the world will provide your organization with valuable insight into how to attract, sustain, and motivate the younger generations. When you speak their language and they understand your language, the stage is set for better communication, increased productivity, and increased profitability. I was reminded of this when one of my clients commented, "Why do my younger employees keep talking about this whole 'balance' thing, when there's work to be done?"

The first thing to consider is that each generation has different formative experiences and, therefore, places different values on different things. This does not make one "right" and another "wrong"—just simply different.

So, what are those differences and what can you as a manager do to access the talents of these generations? Each generation has its own work ethic, different perspectives on work, preferred ways of being managed, idiosyncratic styles, and unique ways of viewing workworld issues such as quality, service, and showing up for work. Bridging the generational gap will:

- Provide an atmosphere for shared learning
- Heighten productivity
- Increase leadership capability



- Identify company and individual goals and enable action to reach them
- Boost morale
- Sustain commitment and reduce attrition rates, thereby reducing cost of recruiting and training

Working Harder or Smarter?

The more seasoned generations believe working harder equals achievement. According to their philosophy, the more hours spent in the office represents more work that is being accomplished. The younger generations place a higher value on balance, informality, and working smarter. When I first began my career at the National Institutes of Health (NIH), I remember thinking to myself, "Do these people have a life outside of their computers? All they do is work all the time." I was confused and, frankly, scared.

Although I did not know exactly what I wanted to do with my future, I did know that I did not want to work crazy hours glued to a lighted screen. What I needed more than anything was to spend some time thinking about and creating my future—actually developing a plan. If my mentor

would have taken the time to sit down with me and help me think through and create a plan, my anxiety would have decreased and my commitment to her and the organization would have increased significantly.

Learning on Your Own or Through Mentoring

I began searching for someone to mentor me as soon as I arrived at NIH. Every time one of the scientists said they would mentor me, they simply gave me more work to do. They didn't understand that I needed to know what the larger vision was for my future, how my efforts would contribute to the vision at NIH, and how the work they were giving me would help me add to my professional growth. I have now realized that this scenario is widespread. The intentions were right, but they did not have the understanding of how to effectively mentor younger generations. In addition to providing these generations with important work, it is crucial to show how their work contributes to the larger picture, which in turn enables them to explore and clearly define their career plan and the steps to get to where they want to go.

Paying Your Dues

The second thing to consider is that most young people expect to finish college and land a well-paying job without having to prove their work ethic and abilities. Of course it rarely happens that way. Simply put, showing enthusiasm and a desire to do a great job with small projects—even something as small as offering to take notes in meetings—shows a potential to take on bigger projects. Managers are more likely to trust that person's level of commitment, and trust is built and nurtured over time. In general,

Misti Burmeister is CEO of Inspirion, Inc. (www.inspiration.com), based in Bethesda, Maryland; she can be reached at mburmeister@inspirioninc.com. This is her first article for Facilities Manager.

Ultimately, it is not about acceptance or rejection—it is about filling needs— not only your organization's needs, but that of your employee.

most managers are unwilling to delegate larger projects if the employee cannot demonstrate an ability to do the small tasks really well. Allowing for time to pass, so that experiences and relationships can be built, is vital to career growth.

Taking the time to help your younger employees understand that something as small as doing an excellent job taking notes in meetings can affect their future with the company is vital to their development. Younger employees will develop trust and loyalty towards you and the company if you use this mentoring style. "What you give is what you get" may be a truism, but it still applies—especially when it comes to the development of younger employees. If you take the time to help them plan for their future and see the value of their work, there is a greater chance they will work that much harder and smarter for you.

Many people might think of mentoring as "babysitting" because it can be time-intensive. However, mentoring does not need to be hand-holding nor does it have to lead to frustration. You begin mentoring a young employee simply by listening and searching for ways to address the inevitable uncertainties and fears. By effectively mentoring, you take the anxiety for the future out of the picture and allow the employee to be present in their experience of your organization.

Charting a Course

When you hire a younger employee, it is beneficial to map out a plan for the future accompanied by milestones to achieve your respective goals. *It's a win-win situation.* You

want highly productive, engaged (and engaging) employees, and your employees want to know what's possible for them and how to achieve it. If you discover that the position an employee currently occupies is not a good match for his or her abilities or future ambitions, be sure to explore how the employee sees this position leading to the future he or she desires. Ultimately, it is not about acceptance or rejection—it is about filling needs— not only your organization's needs, but that of your employee. If it

leads to a change in jobs for the employee, whether inside or outside your organization, positive growth will occur for both the organization and the employee. ▲

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Staying on the Quality Path

by Vicky Ramakka

It is the opening of the semester; faculty and staff are swapping stories of summer travels. The college president conducts the traditional convocation with notices and awards. Then the president recognizes the physical plant crew—everybody leaps to their feet, a standing ovation, the maintenance crew ducks their heads in embarrassment, but grin with pleasure. Is this a facilities manager's daydream? No, it's an annual tradition at San Juan College.

What does it take to gain the respect of an academic community? It takes the management skills combined with the service attitude that Steve Biernacki brings to his position. For Biernacki, the job is not taking care of buildings, it is creating a place where learning occurs. Now in his 15th year as physical plant director at this community college in northwest New Mexico, he supervises 68 staff and oversees new construction and facilities maintenance of more than 900,000 square feet.

"My goal is to never get a call about a problem with the facilities," says Biernacki. "The aim is to take care of situations before the customer becomes aware of it." He identifies his customers as faculty and staff who serve the more than 9,000 students per semester.

Biernacki's management techniques focus on providing excellent service to the college community. He relies on



proactive maintenance, continuous process improvement, and employee participation.

Quality Is Contagious

As soon as he was hired, Biernacki set out to change attitudes. When a faculty member asked his staff for an extension cord, rather than reply, "can't do, there isn't a budget for that," Biernacki went out and bought 100 extension cords. He told staff to give them to anyone who asked. This changed attitudes. The requester was happy, and staff started receiving positive feedback from college employees.

Attending a conference that covered quality processes put Biernacki on the quality path. He recalls his excitement about learning quality processes, measuring how you are doing. "Wow, what a concept," he said, "I believe in it and continue to practice it."

Biernacki searches for continual improvement in processes. Suggestions usually come from his staff. At weekly meetings, Biernacki asks, "Is there anything that can help everybody here?" To prime the pump, he'll

cite earlier suggestions which have been implemented. These bottom-up ideas have included: a Tommy-lift for the truck, cordless tools, a Genie-lift to repair ceiling lights, an expanded yard for safer maneuvering of equipment, and built in-shop cabinets to store hardware items.

These weekly meetings help Biernacki lead the physical plant department toward team work and a service attitude. He likes to use a technique called "scripting." He may play the role of "the bad-tempered professor" and model how to maintain a professional demeanor, use questioning to get to the real problem, and use phrases which help employees communicate that the physical plant will do whatever is feasible to resolve the problem. Crew members are always instructed to ask, "Is there anything else I can help you with today?" This scripting gives crew members human relations tools to succeed in the college environment.

The physical plant uses computerized work orders and follows up with a Services Questionnaire to obtain feedback on whether work was performed satisfactorily. The nine-item survey asks the requestor to rate timeliness and quality of service. Department heads use ACT 1000 software to sort work requests and customer satisfaction surveys by type of job, by requesting department or by employee assigned the job. The department uses this documentation for planning, staff evaluation, and improving services.

Agility

Biernacki believes in fixing a problem when it occurs—period. He says time explaining why you can't do something is time wasted. It's better to figure out how to solve the problem.

Vicky Ramakka is director of university programs at San Juan College in Farmington, New Mexico; she can be reached at ramakkav@sanjuancollege.edu. This is her first article for Facilities Manager.



Steve Biernacki with a sign for San Juan's Quality Control Hotline.

The shop holds an inventory of hardware and tools valued in six figures. He keeps 100 door knobs of various styles on hand, because delivery can take weeks for those specialized items.

Day crew members carry mobile phones. If there's a spill somewhere or a broken railing, they're on it. Biernacki says he has 30 sets of trained eyes taking care of problems, or better yet, preventing them in the first place. Each full-time crew member has a credit card issued in his or her name. The night custodial team leader can go to Wal-Mart at 2:00 a.m. if he needs something to expedite work. If vendors deliver supplies at off hours, a crew member can pay for it then and there.

Big jobs call for the "Tiger Team." Biernacki's assistant director, Garry Smothers, a retired Army Installation Commander, drew on his experience mobilizing troops to create the Tiger Team system. When a Tiger Team alert goes out, it means finish up what you are doing and meet in a specified location in 30 minutes. At least a dozen people show up, with tools and fork lifts, from every department—grounds, maintenance, custodial. For planned or unexpected events, everybody pitches in and knows that the job will get done quickly.

Smothers claims, "The Tiger Team can do anything." Staff know that when their department is faced with a big job, other departments will be there for them. For example, when a tractor trailer load of paper arrives for the printing department, 960 cases at 40 pounds each are unloaded and placed inside in less than an hour. When heavy rainfall flooded a construction site, the alert went out for all hands to come with shovels. All hands means supervisors, too. Smothers recalls his cell phone ringing and the vice-president demanding to know what he was doing out there in the mud. Garry replied that, "A Tiger Team works best when the lead Tiger is there too."

Biernacki believes in fixing a problem when it occurs—period. He says time explaining why you can't do something is time wasted. It's better to figure out how to solve the problem.

Good Service Fosters Excellence

With its expectation of quality service and flawless facilities, the San Juan College physical plant has moved away from contracting out services. In his unassuming way, Biernacki confirms his high standards when he calmly says, "You lose something if you outsource. By not contracting out, you have control over quality of work and timing, you don't have to rely on outsiders' schedules."

Biernacki wants students and community members to have a sense of pride when they drive onto campus. He says that "Success draws success. The college has great community support. Their tax dollars are visible in the grounds and physical plant. First impressions are important. Visitors

first see the work of the grounds department, then they enter a building and notice that it is in tip-top shape due to the maintenance department. And when it comes time to visit a restroom, it is clean. Every department counts."

Building Competence

Biernacki is a long-time member of APPA, and regularly attends professional conferences. He considers Don Mackel, a past president of APPA, as his mentor. Upon being hired at San Juan College, Biernacki visited Mackel, then physical plant director of the University of New Mexico in Albuquerque. He refers to Mackel as the "guru of preventive maintenance."



San Juan College's assistant director, Garry Smothers

Biernacki graduated from Denver Automotive Diesel College and holds licenses as a Journeyman Carpenter, Millwright, and Certified Welder. He also operated his own construction business. This background gives him the technical know how to supervise

both maintenance and new construction.

Biernacki is a certified Quality New Mexico Examiner. A career high for him was being part of the College Leadership team that won the Quality New Mexico Zia award, the first time it was ever awarded to an academic institution.

Setting a Standard

Biernacki believes that as a community college, San Juan College facilities maintenance should set a standard and be a model for the community. A recent initiative is converting expanses of grass to xeriscaped zones. "This is a significant cost savings," he says, "not only in water, but in manpower to mow and maintain lawns. Visitors get ideas for their own yards. A community college should project an image that this is how it should be in a dry climate."

Biernacki believes that as a community college, San Juan College facilities maintenance should set a standard and be a model for the community.

San Juan College President, Dr. Carol Spencer recognizes that the condition of the physical plant can either enhance or hinder the learning environment. She declares, "Our physical plant employees take great pride in being part of the educational process. Their pride is obvious in how they maintain our campus. Steve makes sure his employees know they are the ones who provide the framework for an education here."

The President's Mission Award went to Biernacki for his selfless service to the community. He also received the peer-to-peer Sun Award. Calling his staff a good team, Biernacki continually emphasizes they are "not just custodians" but individuals who provide an environment for students to get a quality education. "Graduation is hectic for us," he says, "but the staff sees this event as their accomplishment too." 📌

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CAMPUS FUTURES

by Jim Dator

There's more than one way to put up a residence hall, deliver a calculus course, and fund a research initiative. When leaders and stakeholders band together to envision and invent a preferred future for their institution, they readily spot alternatives to the status quo.

Most people in the United States, no matter how extensive their education, have never had a course dealing primarily with the future. But they have had at least one course, and probably many courses, dealing with the past. Most also have never questioned why the past is so emphasized in formal education while the future—the only arena over which we can have any true influence—is so utterly ignored.

As a discipline, the study of alternative futures is absent from almost every higher education curriculum in the United States. So it's not surprising that as a general practice, colleges and universities do not contemplate mission-critical decisions regarding students, programs, and infrastructure in the con-

text of a range of futures. Yet, a collective consideration of possible and preferred futures can help administrators and faculty ask and answer important questions: What kind of curriculum may be needed by the students of tomorrow? Who will those students be? Who will or should pay for education and related services? What educational delivery systems might exist, and how might these alter the character of learning spaces? What global and other influences might impact the substance and governance of institutions as well as the design and management of campus facilities? What, in fact, ought a college or university campus look like?

Seriously considering many radically different alternatives is the key concept of futures studies. There is no single "future" that exists "out there" to predict. Rather, many alternative futures to forecast and preferred futures to envision, invent, and realize simultaneously exist. Futurists study images of the future—ideas, beliefs, fears, and hopes about things to come. From the tremendous variety of images held by a wide range of stakeholders, futurists then attempt to understand where these images come from and how they influence behavior. It is important to study these images because our present-day actions and decisions are, in significant measure, made on the basis of these images and what we think may be the consequences of our actions in years to come. These images are also important to study because they differ by gender, age, culture, language, class, experience, and many other factors (see sidebar, "Teaching Alternative and Preferred Futures").

Jim Dator is a professor of political science and director of the Hawaii Research Center for Futures Studies at the University of Hawaii at Manoa, Honolulu, Hawaii; he can be reached at dator@hawaii.edu. This article, his first for Facilities Manager, is being published jointly by APPA, NACUBO, and SCUP in preparation of the joint 2006 conference, at which Dator will facilitate a discussion by a futures panel. The Campus of the Future: A Meeting of the Minds, will be held July 8-11, 2006. For more information or to register, visit www.campusofthefuture.org.

Four Tomorrows

While any attempt to categorize our rich array of images of the future may seem to limit the richness of that array, four generic images can capture that variation, even across cultures. These images are helpful for understanding why we as individuals and institutions make certain decisions or hold certain beliefs about the futures.

1. Continuation. Progress, development, and continued economic growth are alternate expressions of the "official" image of the future of the United States. In fact, a primary task of our modern educational institutions, especially public institutions and land grant universities, is graduating individuals who collectively can and will keep the economy growing. On some level, every nation, society, corporation, and organization is formed around some concept of continuation. Because of the strong pull of this dominant view, it can be extremely difficult for institutions and individuals to consider futures not based on some model of sustained growth.

2. Disciplined society. Many voices say that while aspects of progress and development have been good overall, continuing on that path is neither sustainable nor preferable. While initially a "green" concern, this image is now held by a growing contingent of scientists who recognize the probability of climate change, limits to oil supplies, scarcity of clean drinking water, and myriad other environmental concerns. These will eventually bring economic growth to a halt if not refocused on *evolvability*—that is, the ability to evolve as conditions and opportunities change. This goes beyond the concept of *sustainability*, which some think may be too static and passive. Others call attention to what they consider basic unfairness and single-mindedness of the global economic system, concluding that it is not sustainable or preferable. These groups envision a future organized around a set of overarching traditional values that introduce disciplines and controls to prevent the destruction of cultures, environments, and fundamental beliefs and practices.

3. Transformational society. Individuals who support this image are usually of either a high-tech or a "high-spirit" variety. They foresee an end to current forms and the emergence of new (rather than a return to traditional) beliefs, behaviors, organizational models, and life forms. High-spirit advocates believe that new spiritual forces will drive these changes. The high-tech people believe that the technologies of artificial intelligence, genetic engineering, nanotechnology, and space exploration and settlement will transform human society and the once "natural" environments of Earth (and Mars) will become artificial, managed gardens.

4. Collapse. Among the many alternative voices to emerge during the past 50 years are groups that say continued economic growth is inherently destructive—whether from a social, cultural, environmental, or economic standpoint. They say unchecked growth will result in environmental overload; resource exhaustion; economic instability; moral degeneration and personal alienation; and the loss of ancestral values, be-

liefs, and practices. History is replete with examples of once sustainable, thriving societies that overextended, resulting in decline or disappearance. The difference this time, many fear, is that collapse may be not only local but also global. Moreover, even if societies persist for centuries, institutions within them come and go with alarming frequency. When anticipating the futures of any institution, its collapse—and its collapse as a *preferable* future—must be honestly considered.

In considering the future, it's important not to favor one category or image or to assume that one or more images is "good" or "the most likely" or "the best-case (or worst-case) scenario." Rather, understanding that a variety of more or less reasonably held images of the future exists allows individuals and institutions to reflect on their own images; where these come from; and how robust they are by comparison to the images of other individuals, institutions, communities, and society as a whole. These generic images also can serve as the basis for *deductive forecasting* about the general characteristics of a family, institution, or society when its future is viewed through a collapse versus a transformational image, for instance. Once individuals and institutions break from thinking narrowly about a single future, they can work to shape a preferred future.

Looking Past Today

At the University of Hawaii, we have been discussing for many years whether to build a new four-year campus a few miles down the freeway from our current main campus. Pouring concrete is an easy solution, but is it the best one for serving not only today's students but also tomorrow's students? The University of Hawaii System is still funded by its state legislature at a higher proportion than many other state university systems. But we are also quickly moving from being the University of Hawaii to a university *in* Hawaii and perhaps eventually will become a global institution in cyberspace. For-profit educational options are already available, and online education opportunities offered by institutions worldwide emerge daily and are highly competitive.

Based on the continuation image, the "logical" conclusion or the "natural" inclination may be to erect a new campus, but from a transformational perspective, an equally strong argument exists for not constructing additional physical infrastructure. Perhaps in determining how best to deliver higher education to individuals who live away from a physical campus, the university should instead consider enhancing its communication infrastructure. Students may still need to physically gather, but could they do so in existing structures closer to them, such as libraries or community centers? And if we do decide to build a facility, how do we ensure that we design with optimum flexibility to accommodate the needs of future students instead of simply continuing, or improving upon, the way we've designed before? How do we frame these decisions?

Teaching Alternative and Preferred Futures

Most of us hold several, often contradictory, images of the future

without realizing that we do so. For example, in my experience, when asked to describe a day in their life 30 years from the present, almost all young Americans paint an idyllic picture of themselves in a wholesome nuclear family. Yet, when asked to describe their community 30 years hence, the picture is not so pleasant. Crime is rampant, terrorists rage, drugs are ruining children, the environment is polluted, the weather is humid, and the seas are rising. Sadly, not much within their formal education encourages students to believe that they can or should influence the future except in the very narrowest personal sense.

One reason I've heard as to why futures studies are largely ignored is that it is impossible to teach about something that does not exist. And the future does not exist—yet. But schools teach about many things that do not exist, including history. Until time machines are invented, we can never travel back in time and validate through empirical, scientific methods what actually happened and why. Instead, historians must interpret various fragments from the past to determine what occurred prior. And because we are constantly uncovering new fragments or reinterpreting old evidence, our understanding of the past is in constant flux. By contrast, varied images of the future do exist in the present and can be studied empirically.

Many people will argue that the point of teaching history is that we must learn from the past to act more wisely in the future. I, too, am a fan of comparative history, anthropology, archeology, and evolutionary studies—all of which can help us understand how our pasts have shaped our present. In fact, I have long argued that futures studies should be a part of historical studies and that the two form a new science, perhaps called *chronology*, that would study humans past to present and into many alternative futures.

Indeed, why not teach history as a futures-oriented subject? For various known turning points in history, students could be encouraged to apply the theories and methods of futures studies to forecast what might happen next and to consider what they think *should* happen next. They could then compare their forecasts and preferences with various interpretations of what “actually” happened and why. By doing so they would first understand that what seems an inevitable flow of events from past to present is simply one of many futures that might have come to be. More importantly, if history were studied as steps in a series of alternative futures, students might find it natural to create alternative and preferred futures now and in an ongoing manner as they move forward in their lives, careers, and roles as futures decision makers.

Back to the Present

In 2007, the University of Hawaii will celebrate its 100th anniversary. As we plan celebrations from a historical standpoint, we also are gearing up to engage the larger community in “Hawaii 2100.” Our systemwide activities are part of a larger communitywide initiative to consider what we want Hawaii to be like in 100 years and what steps we can take now to get there.

As a capstone to our centennial activities, the university will host a three-day conference during which the University of Hawaii and the larger community will come together to discuss how the curriculum, delivery, governance, financing, and all other aspects of the system can be enhanced, expanded, or otherwise strengthened or reconfigured. Our goal is to outline how higher education in Hawaii helps the entire community become the kind of place its inhabitants now and in the future wish it to be. Our intention is to bring these future-focused conversations back to the present—to start from a *preferred future* and reflect back on what present actions we can take. This is markedly different from most planning efforts, which typically begin with an assessment of the present or past and project forward on continued-growth assumptions alone.

The images of the future held by young people are, and increasingly will be, much different from the images of many of today's decision makers. Therefore, college and university faculty and staff must also consider the possible and preferred images of *future generations* when mapping institutional directions. While I certainly don't know the shape of things to come in higher education, I do feel safe in wagering that higher education will increasingly focus on the learner rather than on the teacher, researcher, or administrator. In fact, it is here that futures studies raise their gravest challenge to educators: Until we have seriously assessed the alternative and preferred futures of the people we are teaching, how do we know what to teach?

It is highly likely that, left to our own devices and following past practices, we will unreflexively employ continued economic growth models as we plan for traditional university campuses and build curriculum around the concepts and needs of yesterday's students, faculty, administrators, and stakeholders. But we must remember that alternative images of the future that are not dominant now may dominate in the years ahead. While it is helpful to research current student demographics and job market trends, attention and policy discussion must focus on understanding how dramatically different student composition, educational needs, and delivery mechanisms may be 20 years hence. 🏰



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LOOKING FORWARD TO THE CAMPUS OF THE FUTURE

AN INTERVIEW WITH
RICHARD KATZ AND
DIANA OBLINGER



By Terry Calhoun

Terry Calhoun is director of media relations and publications for the Society for College and University Planning, Ann Arbor, Michigan. He can be reached at terry.calhoun@scup.org.

In 2005, Diana G. Oblinger, an EDUCAUSE vice president, addressed plenary sessions at the annual conferences of APPA, the National Association of College and University Business Officers (NACUBO), and the Society for College and University Planning (SCUP).



Diana Oblinger



Richard Katz

Both she and Richard N. Katz, also an EDUCAUSE vice president, will be at the July 2006 joint APPA/NACUBO/SCUP conference, *The Campus of the Future: A Meeting of the Minds*, where Katz will be a member of the Futures Panel that will kick off the program and Oblinger will present a session on *Education for Our Times: Expertise and Engagement*.

Terry Calhoun: *Diana, you presented an excellent keynote address at the APPA, NACUBO, and SCUP conferences in 2005, bringing us all up-to-date on the new generation of college students. There was a lot of interest in what you had to say among the attendees, who will mix for the first time as a single group at The Campus of the Future conference this July. Have you any new ideas or thoughts that came about from observing the reactions and questions from the varied groups in attendance?*

Diana Oblinger: One of the things I've learned is that the issues raised have broader applicability than I had guessed. For example, the discussion of the Net Generation and the move to more media-rich forms of communication catalyzed a cashier's office to rethink its website when it immediately realized that text-heavy pages might not be meeting students' needs. Another individual volunteered that a library redesign has changed based on the notion of informal spaces and peer-to-peer collaboration.

Also, I think all groups have found it valuable to think about the Net Generation in their workforce, whether that is the business office, facilities, or human resources. Will these Net Gen employees be able to work through text-heavy instructions? Will they have patience for the detail or time lag involved in many college and university processes? Will they respond to authority or are they more likely to want to decide things on their own? What kind of professional development will be most effective for new employees?

Of course there is another kind of response that I hear fairly often, and that is that "our students aren't like that." In fact, one institution was so certain that its students were different that it undertook a study to find out. That institution was good enough to come back and tell us that they were, in fact, very much like what we'd described.

That has happened more than once. But it is important to not just take someone else's word for things. That is why we've been beta testing a survey that EDUCAUSE members

can use to find out more about what their students—and faculty—think about information technology (IT). We think this will help people not just understand more about their students, but have a dialogue about what IT means to their institution.

Calhoun: Richard, ten years ago SCUP published the book *Transforming Higher Education* by Michael G. Dolence and Donald M. Norris—it was a best seller, we've not had success like that with a publication since then. Was the timing just right? What was your reaction to the book in 1996?

Richard Katz: I was very enthusiastic. The book closely paralleled in perspective and impact the piece *Sustaining Excellence in the 21st Century*, which I authored in 1992 with California State University's Richard West and which was published by the National Center for Higher Education Management Systems (NCHEMS), and the report *Transforming*

Part of that cultural change is a move from a hierarchical structure to one that is more lateral and distributed. Another part is the demand for more immediacy. I guess the bottom line is that I think it isn't technology that changes things, but our culture. And culture has certainly been changed by technology.

Katz: I am struck by these same two feelings. First, we were all spot on about the course that IT would take. Second, we underestimated both the rapidity with which changes would occur in domains like research and the slowness of change in a host of higher education institutional processes, both instructional and administrative.

What I know that I failed to really understand was the inherently empowering nature of the technologies we were unleashing. I naively, to use Diana's term, believed that we could control how innovation could be assimilated in the academy. I understood that IT would facilitate a shift in

As I continue to watch students and how they use technology, I am struck that our entire culture is changing. Students are often harbingers of cultural change and I think that is as true today as it was in the '60s or '70s. Culture has an impact on what we think, how we behave, and how our organizations operate.

Administration at UCLA—A Vision and Strategies for the 21st Century (an internal University of California, Los Angeles document). In the early 1990s the authors of these works all collaborated and shared a vision of how IT in general and networks in particular could transform higher education in all aspects.

Calhoun: If that book were rewritten now, with the experience of the past ten years, what perspective on the next ten years would you advise the authors to have?

Oblinger: When I look back at material that is ten years old, much of it tells people they have to change because technology has opened new opportunities. We also heard a lot about e-learning and how you've got to get on board now because the train is leaving the station. Those who were skeptical of the dot-com movement are pleased to tell us all how that ended. I don't know that many of the visions were so terribly wrong, but how we thought we would get there was perhaps naive. Technology was in the lead, not people.

As I continue to watch students and how they use technology, I am struck that our entire culture is changing. Students are often harbingers of cultural change and I think that is as true today as it was in the '60s or '70s. Culture has an impact on what we think, how we behave, and how our organizations operate.

"power" from the central campus units to the academic departments. What I didn't realize was that this shift was overwhelmed by a much bigger devolution of power from the institution's center to key campus stakeholders like faculty and students. We're only at the beginning of understanding how research and instruction will be carried out in the context of this massive (and in many ways unplanned) devolution of power.

This devolution of power makes rewriting the book a monumentally difficult task. In retrospect, the vectors of change seemed easy and manageable. Today, real learning and real research take place in many contexts and only some of these contexts are formal ones. The boundaries between facilitated learning and self-study are blurring as are the boundaries separating amateur research, such as in astronomy, from professional research. My guess is that this process of blurring boundaries will only gather steam in the time ahead, making forecasting the future a very dicey enterprise.

Calhoun: Richard, you've been an avid proponent of getting the campus CIO right up there in the midst of strategic planning initiatives, and rightfully so. Do you think this is happening more? Do you see the CIO in the campus of the future as even more deeply involved in strategic planning and decision making?

Katz: My sense is that the data are equivocal. On the positive side, it is absolutely clear that more and more CIOs are sit-

ting on the president's leadership team or cabinet. It is also clear that a seat on the cabinet has a really positive impact on one's influence and ultimate success in the job. On a less positive note, it is equally clear that CIOs have been only partially successful in causing their executive colleagues to assume responsibility for the process changes that IT can enable. As a result, IT investments often deliver tactical results rather than strategic results, because strategic change demands culture change, leadership engagement, aligned rewards, and other things that are outside the scope of a CIO's responsibility.

Calhoun: *Diana, EDUCAUSE, especially the EDUCAUSE Learning Initiative (formerly NLII), has recently done some excellent work on the design of learning space, including a great issue of EDUCAUSE Review in 2005. As a result of that and other trends, no one talks much about just "classroom design" anymore.*

How do you see learning space design working in the campus of the future? Will it get not only outside classroom design and into virtual space, but include—as many who think about the "intentional campus" believe—all campus space? What do you foresee as the makeup of the teams of people who plan for learning space?

Oblinger: The notion is becoming that the entire campus is a learning space—and that doesn't even begin to include all the virtual spaces associated with it!

Learning space design is a big issue for colleges and universities, and it is much more than whether you use tablet chairs or tables in a classroom. There is a concept called "built pedagogy." Basically the design of a space will lead you to a certain type of pedagogy. If all the chairs are facing forward and there is only a single focal point to the room, you're probably going to lecture in that space. The way it is built pretty much dictates the pedagogy. This kind of thing can happen in informal spaces as well. You can walk through lounges or courtyards and see benches bolted to the floor, making it impossible to pull chairs together for informal chats.

Calhoun: *I've heard that called maintenance-driven classroom design. Do you think that is going to change on the campus of the future?*

Oblinger: What I believe will happen is that we'll start paying more attention to the flexibility of our spaces—and to how welcoming they are to different types of activities. This doesn't mean that you have to wait until you get to construct a new building. Interesting things have been accomplished by changing lighting schemes, adding movable furniture, or even putting up artwork. Learning happens all the time—and it happens through people. Our spaces should encourage that.

Interesting things have been accomplished by changing lighting schemes, adding movable furniture, or even putting up artwork. Learning happens all the time—and it happens through people. Our spaces should encourage that.

You mentioned teams; that is a very important concept in learning space design. Some of the best spaces are designed by teams with different perspectives, such as a faculty perspective, a student perspective, a maintenance perspective, and so on. And, if what we're trying to do is to design spaces to make people comfortable and engage them, perhaps we need to involve people who design restaurants or other types of facilities. The Computing Center at Cox Hall at Emory University is a great model of innovative space. I understand they involved someone who had experience designing restaurants and bars, not just classrooms. The student traffic in the Cox Center certainly attests to its success.

Another important point, though, is where the discussion begins. We need to be thinking about the activities we want to enable, not jump directly to considerations of HVAC (heating, ventilation, and air conditioning) systems or audiovisual equipment. And, it is important to have a set of guiding principles. That way when trade-offs or decisions have to be made, you can use the principles as a guideline.

Calhoun: *Get crazy for a moment, you two. Speculate a bit about what you see a student's daily life looking like in 2015. It doesn't have to be the "traditional" student in a four-year on-campus program.*

Katz: The metaphor that has captured my interest is that of ecosystems. In the 1970s and 1980s, we thought of pyramids and hierarchies, and our language mirrored that of engineering. We described systems of command and control, management by exception. Even into the 1990s, we talked about "reengineering." It is clear to me that the empowering nature of networks is making it possible for natural ecosystems to evolve—in many cases absent human design and architecture. The desire to express one's self and to be heard is fundamental to human psychology, and IT is now making it possible for everyone to become a publisher or broadcaster.

The question for those of us who will be responsible for educating students in 2015, then, is how we position the institutions we serve within an ecosystem. Students will be further empowered and will increasingly expect to customize a curriculum (and a cocurriculum). In a cyber world in which someone else's educational offering is only "one click away," the challenges for educational administrators will be to create

educational policy that encourages this behavior in an academically responsible manner and a web of partnerships that behaves from the student's perspective like an ecosystem. Students will demand the ability to move seamlessly across disparate educational environments. Institutions that make this possible will prosper.

A second complex of issues that occupies more and more of my thinking is that of authenticity and identity. We all know that on the Internet, "no one knows you're a dog." The challenge for educators in 2015 will be an extreme form of the challenge that has faced educators since Plato: how do we recognize authentic knowledge? As we all know, the Web is an extraordinary resource. We also know that it is littered with sources of information of varying quality and credibility. Critical thinking for 2015 and beyond will be more necessary than ever, and our faculty need to devise strategies, programs, and pedagogies that will help their students "seek truth" in environments that contain "multiple truths" at best.

Calhoun: *It does become clearer every year that we have so much more to learn from natural systems than we ever thought. Diana, how about your look to the future? At some of the meetings we've both been at I've heard people talking about students "going to class at home and then going to campus to study and socialize."*

Oblinger: I see many students being on campus because of the social and intellectual environment, but not tied to campus. I can see them linking to other institutions, other faculty, and other experts as the need or interest arises. This whole notion of distributed cognition—or the power of the network—will be a way of life. Technology will support much of what students and faculty do, but it won't be noticed. Learning will have become more active and engaged, with students taking more responsibility for their learning. And, competencies will be

articulated and measured throughout college, so students know how they are doing and where they need to improve.

I also see that analytics will play a bigger role in higher education. Systems will be able to identify students who might be at risk and recommend appropriate interventions. We won't teach just the way we were taught; we'll have the opportunity to teach in ways that have been proven effective.

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Calhoun: *Okay, I was hoping you'd get a little crazier, but those are important ideas, and when our readers think about them they'll realize that there's plenty of craziness embedded in getting to there.*

Oblinger: Remember, you don't have to be crazy to be effective. If we put into practice the things we already know that matter, we'd be a big jump ahead of where we are today. Part of the point is that these changes aren't impossible or science fiction, they're doable.

Calhoun: *What do you think our professional constituencies should be looking at as important new things to pay attention to between now and 2015? First, let's look at the future for business officers.*

Oblinger: I mentioned analytics before. I think that applies to all kinds of things we do, in and out of the classroom. I believe we'll have better developed collaborations that provide for sharing of information and resources, such as buying co-operatives. And, I believe we will constantly focus on how to keep education affordable.

And then there is the question of assessment. I think this applies to business officers and all the rest of us in higher education. We need to be sure we're asking the right questions, but we need to be sure we are looking at results, not just our hopes or assumptions. But perhaps the hardest part is getting the questions right.

Katz: I believe that the conditions are ripe for a major economic storm on higher education's horizon. Enrollments are now set to decline, the federal budget deficit is breathtaking, and entitlement programs such as Medicare will crowd out spending for the National Science Foundation and the National Institutes of Health. This is a time when business officers must play critical roles. In particular, our business officers must help our institutions get serious about real process change. We can no longer afford to muddle through change incrementally, not if our institutions are going to continue to prosper.

Calhoun: *How about facilities officers and managers?*

Oblinger: Space will be seen as having a key role in student and faculty success and in institutional pride, as well as in student and faculty recruitment. Facilities officers and planners will be continually changing space to capitalize on new insights and emerging needs. And, those decisions will be based on better information than ever before. I also think that "facilities" will broaden beyond just the physical to include virtual spaces.

Calhoun: *Thanks for that observation. Even though it confuses the fact that a lot of IT on campus is not infrastructure per se, a lot of IT is infrastructure, and I personally am having more and more difficulty accepting, for example, phrases like "facilities planning." My eyes and ears want to see and hear "infrastructure planning." Your thoughts, Richard?*

Katz: I'd love to see facilities officers develop real partnerships with CIOs. Not only do CIOs have the capacity to help facilities officers and planners design built learning environments, facilities officers have the potential to bring critical concepts and skills to the crafting of the institution's Web presence. It seems to me that techniques and practices such as architecture, program planning, long-range development planning, design-build, value engineering, and others have as much place in cyberspace as on our campuses. Drawing on the metaphor above, we need to begin thinking of professional ecosystems. Of course this ecosystem really depends on IT officers, business officers, facilities officers, and planning officers.

Calhoun: *Richard, we should talk more often, because I also often wonder why there is so much of a disconnect. I'm going to share those words with my colleagues on UwebD, the college and university Web masters e-mail list; they are yet another group with a key role to play.*

How about the people on campus, or consulting with campuses, who plan? These folks do planning of all kinds, physical/infrastructure planners, academic planners, IT planners, and budget and resource planners? Some of them have planning in their title; most do not. What should they be looking out for?

Oblinger: Planners will pay even more attention to the external environment—particularly internationally. And, they will continually involve students in the planning process. Assessment will become a consistent part of the planning cycle—always looking at results and modifying, as necessary.

Calhoun: *Indeed, I had dinner last night with one of SCUP's more senior consultant members, and he was describing the kinds of almost intimate things that students had been telling him in focus group meetings. There is quite a growing trend among our constituencies to eagerly learn more about who the students are.*

Oblinger: And we are all going to have to think about how we ensure our institutions are agile. Changes come very rapidly. The challenge is how we maintain our historic mission while constantly adapting to the changes around us, whether that is public policy, technology, culture, or some other factor.

Katz: Our planning systems need to move to what some label "the adaptive enterprise." The adaptive enterprise metaphor likens the enterprise to a living system and the planning process is one of "sensing and responding." We will need to develop information systems that imbed sensors everywhere and in everything and in which massive amounts of current information are streaming into planning systems on a 365-24-7 basis.

We need to develop models and simulations that will help us know in an instant when a student is at risk, when a business process is at risk, and so forth. We need a fabric of autonomous intervention systems so that information from sensors can trigger automatic interventions. So, for example, when a student fails an exam, an alert is sent to an academic advisor. This is a fundamentally new planning model and is both outrageously difficult and promising. Implementing the

vision of a sense-and-respond adaptive organization will demand a real partnership between planners, facility managers, business officers, deans, IT, and others.

Calhoun: Richard, you're on a key Futures Panel that our readers will enjoy at "The Campus of the Future" conference. Have you given some thought yet to what you will say there? At what angle you might come at things?

Katz: No, you know me better than that! Actually, I'm thinking about this all of the time, but my thoughts won't gel until the time gets closer because I definitely want to peak in Hawai'i. This invitation is incredibly flattering and humbling. I promise to think really hard on this. And of course, I will plan to be provocative!

Calhoun: Well, Richard, I do know you well enough to know that what we'll hear from you will be provocative, entertaining, enlightening, and tailored to the great collection of campus teams that are heading to Hawai'i.

Thank you both so much for taking the time out of your very busy schedules to share these thoughts with the overlapping constituencies of APPA, NACUBO, and SCUP! Aloha! 🌺

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Student Unions *Campus as One*

by Kyle Taft, AIA



As universities seek smart growth solutions for their campuses, both new and remodeled buildings must be designed or adapted to compliment their campus surroundings. As a major building type on campus, the student union, whether renovated or new, impacts the texture of the campus. Among a multitude of design considerations used to successfully integrate the student union within the campus fabric, are three significant concepts: visual connections, physical relationships, and symbolic representations.

Visual Connections

On many college and university campuses, a central role of the student union is to provide a positive first impression to visitors, prospective students and their families, community members, and the public at large. Through proper placement on campus in relation to arrival zones and transportation corridors and nodes, an immediate visual connection can be established with the student union, allowing it to serve as an ambassador for the college or university. Such visual connections support the student union's role as a central greeting place and arrival zone, where people come to learn more about the university and campus. Visitors can be immediately connected with a source of campus information and services.

The student union fills a vital role as a provider of information to visitors as well as students, faculty, and staff. Information desks, electronic kiosks and thematic displays

make the union a great place for first-time visitors to learn about the campus through human contact, complementary literature, and interactive electronic programs.

On some campuses, this information service is taken to the next level with the introduction of a "One-Stop-Shop," a location where students can obtain services that are normally spread across campus in a variety of buildings. At the newly remodeled and expanded Centennial Student Union on the campus of Minnesota State University, Mankato, the One-Stop-Shop includes an information desk, campus ID card source, and outreach services of the registrar,

the scholarship office, and the bursar's office. This convenience allows students to resolve their business concerns at one location rather than traipsing across campus.

Once at the student union, it is important for visitors and campus users to obtain a visual connection with the rest of campus. A strong visual link from the union to campus immediately connects people to the whole university community. This connection should provide them with a clear understanding of where they are and where they would like to be. Likewise, the union can provide an anchor for people negotiating the campus, a visual link back to the student union from all directions as they extend their circle of explorations. Once on campus and away from their arrival point, the union can offer a way back home, acting as a "north star," visually prompting the explorers on how to return to their beginning point.

The principle of visual connection applies to other facets of the student union; visually inviting one to enter, connecting the interior to the exterior, and offering clear and understand-

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Rendering of the new Auburn University Student Center, showing relationship to the campus green.

able orientation within the building. Windows and clear line of sight within the building provide the link between the visitor and the building itself and additionally allow natural lighting of the union interior. Once inside, the link back to campus also comes by way of the views allowed through these windows. The remodeled and expanded Shaw Center at Westminster College in Salt Lake City exemplifies these visual connections from campus into the union and from the union to the campus.

Physical Relationships

As student unions are built new, rebuilt, remodeled, and expanded, consideration must be given to their physical relationships to transportation corridors, pedestrian pathways, service and dock entries, other buildings, open space, and view corridors. Geographic and climatic influences should also be considered as building projects are planned. Heightened awareness of how the student union building influences the world and our environment reminds us that principles of sustainable design must be used in design decisions for both new and remodeled student unions. Reusing and renovating existing structures promotes sustainability. Many colleges and universities often prefer to recycle a building, rather than tear it down and build new.

When student unions were added to campuses, many during the post-World War II era of the late 1940s, a goal was to locate them at or near the heart of campus, and to provide a powerful and attractive public presence with clear and under-



Hearth room at Centennial Student Union, Minnesota State University, Mankato.

standable links to transportation and pedestrian corridors. As campuses have grown, the student union may no longer be at the heart of campus nor oriented to provide the best relationship to the campus. While new student unions can be designed with these principles in mind, existing student union buildings can be reoriented, renovated, refurbished, reinvented, and expanded to regain and enhance their role of public interface and prominence on campus.

What was once the service side of a student union—with docks, dumpsters, and non-descript facades—can no longer afford to under-perform. The student union needs “four front doors,” and each façade needs to invite and attract visitors as well as the campus population. At the University of Arizona Student Union Memorial Center, the north façade of the original student union presented docks, compactors, and dumpsters to those arriving from Mountain Avenue. The new building provides an attractive and inviting north arrival zone not only for the student union, but for the campus as well,

Many colleges and universities often prefer to recycle a building, rather than tear it down and build new.



Centennial Student Union, Minnesota State University, Mankato, showing clear lines of sight.

directing people through the “canyon” that flows through the student union’s retail corridor, and into the main mall, the heart of campus. An underground dock area now removes offending services from public view and eliminates interference with pedestrian and vehicle traffic arriving at the university.

When ideally located along major pedestrian pathways, the role of the union as a service provider is strengthened and reinforced. Strategic placement of retail operations and dining options will encourage healthy use of these important sources of revenue, helping the union earn its way. Plazas, patios, and decks can also be key elements in establishing a link between the union and the campus, offering options for dining, programming, and just being seen. At the University of Arizona Student Union Memorial Center, food service op-

As the student union is built, remodeled, or renovated, its architectural design can symbolically represent the character and image of the campus.

tions abound and are afforded the option of interior or exterior dining seating.

Sometimes an exterior space can be underutilized and ineffective at meeting the needs of the campus. Climate can play a role in this situation. At the University of Minnesota, Mankato, a sunken patio area was walled off from the campus with 10-foot-high concrete walls and affectionately dubbed the "prison yard." The Minnesota climate took this space out of use for much of the academic calendar year. By reducing the height of the wall, adding a roof and a sun shaded curtain wall, this space has become "The Hearth Room," appropriate for the Minnesota climate and giving the student union a better relationship to the campus and the environment.

Symbolic Representations

With its role of ambassador for the campus, the student union can represent the character and image of the college or university. Each college or university is remembered or differentiated by unique attributes and characteristics embodied by the institution, its students, staff, faculty, and administration. The mission of the university, its focus, and goals also help

determine this character and image. As the student union is built, remodeled, or renovated, its architectural design can symbolically represent the character and image of the campus. Without being heavy handed, the design can provide an intuitive understanding of what the university represents.

At Auburn University, the new Student Center's 185,000 square feet are home to dining options, meeting and conferencing space, lounges and gathering space, programming and performing areas, offices, work rooms, and headquarters for student organizations and government. The challenge and directive from campus administration was to follow the architectural guidelines established to reinforce the campus style of Georgian architecture and thus reinforce the character and image of Auburn University. While the Georgian style and proportions readily accommodate smaller footprints, the large project size required careful planning, proportioning, and placement of program elements. The successful design is a vital link in the students' academic, social, and recreational pursuits, and captures the character and image of Auburn University.

Symbolic representations can also focus our vision and understanding on events, ideals, and principles. Embodied within the architecture of the University of Arizona Student Union Memorial Building are concepts of freedom, dedication, and sacrifice of those who served in the country's defense, specifically in relation to those who served on the USS Arizona and were lost during its destruction at Pearl Harbor in 1941. Subtle symbolic references are embodied in the architecture; the angular end of the canyon wall symbolically references the prow of a ship; bridges that connect portions of the buildings upper levels are subtle reminders of bridges on a battleship; a mast element and a sail-shaped sun shade reference nautical features without blatant reproduction; a circular roof over the central rotunda is reminiscent of the battleship's gun turrets.

In the 19th century Pocatello, Idaho was the scene of annual gatherings of trappers, explorers, and Native Americans. These rendezvous brought diverse cultures together in events of sociality and sharing. In a similar way,



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North Arrival Zone at the Student Union Memorial Center, University of Arizona.

the architecture of the new Rendezvous Center at Idaho State University allows a diverse population of students, faculty, and staff to gather for academic pursuits in 50 new classrooms, participate in residential living in 300 new residential suites, and to socialize in the new satellite student union that unifies the entire structure. This symbolic unifying of the campus is further supported by the location of the Rendezvous Center on campus, connecting the upper and lower portions of campus as well as unifying the residential,

academic and recreational zones of campus at the epicenter of campus life.

Future Growth

As an essential gathering place, the student union offers many opportunities to make strong connections to the campus and at the same time strengthen the image and identity of the university. When planning for the future, in redesigning or building new, key considerations will successfully integrate the student union into the existing campus, promoting smart future growth of the campus at large.

The strong position of a student center in its campus gives visitors and students alike a vital heart to their living, learning, and socializing pursuits. A fully connected student union with its visual connections, physical relationships, and symbolic representations, can positively contribute over the years by giving a stable, yet flexible base of services for a growing, changing campus as it responds to the challenges of the future. 🏛️

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USING BEHAVIORAL RESEARCH TO ASSIST IN THE REDESIGN OF UNIVERSITY PLAZAS

by Daniel J. Amsden

Planners, designers, and decision makers constantly strive to create public gathering spaces within the built environment that respond to people's needs and aesthetic values and help promote social interactions. These plazas are a vital aspect of any university campus and play a valuable role in the overall success of a campus's design. They allow an area for students and faculty to gather, relax, study, reflect, pass time, and interact with the outdoor environment. If planners, designers, and decision makers can understand the interactions between people and these designed spaces, they can effectively create better plazas in the future.

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This article looks specifically at the behavioral research that was conducted at University Union Plaza at California Polytechnic State University (Cal Poly), San Luis Obispo. University Union Plaza is a unique venue for behavioral research because it is a space that is believed by many at Cal Poly to be unattractive and underutilized. As a result, it was determined in the revised campus master plan (California Polytechnic State University 2001) for Cal Poly that the plaza should be dramatically redesigned.

Several authors have shown that design affects the way people use and perceive an outdoor space. Physical elements can affect a user's social interactions, ease of locational transport, and his or her identification of features. The behavioral research used here was designed to gain an understanding of how people react to various design attributes of University Union Plaza and how this affects the way they use the space. This research was designed to complement recent and histor-

ical efforts related not only to university planning, but also to broader topics of public space, environmental behavior and design, environmental psychology, research related to the meaning of space, visual research methods, and spatial geography. A strong relationship between environmental behavior and historical research is essential in planning our built environments in both theory and practice.

Overview of Cal Poly and University Union Plaza

University Union Plaza is the primary outdoor space within Cal Poly's 155-acre campus and is a major destination for students, faculty, staff, and visitors. The plaza has the benefit of being centrally located within the institutional core of the campus and adjacent to a wide variety of uses. It is described in Cal Poly's 2001 master plan as a gateway between the future Centennial Green (another plaza) and the existing performing arts center. The plaza is encompassed by the University Union, a student recreation center, a music center, the campus theater and bookstore, eateries, dormitories, and various physical education classrooms and offices. This study



Figure 1:
Modernist-inspired Upper Plaza (on left) and more recent, postmodern Lower Plaza (on right)



incorporating into his design a 5- to 10-foot wall between the plaza and street.

Through the use of site-specific behavioral research, we can gain a greater understanding of how people use public spaces such as plazas.

separated University Union Plaza into two spaces: an upper and a lower plaza (see Figure 1).

Upper plaza. The upper plaza was the main focus of the study and is located adjacent to the University Union. The space was designed by Lawrence Halprin in 1969 and consists of a series of concrete seating structures surrounding a central fountain. It was designed to mirror and complement the modernist style of the University Union building. The design uses concrete as the building material for the seating structures, fountain, and wall. The University Union building also incorporates a similar colored concrete into its facade on the walls facing the plaza.

The surface of the plaza was originally designed to have brick and concrete sections that radiate out from the central fountain. As a result of budget cuts at the time, the portions of the surface that were supposed to be brick were instead filled with asphalt. As a result, the asphalt's dark surface does not blend with its surroundings (see Figure 2).

Probably the most noticeable design feature of the plaza is the concrete seating structures that frame the sides of the plaza. They serve various functions, from providing seating and gathering areas to creating a definable edge for the space (see Figure 2). The upper plaza was also designed to be a separate space from an adjacent streetscape. Halprin did this by

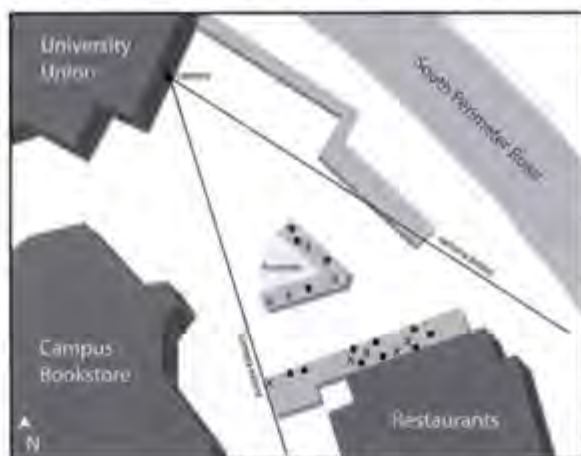
Lower plaza. The lower area was designed more recently and serves as a connector between the upper plaza and the center of the campus. The lower plaza has a different feel than the upper area and exhibits postmodern design with its strong connection to adjacent buildings and a pedestrian-friendly atmosphere. The plaza is easy to navigate because of

Figure 2:
View of the Upper Plaza from the University Union's balcony. Note the asphalt surfaces and concrete seating structures.



Figure 3: Results of Tape A

Note: X=people sitting together; •=people sitting alone.



the use of planters and other objects as borders and focal points.

Research Method and Assumptions

The hypothesis for this research assumes that a direct correlation exists between the physical design of University Union Plaza and how people were using the space. The first research technique used was to create behavioral maps from video recordings of people using the plaza. The video was shot at peak times and sped up to illustrate trends of where people were sitting, their paths through the plaza, and their activities. This allowed us to gather objective data because there was no contact with people in the plaza.

The second research technique was to ask participants to create a cognitive map of what they believed were the major features of the plaza, how they used the space, and what they liked or disliked about the plaza's design. We gave participants blank maps to draw and write on and asked them various questions related to the plaza's design. This technique enabled us to acquire subjective data, because we directly interviewed the users regarding how functional the plaza was to their needs.

Behavioral Mapping Research

Behavioral mapping is a technique that is widely used to study people's locations and actions within a given physical environment (Sommer and Sommer 1997). Information about movement patterns is typically obtained by tracking people, either on-site or through the use of film analysis (Madden and Love 1982). For this research, we positioned stationary video cameras on a balcony overlooking the plaza on three separate days. The cameras were left to record 60 minutes of continuous footage, filming the various activities people were engaging in at the plaza (known as tapes A, B, and C). Classes at Cal Poly are typically an hour long, and buses are scheduled at 60-minute intervals. This allowed the cameras to record two bus pickup/drop-off times where key circulation and gathering characteristics could be observed. We also

videotaped during peak hours (typically between noon and 1:00 p.m.) to witness the greatest amount of activities within a 60-minute interval.

After the video footage was shot, the tapes were time-lapsed to better identify trends in the location and activities of the users. We then compiled this data into various place-centered maps (Sommer and Sommer 1997) to show where people were located and the behaviors they were exhibiting. The objective was to understand how people were using the space and how the design of the space encouraged or discouraged various activities.

Tape A. Tape A was shot facing south from the University Union balcony. Figure 3 shows the camera's angle and where people were seated in the plaza and whether they were in groups or sitting alone.

Tape A showed that people mainly choose to sit on the concrete seating structures next to the fountain and on the south side of the plaza. They were all sitting in the sun and facing the main circulation paths through the plaza. For the most part, people were socializing and studying.

The video also showed some interesting circulation characteristics about the plaza. By speeding up the tape, we were able to see that a significant number of individuals who were leaving the bookstore and heading to the bus stop had to maneuver awkwardly around the fountain. This was interesting to observe and clearly showed that the fountain was an obstacle in their path.

Tape B. Tape B was shot facing east from the University Union balcony above the bookstore (see Figure 4). Similarly to tape A, it showed that groups and individuals were inter-mixed within the plaza. One difference was the large number of groups located around the fountain. This particular day was during the university's rush week, and there were many fraternity/sorority booths on display near the fountain.

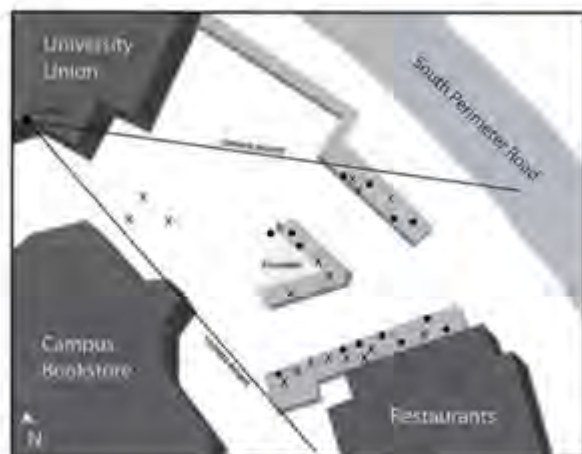
This video also showed that people had to navigate around the fountain to reach their destination. This is not necessarily

**Figure 4:
Results of Tape B**

Note: X=people sitting together; •=people sitting alone.



Figure 5:
Results of Tape C
Note: X=people sitting together; •=people sitting alone.



negative, but it does show the importance of the fountain as a design feature within the plaza. This view showed quite well the separation caused by the wall between the plaza and Perimeter Road. The camera angle also showed that the tables located in front of the University Union building were cut off from the rest of the plaza and the main pedestrian flow.

Tape C. Tape C was shot facing south from the portion of the University Union balcony located at the top of the main stairway (see Figure 5). Similarly to the first two tapes, it demonstrated that there was a wide disbursement of groups and individuals throughout the plaza. This angle also allows one to observe the entrance area to the University Union building and the bookstore where a large amount of social interaction occurs. This was interesting because the location is in the middle of the main footpath between the plaza and the University Union building. The tape also allowed for the best view of the circulation issues within the plaza and showed that the fountain presents an obstacle to people who are trying to get through the plaza.

Circulation patterns. Figure 6 shows the circulation patterns observed in the plaza and is a collection of what was observed from the three tapes. Users tended to follow pathways that were either close to buildings or in a direct line to their target. Users often passed close to the fountain in order to maneuver around it in a timely manner. There were significantly more people trying to get through the plaza than people who were staying and enjoying the space. This is most likely a result of the plaza's being a connection between various areas of the campus.

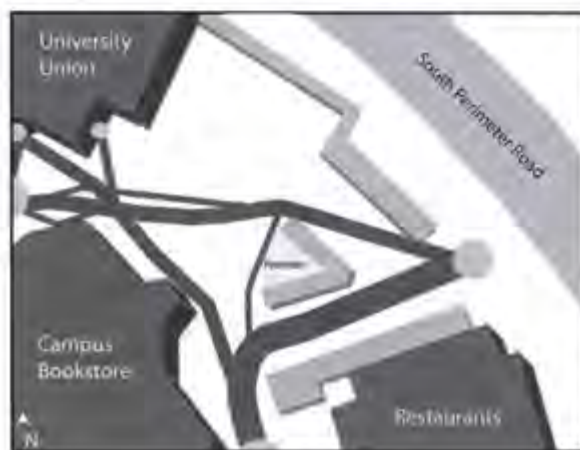
Cognitive Mapping Research

Cognitive maps are mental representations of a particular environment with which people are familiar. The term was first introduced by psychologist E.C. Tolman (1948) to explain how rats remembered the location of prizes within a maze. Tolman found that rats did not have a complete mental picture of the maze: They only remembered information that

was important in order for them to reach their reward. Tolman hypothesized that organisms tend to remember spatial traits that are relevant to a particular goal. Downs and Stea (1977) described this process as a series of psychological transformations by which an individual will acquire, code, recall, and decode information about the relative locations and attributes of phenomena in his or her everyday environment.

One of the most common cognitive mapping methods is to ask a participant to draw a map of a particular area he or she has visited. The assumption is that subconsciously people will draw features on the map that are important to them and omit features that are less important or less obvious. For this reason, cognitive maps can be quite different from the actual places they are supposed to represent (Sommer and Sommer 1997). This method allows researchers to get inside the

Figure 6:
Circulation Patterns Observed During Behavioral Research
Note: Larger lines indicate heavier traffic.



participants' heads and see how they visualize the place in question.

The cognitive mapping and survey portion of this research was designed to bring people into the planning and design process. It provides an opportunity to understand how people are using University Union Plaza and which aspects of its design are relevant and important to their needs.

These visual self-reports are limited by the assumption that only the information provided in the report has some significance to the respondent (Sanoff 1991). This particular research method is also limited by the fact that the participants' cognitive maps will be influenced and distorted by their background, experiences, purposes, and so on (Zeisel 1984). The benefit to researchers of public spaces is that through the use of this technique, they can determine which aspects of the physical environment are important to various users and which are not. In turn, they can use this information to help plan and design places that are more comprehensible to people (Zeisel 1984) and better serve their needs.

Figure 7: Survey Groups

Planning Students:	n=20
Users:	n=11
Type:	Architecture or City and Regional Planning
Students Number	20
Type:	
Freshman	3
Sophomore	3
Junior	1
Senior	2
Graduate	1
Faculty Number	1

Survey design. We administered the cognitive mapping and survey portion of the research to two groups: one group consisted of city and regional planning and architecture graduate students, hereinafter referred to as planning students; and the other included students and faculty members who were approached at the plaza, hereinafter referred to as users (see Figure 7).

The survey included the following six questions relating to various activities people participate in while at the plaza and their personal impression of the plaza's design:

- Question 1 asked participants to draw a cognitive map describing features of the plaza that were important to them relative to how they used the space. For this they were given a site plan of University Union Plaza (see Figure 8) showing only major streets and the footprints of buildings. The question asked participants to draw in key features of the plaza they believed were interesting or had some significance to them. They were also allowed to describe in pictures or words any attribute of the plaza or surrounding buildings.
- Question 2 asked participants to state whether they were students, faculty, staff, or visitors.
- Question 3 asked participants how often they visited University Union Plaza.
- Question 4 asked participants in which kinds of activities they participated.
- Question 5 was more direct and asked participants to describe which features of the plaza they liked and disliked.
- Question 6 asked participants what they would change and why if they could redesign any feature of the plaza.

Administering the surveys. The first group we surveyed was the planning students group. We approached them during one of their classes and gave a brief description of the research. We then gave the survey to the participants, who took as much time as they needed to complete it. There were

two benefits to administering the survey to the planning students. First, it was assumed that the students already had some knowledge of the theories related to urban design. This allowed them to analyze the space more objectively considering their background. Second, when we surveyed this group, they were not actually in University Union Plaza but were in a classroom on the other side of the campus. This was particularly beneficial to the cognitive mapping question because it forced them to rely on their memory of the plaza.

The second group we surveyed was the users group, which consisted of people who were approached while they were in the plaza. Users who filled out surveys included undergraduate and graduate students and one faculty member. They were given as much time as needed to complete their surveys. To remain impartial and not skew the results, we, as survey administrators, were not allowed to answer any questions about the plaza or its design.

Planning students survey results. The features that stood out most in the cognitive maps done by the planning students were the fountain, main seating areas (concrete, step-like seating structures), the large wall between the plaza and Perimeter Road (see Figure 9), and the entrances to the buildings. The respondents seemed to feel that these features were negative in either their design or functionality. The planning students mentioned positive features of the plaza, including the entrance of a newer building to the south, the built-in



Figure 8:
Example of Template Used for Cognitive Mapping Research

concert stage, tables located in the lower plaza, and a large tree in the center of the lower plaza.

A majority of the planning students stated that they only visited the plaza on rare occasions and their activities usually entailed walking through the plaza to get to some other destination. Some noted that they went to the plaza on a regular basis (i.e., one to three times a week, every day). However, their responses showed that they did not use the space as much as the undergraduate students of the user group.



Figure 9:
View from the street of the University Union Building and the Upper Plaza (on the left); reverse view back to the street (on the right). Note the large wall separating the two spaces.

Responses to the fourth question showed that walking through the plaza was the main activity that the planning students performed within the space. The utilitarian activity of buying textbooks at the El Corral Bookstore also received a significant number of responses.

Responses to question 5 provided detailed information on the planning students' views of the current design of the plaza. The results were straightforward, and the overall direction of their answers was related to the plaza's aesthetics and circulation pattern. They liked the sociability of the plaza and its adjacent uses and seemed to dislike the large amount of concrete used in the plaza, the fountain, and the seating structures.

The three most notable recommendations from the planning students were to 1) create a more natural landscaping with trees and grass, 2) design a working and aesthetically pleasing fountain as a focal point for the plaza, and 3) provide more mobile seating with tables. The students also brought up issues of poor access, lack of a sense of place, and the creation of a better stage.

User survey results. The users described features of the plaza in their cognitive maps that were similar to the planning students group. This included the prominence of the fountain and main seating structures. One difference was that the users had a favorable opinion regarding the functionality and overall design of the fountain. They generally liked the layout of the

seating structures and the fact that they could "people watch" while they were sitting.

The only negative remarks made by the users on their cognitive maps were in respect to the tables located near the large wall that separates the plaza from Perimeter Road (see Figure 9). They did not like the fact that the tables had no shade and were isolated from the rest of the plaza. These remarks were similar to those given by the planning students and suggest that participants in this research had an overall negative view toward the wall that separates University Union Plaza from Perimeter Road.

The users tended to spend more time in the plaza than the planning students, as evidenced by their answers to question 3. A majority stated that they visited the plaza on a daily basis for various activities, such as studying and visiting with friends. The users also had significantly different answers than the planning students did to question 5.

The users seemed to like the seating areas. The planning students seemed to dislike particular design elements of the plaza, whereas the users disliked the lack of functionality of the space (such as their ease of movement through the plaza). Redesign suggestions provided by the users were similar to those given by the planning students. These included the creation of a working fountain, more shade trees and natural landscaping, less use of concrete, and more functional

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features (such as tables, a visible clock, and a better connection with the street).

Conclusions

The goal of this research was to understand how people react to the design characteristics of University Union Plaza at Cal Poly and how this affects the way they use the space. The hypothesis was that there is a direct correlation between the physical design of University Union Plaza and how people were using the plaza. The research presented here used behavioral and cognitive mapping in an attempt to justify this correlation.

The behavioral mapping portion of the research justified the assumptions of the hypothesis by showing that a pattern existed between the designs of the plaza and how people were using the space. The research showed that various elements of the plaza's design affected the way people moved through the space and in which activities they participated.

The cognitive mapping research method was able to extract a large amount of information from the participants related to how they used the space and what their opinions were regarding its design. The cognitive mapping technique was also valuable because it allowed for participants to be subjective in their answers.

This research has shown that through the use of site-specific behavioral research, we can gain a greater understanding of how people use public spaces such as plazas. This particular approach was unique because it looked at an existing plaza that is scheduled to be redesigned within the 2001 revised campus master plan. Although this plaza has been underutilized for many years, the research has proven that there are some positive qualities to its design that should be taken into consideration within its redesign process.

This method was useful as a means of determining which design features should be utilized in the new plaza. It also proved to be an effective way for Cal Poly planners to analyze the plaza's existing design and determine justifiable recommendations for its redesign. This technique can be beneficial to planners and designers at other university campuses who are interested in redesigning plazas and communal areas within our built environment that respond to people's needs and aesthetic values and help promote social interactions. 🏢

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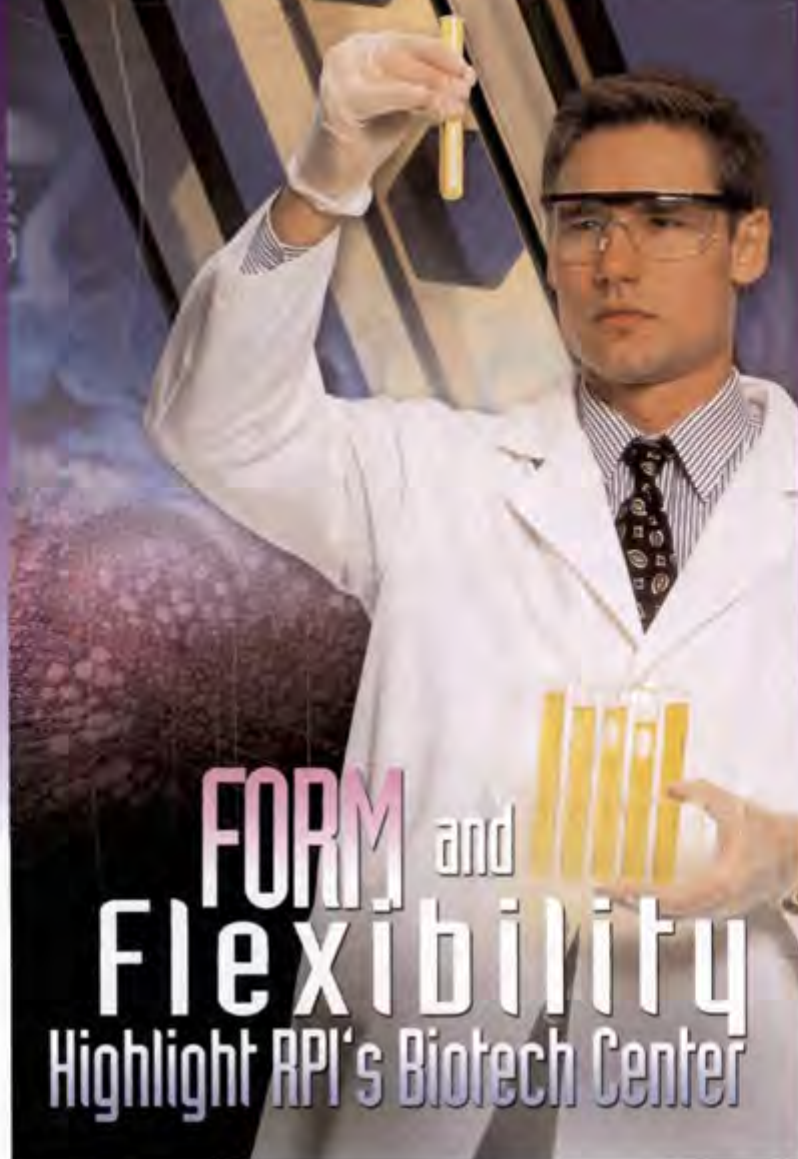


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By Amr Abdel-Azim

The new Center for Biotechnology and Interdisciplinary Studies at Rensselaer Polytechnic Institute, Troy, New York, is a state-of-the-art, advanced research platform for a new era in research at the nation's oldest technological research university.

The 218,000-square-foot, \$100 million facility (including \$80 million for construction), opened in September 2004, ranks among the world's most advanced research facilities focused on the application of engineering and the physical and information sciences to the life sciences. With its high-

tech laboratories and expansive atrium, the Center for Biotechnology and Interdisciplinary Studies provides a platform for collaboration among many diverse academic and research disciplines to enhance discovery and encourage innovation. The center is designed to foster the multidisciplinary nature of biotechnology.

Research and office space support approximately 400 faculty, staff, and students. A wired 150-seat auditorium, the Bruggeman Conference Center, and other meeting spaces enhance opportunities for collaboration on campus, throughout the region, and around the world. The labs include state-of-the-art equipment, such as a 900 MHz nuclear magnetic resonance (NMR) spectrometer.

Several years ago, under the leadership of President Shirley Ann Jackson, Rensselaer embarked on an ambitious long-range strategic plan that has led to a renaissance at the Institute. This strategic blueprint, *The Rensselaer Plan*,

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The concept of interdisciplinary studies is well supported in the building design, which creates an environment that encourages and facilitates interaction among researchers.

includes \$400 million in new construction and renovation, including the new biotechnology center.

"By establishing the Center for Biotechnology and Interdisciplinary Studies, we have created a gathering place where scientists and engineers from various disciplines will explore at the intersection of the life sciences, with engineering and the physical and information sciences, thereby accelerating discovery and ultimately enhancing the quality of life for all people," said Jackson.

The concept of interdisciplinary studies is well supported in the building design, which creates an environment that encourages and facilitates interaction among researchers. The research spaces are open and flexible in their use, and therefore conducive to collaboration among various disciplines. Meeting spaces—scheduled or by chance—abound, including wide corridors equipped with lounge furniture, and conference rooms of various configurations.

The most prominent of all the interactive spaces in the building is an atrium, which serves as a gateway to the labs on the interior of the building and the offices, in an "L" shape along the exterior. The labs are connected to the offices by bridges that cross the atrium. The atrium, with its expansive open spaces, three-tiered skylight providing natural light, and balconies, links to meeting and break rooms and connects to outside terraces. All are spaces that encourage user interface.

The 150-seat auditorium, located at the west end of the center, is designed to be an integral part of the research facility or to function independently of the core research areas. This allows maximum flexibility and maintains the required safety and security functions. The auditorium houses state-of-the-art audio-visual, presentation, wired and wireless features for the exchange of information in and beyond the facility. Every seat has an electrical outlet and data port. Above the



Adding to the quality of interior spaces, the three tiered skylight provides natural light and balconies, links to meeting and break rooms and connects to outside terraces, to encourage user interface.

auditorium is a spacious outdoor plaza that can be used for social functions that may accompany a lecture or symposium.

Features for Researchers

The building is designed to foster interdisciplinary research, changing the culture by altering day-to-day interactions, encouraging researchers to view the same problem from different aspects. Researchers work in "faculty constellations" in areas such as biocatalysis and metabolic engineering, areas that reach across traditional academic disciplines. The new structure supports and promotes these new, non-traditional interactions.

The laboratories are designed in a three-tiered hierarchy:

- Research Laboratories
- Support Laboratories
- Core Laboratories

The Research Laboratories are open labs with no intermediate walls and with no "anchor" functions that would impede their flexibility.

The Support Laboratories support each faculty constellation and are intended to house those activities that are either procedure-specific or equipment-specific. The Support Labs have less need for flexibility, but allow the Research Labs to retain their flexibility. The Support Labs contain such activities as tissue culture, microscopy, and mass spectrometry.

The Core Laboratories house research tools—in many cases one-of-a-kind within the facility—that are available for use by all researchers. These include: 900 MHz NMR, microscopy, glass wash, imaging, etc.



South elevation of the building opens up to an opened landscaped area. With columned arcade, seats, lighting balusters, and trees to form an inviting south facade.

The building is tied into the surrounding campus via an array of streetscape projects, including landscaping, exterior light fixtures, continuation of fencing along the main street of campus, sidewalks, and seating areas. The building blends nicely with the surrounding architectural fabric of the historic campus.

The Center's Structure

On the exterior, the east facade of the building is Flemish-bond red brick, designed to blend with the adjacent historic residential Quadrangle, which lines one of the main roads of Rensselaer's campus. Behind this red brick exterior is a state-of-the-art modern facility extending into the academic heart of campus. The building is tied into the surrounding campus via an array of streetscape projects, including landscaping, exterior light fixtures, continuation of fencing along the main street of campus, sidewalks, and seating areas. The building blends



The research labs are open labs with no "anchor" type functions which would impede their flexibility. Overhead service carriers with all utilities greatly contribute to the flexibility.

nicely with the surrounding architectural fabric of the historic campus.

The building includes many "green" design elements.

The atrium is naturally ventilated through a series of louvers concealed by soffits along the outside of the building. Smoke evacuation fans, required in all atrium areas, vent the space. Walls of the atrium of adjacent offices and labs are designed to temper the atrium space, hence it provides for a substantial energy savings all year around.

The building was designed by Burt Hill Kosar Rittelmann (BHKR) and Bohlin Cywinski Jackson (BCJ). Principals of these firms are graduates of Rensselaer. Construction management was provided by McCarthy Construction. The building was opened for an international biotechnology symposium in September 2004.

It has been an exciting time to see this part of *The Rensselaer Plan* in the making, with all hopes of the momentum that these projects bring to campus. 🏢

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Sometimes, even when you get it right the first time, you still have to go back and redesign. This was especially true in the case of the renovation of the El Segundo High School campus.

El Segundo Unified School District is a small coastal southern California school district. The only high school in the District is the pride and joy of generations of community residents. The original buildings were built to an exactingly high standard in the mid 1930s in a Lombard Romanesque style and have been used as the very image of a small town school in numerous movies and television programs. The majority of the remainder of the buildings were constructed during the late 1940s and early 1950s. In early 1998 the District was ready to modernize the campus. At that point they had raised approximately \$12 million to modernize and refurbish the 11 buildings on the campus.

The design team developed a master plan for the campus that stressed 1) demolition of substandard structures; 2) the utilization of the remaining building stock to its best use; 3) the modernization of all teaching spaces to provide essential pedagogical infrastructure; 4) the development of the site to rationalize parking and drop off and to create a sense of place; and 5) the construction of a new state-of-the-art music and science building. The District bravely chose to go back to the voters for additional funds, and they responded with an overwhelming approval of an additional \$25 million to carry out the new scope of work. The work was broken up into three phases so as to minimize the impact on the students, and the first phase began construction in late 2000. The final phase was completed in the fall of 2005.

Much of the work in the initial phase involved the modernization of the Administration Building and the Media

EL SEGUNDO HIGH SCHOOL RENOVATION: DESIGN AND REDESIGN

by Jorge de la Cal, AIA, LEED AP

Years of inadequate funding had created a situation where many of the buildings had significant arrears of deferred maintenance. Repairs and alterations to the existing buildings had been carried out in an ad hoc and piecemeal way with little long-term thinking in mind. In addition it became clear that both the science and music programs were housed in inadequate facilities. The analysis also showed that many of the buildings on campus needed a basic rethinking to bring them up to current curriculum and programmatic needs.

Jorge de la Cal is an associate principal for CO Architects, Los Angeles, California; he can be reached at jdelacal@coarchitects.com. This is his first article for Facilities Manager.

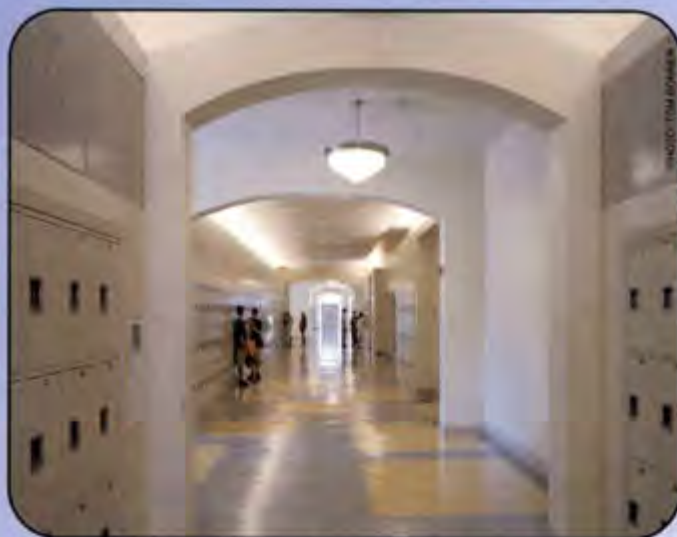


Building: new windows were provided throughout and the existing masonry and clay tile roof were repaired and restored. The landmark bell tower of the Administration Building was seismically upgraded and provided with a new elevator and carillon, but the general configuration of the buildings remained unchanged. Throughout the master planning process each building had been assessed not only as to how much work would be required to bring it up to current physical standards, but also tested as to whether or not it furthered school educational goals and curriculum needs. Some buildings passed this requirement with flying colors, others required remedial design.

The Liberal Arts Building finished in 1935 had been constructed as two floors of classrooms along a central corridor.



Campus Site Plan



Administration Building main corridor



South Gymnasium with new clerestory glazing and ventilation system

In the 1960s it had been altered by demolishing the corridor and combining smaller classrooms into larger science classrooms. In addition, a functional but insensitive lean-to addition was attached to the existing masonry structure and the symmetry of the elevation destroyed through the removal of existing windows and the addition of new exterior doors.

The redesign argued that science instruction would be better supported in a new home designed for that purpose and that the existing building would serve the high school better as additional general assignment and special education classrooms. In this case, taking a step backward was the appropriate move. The layout was redesigned to restore the original central corridor and stair, and was added a new elevator. This allowed the District to demolish the 1960s addition and restore the masonry and terra cotta exterior, including the restoration of the original columned entrance.

The original buildings were built to an exactly high standard in the mid 1930s in a Lombard Romanesque style.

The Manual Arts Building was also part of the historical core of masonry structures. It had been designed as an open steel trussed space to house the auto shop and body repair program. The program had been long discontinued and it was therefore decided to convert this building to a home for a series of computer-assisted education classrooms and computer labs. The classrooms were left with open ceilings and the steel trusses of the original building were left exposed in the new



Music/Science Quad with demonstration gardens and sunken lawn

construction as a reminder of the original use. New electrical and data services were provided through trench ducts embedded in the slab.

El Segundo High School is fortunate in having two gymnasiums with true architectural merit. Unfortunately, their support spaces no longer served the functional needs of the current physical education program. Those spaces were reworked to do away with large shower facilities and to concentrate locker rooms. This allowed the creation of new flexible education spaces and the expansion of aerobic and weight training rooms accessible to the larger community. As part of the modernization effort, the design team also provided a new ventilation system for the main halls as well as the restoration of clerestory windows and vents to reduce energy consumption generally.



South side of Science Building

At the beginning of the design for Phase II, the District energetically supported the idea to incorporate sustainable design goals into the fabric of the modernization effort; this soon led to the campus becoming a model project for CHPS (Collaborative for High Performance School). The implementation of these goals can be seen throughout the campus, from the use of drought tolerant plants and reclaimed water in the landscape, to the specification of a cool "green" roof for the



North side of Science Building looking toward Music Wing and South Gymnasium beyond

The science wing was designed with classrooms and support spaces providing college-level facilities for science instruction.

South Gymnasium. Of all of the buildings on campus, however, the new Science and Music Building provides the most complete compendium of sustainable design ideas.

The science wing was designed with classrooms and support spaces providing college-level facilities for science instruction. In addition we took the attitude that the building itself should provide instruction on environmentally appropriate building solutions. The courtyard it forms with the music wing includes a demonstration garden and a sunken lawn. In addition to providing a venue for science demonstration projects, the lawn area acts as a large retention basin for on site storm water.

The science wing was oriented on an east-west axis to optimize natural lighting. Windows to the south were fitted out with overhangs and light shelves to bounce light into the classroom space. In addition, large areas of glass were also provided at the north elevation to balance the light distribution. The lighting control system is programmed to light sensors that reduce the lighting output as natural light

Programmatic, cultural, or even stylistic change requires that buildings be re-assessed periodically to see if they still meet their users' needs.


increases. The indirect lighting system was designed to provide low glare lighting and the light fixtures were specified with high output lamps and efficient ballasts.

The science wing is also naturally cooled. This is primarily possible due to the school's location one mile from the ocean and the fact that it does not follow a year round schedule. Even so, it was a challenge to design a mechanical scheme that was energy efficient and comfortable for the occupants. The challenge was met through the installation of a green roof and the use of heavy masonry walls that are allowed to cool at night by assisted ventilation. These walls are exposed on the interior and absorb the heat generated by the students during the day. In addition, fans bring in air from the north side of the building and pressurize the classroom before being vented on the south. The same high efficiency fans bring in outside air and temper it on cold days.

In this building as in all of the others that were modernized, an effort was made to specify materials with a high recycled content. In addition, for the music wing, the District took the then-risky step of installing waterless urinals. This wing with its acoustical and light control requirements precluded natural ventilation and lighting. Even so we made every attempt to provide the highest levels of energy performance for the spaces overall. The building is built of durable concrete masonry block construction with a solid brick veneer that connects it materially with the dominant material on campus.

All architects aspire to design buildings that will stand the test of time. The modernization of the El Segundo High School campus teaches that redesign over time is a natural part of a building's life. Programmatic, cultural, or even stylistic change requires that buildings be re-assessed periodically to see if they still meet their users' needs. We hope that our design solutions for El Segundo

High School are flexible enough and of such quality and integrity to provide years of exceptional use, until the next redesign comes due. 🏠

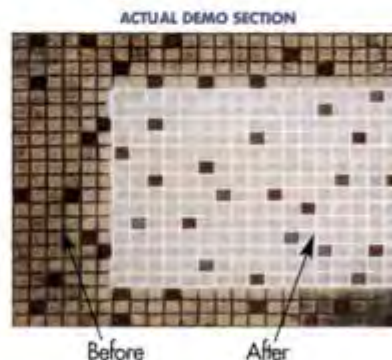


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THE IMPACT OF FACILITIES ON RECRUITMENT AND RETENTION OF STUDENTS



by David Cain, Ph.D. & Gary L. Reynolds, P.E.

This article is a summary of the full research report that will be available this summer. Over the past 30 years considerable research has been done to understand the issues that impact the decision of a student's choice of a higher education institution. This research has focused on understanding the phases of the decision process, the timing of the phases in the decision process and the personal, financial, and environmental factors that influence institutional choice. While many of these studies include some aspect of the institution's physical environment, these physical aspects are usually secondary to the main thrust of the research. (See the references at the end of Part II of this article for further details.)

PART I: RESEARCH FINDINGS

David Cain is vice president and associate, Higher Education Sector, for Carter & Burgess, Inc., Phoenix, Arizona; he can be reached at david.cain@c-b.com. Gary Reynolds is director of facilities services at Colorado College, Colorado Springs, Colorado; he can be reached at greynolds@coloradocollege.edu. This article is an executive summary of the authors' research project sponsored by APPA's Center for Facilities Research. Part II will appear in the May/June issue.

Key questions in these research projects are, "What factors influence a student's choice of higher education institution?

When and how do students obtain their information about an institution? What institutional factors influence a student to stay at their original institution of choice? What are the differences between demographic groups in this decision process?"

Through the support of APPA's Center for Facilities Research (CFaR) our research has attempted to determine the level of importance of facilities relative to other institutional characteristics and then to explore various facilities influences. In other words, "What can the physical assets (buildings, grounds, landscape, and other tangible resources) do to help recruit students?" Simply put, "What is the benefit of facilities in the recruitment process?" As a follow-on, "What, if any, impact does facilities have on retaining students?" and "Are there demographic differences in the impact of facilities on recruitment and retention?" The relationship and linkages between physical assets and outcomes are explored and examined in this study.

Does the physical environment:

- Improve the institution's recruitment efforts?
- Have a different impact on various demographic groups on recruitment?

- Improve the institution's ability to retain students?
- Have a different impact on various demographic groups on retention?

Specific Purpose of the Study

The purpose of this study is to determine (a) the relative importance of an institution's physical assets on a student's choice of higher education institutions, (b) the relative importance of various facilities in the decision process, and (c) the demographic differences in this decision process.

Survey Design

The survey tool was developed by APPA in conjunction with George Dehn & Associates, Inc. (GDA). Questions were developed based on a review of the literature, previous research completed by GDA, and APPA member experience. The questions were designed to explore the three main issues cited in the specific purpose of this study.

It was initially planned that the survey would be distributed through a mass e-mailing to approximately 200,000 students in North America. However, the new anti-spam laws would not allow this approach. Several alternative methods were discussed with concern for obtaining a representative sample. The final distribution plan involved engaging APPA members to help with distribution of the survey.

Survey Distribution

APPA membership is organization-based with each member organization identifying their organization's representative. APPA reviewed their membership list and created a list of 1,013 institutions of higher education. The membership list review was necessary because a number of APPA members are not institutions of higher education and would not have students that could be surveyed for this particular study.

Multiple e-mails were then sent to each of the 1,013 organization representatives asking for their participation in distributing the survey via e-mail on their campus. The e-mail directed them to our research website where they could learn about the survey and the need for their participation. The website also allowed them to sign up to participate and to designate a time when they would like to administer the survey on their campus. Forty-six institutions agreed to participate.

At the designated time, an e-mail was sent to the organization's representative with a password specific to that institution and the Web link to the survey. The institution then internally broadcast the password and Web link to their student population. The data were gathered anonymously at the student level and collected by the Web-based survey engine. Ultimately, 16,153 students from the 46 institutions filled out the survey during spring semester 2005.

The shortcoming to this method is that we could not control the sample demographics. As a result we explored several subsets of the responses that were demographically balanced to see if there were significant differences.

The Results

Respondent Demographics

A total of 16,153 students responded from 46 institutions across the U.S. and Canada. For this report the results will be provided for the U.S. respondents only (13,782 respondents) so that the U.S. National Center for Education Statistics (NCES) Integrated Postsecondary Educational Data System (IPEDS) can be used to examine the design of the survey.

The students were from 27 different states with a fairly even distribution between states in the East, South, Midwest, and West. Ninety-five percent of all respondents were fulltime while 5 percent were part-time compared to 93 percent full-time and 7 percent part-time nationally (IPEDS 2004). Seventy-four percent of all respondents were attending their school of original choice with 26 percent reporting as transfer students. Sixty-eight percent of the respondents were female and 32 percent were male compared to nationally reported statistics of 56 percent female and 44 percent male (IPEDS 2004). Eighty-five percent of the respondents reported they were Caucasian with 4 percent reporting as Hispanic, 4 percent Asian American, 3 percent African American, 1 percent Native American, and 3 percent mixed. This demographic compares to the national demographic of 78 percent Caucasian, 13 percent Black and 9 percent Hispanic (IPEDS 2004).

Sixty-five percent of the respondents reported they came from an urban or suburban home environment with 23 percent reporting they came from a small town and 12 percent from rural areas.

Eighty-three percent of the students attended a public high school, 8 percent attended a parochial high school, 7 percent attended a private high school with the remaining either home schooled or attended a boarding school.

Twenty-one percent of the respondents were first-year students, 20 percent were sophomores, 23 percent were juniors, 25 percent were seniors and 11 percent were graduate students.

Forty-five percent of the respondents reported a grade point within the 3.5 to 4.0 range, 33 percent in the 3.0 to 3.4 range, 17 percent in the 2.5 to 2.9 range, 4 percent in the 2.0 to 2.4 range and 1 percent with a grade point less than 2.0.

Sixty percent of the respondents reported that they first visited their institution of choice while in high school, 12 percent visited before high school, and 12 percent visited after high school. Eight percent visited their campus the day they enrolled, implying that they did not visit the campus as part of their decision process. Eight percent visited after they graduated from college, which would represent graduate students

Continued on page 57

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making a decision about an institution for their graduate work.

A total of 69.2 percent of the respondents indicated that they lived in on-campus residence halls during their first year, 19.3 percent lived off campus, and 11.5 percent lived at home.

Institutional Demographics

The respondents reported they were attending schools in both the US (86 percent) and Canada (14 percent). The respondents were asked to identify the type of institution they were attending. However Carnegie Classifications were not used as it was felt the students would not know how to classify their school. Thus, a more generic description was used. Forty-seven percent were attending a large (>25,000 students) public institution, 18 percent were attending a smaller (<25,000 students) public institution, 13 percent were attending a larger (>2,500 students) private institution, 20 percent were attending a smaller (<2,500 students) private institution, and 2 percent were attending other types of institutions.

The respondents were asked to identify the setting of their school. Sixty-one percent reported they were attending an institution in an urban or suburban setting, 34 percent in a small town setting, and 5 percent in a rural setting.

Respondent Observations and Opinions

Issues of Recruitment

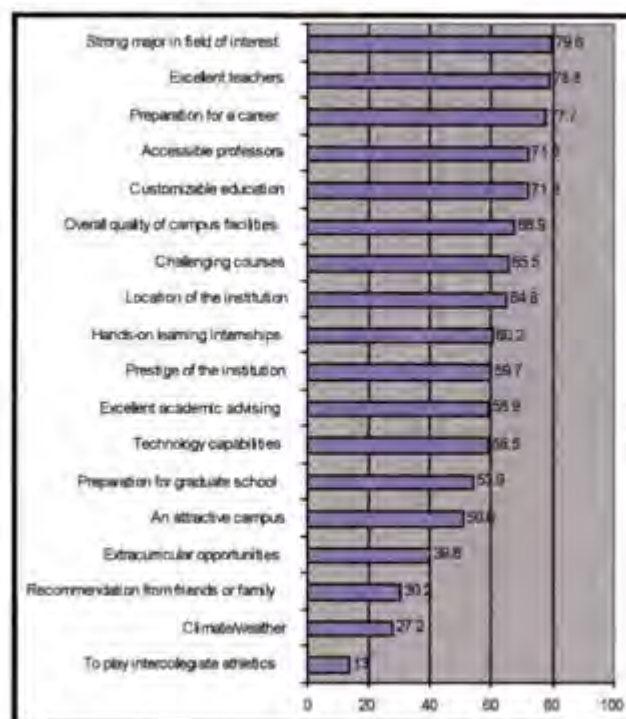
In order to understand the relative importance on the decision process of broadly described institutional physical characteristics, the respondents were asked to provide their observation or opinion on a number of institutional characteristics. A summary of the results is shown in Figure 1 for those who indicated the characteristic was "Essential" or "Very Important."

Note that the top five characteristics are academic oriented indicating that the students are evaluating the quality of their institution of choice based on its academic strength. Further note that two-thirds of the respondents indicated that the *Overall Quality of the Campus Facilities* and that half of the respondents indicated that the *Attractiveness of the Campus* were "Essential" or "Very Important" to their decision.

Since our survey sample is not gender balanced, based on national IPEDS data, this question was tested using a gender-balanced (56 percent female/44 percent male-IPEDS 2004 data) subset of the survey respondents. The data subset was created using all the male responses and randomly selecting from the female responses to provide the correct ratio. The results show the same top five in the same order but with slight changes in percentages:

Strong major in field of interest	79.1 percent
Excellent Teachers	77.7 percent
Preparation for a Career	77.2 percent
Accessible Professors	70.6 percent
Customizable Education	70.9 percent

Figure 1. Essential or Very Important Institutional Characteristics (%)



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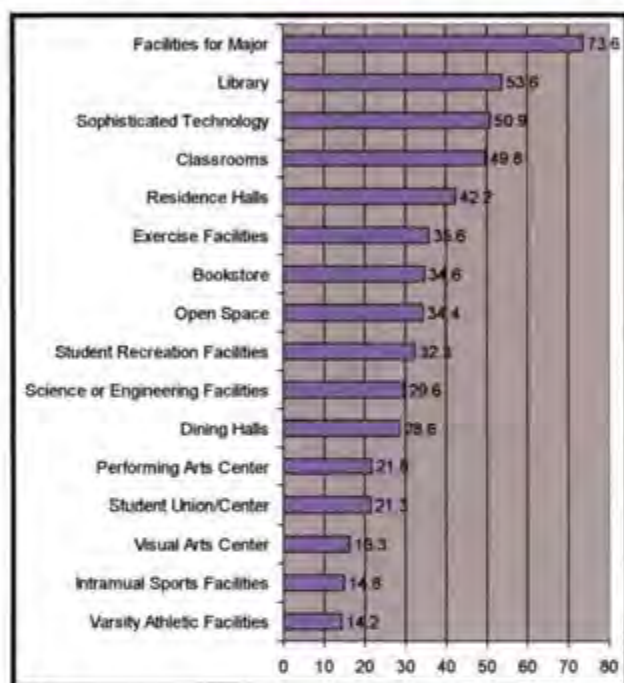
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The only overall difference is that *Technology* moved up from 12th place to 11th place and *Excellent Advising* dropped from 11th place to 12th place.

This test gives some assurance that using the entire respondent database will not significantly skew the results.

Having explored the relative importance of an institution's physical environment relative to other institutional characteristics we then explored the relative importance of various facilities by asking what was important in their decision and what was important to see during a visit to the campus. The results are shown in Figures 2 and 3.

Figure 2. Extremely or Very Important Facilities in the Selection Decision Process (%)



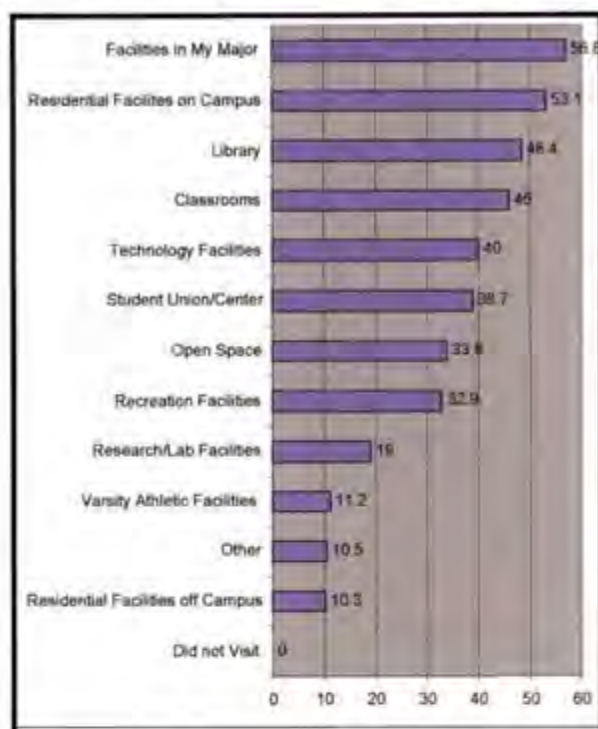
When asked to identify specific facilities (as opposed to general characteristics) the respondents focused on academic oriented facilities with at least 50 percent (including classrooms at 49.8 percent) of the respondents indicating that the top four facilities were "Extremely Important" or "Very Important."

Once again academic facilities are cited frequently, however *Residence Halls on Campus* moves up to second in importance with 53.1 percent of the respondents indicating that it was important to see during their visit.

This question was also tested using a gender-balanced (56 percent female/44 percent male) subset of the survey respondents.

The top four responses remain the same however *Residential Facilities on Campus* moves to 1st place and *Facilities in My Major* drops to 2nd place. Also, *Technology* moves up to 5th place from 6th place and *Student Union* moves from 5th place to 6th place. These results also indicate, that while there

Figure 3. Facilities Important to See During Visit (%)



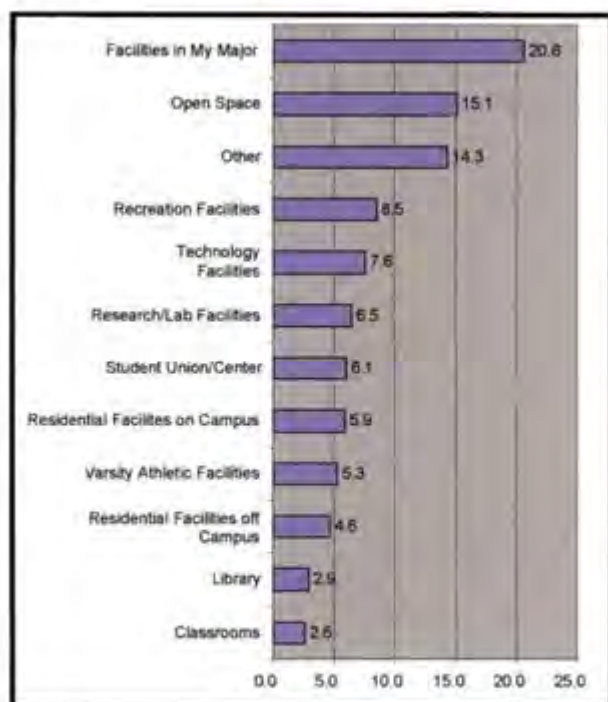
are subtle differences the general conclusions of importance remain substantially the same.

A final question was asked to confirm the level of commitment and to which facilities the respondents felt were important in their choice decision. The respondents were asked to pick the one facility that had the greatest impact on their decision; 30.5 percent of the respondents indicated that a *Facilities in My Major* had the greatest impact with 21.9 percent indicating that *Other* characteristics had an impact. We did not explore what the respondents meant by *Other* but the literature review indicates that such items as costs, financial aid, closeness to home, friendliness of faculty and staff and costs of local services are examples of factors frequently cited as having an influence on the decision process. The third most cited characteristic was *Residential Facilities on Campus* (11.5 percent) and the fourth most cited characteristic was *Open Space* (8.1 percent).

We then explored if the lack of a facility, the inadequacy of a facility or the poor maintenance of a facility had an impact on the decision process. 29.3 percent of the respondents indicated that they had rejected an institution because it lacked a facility they felt was important, 26.1 percent rejected an institution because an important facility was inadequate and 16.6 percent rejected an institution because an important facility was poorly maintained.

We also wanted to understand which facilities were causing the rejection of an institution. Figure 4 shows the percent of respondents who rejected an institution because of a missing facility.

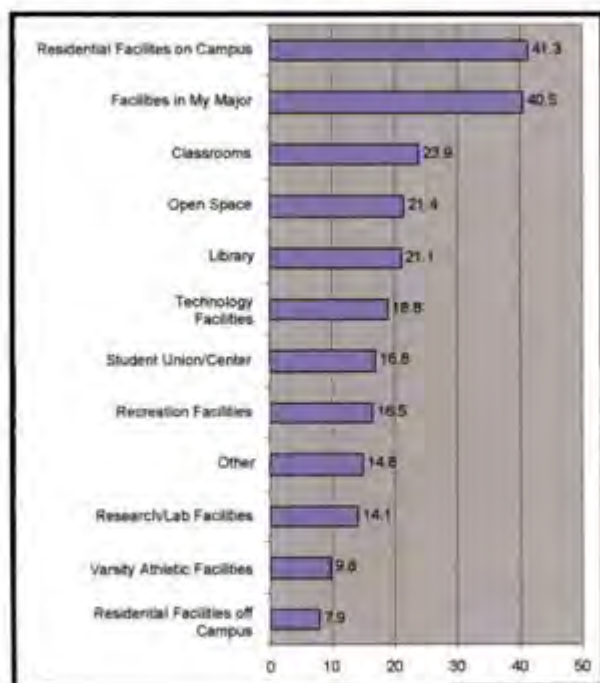
Figure 4. Facilities Missing from Rejected Institution (%)



It is not surprising that a student would reject an institution because it lacked a facility that would support their major. Note that *Open Space* has a significant impact with 15.1 percent of the respondents rejecting an institution for lack of open space.

Figure 5 shows the impact of inadequate facilities on the choice decision.

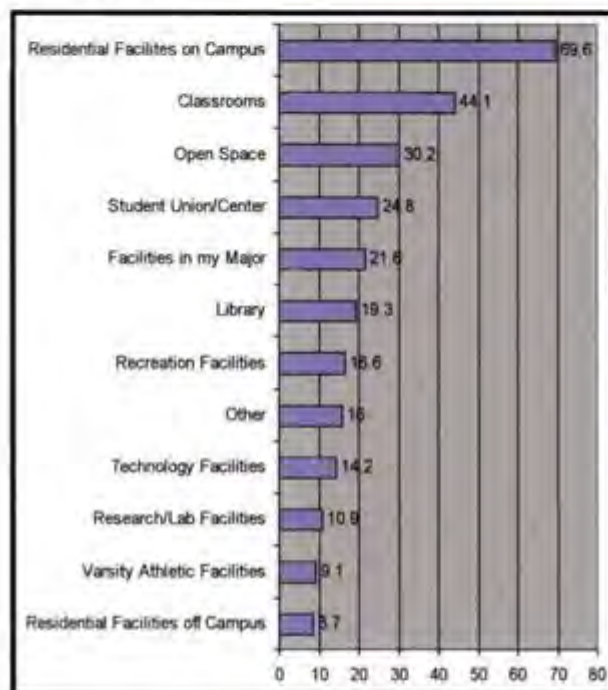
Figure 5. Inadequate Facility at Rejected Institution (%)



Residential Facilities on Campus moves up in importance. This is not surprising since 69.2 percent of the respondents indicated that they lived on-campus their first year. *Facilities in My Major* once again is near the top of the list with *Classrooms*, *Open Space* and *Library* also having a significant impact on the rejection decision.

Facilities can be inadequate for a number of reasons, one of which is that they are poorly maintained. Figure 6 shows which facilities were poorly maintained resulting in a respondent rejecting an institution.

Figure 6. Poorly Maintained Facilities at Rejected Institutions (%)



Once again, students are very discriminatory about their living and learning spaces with poorly maintained open spaces also playing a role.

The impact of the quality of maintenance was further explored by asking if the good condition of a campus' facilities was important in their choice. Seventy-six percent of the respondents strongly agreed or agreed with this statement. First impressions were also explored by asking, "When I first saw the campus, I knew this was the right college for me." Fifty percent of the respondents either strongly agreed or agreed with this statement.

Issues of Retention

We then turned to exploring how the respondents felt now that they are on the campus.

In asking about overall satisfaction of the facilities on their campus, 66 percent indicated that they were extremely satisfied or very satisfied with one-third of the respondents indicating they are only partially or not satisfied.

A paired question was developed that asked, for each type of facility, its importance to the choice decision process and the respondent's satisfaction with the facility now that they are on campus. Figure 7 shows a matrix of importance versus satisfaction using a relative scale.

Figure 7. Facilities Importance versus Satisfaction



Facilities in the upper right quadrant are both important and satisfactory to the respondents. Facilities in the lower left quadrant are not as important but are also not as satisfactory. Facilities in the upper left quadrant are not as important but are satisfactory. There are no facilities in the lower right quadrant.

Note that the academic facilities of *Facility in My Major*, *Library*, *Classrooms* and *Technology* are fairly high in importance but are also fairly high in satisfaction. These facilities will be important areas to continue to address to ensure keeping higher satisfaction levels.

A number of other questions were asked to elicit the respondent's observations and opinions but they will not be explored in this summary article. Part II: Comparative Analysis will appear in the May/June issue of *Facilities Manager* and will explore the differences of gender, race, institutional type, and other comparative responses.

In addition, overall conclusions from these research findings will be included in Part II. 🏠

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"In-source" Contracted Services

by Matt Adams, P.E.

There must be some real case study now available in our nation's MBA programs that has addressed our educational support operations. To the younger students, this area might seem non-glamorous. For the more seasoned student, the actual challenge can be more profound. In the facilities business, for example, there are plenty of worthy topics for an MBA team to address. Five or more years ago, the topic of "outsourcing" facility management operations might have been entertained. This subject is well known, but not totally exhausted.

For example, is it possible to create a distinct contracted (outsourced) business within the confines of our nonprofit world? If the answer is yes, and it is, then what does this do for the institution and the facilities man-

agement department? Now this is a new spin on an old idea that might entertain MBA students for a few months!

First of all, why would anyone even consider such a premise? Isn't this mixing oil and water, so to speak? The best answer to that question relies on the old "pendulum" metaphor. We have learned that too much outsourcing is not good, and that too little is not a solution either. Somewhere in the middle of the pendulum swing is the mix of services that is just right. To that extent, our industry still has room for much trial and error in that middle swing area.

As I said, we have learned that it is often practical to mix internal services with outsourced services on our departmental "menu." The next question becomes, are there practices that the outsource contractors embrace that we can borrow or mimic and apply to our internal service centers, a.k.a. cherry pick? For now, the answer is yes, until our peers or some super smart MBA students prove otherwise.

There are three primary areas where the contractors have better best practices than we do. These areas are cost accounting, enterprise scalability, and work-loading. With respect to cost accounting, most of us play a complex version of the old shell game. There is a financial interdependency that evolves over time that makes it difficult to financially measure (account for) and therefore manage the various service centers with fiscal accountability and transparency. We should borrow from the external contractors and properly account for and allocate all

overhead so each service center is clearly represented by its financial statements. In other words, is it "really" breaking-even or is it a loser? Most of us really don't know the answer to this for each of our FM constituent departments. In other words, we are not transparent.

The first move in organizational change with respect to cost accounting is to recast the financial statements and make the effort to accurately quantify and allocate 100 percent of the costs in the department. Some of our services are overhead and some are chargeable. This exercise not only creates the accounting systems that can be reused for this exercise year after year, but offers dramatic diagnostic data for the department and its service centers. One of the service centers that delivers what are now or potentially chargeable services is an ideal candidate to establish as the first "stand-alone" in-source contractor within the overall nonprofit department and institution.

For example, Wildcat Pest Control Services Inc. (random name, I promise) should be setup as a fully functional "contractor" built from within our department. At the end of each reporting period, the financial statements should clearly indicate the financial viability of the current set-up.

Some would say that we don't have the option of being "scalable" in the educational/institutional FM world. For anyone who has ever endured one or more budget cuts, you know this is not really true. In our new world of increased accountability and transparency, this is one of the best practices that we *must* borrow from our peers in the outsourced contract world. To do it, we must adopt new business rules (policies and

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procedures) that more aggressively manage both the supply as well as demand side of our service centers.

Let's take the more obvious first practice: supply side management. Like a contractor, we should know well what our peak season is as well as the slow time. Never again should we staff for peak season. Contractors

An internal margin on services that we can deliver competitively only creates more resources for internal reinvestment into the service center—or ultimately reduction in overhead cost recovery rates.

don't do it, nor should we. In short, there is some average load between peak and trough where we can fully charge the cost of our in-house staff. To meet the peak load, we have to utilize more options like casual labor, overtime, contract labor, etc. It is doable; the contractors do it every summer!

The other side of the equation is demand management. Supply management alone won't be successful. Only a few of our peers are willing to do this, but this practice will only grow in acceptance. In essence, the FM department and its service centers can say "no" on occasion. In some cases, the "no" may take the form of prohibitive premium charge rates or lower response times or some other disincentive, but it must be a response that is at our disposal. Contractors pick and choose the jobs they take and don't take. Our in-house contractor should adopt a version of this technique. We are not funded to do everything, so we shouldn't try!

Finally, a good contractor masters the art of work loading his or her crews. Our approach is largely reactive in the institutional world. For example, if our service centers find out what they are doing each week only when they see the output on the printer Monday morning, we are not actively managing the work load of our staff. Much of this practice requires gradual improvement of the customer—service center relationship. In fact, the basic

"mason-jar" loading approach used by most contractors is a reasonable start for our in-house contractors. Using this practice we populate our year (jar) with larger or high volume projects (rocks) first and then fill in the opening with smaller work items. If done well, there is little room for last-minute work that is unplanned. This

reality must be communicated to customers, just as a contractor would say: "I am sorry we don't have the ability to do your work until next month."

What about margin on projects? This is a new area for in-house contractors. Is it reasonable to charge a "fair" rate for services rendered even if our department has a competitive advantage and can do it for less? I believe it is. Ultimately, there is no profit for us. As such, an internal margin on

services that we can deliver very competitively only creates more resources for internal reinvestment into the service center—or ultimately reduction in overhead cost recovery rates. This practice, if successful, is better than outside contractors in that the margin is kept in the institution and reinvested.

This idea offers an opportunity for one service center to adopt and try some new best practices, even if they are from the "competition." If they work, the department and the institution win. There is no harm in trying these practices, only lessons learned. We are called upon to improve our operations and some of the tools used on the outside are worth trying within our institutional service centers. Perhaps we can have the best of both worlds. 🏢



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Training in TEXAS

January 2006 marked another offering of APPA's Institute for Facilities Management as well as the Supervisor's Toolkit in Ft. Worth, Texas, January 22-26. The Institute welcomed 109 new attendees this time, proving that APPA's professional development continues to be strong.

Facilities professionals from around the world participated in a week-long program that offered educational training in APPA's core areas of general administration, operations & maintenance, energy & utilities, and planning, design & construction.

The success of these programs is due to the dedicated faculty who continue to raise the level of professional development allowing APPA to provide premier training. A special thanks to the deans of these content areas: Mary Vosevich, General Administration; Jay Klingel, Operations & Maintenance; Cheryl Gomez, Energy & Utilities; and Don Guckert, Planning, Design & Construction. Without their expertise and dedication to their faculty, APPA would not be able to provide the outstanding quality offered at the Institute.

During the week, the Supervisors' Toolkit trainers were absorbed in providing the newest techniques for those who may be new to a supervisor role in facilities or

who just needed to brush up on some skills. Participants had a successful session thanks to their trainers, Nancy Yeroshevsky and Carol Trexler.

During some downtime, participants were able to spend time around the programs' host city of Ft. Worth. Some visited the famous Stock Yards, while others enjoyed time at museums such as Amon Carter Museum, Kimbell Art Museum, and Modern Art Museum of Fort Worth. To really get a flare for the area, many participants visited Billy Bob's Texas—a honky-tonk environment that provided a true feeling of the Ft. Worth community.

The week concluded with a celebration to mark the completion of a week of hard work by all and congratulating those who officially graduated from the Institute. The Class of January 2006 consisted of 56 who proudly participated in Thursday's evening festivities.

Program participants experienced a week of outstanding training, wonderful networking while visiting with old friends, and meeting new colleagues. We look forward to seeing all at the next APPA professional development opportunity. Please visit www.appa.org for more information and registration dates.



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The Bookshelf

Book Review Editor: Theodore J. Weidner, Ph.D., P.E., AIA

Nanotechnology: Environmental Implications and Solutions, by Theodore, Louis and Robert G. Kunz, Wiley-Interscience, New York, 2005. 366 pages, \$99.95, hardcover.

Universities are all about research and instruction. The research is usually cutting-edge. It can be exciting and attract a great deal of interest. Research can also be a challenge for the facilities organization. One of the research areas to challenge higher education facility and safety officers is nanotechnology.

Rising to the challenge of dealing with a new technology often requires the facility officer to do some significant research in order to address the challenge adequately. In the 1980's research into semiconductors lead facility officers to understand how to deal with very hazardous chemical and gasses. There were gasses that ignited when exposed to oxygen and others where the researchers joked if you could smell almonds you would be dead. As we designed the facilities we met with local code officials and explained why the local building code actually made the laboratory more dangerous; we got variances and developed new safety devices. We installed sophisticated air and gas detection systems, tied them to alarms and the buildings automation system, and set aside a room as an emergency management center in the event

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something went wrong in our new, expensive, sophisticated laboratory.

Now, to assist with the management of facilities and nanotechnology research, among other things, Theodore and Kunz have compiled an important and dense reference to assist the university facility and safety

officers with the challenges of nanotechnology. *Nanotechnology: Environmental Implications and Solutions* begins with what nanotechnology will do for society. Imagine a spray for paper that makes it waterproof yet you can still write on it. Those khaki slacks you may be wearing resist spills and stains thanks to nanotechnology; it's a little like Alec Guinness in *The Man in the White Suit*. But what happens if the nano materials don't end up where they are supposed to? How do we deal with them?

Nano-sized particles are small, extremely small. The average human hair is about 10,000 nanometers (nm) in diameter. Some bacteria are 1,000



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nm in size while the common cold virus is 20 nm. Nano-particles are anything 100 nm or less. Their small size means they fit into the cracks and crevices of most common materials. That size also means they behave differently. Controlling nano-materials is a challenge because normal air filters might not work. If not floating in the air, nano-materials might be suspended in water or an apparent solid form

like very fine sand. How can they be managed to prevent accidental exposure, inhalation, ingestion, etc. What will happen to someone with nano-materials in the lungs?

I'll be the first to say this book is not an easy read so I don't recommend it to people who don't have to deal with nanotechnology researchers unless you like science. Even then, the "Cliff Notes" version might be pre-

It is my intent to keep this book and study it more as my university makes plans for a nanotechnology research building.

ferred. However, the authors do a good job introducing the positive aspects of nanotech first, then address the potential environmental and health implications and the physics behind our 'standard' environmental management systems and how nano-materials will behave as we attempt to filter, trap, sequester, or manage these materials. In addition to the physical issues the authors discuss risk assessment for health and the environment. Lastly, there are several scenarios presented to pose ethical questions for professionals. Each scenario then poses several questions which go unanswered and clearly require discussions with others and ethicists.

Does this book tell the reader everything needed when a new nanotechnology laboratory or facility is constructed on your campus? No. But it will help the determined reader grasp many of the implications, challenges, and opportunities presented by the management of nanotechnology materials. It is my intent to keep this book and study it more as my university makes plans for a nanotechnology research building. If you have a similar situation, this book may be for you.

This is one of the first books on the subject and it will not be the last. Nano-materials form a vast research area with many possible benefits. We'll have to develop means and methods to deal with these materials so we can avoid, as best we can, situations similar to asbestos, PCBs, and other materials. Chief Seattle said, "Continue to contaminate your bed and you will one day lay [sic] in your own waste." Learning how to manage these new materials is essential for our future. 🏠



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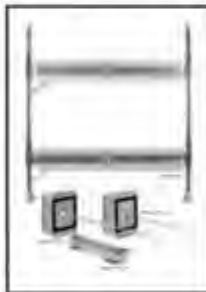
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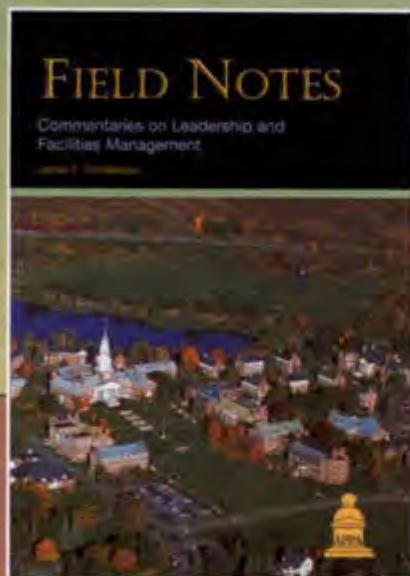
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—The author



About the Author

James Christenson, a past recipient of APPA's Meritorious Service Award and Rex Dillow Award for Outstanding Article, has worked as a facilities professional for more than 40 years in 17 different facilities management positions. *Field Notes* provides an interesting read and plenty of useful ideas for the facilities professional or anyone involved in leading an organization to success.

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Jul 8-11—Campus of the Future. Honolulu, HI. Joint conference by APPA, NACUBO, and SCUP. Visit www.campusofthefuture.org for more information or to register.

Sep 10-14—Institute for Facilities Management. Indian Wells, CA.

APPA Regions - 2006

Sep 30-Oct 4—PCAPPA Annual Meeting. San Jose, CA.

Sep 30-Oct 4—CAPPA Annual Meeting. San Antonio, TX.

Oct 1-4—MAPPA Annual Meeting. Indianapolis, IN.

Oct 12-17—SRAPPA Annual Meeting. Durham, N.C.

Oct 15-18—ERAPPA Annual Meeting. Mystic Seaport, CT.

Oct 18-22—RMA Annual Meeting. Billings, MT.

Other Events - 2006

Mar 20-21—Management Models for Capital Projects and Facilities Management Conference. Hilton Head, SC.

Mar 27-28—International Conference on Biocontainment Facilities. St. Petersburg, FL.

Apr 10-11—Summit on Facilities for Emerging Sciences 2006. St. Petersburg, FL.

Apr 19-21—National Conference on

Building Commissioning. San Francisco, CA.

May 1-2—Research Buildings 2006. Boston, MA.

Jun 25-27—ACUHO-I 58th International Conference. Atlanta, GA.
Contact Jennie Long
jennie@acuho-i.org.

Jul 17-18—Science Buildings Canada 2006. Vancouver, B.C. Canada.

Oct 15-18—NACAS 38th Annual Conference. San Diego, CA.

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