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The ways in which students learn, work, and interact are changing at a such a rapid pace that future higher **education** facilities will require radical rethinking during the next decade. Now's the time to start planning for the Class of 2020.

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BODY:

The nation's colleges and universities have a decade until they welcome the Class of 2020 to campus. That's just 10 years for schools to prepare for the demands these students will make on both their academic programs and physical facilities.

Judging by the presentations at this summer's joint conference of the Society of College and University Planners, the National Association of College and University Business Officers, and the Association of Higher **Education** Facilities Officers, the student population entering college 10 years from now will require a radical rethinking of campus facility design. Building Teams need to start working with colleges and universities to plan some of the most significant changes to happen to academic facilities in recent memory-to design and build multipurpose academic buildings with flexible spaces that accommodate formal, informal, and group learning and residence halls that offer true live/work/play environments.

Let's start with the design of the ever-evolving academic facility itself.

Academic Facilities-Where Technology Meets Pedagogy

One of the biggest drivers of change noted by speakers and attendees at the conference was-no surprise here-technology. Consider the lightning-fast pace at which today's young people adopt the newest tech toys. With iPods, Palm Treos, text messages, blogging, IMing, MP3s, and **podcasting** already part of their everyday lives, imagine what innovations these "digital natives," as some have called these Net Generation kids, will be taking with them as they invade college campuses in 10 years.

Such gadgets and services can't be dismissed as mere entertainment. They are in fact changing the way this generation learns, researches, socializes, and interacts with teachers and peers. The Net Generation is constantly connected, and once in college they will rely less on formal classroom instruction and more on informal information gathering 24/7 from inside and outside the classroom with the click of a mouse-if such a thing as a mouse even exists then.

Students in 2016 are also going to be very comfortable studying in groups and collaborating with peers. Remember, this is a generation that grew up chatting and sharing personal ideas in public Internet forums and whose best friends might be "virtual" people they've met through MySpace, Facebook, or Friendster. Even today, it's not uncommon for this generation to have logged as much time in front of a computer screen as they have with real people.

In part due to the impact of technology, future academic buildings will have to emphasize flexibility; in 10 years, most new academic buildings won't be shrink wrapped around specific programs, says Mark Maves, AIA, SVP for A/E firm SmithGroup in Washington, D.C. "My sense is that there'll be specialized building types only in cases where you end up needing science labs or things that aren't terribly mobile," he says.

Maves sees academic buildings evolving into facilities were learning occurs in multiple locations and in spaces shared by different academic departments-a concept he admits is now just starting to garner attention but one he predicts will be fully embraced by the time the Class of 2020 enters college.

Andrea Cohen Gehring, AIA, LEED, design partner with WWCOT in Santa Monica, Calif., also sees shared facilities as the future of academic facilities. "You're not going to have a lecture hall per department, but rather shared facilities where multiple departments sign out lecture halls or classrooms to allow maximum use of the space," she says. Gehring recently completed plans for a 47,000-sf academic building for West L.A. Community College in Culver City, Calif. The building is centrally located, so each of the school's department can utilize the building's 16 classrooms or its single large lecture hall.

Shared academic buildings offer economic advantages. "Not every department needs everything," says Gehring. "This type of building is a way to economically create efficiency and give the college the space it needs, while keeping academic programs intact."

"Robust technology" is critical for shared facilities, says Maves, but you also need a solid plan for introducing new technology into facilities where each academic department may have unique technology requirements. Wireless technology is already part of the educational landscape; by the time freshman enter college in 2016, a decade of technological advancements will have come to market-so schools will have to integrate the technology as quickly and easily as students adopt it.

Another reason for greater flexibility in future classrooms and lecture halls goes to the issue of pedagogical style. The Net generation will be looking for a more Socratic learning process with less formal, traditional lecturing and more interaction between teacher and students and among the students themselves. "It's an interesting evolution, trying to create more intimacy in the classroom setting when classrooms still have to accommodate 100 or 200 students," says Maves.

One significant change that is already taking hold is classroom size. "The space to do interactive things and to work efficiently in groups is getting larger," says Maves. "The typical academic space is now about 7-8 sf per student, but a truly interactive space ranges from 28 to 45 sf per student," he says. The extra space is required to allow for seating in horseshoe configurations instead of traditional rows, or to incorporate more space between seats or tiers of seats. Rooms will have to be configured to allow students to adjust their positions to work with people seated in front of or behind them. Even though individual facilities will be larger, however, fewer buildings will be required because facilities will be shared more extensively than is the case today.

Maves is also optimistic about the effect **podcasting** and other distance learning methods will have on classroom space. If **education** delivery can happen anywhere, will future academic spaces need to seat 200 students? In a recent *Los Angeles Times* article, a UC Berkeley professor reported that after putting audio recordings and digital videos of his lectures online, only about 20 of his 200 enrolled students showed up for class. (Maybe the occasional "pop quiz" will lure them back to class.)

For the Class of 2020, a social bunch comfortable with informal, group learning, it's critical to have space outside the formal classroom setting where they can collaborate with both instructors and peers. One of the best locations is literally right outside the classroom or lecture hall-hallway circulation space as collaboration space.

"There's no such thing as a utilitarian part of a building," says WWCOT's Gehring. "Hallways are opportunities for meetings, exchange, collaboration, and discussion."

SmithGroup's Maves agrees. In planning a $110 million building for New York Law School in New York City, he designed lecture halls that open into extra-wide hallways furnished with sofas and chairs. His design for George Washington University's School of Business in Washington, D.C, also includes multiple areas where circulation space morphed into gathering space.

In Kanbar Hall at Bowdoin College in Brunswick, Maine, Peter Kuttner, FAIA, president of Cambridge Seven Associates in Cambridge, Mass., virtually removed hallways altogether from the 26,000-sf building's first floor, even turning one area into a "living room" for the **education** department. Department offices and an entrance door open into this cozy area, which is furnished with a sofa and chairs.

"It's great circulation space, and so much better than a hallway would be," says Kuttner, who kept a 50% ratio of formal to informal academic space on Kanbar Hall's first floor. On the building's upper two floors, Kuttner minimized the impact of hallways by including bump-out windows and designing exaggerated elevator lobbies that function as lounge space. Each floor also has a dedicated study lounge and study space.

One of Kanbar Hall's biggest spaces is the 2,000-sf learning center, essentially a study lounge with a kitchenette where group discussion, hanging out, and learning are all encouraged. "In architecture we've all learned that you can't make informal learning happen, but you can put up obstacles to formal learning," says Kuttner.

Campus Residences-Forging Communities, With a Touch of Privacy

As comfortable as these future students may be with sharing and interacting in the learning environment, they feel somewhat differently when it comes to their living environment. The NetGeneration will arrive on campus in 2016 having never shared a bedroom with a sibling, so the concept of sharing one with a randomly assigned roommate will be completely alien. They may come to view their larger residential environment as their community, but that must be balanced by the ability to find privacy when needed. So, while students will see their sleeping quarters as sanctuaries, they will see the rest of the residence hall as an extension of the campus environment with the same 24/7 access to **education** and services.

What will future residence halls be like? That's what Michael Coakley hopes to determine. Coakley, recently named executive director of residential life at Arizona State University in Tempe, chaired the Association of College & University Housing Officers International's "21st Century Project," a program that brought together leading campus housing professionals to discuss and debate the future of college housing.

If the housing specialists' prognostications are right, future residence halls are going to be radically different from those of today. Coakley breaks down the existing campus housing stock into two groups: those that were built in the 1950s in response to the huge demand for campus housing following World

War II, and a second wave of housing built in the '60s when the Baby Boomers stormed America's campuses.

The design imperative for both groups, according to Coakley: cram the greatest number of bodies into the smallest footprint possible; hence, double-loaded corridors, shared bedrooms, and common bathroom-a layout that today's students abhor.

The residence halls the Class of 2020 could be calling home will be active, 24/7 environments with all the prerequisite technological goodies in a mix of building types-recreation, retail, food, and learning spaces-that provide a sense of community balanced with private living space.

The 21st Century study participants identified four design types that address future student needs: the Village, the Neighborhood, the Block or Street, and the Home. The prototypes are modular in design so they can be scaled up or down and built vertically or horizontally to accommodate campus needs, physical constraints, or economic considerations.

Starting at the macro level, the Village would be a cluster of buildings that shape the overall residential environment-the residence halls, the retail shops, a recreation facility, academic spaces, or whatever facilities institutions might dream up. There would be a true village center-a garden, park, student green, pedestrian plaza, or similar open area designed to encourage student interaction.

The Village would also encourage student-faculty interaction. Currently, says Coakley, most faculty members are "extremely uncomfortable" coming into the student housing environment. The Village concept, he believes, will break down that barrier by creating "very enticing" academic spaces within the overall residential environment, but separate from actual student living space.

Each Village would have a recommended student population of 500-1,000 students and would be comprised of several Neighborhoods.

The Neighborhood would constitute the residence hall itself. With a recommended population of 150 students, the Neighborhood would be the students' hub of social activity. Each building would have a public lobby, coffee lounge, small retail shops, and other community spaces.

Next would come the Block or Street-individual floors or wings within the Neighborhood (or residence facility). Their number would vary by Neighborhood size and configuration, from 15 students to 50, with an average of about 30, depending on the building's architecture or organizational arrangement. Some schools might choose to organize Blocks by grouping students of similar age, grade level, major, or avocation. Blocks would be seen as primarily residential space: community space would be restricted to quiet study lounges.

At the micro level, the Home would be the private student residence on the Block or Street where collegians would close themselves off from the Neighborhood community when they chose to do so.

In the 21st Century Project, the merits and pitfalls of random assignment of roommates was vigorously debated. "How necessary is the roommate experience?" asks Coakley. "I think being part of a community is necessary, but does having a roommate help you engage with the community? Is this one freshman-year experience where you're forced to live with someone you don't know really a benefit, or does it cause problems for academic success? That's what we couldn't come to terms with."

Possible design concepts for the Home resulting from this discussion might include single-student spaces, shared suites, and apartment configurations with individual bedrooms and bathrooms opening to a common living-kitchen area.

Sustainability in Higher **Education**

There are 4,000 higher **education** facilities in the U.S., which annually enroll 15 million students. Because the buildings in which these students are educated and housed generally are built to last two or three times as long as that of most commercial structures, they have a significant long-term impact on the environment, says Ellen Watts, AIA, LEED, principal at the Boston architectural firm Architerra.

Watts and her colleagues researched sustainability practices among the 13 colleges and universities belonging to the Boston Consortium, whose members represent a diverse pool of higher **education** institutions-the largest with a student enrollment of 25,000, the smallest with 225. Eight of the consortium members, representing 60 million sf of building space (roughly equal to the amount of office space in the city of Boston), completed the survey in both 2003 and 2005.

The 2003 results indicated that sustainability practices among consortium members varied widely, with the leading institution adopting twice as many sustainability practices (83%) as the lowest-scoring institution (41%). Only three of the 13 consortium members belonged to the U.S. Green Building Council; only three had LEED-certified buildings.

Member institutions based most building product purchasing decisions on cost, maintenance, and durability, not environmental preferability. Operating cost savings were key drivers for sustainability, but perceived cost premiums (even if not proven) were listed as the key barrier. "We absolutely do not believe there is much of a premium if any," says Watts.

As for the 2005 update, Watts refers to the results as sobering. Significant among the findings:

Water consumption among the institutions went down 5% between '03 and '05, but electricity consumption went up 14%-likely the result of the proliferation of students' tech toys.

Energy costs (electricity, fuel oil, and natural gas) went up 40% in two years. The average cost per person-students, faculty, and staff-was almost $1,000.

Total energy consumption increased a dramatic 60% between '03 and '05.

Based on this research, Watts offers four suggestions as to how individual colleges and universities improve their sustainability practices and performance:

Colleges and universities need to identify a strong, clear leader who can spearhead an institution's sustainability programs. Performance can't improve if there's no one pushing improvements. Institutions should conduct energy audits to establish what they're doing well in terms of sustainability practices and where improvements are needed. Colleges and universities should create sustainable campus plans, which go beyond traditional campus plans by taking a holistic look at the campus. Higher **education** institutions should take collective action-sharing ideas, jointly addressing problems and developing solutions, taking advantages of economies of scale and bulk purchasing.

Key components of future academic facilities

* Shared academic buildings

* Flexible/adaptable classrooms and lecture halls

* Larger but fewer classrooms and lecture halls

* Circulation space as collaboration space

* Multipurpose areas

* Group study space/lounges

* Accessible technology

Key components of future residence communities

* Student communities with living, recreation, academic, and retail spaces

* Flexible building designs for varied student populations

* Designated social hubs

* Mix of group work space and quiet study lounges

* Private living environments

The freshman class of 2020

16 million : The number of undergraduate students expected to be enrolled in the nation's colleges.

80% : The increase in minority-student enrollment. Hispanic-Americans will account for the most significant gains, followed by Asian-Americans and African-Americans.

7.8% : The decrease in Caucasian student enrollment.

31% : The increase in enrollment of older students (aged 24 or older).

41% : Approximate percentage of male undergraduate students (the number of female undergraduate students is already starting to surpass male student enrollment.)

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