

360°

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Rethinking Higher Education Spaces

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360°

ABOUT THIS ISSUE “You send your child to the schoolmaster, but ’tis the schoolboys who educate him.” Emerson’s observation is more true than ever. Students are more engaged in learning together, frequently working in groups and interacting with peers. The professor’s role is changing from “sage on the stage” to “guide on the side,” as educators phrase it. Yet most college classrooms are set up for Emerson’s era. That’s why designers and educators are rethinking the classroom, installing flexible furnishings, user-friendly technology, and other new tools that support interactive learning. Libraries are changing, too, evolving from musty book warehouses to places for group and individual learning. All over campus, hallways, commons areas, cafes and other in-between spaces are extending the learning experience. In this issue of *360 Magazine*, we talk to the people making it happen, look at innovative campus spaces, and yes, learn from our peers.

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INTRODUCTION

┌ All ages are
off to college. ┐

Gen Y students want a degree and a job, of course. Gen Xers and younger Boomers are attending grad school and night class to polish their skills, while older Boomers are making university towns – vibrant, diverse, intellectually stimulating – the new retirement locales of choice.

A big attractor: being where innovative things are happening. For example, universities are leading the effort to digitize knowledge and information; a joint effort of 30 university libraries will soon have scanned 7 million volumes. Younger generations are always exploring the edges, and Gen Y students have brought their own attitudes and ideas to campus. They seek 21st century skills – collaboration, critical thinking, content creation and analysis, and more – and they're pushing colleges to prepare them to compete in the new global economy.

College economics have changed, too. (The cost, that is; the course is still a mystery to most of us.) The tab for tuition and fees at private schools has risen 250% in constant dollars over the past 30 years, nearly 300% for public schools. Student and parent expectations for their investments have risen similarly. Colleges are trying to meet those expectations while dealing with increases in the price of everything from real estate to the pasta in the dorm cafeteria.

As a result, colleges and universities are transforming their teaching methods, reconsidering how they use tools and technology, and rethinking the spaces where education happens. Steelcase

researchers have studied higher education for more than a decade and have developed a deep understanding of learning spaces and the needs of students, faculty, and administrators. Based on these findings and interviews with educators, designers, and facilities professionals, in this issue we consider space and its role in higher education.

First, we look at how the classroom is being reinvented to support new pedagogies that deeply involve students in the learning process. Next, the library: it's no longer a book warehouse, but a place for planned and random acts of teaching, learning, and group work. Our third feature examines how learning spills into hallways, cafés, and common areas across campus, and strategies for making the best use of these places.

Lessons Learned captures key insights for making college not just attractive but productive for everyone on campus. And our Q&A guest this issue, Deborah Loewenberg Ball, Ph.D., head of the education school at the University of Michigan and a renowned researcher and practicing educator, offers a unique perspective on how to improve the learning spaces for both students and teachers.

We hope you enjoy our visit to campus.



Innovation enters
the classroom



Gen Y college students expect technology to be readily available, yet most classrooms are tech wastelands. Innovative college administrators are incorporating media:scape settings which let students share content and present their thinking to others at the push of a button.



Want to see something amazing? Visit a college classroom.

You'll be amazed, perhaps astounded to learn that today's classrooms look completely – like the ones you sat in five, 10, or even 50 years ago. Despite revolutionary technology, the information explosion, and an interconnected planet, not to mention improved teaching and learning methods, the typical college classroom is fixed in time like a museum diorama.

Sure, there's often a computer in the corner that can pull up a YouTube video, maybe even an electronic whiteboard. But the scene rarely changes: rows of hard chairs with little tablet arms, a writing board attached to the wall, an instructor's lectern – in short, everything geared to the lecture format developed back when the only iPad was a chalk slate.

Can 19th century classroom design be the best way to prepare students for the 21st

century knowledge economy? Now that would be amazing.

A few classrooms, however, are escaping the educational equivalent of a land time forgot. You'll find these innovative spaces at well-known schools such as Arizona State University, the University of Michigan, and Stanford University, as well as at small community colleges you may not have heard of before. These schools are reconsidering the relationships between classroom space, furniture, technology, and pedagogy and seeing great results.

Many educators say it's about time. "A lot of classrooms, in terms of flexibility, ease of use, comfort, proper lighting, I'd give a failing grade," says Dominique Laroche, director, Office of the University Architect at Arizona State University (ASU) and a faculty associate with the School of Architecture and

Landscape Architecture. "Technology is light years ahead of us. The infrastructure and the classrooms are lagging behind."

"Students today are far more connected, far more facile with technology than students 30 years ago, but schools haven't accommodated what kids can do, or adjusted what we try to do with them. You see students using laptops or other devices, but the instruction often isn't designed to take up on the fact that they're coming to class with those tools instead of binders and pencils," says Deborah Loewenberg Ball, dean of the School of Education at the University of Michigan (U of M) and a prominent researcher in effective teaching methods.

Jason Meneely, a professor in the College of Design, Construction & Planning at the University of Florida (UF), agrees that today's



If it's not written down, an idea can vanish in a matter of seconds. Whiteboards are simple and effective means for capturing, evaluating, and sharing ideas in any learning environment.

“We need to teach students not only how to acquire knowledge, but to be problem solvers, how to think and operate when they don't have all the information.”

Jason Meneely
Professor, University of Florida

Generation Y students “have expertise and knowledge, particularly of technology and social networking, that we can start to leverage if they're given a voice in the classroom,” but says it's not the primary reason to change. “The problems in today's world are complex and the pace of change imposes a short shelf life to the knowledge students acquire. We can't emphasize knowledge as a fixed quantity. The accumulated knowledge in every discipline shifts so quickly that what we

need to teach students, beyond the acquisition of knowledge, is how to become problem solvers and how to think and operate when they don't have all the information.”

Most college classrooms are set up for passive note taking, not the give and take common to knowledge work. “We found that most classrooms are a barrier to learning and don't support the individual needs of students and instructors,” says Elise Valoe, a principal researcher with

Steelcase WorkSpace Futures. Her team studied learning spaces at a dozen different universities across the U.S., including public, private, and community colleges.

“In many academic disciplines, the curricula are moving to constructivist learning theory where students actively construct meaning when they make their own discoveries during the learning experience. It's how colleges teach students skills for the knowledge economy: how to work in groups, how to collaborate with others, creative problem solving, and other critical thinking skills. As a result, college students today have a much greater role in the learning process. They spend almost three-quarters of their class time in group discussions and nearly a quarter of their time in group work.”

Yet traditional classrooms, which is to say most in use today, make working in groups and other new pedagogies (strategies of instruction) an almost impossible task.

Steelcase research shows colleges share many common problems:

- aging infrastructure – most buildings were constructed in the 1960s or earlier
- classrooms built for lectures, not learning
- very limited flexibility inside classrooms
- student movement is limited (fixed tablet arms, chairs and tables without casters, etc.)
- interaction between students and instructors is constrained by space and furniture
- technology is poorly integrated into the classroom
- support for collaborative learning is inconsistent or nonexistent

Add to those issues space standards that are driven by efficiency, a design process that doesn't usually involve users, and too many other demands for funding, and it's no surprise classrooms change at a glacial pace.

TEACHING OLD CLASSROOMS NEW TRICKS

As more educators shift to constructivist teaching methods, the need to rethink the classroom becomes more pressing. There's no single right answer. Steelcase researchers



Classroom work today means studying individually and in groups, with both analog and digital tools. (Photo courtesy of the University of Florida.)

found that schools vary in the degree of change that's right for their curricula and need a range of solutions to fit desired learning outcomes. "We see it as a spectrum of change that schools can explore as they move to a more constructivist pedagogy,"

says Valoe. "It may range from simply changing the furniture in existing classrooms to a more significant change in structure and technology, all the way to a learning environment that doesn't even resemble a traditional classroom."



In constructivist learning approaches, students are more engaged in the learning process and work closer with their peers. They spend up to three-quarters of their class time in group discussion.



One classroom, multiple settings. Mobile node chairs let students and teachers shift quickly from lecture mode to a U-shape set-up for discussion to working in groups. 89% of the students in this U of M class said the node chair improved their concentration and focus and 99% said the chair makes it easy to move into different activities.



Adding media:scape® to a LearnLab™ environment lets students present their laptop content at the click of a button.

Educators and college planners say the underlying need is for flexibility. The rationale is simple. Different courses often use the same classrooms, yet their needs vary: science classes are different from English discussions or business seminars. Teachers and pedagogies vary, so classes might employ lecture mode, group set-ups, individual work – from one class to the next, or even during the same class period. Flexibility in furniture, technology, and space simplifies transitions between different modes, classes, and teaching styles.

“We like to offer different types of spaces for students to work in so that they can be intentional about what space they want to work in during that phase of their process,” says Scott Doorley, a professor at Stanford University’s Hasso Plattner Institute of Design. “So we can have students jump into a space that has low couches when they want to have a discussion or reflect. Or a space that has tools if they want to be building, or a space that has whiteboards and stools if they want to have a brainstorm and be active about sharing ideas. We try to give students an environment that allows

them to be intentional about what they need at any given time.”

Flexibility is a need not only in classrooms in North America, but in Europe as well. “There is a clear need for increased flexibility with learning spaces, to be able to reorganize the layout according to the task, the topic, and the activity,” says Jean-Marc Jeltsch, vice president, Intellectual Property, Contracts & Partnerships at the University of Strasbourg, Strasbourg, France.

Classrooms are being designed that are as different from a traditional classroom as a tablet computer is from a tablet-arm chair. Jason Meneely’s University of Florida classroom exemplifies the multiple rhythms and work modes of interactive learning: working alone, in pairs, and in groups; employing digital and analog tools; using horizontal and vertical worksurfaces; being immersed in and creating content, not merely receiving it.

When a classroom supports lectures, group discussions, and team project work, it not only supports new pedagogies, it also makes better use of real estate, furniture, and technology.

FIRST STEPS

Using existing real estate, without redesign and construction, traditional classrooms can be made more flexible by incorporating chairs that support more active and engaged students. “I have ’50s-era table arm chairs in some classrooms. These are chairs I may have sat in when I was in school. Some rooms have chalkboards. Some days I can’t get enough money for a fresh coat of paint,” says ASU’s Laroche.

Yet student life has changed. “Students have backpacks, laptops. You can’t put a laptop on a table arm, it’ll fall right off.” To provide more storage and worksurface, and support for a more interactive learning style, Laroche installed Steelcase node™ classroom chairs “as a kind of easy, less expensive retrofit.”

The chairs feature adjustable worksurfaces and flexible seats that swivel, a built-in storage shelf, and five casters for easy movement. When Laroche showed them to six instructors, one was hesitant to try the chair but the students convinced her; the other five instructors said, “It’s about time.”



A LearnLab classroom with round tables and mobile chairs provides an egalitarian teaching and learning environment for students and faculty at Arizona State University.

Follow-up surveys with students after a week using the chairs provided definite reactions:

51% said the node chairs would improve their classroom experience, and 42% said possibly it would. In addition, 71% of students said they like the function of the chair best; 58% said they liked best its versatility, and 51% said its comfort. Some students asked for upholstered seats, but Laroche says, "As a facilities person, I have to think about upkeep. I like it that I can hose the chairs down."

She plans follow-up surveys after the semester but is convinced the chair's a positive step forward for her classrooms. "It's a very innovative way of looking at a very old design and updating it for this generation."

ASU LearnLab: Bottom Line

Redesigned classroom
New furniture & technology
+ New pedagogy

Higher grades,
better retention, and
\$600,000 savings/yr.

WHERE'S THE TEACHER?

As professors embrace a constructivist approach and students are actively involved in the learning process, the professor's role evolves from a traditional "sage on the stage" to "guide on the side," as educators phrase it. The instructor becomes both an expert facilitator who conveys subject matter and a mentor who helps students reach their own understanding of the content via small groups and informal individual conversations with students. They, in turn, help guide their peers.

This requires rethinking the classroom. As the instructor's and students' roles shift, the classroom furniture and tools help them work differently. Good example: a classroom at ASU where Ron Briggs, senior lecturer and coordinator of general chemistry, teaches large chemistry classes. "We've done inquiry-based learning in the labs for years," says Briggs, "but we wanted to incorporate it into our recitation sections, too. That's a period before labs where the teaching assistants talk about the lab, students ask questions and they work with models and other hands-on work, short of using chemicals." The classroom incorporates projection on multiple screens, tools that allow real-time annotation of screen content, furniture that supports group work, and a design that puts the instructor anywhere in the classroom: there's no "front" of the room or lectern he's anchored to, so he can teach

wherever it's appropriate. Students are more engaged and they coach each other. "Try to find the teacher in the photo of the students at work," he says. "At any one time there are 72 teachers in this class."

Briggs' classroom is a LearnLab™ environment (a rendering of LearnLab environment is pictured on pg. 9), a design introduced by Steelcase three years ago that creates stages for the instructor and students as well as space that encourages communication and collaboration. It also immerses participants in information. LearnLabs have:

- projectors and screens at a predetermined geometry that breaks the traditional classroom hierarchy and gives everyone an unobstructed view
- fixed and portable whiteboards and display screens that support information immersion and retention
- spaces and furniture that support different learning processes and styles

ASU is one of the largest universities in the country, but budgets and real estate are tight here, as they are at every college. So Briggs, in collaboration with other ASU faculty and staff, made an educated bet, if you will: they traded six 24-seat classrooms for the chance to rehab a 1,623-sq.-ft. room ("a derelict lecture hall," Briggs calls it) into a LearnLab.

The room now seats 72 people at round tables and mobile task chairs so students can work together easily. Projectors, big screens, and tablet PCs support a new, more interactive curriculum developed by Briggs and his colleagues. With no front stage, instructors move around and immerse themselves in the learning environment with the students, who build Lego models to better understand chemical reactions or fashion a spectroscope from a cardboard box and a DVD. Once-sleepy recitation sections are now hands-on, brains-engaged classes that have connected well with students.

How well? Chemistry has a high dropout rate compared to other subjects, which Briggs says “has less to do with their performance in the course than feeling a part of the group.” The ASU LearnLab nurtures community as students work in pairs, information is easily displayed for everyone to see, and “you get a question to answer, not a process to follow,” says Briggs. Retention is up nearly 5% and grade performance is up 3-4%. Briggs credits the personal connections students form in the classroom environment. “We put students in groups. They don’t get to pick their teammates. Once they make the initial connection, they get together outside of class as well. It all gets back to community.”

ASU’s LearnLab class costs less to operate than their previous traditional classroom. Briggs and his colleagues teach 6,000 students over the academic year in more effective fashion (booked solid 12 hours a day, Monday through Friday) and do it with fewer teaching assistants, ultimately saving the university \$600,000 per year in reduced staff costs and an estimated additional \$300,000 in real estate savings.

Why does this classroom work so well? Equal parts good design, effective tools, and inspired teaching methods. Every seat is a good seat, so students don’t have to crane their necks or twist around in their seats to see content on the board. They have adequate horizontal worksurfaces for tools, technology, and materials, and vertical surfaces for sharing information. Instructors have visual and physical access to every student, and students have the same access to course content and fellow students. Collaborative learning also impacts student outcomes. Briggs replaced what he calls “typical cookbook experiments” with guided inquiry exercises that encourage students to think and work as a group rather than follow recipes with predetermined results. “They develop skills that better prepare them for future work and give them the tools to help them retain knowledge long after the semester ends,” he says.

BETTER TECHNOLOGY INTEGRATION

When it comes to technology, students and instructors have one thing in common: they learn from their peers. Gen Y students are digital natives, comfortable with technology. Instructors tend to be digital adopters, yet need to learn how to incorporate technology into their curricula. The task is made easier by effectively integrating mixed media that can be used easily by both students and instructors. Some classrooms, designed decades ago, are practically anti-technology. “Approximately 50% of our students use laptops during class,” notes the University of Strasbourg’s Jeltsch, “but there are not enough sockets, so cables lay around the floors and that can cause accidents.”

Power is only part of it. “We have a lot of classrooms that are traditional classrooms, with primarily a blackboard and an acetate overhead projector. That works for some faculty who want to focus on discussion with students. Other faculty are interested in doing more than a plain PowerPoint presentation. These instructors and their students are going out to the web, pulling up videos, using social media, going out on the fly when a student asks a question to the library’s digital resources or to a digital archive, or doing an instant poll about something that’s going on in the news, and bringing all of that into the classroom,”

Design principles for 21st century classrooms

Steelcase WorkSpace Futures researchers and designers have developed key design principles for planning 21st century classrooms. “These are based on our research and intended to provide people who plan higher education spaces some guiding tenets for more interactive, more flexible learning environments,” says Elise Valoe, a principal researcher with Steelcase. The essential principles:

- › Design for multiple rhythms in the same classroom
- › Allow everyone to be seen and heard
- › Take advantage of new media
- › Support the dynamic presentation of information
- › Design for mentoring and apprenticeship
- › Design for temporary ownership of space

WorkSpace Futures also developed design renderings for each principle, with application variations for different space dimensions.

The design principles grew out of the Steelcase User-Centered Design Process, a six-stage protocol: Understand, Observe, Synthesize, Realize, Prototype and Measure. In the Understand phase, secondary research gathers essential information, language, and trends about the industry.

Next, Observation involves going on site to see how things work. This may include contextual interviews, focus groups, photography and videography of how users and their work processes function. From these first two phases, they Synthesize the findings to develop insights about the situation and design principles to help solve identified problems.

These design principles are used in the Realize stage to create thought starters or design considerations as potential solutions. Ideas are shared and concepts are visualized, leading to the next step, Prototypes of the hypotheses. Full-scale prototypes are built to carefully Measure their performance. Solutions are refined, tested, and evaluated to yield workable solutions.



An instructor and her students reference content on the flat screen of a media:scape setting at the University of Michigan.



says Monika R. Dressler, Ph.D., director of Instructional Support Services in the School of Literature, Science, and the Arts at the University of Michigan.

Many faculty members are trying new ways for students to more actively participate, “encouraging students to ask questions in a live chat during lecture, which a grad student instructor or the faculty member answers as the lecture continues, or having students work collectively on questions in small groups during class, research a topic, and then come back to class to discuss what they found. So we need to work with faculty to think about how to use technology to engage students in new ways and how to outfit classrooms in a variety of ways to meet different approaches of teaching and learning.”

To solve for these challenges, U of M has installed media:scape® settings in classroom and lounge spaces. media:scape makes sharing information easy for students and faculty: they simply plug a media:scape Puck™ to their laptop in a USB port and share what’s on their computers via the integrated monitor at the table. Pressing the

puck switches between laptops. “Students can use their laptops, show what they’ve been working on outside of class, give suggestions to each other, and do a lot of peer-to-peer editing and collaboration,” says Dressler.

media:scape’s unique approach to information display makes content review and sharing more effective. Pharmacy students at Virginia Commonwealth University use a lab equipped with media:scape to review patient cases, “then they share their analysis and conclusions with their peers,” says William E. Smith, professor and executive associate dean of the School of Pharmacy. In the past, students would have to connect laptops via cables, a process Smith says was “too cumbersome” and took valuable time from class work. “Now the whole process is more efficient. The first morning we used media:scape, the students went into the labs at eight o’clock, plugged in, and got to work. They absolutely loved it.

“The ability to use their own computer, work together as a group, be able to pull up different information sources – we just think it’s great.”

VCU has six media:scape settings, each seating seven students. The space is used for both required course lab sections and elective courses. Using teleconferencing integrated in the media:scape settings allows students at another campus 100 miles distant to connect with faculty and students on the main campus. “We want to assess this space on its impact on learning, and think about where we think we can go with teaching in this space over the next three years, and lay out a plan for how to use the space even more effectively than we are now,” says Smith.

The University of South Dakota equipped a 62' x 32' classroom with nine media:scape settings that each serve a dozen students. “We didn’t come at media:scape from a technology standpoint, it’s about sharing information. It’s simple and not scary at all. It’s very intuitive to use,” says Cathy Wagner, director of planning and construction at USD. The classroom has Huddleboard™ portable whiteboards between each media:scape setting and Cobi® chairs designed specifically for group work.



Virginia Commonwealth University pharmacy students use a classroom media:scape setting. “The ability to use their own computer, work together as a group, be able to pull up different information sources – we just think it’s great,” says William E. Smith, professor and executive associate dean of the School of Pharmacy.

Retrofitting existing classroom space in this fashion addresses common facilities issues of aging buildings: how to easily integrate technology, how to make classrooms more interactive, and how to solve these issues in a cost-effective fashion.

AND NOW FOR SOMETHING COMPLETELY DIFFERENT...

The Stanford Institute of Design, known as the d.school, pushes the notion of the classroom even further by creating a range of spaces where faculty and students can work and learn together (see page 14). Educators there fully embrace constructivist teaching methods, referring to it as “the flip” when content comes from students who generate rather than receive information. One of the principles to support this flip – which can make old-school instructors shudder – is to promote movement throughout class. For example, they purposely chose more stool-height seating because, as professor Doorley explains, “When the students can get up and move and lean and feel a bit more fluid, it allows the leadership in a group to be dynamic. If you have five people sitting around the table and one person is the

leader and no one can move or re-establish a physical position, it creates a very static relationship. If people can stand up, students can reposition themselves, which allows a shared sense of leadership, and we think that’s really important to collaborative creation.”

Movement has other benefits, Doorley believes. “We try to have college students share responsibility for different tasks. They’re in a learning environment so we want to push them out of their comfort zone into areas that they might feel they have a weakness. We try to set up scenarios where students can move around a lot, exchange leadership responsibility, or trade off on roles. Another reason I think movement is good in the classroom is it allows a release of energy and it actually allows them an exchange of energy. Moving allows students to express anxiety or express excitement, or just kind of check out for a minute, which I think is really important.”

With the cost of higher education outpacing inflation, it will be a continuing balancing act for colleges to cope with aging infrastructure, new technology and

pedagogies, and meeting the heightened demands of students and their families. New design strategies can help improve the effectiveness of long-overlooked classroom space. Even new technology and furniture products alone can improve the learning opportunities in an existing space.

“Space is very good at supporting, communicating, and giving students the ideas that are inherent in the lesson that you’re trying to teach,” notes Doorley. But space is only part of the solution. Educators need to learn to use these new spaces, technologies, and teaching methods. As U of M’s Dr. Ball points out, there are 4.5 million teachers in the U.S., across all grade levels. They are the largest occupational group in the country and key to the successful use of classroom space. “If you think we can make fundamental change in the way classrooms work without actually touching all the ways in which those people are prepared and supported in their work, it isn’t going to happen.” ○



pushing the edges: the d.school

This is far from your typical college classroom building.

Walls made from sliding whiteboards are covered in sticky notes and scribbles. Big foam cubes serve as makeshift workspaces and footrests. Some students are working in lounge furniture, others are huddled around a freestanding work surface that's intentionally designed to be too small for their group. Everything can be moved, rearranged, and reinterpreted. But nothing resembles the standardized classrooms you see on most campuses.

Welcome to the Hasso Plattner Institute of Design at Stanford University, known as the d.school, an ongoing exploration and example of new ways of thinking about higher education spaces.

It's not about designing beautiful objects here, although that's a possible outcome. It's about solving big, hairy, audacious problems. The school teaches design thinking, a step-by-step process for producing creative solutions on a routine basis, and their mission is to teach students from a broad range of disciplines how to use design thinking to tackle today's complex innovation challenges. "Our biggest dream is that every student who leaves Stanford feels confident in their personal ability to innovate,"

says d.school executive director George Kembel. "Whether they're a teacher who needs to innovate in how they teach kids, or they're a doctor going out in the world to innovate in new patient care services, or a business leader designing a new business."

The space itself embodies the school's mission and was created to promote behaviors critical to design thinking, such as empathy and experimentation. It not only encourages rapid prototyping of ideas, it is itself a prototype that changes as faculty and students learn more about how to use it.

"There's power in having space that's changeable based on the activities changing within it, so our school space is less precious and more flexible" than other college spaces, says Scott Witthoft, co-director of the d.school's Environments Collaborative, the group responsible for designing the academic and full-time work spaces at the d.school. "It's an evolving space and probably always will be, because the needs of the students and faculty are continually changing based on what's going on in a particular course or a particular class."

A small team of Steelcase researchers and designers collaborated with the d.school in designing many aspects of the new d.school space. "The school was in four locations

in as many years before moving to this new space," says Frank Graziano, one of the researchers. "As a result they have a kind of nomadic legacy, and they're always experimenting. They wanted to keep that spirit in the space over the long term."

The school has a philosophy and a set of foundational tenets for the space, and a spatial logic. Example: "Leverage space as a way to transform behavior, tailoring interactions with one another and our work, individually and collaboratively." That too small table, called the Periodic Table, is not quite large enough for four students to work around and it's too high for sitting, so it alters behavior. Students have to "keep moving, transfer their work to the walls, and share leadership of the process," says Scott Doorley, also co-director of the Environments Collaborative. "It helps students to slowly discover their own process, their own ways of working," adds Witthoft.

The two classrooms where scheduled classes take place are open studios, each 1,500 square feet. One has tall tables, stools, corner projectors and screens, in a workshop-style space. The second studio has low tables, sofas, and a more refined presentation system, and is designed more for lecture and discussion. "Each space suggest themes, ways that the spaces might



The d.school's philosophy holds that space, furniture, tools, and technology are integral to pedagogy. Students are encouraged to display their ideas and work in progress. Julian Gorodsky, clinical psychologist and associate professor, counsels a student (above), while another student makes lounge furniture a workspace (lower left), and instructors work in decidedly nontraditional faculty offices (lower right).



be used, but also offer up opportunity for improvisation," say Witthoft.

Can this design school's approach to space work for other college departments? "What we do can apply elsewhere. All our spaces accommodate different levels and styles of learning. We're just extreme users. We push it a bit further, but what we're doing applies to many different departments," says Doorley.

"Take a business class. There are phases of a project where teams are talking and working with each other, or they're jamming behind the scenes on their own. Then they might come up with a business plan, and they want to present it. The space is a tool for students to do their work and for teachers to help elicit and encourage behaviors they want students to engage in. That works in any department."

The d.school has attracted interest and a constant stream of curious visitors from other Stanford departments, educators from other

schools, and corporations who wonder how space can encourage collaboration, learning, and innovation.

Doorley believes it's a sign of the times.

"We're in kind of a transitional time. Institutions are shifting, the economy is shifting, technology is shifting. Optimizing space is important, but you need to be able to respond to changes in the marketplace, in people's needs, changes in the environment. There's an underlying need to be flexible, responsive, and innovative. And that's the case whether it's an educational institution, a business, a non-profit, or an individual. People come here and they see something in what we're doing that resonates with them."

One of the key things the d.school experiment has uncovered is the importance of space in the innovation process. "When we started the d.school, we thought we had the silver bullet: the design thinking process,

the process of tackling innovation problems. All we had to do was bring these diverse teams of faculty and students together and introduce them to this process and great things would happen. But another thing we found was, in addition to being mindful of process and mindful of team, being mindful of environment is perhaps as important," says Kembel.

The d.school's approach may be pushing the envelope too far for many colleges and instructors. The openness and lack of hierarchy can be disorienting if you've designed a course for a 300-person lecture hall. But as a place that explores new ways in which space, furniture, and technology can better support students and faculty, there's plenty to learn at the d.school. ○

Making Noise in the Library



“Libraries need to break out.... We need to rethink our whole attitude about the relationship between students and space, furniture, and information, and redefine what a library should be.”

Lee Van Orsdel

Dean of University Libraries, Grand Valley State University

If the classroom is the heart of higher education, the library is its soul.

Students can put their hands on digital books and information from virtually anywhere, but the library is the main place on campus where traditional and new knowledge resources, the latest information technology, and skilled instructors converge in an ongoing process of learning, teaching, and research.

Like every space on campus, the library now is being rethought and reorganized. “The changes going on in the classroom are beginning to migrate into the rest of campus. The classroom experience is moving out to other spaces so collaborative teaching and learning can happen, and the library is the paradigm,” says Tod Stevens, partner of SHW Group, an architecture and engineering firm specializing in educational environments.

Librarians are rethinking how libraries function and what people need from them. Bruce Miller, librarian at the University of California's newest campus, in Merced, says, “I was on the Britannica project. When Wikipedia started, we spent a lot of time carefully explaining why Wikipedia sucked. I mean, Britannica was edited by 400 scholars! Well, once Wikipedia reached a certain critical mass and developed some self-correcting processes, it started to work. You can find junk science in there, you can find mistakes, sure. But when you look at the whole mass of what's available there, it's absolutely useful. We have to look at our



Public spaces are designed to attract students at Grand Valley State University's planned Mary Idema Pew Library Learning and Information Commons (opposite) and the University of California, Merced Library (above). Students are drawn by the natural light, a feeling of community, and a variety of group and solo workspaces convenient to classrooms.

information in the library in the same way and rethink the ways we provide it to people.”

“Libraries need to break out of the atmosphere of tradition, to escape gravity, as I call it. We need to rethink our whole attitude about the relationship between students and space, furniture, and information, and redefine what a library should be,” says Lee Van Orsdel, dean of university libraries at Grand Valley State University, Allendale, Mich.

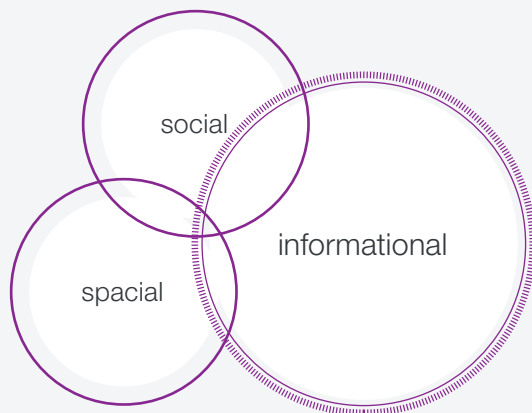
Innovative library administrators, designers, and educators are reshaping the 21st century college library into something quite different from a traditional book warehouse. To better understand the trends, Steelcase WorkSpace

Futures last year initiated a major study of libraries at private and public colleges and universities across the U.S. What the Steelcase researchers discovered were major shifts in how the library is being used and a number of opportunities to better leverage space, new technologies, and pedagogies for a new generation of students.

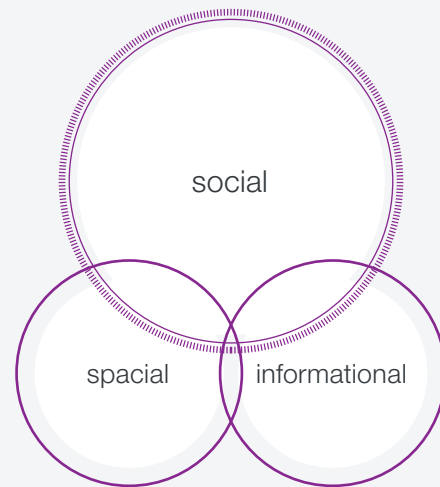
MEET YOU AT THE LIBRARY

In an age of iPads, Kindles, and other wireless devices, it's somewhat surprising that students today love libraries. But it's not because of all the books. For earlier generations, the college library had an aura of scholarship and learning, and a hold on students' long, quiet hours hunched over

The evolution of the library



20TH CENTURY LIBRARY



21ST CENTURY LIBRARY

reading centered → storage centered → learning centered

When books were precious, library space was designed for readers, primarily scholars. As the printed book became commonplace, collections grew and the library became a book storehouse. Today, information is digital and the library is the site of varied social activities: teaching, mentoring, and collaborative learning. Librarians are active instructors. Students engage with each other in team projects. The library has become a primary place for important social activities.

big projects in study carrels – students had to go there. Today, information is digital, downloadable, and available anytime, so why go to the library? Steelcase research shows that students say the library rocks because it's:

- a convenient spot between classes
- a place to socialize with others and to be motivated by them
- where to collaborate on group work
- close to many resources
- a safe, non-distracting place to study
- where collections are on reserve
- the place for computing software, copying, printing, scanning
- a great atmosphere

"The library is becoming a key location outside the classroom where the constructivist pedagogy plays out as students learn to analyze information and create new information, often as working in a group," notes Elise Valoe, principal researcher with Steelcase. "This represents a great shift for the library from a reading and storage site to a center of interactive learning."

"When students work in groups in the library, they can work for hours at a time, and it can be one of the noisiest, busiest places you can think of," says Miller. "But the library as a collaborative place is a very good thing."

Colleges and universities have tried different approaches to meeting the new demands placed on the library, often with mixed results. For example, growing computer use led many libraries to install computer stations into any available space. But people dislike having their back to hallways and their screen open to anyone who walks by. Moreover, students don't need hardware: 95% of them own at least one computer, according to research firm Student Monitor.

Group work areas in libraries are often located near individual spaces for quiet study. This frustrates quiet-seeking students working alone while student teams lack the right space and tools for effective collaboration. A better approach is providing dedicated spaces for both individual and team work in a range of settings spread across different floors of the library that progress from free-ranging team spaces to private study spaces.

LEARNING, NOT JUST READING

The Steelcase higher education research unveiled six core findings about college library space:

- adjacencies are ineffective
- libraries are considered extensions of the classroom, but don't support changing pedagogies
- the librarian's greatly expanded role as an instructor is not supported
- traditional lounge spaces do not live up to their real purpose: supporting informal learning
- individual learning spaces lack ergonomic and privacy solutions
- students are often unaware of the library's many offerings, and struggle to understand and access them

"Our findings demonstrate how the library is becoming a place where students are engaged in the business of becoming learners, and how library space planning has often failed to keep up," notes Valoe. The issues are related but different from those in the classroom, where students are involved in hands-on learning but the instructor still leads. In the library, students



Grand Valley State University's new library interiors will be bathed in natural light. Places for working and connecting with others include a cafe, a large concourse, lounge areas, and a wide range of spaces for individual and group work.



take control of their instruction as they discover, analyze, and share information, and in the process become comfortable working individually and with others. This work mirrors the knowledge work of business today and reflects the increased demands of businesses, parents, and students themselves for better preparation for real-world careers.

Grand Valley State University (GVSU) broke ground this fall on a new campus library, the Mary Idema Pew Library Learning and Information Commons, which is designed to meet those needs. "We're planning the library to be an enriched environment where students can continue the work started in the classroom and add a dimension to learning that a classroom doesn't always offer," says Van Orsdel.

Most libraries today were designed and built for getting books and checking them out. Library adjacencies, space utilization, and new learning processes need to be carefully evaluated. The library should support student collaboration and group work, the dominant instruction and learning style today. Students need study space, support for computing equipment, access to reserved material, content-creation tools, and a flexible

environment that supports working in pairs and teams.

At GVSU, Steelcase prototyped this type of study space as part of planning the new library. Researchers observed how students used the two spaces: one with group work tools (portable whiteboards, mobile tables and chairs, wall-mounted storage shelves, access to power, and defined team areas), another with a media:scape® setting, where people can plug in laptops and simply press a puck to show information on two integrated flat screens (pg. 20), and similar group work tools.

By studying the use of these spaces in person and through time-lapse video images, the Steelcase team noted a variety of results, including:

- portable whiteboards were heavily used by students in hands-on learning activities
- providing a framework that helped define the space created a sense of enclosure, enough for the team to feel in control of the space
- storage shelves weren't used much; perhaps because the teams didn't own the space

- power outlets were used often by tech-savvy students

Similarly, a team space prototype with mobile tables, mobile chairs, and other tools was popular for individual and team work by students using laptops and an array of digital and analog materials. Lead designer Tod Stevens, says, "When the library put work spaces near the windows and in other attractive spaces that used to be taken up by shelves of books, the gate count went way up." He notes that team spaces are a key reason students come to libraries: "It's where they can find resources, get help, and work together on projects."

THE LIBRARIAN'S EXPANDED ROLE

Marian the librarian couldn't cut it today. The librarian job description includes content expert, IT service provider, collaborator with students, and educator. Yet the reference desk inside the front door of most libraries, intended to be the triage point for students, is confusing at best and often intimidating.

Library planners should eliminate barriers, real and perceived, to information and resources. Shared screens and workspaces, classroom space, and a welcoming environment contribute to

a more productive relationship between students and staff. When librarians and students work closely together, such as at a shared monitor and worksurface, collaboration is more natural, and each encounter has the potential to become a teachable moment.

GVSU's new library exemplifies this strategy. "Universities have not made their services seamless. We've compartmentalized them into pedagogical areas where they're taught: English, writing, research, technology, speech, etc.," says Van Orsdel. "The defining or central construct of the new library is a knowledge market that puts together in one place, right in the path of the students, the resources to build all of the skills employers tell us are critical in the workplace: writing, speaking, presenting, research. Students



These photos are video frame captures from research studies of various settings prototyped for the new Grand Valley State University library. Student study patterns and workstyles informed the design and furnishings selections for the new library, scheduled to open in 2013.

manage their own learning, choosing the type of help they need, when they need it."

GVSU benchmarked innovative library design at the University of California, Merced (opened in 2004) in their planning. Van Orsdel calls that library "a whole new attitude about the library's relationship between students, furniture, and books."

The Merced library (photo on pg. 17) is a campus center for social and educational activity. It brings people together in ways that might not happen in the classroom, residence hall, or coffee shop. When they enter the library, students become part of a larger community. Informal spaces that support interactions between students, faculty, and staff help nurture both learning and socializing. When the university held its first classes six years ago, the library also was used as a site for many classes since few buildings were complete on the rural campus. "We designed this building to be a modern, large university library, focused on the library as a place as opposed to a warehouse," says librarian Bruce Miller.

New libraries are rare on campus. Nevertheless, the entire library floor plan should be considered when retrofitting even a single setting. Adjacencies are critical, including planning for technology use in practically every setting, from team collaborative spaces to social zones to individual study spaces. Visual and acoustical privacy require careful planning. Visual cues are important in college libraries, too, especially for young students who aren't clear about how library spaces can be used. "One place doesn't fit all purposes," says Miller. "We have collaborative areas, quiet areas, large spaces, and other kinds of spaces. Students naturally migrate to the physical area that suits their needs."

Students tend to work in the library in groups in the evenings (outside of class and work



time) and individually or with one other person during mornings and afternoons. Spaces that work for solo work early in the day have to be flexible enough for teams later on.

For example, the Steelcase researchers prototyped a 120-degree workstation that worked for varying numbers of people throughout the day. In fact, individuals often shared the work setting with pairs, as in the photo above of two students working together on one corner while individuals work alone at other places in the same setting.

One approach is to provide private enclaves, study carrels, and other individual workspaces on upper floors, away from the typically busier, noisier first floor, so it's easier for users to manage their privacy. "Environment matters to students. Many

Design principles for college libraries

Steelcase WorkSpace Futures researchers and designers have developed key design principles for planning 21st century libraries. Like the classroom design principles, they're based on primary user-centered research. The library design principles reflect the changed nature of a library in higher education today:

- › Design library spaces that support social learning
- › Support the librarian's evolving role
- › Optimize the performance of informal spaces
- › Plan for adjacencies
- › Provide for individual comfort, concentration, and security
- › Provide spaces that improve awareness of, and access to, library resources

don't have a place to study so they come to the library. In the past, life was more formal, society wasn't as noisy. Now there are so many distractions that the library is often the only place where you can find a distraction-free environment," says GVSU's Van Orsdel.

As college libraries offer more services and spaces for students, it's essential they clearly communicate those resources. Visual displays, clear paths to customer services, and welcoming spaces help students understand and use library services. "A library is often intimidating to first- and second-year students," says SHW's Stevens. "Finding ways to lower the threshold for approaching library personnel and resources is the key." ○

Libraries without books?!

It was a quiet milestone two years ago when the University of Michigan announced its millionth book online, part of a joint effort of 30 university libraries. Any attention this landmark received was overshadowed by concerns of copyright owners and ensuing legal arguments. To date, the consortium of colleges has scanned over 6.5 million volumes.

Book digitization is part of an effort by higher education libraries to meet the demands for instant access to information, new pedagogies, and higher student expectations. In this flurry of activity some people, especially faculty, are concerned that printed books will get lost in the process.

They have reason to worry. Only a small percentage of a library's books circulate in any given year, so libraries are being more aggressive in culling their collections, keeping the books in highest demand, and correlating their books with course content. This frees up space for access to databases, group and individual work, socializing with peers and faculty, and learning to be a lifelong learner not just a reader – the activities students increasingly see as the library's purpose.

Libraries aren't abandoning printed books. The new Grand Valley State University library will hold 150,000 books in open stacks and another 600,000 in an onsite automated storage and retrieval system when it opens in 2013; the six-year-old University of California, Merced library has 100,000 books on its shelves; the main libraries at the nearly 200-year-old University of Michigan have over 8 million volumes.

The book digitization project points to the future. Practically all college students bring a computer to campus. *The Wall Street Journal* reports that 11 million Americans will own at least one digital reading device by the time this fall semester started.

Amazon.com says that customers buy 3.3 times as many books after they buy a Kindle. Those statistics are some comfort following a report from the National Endowment for the Arts in 2007 that Americans spend less time reading books, and half of all Americans ages 18 to 24 read no books for pleasure. (Many of those are college students who would no doubt point out that they read plenty of textbooks and other required material, leaving little time for bestsellers.)

Grand Valley's dean of university libraries, Lee Van Orsdel, says she plans to purchase an e-reading device of her own, but doesn't worry that books will disappear. "I don't think print's going away until it's replaced by something more satisfying to the user, and we don't know what that will be yet."

Professors worry that fewer books in open stacks means fewer random encounters with new ideas and information from browsing, a treasured part of academic inquiry. University of California, Merced librarian Bruce Miller dismisses this concern, saying browsers only see "what's left behind." More important, he says, is a side effect of browsing: building an academic community. "People who lament the loss of browsing are usually older and remember the departmental libraries, the art school library, the business school, etc. You had to go there to read journals to stay abreast of the latest developments, so students and faculty would run into each other there and that's where the fundamentals and values of the profession were inculcated. We can still do that, but you don't need books on the shelves to accomplish it." ○



Who are today's
students?

The 70-million-strong Generation Y in the U.S. has been the subject of countless studies and articles, for good reason. Like their Baby Boomer parents before them, Gen Y is changing the world. Since most of today's college and university students belong to this generation, they're exerting their influence on campuses as well as the workplaces they enter after graduation. On the basis of sheer numbers alone, it's not enough to understand the needs of only U.S. learners.



Generation Y in India (426 million) is six times as big as Gen Y in the U.S. In China, there are 218 million people born in just one decade, 1980-1990. In a highly networked world that becomes more globally integrated by the day, the college campus is where these massive populations of young people come to live and learn.

As residents in the world's hottest centers of economic growth, young people in India and China are active participants in the rapid evolution of their countries. More of them are urbanized and becoming educated than ever before.

To gain insights into the youngest generation that's entering the global workforce, Steelcase completed primary research in India and China this year, building on a study of Generation Y in North America done in 2009.

Across countries, young adults share some similarities. First and foremost, they're all participants in the convergence of technology that has increased global communications and widespread access to information, as well as shifted wealth and opportunity. The college-age generation is adept at multitasking and using technology, and they're more connected to each other and people outside their own country than any previous generation. They're all socially minded, eager to embrace more active styles of learning. And they all expect education to be a practical springboard to career opportunities.

Generation, of course, is as much about geography as chronology. Young adults

who were born and raised in different countries have unique histories, traditions, and memories that make their behaviors and aspirations distinctly their own.

In India, career aspirations for educated people are shifting rapidly from civil service, engineering, and medicine to computer science and other technology fields. As India evolves into a global technology center, it's no longer necessary to leave to acquire specialized education. Thousands of private technology training centers have sprung up in cities and towns. Although the business world came to India during the past decade in search of its low-cost service capabilities, it's now increasingly coming to tap into core competencies in technology.

Now the most tech-savvy generation in the world, Gen Y in India is ambitious, impatient, and status seeking. They strive for differentiation through education, reputation, brands, technology, and especially money. Proud of their nationality, they intend to bring their country forward in the 21st century as a way of achieving recognition and success. In some ways, their fascination with Hollywood and Bollywood movies can be considered a way of seeing their own lives come to reality.

In China, there's no equivalent Gen Y. The generation born between 1980 and 1990, the closest equivalent, is known as Post-80s. It's the first generation of the one-child rule. Compared to their parents ("The Lost Generation") and grandparents ("The Traditionals"), the Post-80s have grown up in a time of peace and prosperity. They're enjoying the benefits of economic

reform, open markets, and "capitalism with a Communist twist."

From fashion to music to cars and games, China's youth are consumers who are eager to absorb what the world has to offer. Their materialism and all the attention they've enjoyed as only children have earned them a nickname: "Little Emperors." Attendance at universities is booming. As they strive to create their own identities based on their interests, they sometimes experience conflict with embedded traditional values that emphasize harmony and blending with society. As a result, discussion of ideas and opinions – a bedrock of education in the western world – isn't as firmly established in China. But the evolution is underway.

U.S. colleges remain the world leader in higher education, and it's not unusual for the top American universities to have 10-25% of their students from overseas. Of the roughly 3 million students at foreign campuses in 2007 (the latest available data), 20% attended U.S. colleges.

Global shifts are underway, however, as wealth becomes more distributed.

While young people in India and China are passionate about many aspects of western culture, it's a mistake to assume that translates into a desire to become westernized. Part of their energy and confidence is a belief in their own country's ability to become a world leader and their own ability to be active participants in that rapid evolution. ○

Learning Spaces All Over Campus





Colleges are making better use of real estate by equipping in-between spaces. Add wi-fi, comfortable seating, and room to spread out your work and almost any space becomes useful work space. Some examples: an atrium at the University of Michigan (left), a corridor that connects two buildings at the University of South Dakota (above), or a hallway at Stanford University (right).



The college campus has a way of encouraging intellectual pursuits in different places.

Discussions often migrate from the classroom to the quadrangle, cafeteria, or the nearest pub after class.

Now, places outside the classroom are more useful than ever as learning spaces, for two reasons. First, portable technology means you don't have to be near a power outlet to work and wi-fi brings online access to the remotest corner of campus. Second, college work now involves a lot of group projects. More assignments reflect and teach real-world knowledge economy skills: collaborating in pairs, small groups, and teams. Since many classrooms poorly support group work, students often decamp to places better suited to working together. Why not make suitable spaces available on campus that extend learning outside the classroom, keep the group together, and the conversation going?

MAKING CASUAL SPACES COUNT

The first place that can better support learning is the hallway. Group conversations often migrate here because the classroom must be vacated for the next class. Yet hallways typically offer little seating and few, if any, workspaces. Places where pairs and small groups can finish a discussion help teachers leverage those elusive teachable moments. Touchdown kiosks with shared screens allow for even deeper conversations.

Sometimes a hallway just needs the right furniture. For example, at the University of South Dakota (USD) a broad corridor called The Link connects the student center and library. It's outfitted with comfortable booths with tables that seat four. Simple rectangular tables and stackable chairs that seat six are easily rearranged for larger groups. "Students can work alone or with others but still feel a part of the community," says Cathy Wagner, director of planning and construction at USD.

The Link is 150' long, 25' wide and has full-height glass on both sides. Wi-fi is supplemented by data and power outlets

in the floor. "We see both social activity and studying. It's a great breakout space for student groups because the booths are larger than typical cafe booths. Students can move the chairs and tables around, and we put things back in place at night," says Wagner. "It's the one place on campus where you'll always find people, even during semester breaks."

Planned public spaces for group work at Georgia Institute of Technology's Klaus Advanced Computing Building were placed outside computer labs like welcome mats to attract students before and after class. Wi-fi, power outlets, writing boards, lounge seating with tablet arms, small tables and stackable task chairs create intimate spaces within a larger environment. These spaces even draw students from other schools at the college.

Larger public spaces offer multiple benefits for students and the institution. At the University of California's newest campus in Merced and at Ohlone College, a community college in San Francisco's East Bay area, dramatic open spaces work like public squares. Students are attracted by the



sense of community, natural lighting, and the convenience of workspaces near classrooms. Booths fill up first: they're comfortable, and offer worksurface and privacy for individuals and groups.

College student life has changed. Students juggle coursework, jobs, internships, service work, and sometimes family commitments, so centrally located spaces with furniture and tools are student favorites.

There are institutional benefits to a large communal space, too. For UC Merced, it helps establish a sense of place for a college that opened in an undeveloped, rural area just six years ago. At Ohlone, the space helps them avoid the "commuter college" label affixed to many urban institutions. Now, instead of leaving for home or a local coffee shop, students stay at the school and engage with other students and faculty. Another bonus: these large spaces are also used for public events such as foundation and alumni meetings, seminars, etc.

OFFICE HOURS INSIDE AND OUTSIDE THE OFFICE

The informality of certain spaces is ideally suited to students' ongoing need for feedback. Steelcase researchers have found that Gen Y in particular seeks mentoring relationships. "I'd really like to see more guidance from teachers. They pass a lot of

knowledge to you. But if you have questions, especially after hours, when you're doing assignments at home, it's really difficult to get that guidance," one student told a Steelcase researcher.

Faculty agree. "One of the most important things with education is quick feedback. If there is a long lag between the student giving the answer and the feedback, then the student will forget. Their brain moves on. They're in a different state," noted a teacher in another research interview. Learning is enhanced when teachers can quickly provide feedback to a student in an informal space near the classroom.

Teaching and mentoring also happen in faculty offices, and so do many other kinds of work. Steelcase researchers say instructors use their offices in various ways:

- colleagues build communities of practice
- projects are managed
- materials are displayed and discussed
- teachers advise and instruct students
- different media are stored

Instructors read, relax, and conduct other business in their offices as well, so they need furnishings to support a range of activities. Yet real estate at most colleges is tight, to say the least. Recommendations for faculty

offices include using vertical space for wall-mounted worksurfaces, storage, and display, and providing flexible components that serve different purposes, such as a mobile pedestal that doubles as storage and a short-term seat, and mobile tables that one or more people can use. Multiple worksurfaces support piling, a common practice among instructors. Seating should include easily moved side chairs for visiting students and colleagues and an ergonomic chair for the instructor's long hours of focused work.

The 24/7 mentality of business has taken hold on the college campus. "Pulling an all-nighter" to meet a deadline or prep for an exam is a longstanding tradition, but today's students can work anywhere and any time, and often do. As a result, some schools offer spaces in classroom buildings where students can simply chill out. At the University of Florida (UF), design professor Jason Meneely says, "It doesn't matter what time you come, there are students putting that energy in at all hours of the day. But how do they recharge their creative batteries?" At UF the students use an atrium space to play volleyball and Frisbee, or swing on ropes hung from a balcony above. "They let off some steam from the intense creative energy they're putting into their work. I think these kinds of support spaces are just as critical as the actual studio environments."



MAKING MORE OF EVERY CORNER OF CAMPUS

Increasingly, students arrive on campus expecting a variety of non-classroom work environments. At the high-school level, students take on off-site internships, work in group spaces, and team with other students for everything from language practice to lab work. For example, at New Tech High in Coppell, Texas, the curriculum involves a great deal of project work, but there's no library on campus. The school provides casual areas that wouldn't be out of place in corporate or college campuses (right), so students can better collaborate on group projects.

Evolving college curricula and teaching methods, and changing student expectations mean that college spaces have to be flexible and user friendly. Just as every company needs its real estate to better support the mission of the organization, space must further the overarching goal of the college: learning. It's no longer enough to rethink the classroom and library when learning can, and should, happen everywhere on campus.



A large communal space (top) at Ohlone College in San Francisco's East Bay area helps the school avoid the "commuter college" label put on many urban institutions. Instead of leaving for home or an off-site coffee shop, students stick around, study, and meet with other students and faculty. These large spaces also double as event and meeting areas. A variety of workspaces and seating help mobile students stop, drop, and work practically anywhere on campus.





Lessons Learned



Classrooms for the 21st century

ENGAGE WITH TEACHERS

Higher education spaces, just like corporate workplaces, can benefit from input by the users of the space. Yet many learning spaces are planned without input from the people who will teach them. Tap faculty experience in teaching and learning.

FLEXIBILITY IS KEY

Single-purpose tools are inefficient. "The ideal classroom has maximum flexibility," says Deborah Loewenberg Ball, dean of the University of Michigan education school. Banish fixed tablet arms, bolted-down tables, and other limits on interactive learning. Plan classrooms to be used for different courses and work modes ranging from individual focused work to group work.

WATCH ONE, DO ONE, TEACH ONE

The whole point of interactive learning is practicing what you've learned by helping others learn. Students and teachers need to be able to work side by side. Mobile tables and chairs encourage interaction and personal coaching.

ONLY EASY-TO-USE TECHNOLOGY GETS USED

Technology has to be easy to use and simple to connect to, so displaying content can be a natural part of class work. Faculty and students will both want at the controls, too.

SHOW YOUR WORK

"If you don't get an idea written down on some sort of medium in 10-15 seconds, you're likely to forget it," says professor Jason Meneely, University of Florida. Whiteboards are simple solutions. Offer portable, vertical, and horizontal boards. They also encourage the display of work in progress, a key part of knowledge work.

ENCOURAGE MOVEMENT

Interactive learning rules. "Encouraging movement is important to collaboration," says Stanford d.school's Scott Doorley. "When you can move around, it makes relationships dynamic rather than static." Think mobile furniture, portable whiteboards, technology that's easy to use.

SEE AND BE SEEN

Make every classroom seat a good seat by using mobile chairs and multiple projection screens so students can see whiteboards, screens, and everyone else in class.

GO ROUND

"Think of the intimidation factor in standing up to share something verbally in class," say Meneely. Putting students in rows heightens the psychological barriers to sharing of ideas. Round tables help create an egalitarian learning space.

GO INCREMENTAL

Budgets are tight everywhere. If you can only do one thing in a space, consider giving the students more effective worksurfaces and seating. They're inexpensive yet they can increase student interaction, collaboration, comfort, and engagement.





Columbia University's Reality House project defied convention to prove that sustainability goals are achievable and affordable.

Sustainability Spotlight

When Columbia University decided to expand with a new campus in West Harlem, its leaders realized the project presented new opportunities for significant sustainability efforts.

Columbia's 25-year, 17-acre, 16-building Manhattanville expansion project took an early step forward in the summer of 2009 when the University gutted several floors of a brick building named Reality House. (It once housed a substance abuse and HIV prevention and treatment program, and the name stuck.)

The project successfully combined deconstruction, job training, reuse and recycling. It started as an idea that defied convention, but quickly attracted interest and buy-in within and beyond the University. At completion, it's a case study that proves demolition can be done sustainably and affordably.

When Columbia acquired the four-story Reality House, the upper two floors were only partially built out and packed with building materials, used furniture and old computers – 77 tons in all – plus mounds of abandoned paper, cardboard and mixed debris.

The building was targeted for demolition. It had limited parking, no loading dock and just one garage door to take materials out. The easy way would have been to leave it for the bulldozers and landfills. But Columbia saw opportunities to teach and lead others, and was committed to a better solution.

"We set a goal to recycle or reuse 90% of the materials. At the start, we weren't sure how we could get there, but we were determined to get there. We wanted to prove we could turn a stretch goal into an achievable

goal," says Philip Pitruzzello, vice president, Manhattanville Capital Construction.

Teaming with Institution Recycling Network, which matches used products with recipients around the world, and Build it Green!, a nonprofit that matches recycled building materials locally, Columbia successfully met its recycling/reuse goal at affordable cost, "proving the impossible is possible," says Pitruzzello.

But there are even more positives to the story. The project was designed to train women and young men for jobs in salvage, reuse, and surplus management. The School of Cooperative Technical Education, a city program, and the nonprofit Nontraditional Employment for Women (NEW) partnered with Columbia, and about 40 people participated

in the training, wearing hardhats instead of mortarboards at graduation.

It was dirty, heavy-duty work. The participants proved more than up to the demands and gained on-the-job skills that are integral to green building.

"We care about our sustainable footprint in the community and saw this as another important way we could add value," says Pitruzzello.

Because of the role and reach of higher education, Pitruzzello believes that it's especially important for universities to commit to high standards of sustainability. "We have a special responsibility to help lead the way," he says. ●

Note: The Reality House project will be presented at the U.S. Green Building Council's Greenbuild 2010 conference in Chicago in November.



Q & A

with Deborah Loewenberg Ball
On space, teaching, and learning

Deborah Loewenberg Ball is Dean of the School of Education at the University of Michigan, a renowned researcher on mathematics instruction, and a recent appointee by President Obama to the National Board of Education Science, which evaluates the work of the research arm of the U.S. Department of Education. *The New York Times* calls her “one of the country’s foremost experts on effective teaching.” Ball taught in an elementary classroom for over 13 years before earning a M.A. and Ph.D. in education, and she continues to practice her profession, teaching college students at U of M and elementary students in “math labs,” classes she conducts to help students learn math and help teachers learn better teaching skills.

360 Magazine interviewed Ball in her office on the U of M campus in Ann Arbor, Michigan.

Classroom design hasn't changed much over the years. Is that a problem?

A lot of classrooms are designed to support a kind of teaching that has gone on for hundreds of years, sometimes described as frontal teaching, where a teacher is at the front of a group of students, all of them are facing forward, and their job is mostly to listen. The furniture in the space can impede certain kinds of work, and it can be difficult to engage students in talking with one another if the classroom is so tight and small that the only way to fit the learners in is to put 35 small desks all facing forward.

How important is the classroom layout in teaching?

I don't think it's reasonable to think that simply putting in (certain) furniture or space arrangements will drive a different way of teaching or learning, because fundamentally teachers and kids would have to learn how to work differently. But without the space arrangements and the furniture to support it, a teacher could learn to do really different work and still be completely impeded from doing it by the physical environment.

In other words, you need both?

Better forms of physical environment make it possible for teaching and learning to change but it can't drive it on its own. You still need opportunities for professional learning. How do you get kids engaged in that kind of intellectual work? What is it to really lead a discussion among a group of learners where the teacher isn't doing all the talking? Having a certain classroom arrangement can support the teacher. But if a teacher doesn't have the opportunity to learn from model teachers, and get assistance for the problems that

arise when you try to get 35 kids to have a discussion, the furniture alone can't do it. You need both a different kind of physical environment and you need substantial professional learning and support.

President Obama recently appointed you to National Board of Education Science – might that work involve exploring how to make better use of the physical assets in the classroom?

I think so. We're already beginning to see more research on teaching and learning and the instructional dynamic in the classroom, and there's still a need to study how technology and the physical environment, furniture, and space affect that dynamic. We need to understand more about how the classroom arrangement interacts with the type of work kids do, how we use the environment, how much public writing space there is, how students move in the space. That's all fundamental to teaching and learning.

How can higher education better prepare students for the knowledge economy?

People mean a lot of different things by the knowledge economy, but I think they all

converge on a similar issue: what it is that competent adult life requires? Everything from being a creative, well-educated person with a perspective, who can read literature and appreciate it and understand more about the human experience, to more practical things like being able to design products, stories, text, graphics – those are different kinds of things. The more we can create a sense about what adults need to be proficient not only at work but across their life, the more the curriculum in schools will change as well as the way we engage young people in learning.

The constructivist theory of teaching is a growing trend. Is it right for all subjects?

There are moments where information delivery is crucial. You don't want kids inventing things that are actually easier to understand by hearing them or having them demonstrated. But sometimes they can learn much better if they have the chance to get their hands around the information and explore it. Teachers have to make good judgments about when students have to do work independently, supported by the teacher, and when



Deborah Loewenberg Ball, dean of the University of Michigan School of Education, leads a meeting in her office in Ann Arbor (left) and teaches fifth-graders in a “math lab,” a combined classroom and stage, in Grand Rapids, Mich. (right). During math labs in different cities, teachers watch from the sidelines and study Ball’s teaching techniques as part of the Elementary Mathematics Laboratory project at the U of M.



information reception is helpful. If everything were about active learning, you’d never complete anything resembling the necessary curriculum, but if everything is about passive knowledge delivery, they’re going to leave school unable to confront this knowledge economy.

In your math labs, students sit side-by-side in a U-shaped table arrangement, unlike typical classrooms. Why?

We’re experimenting with ways to arrange the space that maximize the learning that we want students to be engaged in, which involves them in discussing mathematics problems or particular ideas, looking at each other, being able to talk with one another. The U-shaped configuration is a very good set-up for it. But it’s not the best arrangement for when I say, “Okay, turn and work with two or three other people on this problem for ten minutes,” because it’s not easy for them to turn to work with others. Ideally they would be able to move their whole table around and sit in a group.

What’s the best layout for a classroom?

The ideal classroom would have a lot of flexibility for how students were configured, plus a couple of different features. One, it’s important to be able to create a classroom where the students can see each other and where discussion is possible, so that they can see the board, see each other and see the teacher and it’s easy to hear. Another feature would be to have lots of public surface for writing. Additionally, it would allow people to watch the teaching, at least in some classrooms, so educators or researchers could come in, in an unobtrusive way, and observe the classroom.

Observers in a classroom?

In a true profession you would want to make it possible for people to be observed, have their work discussed, have it studied.

Students working in groups is usually something you see in high school or college. Why do you have elementary students working together so much in your math labs?

A lot of what I do in the labs is teach students skills for taking advantage of the fact that they’re in the company of other people. It’s the same whether

it’s a class for math, physics, or poetry. This is the intellectual learning that school is supposed to be about. Most academic work – most intellectual work – is work that’s important to be able to do together with other people, to encounter other perspectives and learn to interact about ideas, to disagree with civility, and to formulate and evaluate arguments.

Will the classroom of the future look much different?

If we predicted based on history, they will look much the same because classrooms have looked very similar for 30, 50, even 200 years. I think we’re seeing more understanding that formal schooling relates to a successful economy, a successful society, and, more importantly, to successful individual lives. I’m hopeful that we can see change in the way classrooms are configured and in the work that goes on, if we can get more people in this country to appreciate that. ○



Showing School Pride

With school budgets decreasing and expectations increasing, it's no surprise that more and more schools are struggling to reach their potential. But a new NBC makeover/reality show is helping to revitalize many of these schools and in some cases even prevent them from closing.

NBC's *School Pride*, which premiered on October 15th, reaches out to some of the most affected schools in the country. Along with local volunteers and businesses, *School Pride* helps to restore aging school facilities and bring pride back to students, staff, and the community.

One such school is Detroit's Communication and Media Arts High School (CMA) which until recently was on the Detroit Public School's cut list, despite its above-average academic performance. But with the help of more than 2,600 volunteers and corporate donations from Steelcase, Home Depot, OnStar, Statewide Disaster Restoration and several local trades people, the school has transformed into a vibrant learning environment.

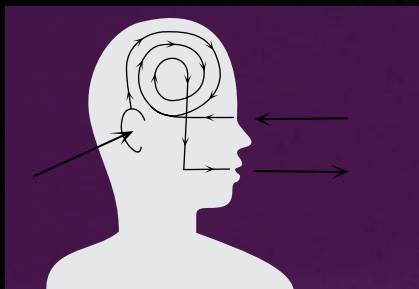
"When we were contacted by the producers of *School Pride* about helping with the renovation of CMA, we knew we could really make a difference by leveraging the extensive research we've conducted in the education market," said Jim Keane, president of Steelcase Group. "And we didn't want to simply donate product to the school. We wanted to be a part of the process and solution by volunteering to help makeover the school. It was a great experience."

Working with design firms SHW and Fanning Howey, Steelcase Education Solutions and Turnstone helped build new classrooms that supported more active learning using the new node™ chair. The media center and library, which had been closed for two years due to lack of funding, was turned into the social hub of the school. Both Campfire™ products and media:scape® helped encourage collaborative learning.

The results: students experience first-hand the power of change, a renewed sense of pride in their school and the confidence that they can do anything they set their minds to.

The Detroit episode is scheduled to air in early November.

Trends360



MOVE. SEE. HEAR. LEARN.

It's a fact: people learn in different ways and the best classrooms support them all. Steelcase observational research documented these differences:

- **Motor Mechanic Learners** – prefer being active, sitting in swivel chairs and writing while standing at boards
- **Visual Imagist & Verbalist Learners** – need clear sight lines to the instructor and boards
- **Auditory Aural & Oral Learners** – benefit from group discussions

TRIANGULATION INSIDE FOUR WALLS

Effective classroom design is based on a triangulation concept. This means students can seamlessly switch from one learning mode to another, i.e. from lecture to team work to group discussion. Transitioning their viewing angle comfortably with minimal effort eliminates moving furniture around, and face-to-face student seating at tables is conducive to discussions happening inside the classroom versus another location, which saves time and campus real estate.

FIVE Es = EFFECTIVE LEARNING

The Steelcase higher education research team used the learning cycle framework of Five Es to analyze their data on classrooms. It's a model for instruction that supports constructivist (experiential) teaching and learning:

- **Engage** – Instructors create a hook to interest students in the topic and sustain attention throughout the class session.
- **Explore** – Teams collect knowledge, ideas, and data and use them to generate new ideas, explore questions, and make discoveries. Tacit knowledge becomes explicit as the group accesses and shares knowledge, building on each other's expertise.
- **Explain** – Students demonstrate their understanding of concepts to their instructor and other students. Instructors guide students toward deeper understanding.
- **Evaluate** – Instructors observe students' understanding and abilities and lead them to assess their learning and performance.
- **Extend** – Students apply what they've learned in different situations.

The 5 Es model was developed by Rodger W. Bybee, Ph.D., director emeritus of the Biological Sciences Curriculum Study (BSCS).

OUTSIDE-IN STUDY SPACES

The outdoors used to be considered a distraction for serious students – something to turn your back on to block from view. But today's learners, deeply committed to sustainability, are attracted to settings that let the outside in. Steelcase research suggests that natural light and views to the outdoors should be

leveraged versus blocked, especially in library design.

Q. WHAT'S THE BEEF?

A. WHERE'S THE PLUG?

It used to be the cafeteria food, but one of students' biggest complaints now is a lack of power sources throughout the campus. Steelcase observational research showed students gravitating to places where they can plug in, whether it's the back row of the classroom or the periphery of the commons.



CARPAL TUNNEL HERE THEY COME?

Gen Y students are at risk for repetitive strain injuries, due to their nearly constant computer use combined with furniture that doesn't adequately support the relaxed body positions they favor. Schools are investing in high-quality exercise facilities, but ergonomic furniture in classrooms and study spaces is another important investment for students' health and well-being.

DEMOGRAPHIC SHIFTS UNDERWAY

Among young people aged 25-34, those with college degrees outnumber those without only in Massachusetts and the District of Columbia, according to the U.S. Census Bureau. What's more, the traditional college-age student population in the United States is predicted to dramatically shrink during

2009-2015. The percentage of graduates with no family history of attending college is expected to rise.

COLLEGE LIFE TRANSITION: ONLY CONNECT

Of the estimated 3.4 million Americans who have entered an institution of higher education this year, about one out of three won't return there for their sophomore year, according to a 2010 report from ACT, the college-admission testing company. A failure to connect is one of the most common reasons. The finding increases the importance of actively engaging students in the classroom versus spoon-feeding them passive learning.

TESTING VERSUS STORY TIME?

In Asia, an emphasis on academic testing begins early in elementary school, whereas Western parents and early education experts have been generally more concerned about whether the kids are having fun in school and adjusting well socially. But increasing diversity in the U.S. combined with programs such as No Child Left Behind and President Obama's Race to the Top are indicators of a trend toward increased accountability for teachers and schools.

FAST TRACK LEARNING TO EARNING

U.S. companies are relying on internships more than ever before to find full-time hires, according to a recent *Wall Street Journal* survey. More than 50% of respondents said their newly graduated hires had previously been interns at their companies. Similar results were recorded by the 2010 National Association of Colleges and Employers survey, which reported that

almost 57% of 2009 graduates were converted from interns to hires, up from 50% the previous year. Interns who succeed in landing the job typically display skills such as problem-solving and collaboration versus the purely rote learning acquired from the "sage on a stage" teaching model.



CHALK IT UP TO PROGRESS

Introduced in 1890, chalkboards have been an especially enduring fixture of education, eventually modernized as whiteboards and reinvented in 1999 as the interactive whiteboard. The school slate, also introduced in 1890, was shorter lived, replaced when pencils started to be mass-produced around 1900. Though some say the iPad is just the slate reimagined, others claim it marks the beginning of the end of the printed textbook. Most agree that education – that transfer of a huge cultural memory bank and the mother lode of tomorrow's breakthroughs – is changing more rapidly than ever as new technologies change both the process and the experience.

READ MY BITS

E-reading expert Evan Schnittman, managing director at Bloomsbury Publishing, says there are three kinds of reading: extractive reading (such as looking up words in a dictionary),

immersive reading (such as reading a classic) and pedagogic reading (studying a curriculum). The third type has failed so far in electronic formats, but tablets like the iPad appear destined for success as an educational device for all reading types.

YOUTUBE TEACHER

The world's biggest school is reportedly Bill Gates' favorite for his kids, and it's completely free. The Khan Academy is more than 1,600 instructional videos on YouTube, all created by Sal Kahn, the son of immigrants from India and Bangladesh who was born in New Orleans, graduated from MIT, and then earned an MBA from Harvard plus two advanced degrees from MIT. The former hedge fund manager turned teacher never appears on camera. Instead, Kahn educates with simple doodles and diagrams on a whiteboard. From calculus to the Napoleonic Wars, his 15-minutes-or-less lessons have received 18 million page views worldwide since the Khan academy began in 2006, proof that they leverage a growing desire for learning that's compact and accessible anywhere, anytime.

SLOWER BRAIN DRAIN IN INDIA

Visa applications for Indian students wanting to study abroad are reduced by about 85%. There's been a boost in opportunities within the country's borders for its highly motivated Generation Y as India gains significance as a global technology center. ●

Atoms & Bits



BEST OF NEOCON AWARDS

The Steelcase family of companies received five Best of NeoCon awards, which recognize the top new products introduced at the show each year.

Among the products recognized were:

- a Gold award for Steelcase's RoomWizard™, the first web-based scheduling system, in the Workplace Technologies category
- a Silver award for Steelcase's FlexFrame™ workwall, a wall-mounted, frame-based system that can be used in any space plan
- a Silver award for Topo freestanding components enhancements by Coalesse®
- an Innovation Award in the Education Solutions category for node™, a classroom chair designed for easy transitions between lectures and group work
- an Innovation awards for SW_1 by Coalesse, a collection of collaborative-height and traditional occasional tables that support the social and collaborative activities that frequently occur during the knowledge creation process

The Best of NeoCon 2010 awards were selected from 332 entries in 39 different product categories.

SHARING OUR INSIGHTS

Steelcase spends a great deal of time trying to understand how work gets done and how great spaces can help enhance the work environment. By using an extensive user-centered design research process, we have been able to get a better understanding of many workplace issues.

Go to steelcase.com/research for white papers on collaboration, benching, brand, and additional topics.





NEW! STEELCASE ROAM™ CHICAGO APP

Our newest mobile app lets you “roam” the NeoCon Chicago WorkLife showroom from anyplace in the world. Access photography, alternative settings, design intent, footprint sizes and more!

Steelcase Roam™ Chicago includes:

- An interactive floorplan of our NeoCon 2010 showroom
- 3D visualization of every solution and alternative settings
- Footprints / measurements for every solution
- Design intent that led to the application
- The types of work the solution supports
- The products that comprise each solution
- Details about the showroom’s design
- Information about workplace surveys
- Information about *360 Magazine*
- An interactive map – providing location and directions



STUDENT OF THE MONTH

Tap into observations and insights on learning from some of today’s most innovative minds.

We are all still learning about learning. And we’re learning from each other, from multiple disciplines, with a single goal: to better the learning outcomes of today’s students. The Student of the Month campaign is meant to start a conversation, to brainstorm and share ideas how we can think differently about our roles in education.

Starting the first week of November, David Kelley, founder of the renowned design firm IDEO and professor at Stanford, will be our first student of the month, launching a six-month conversation asking “what if” when it comes to education today. To join the conversation, visit us at steelcase.com/studentofthemoth.



NODE MAKES NEWS

Since its introduction at NeoCon this past June, node has become somewhat of a media darling. Check out what *Fast Company*, *Metropolis*, *Business Week*, and *AOL News* have to say about how node is changing the face of the 21st-century classroom:

www.fastcompany.com/1660576/ideo-and-steelcase-unveil-schooldesk-for-the-future-of-teaching

www.metropolismag.com/story/20100616/back-to-school

www.businessweek.com/innovate/next/archives/2010/06/steelcase_takes_a_desk_in_the_classroom.html

www.gnn.com/article/classroom-chair-anything-but-old-school/1124866



SCHOOL PRIDE

Don’t forget to tune in to NBC’s new alternative show *School Pride*, airing Friday evenings. *School Pride* is similar to *Extreme Makeover: Home Edition* but instead of a house, communities come together to renovate public schools, badly in need of repair.

The show premiered on October 15th. For more information about *School Pride* and how Steelcase got involved with repairing a Detroit school, read the sidebar on page 33 of this issue of *360 Magazine*.

JOIN THE CONVERSATION

Connect with Steelcase via social media and let us know what you’re thinking.

Facebook

<http://www.facebook.com/Steelcase>

<http://www.facebook.com/pages/Coalesse/51331944213>

<http://www.facebook.com/TurnstoneFurniture>

<http://www.facebook.com/pages/Nurture-by-Steelcase/121261541235551>

Twitter

<http://twitter.com/steelcase>

<http://twitter.com/coalesse>

http://twitter.com/Turnstone_bySCS

<http://twitter.com/nurtureasks>

YouTube

<http://www.youtube.com/user/STEELCASETV>

<http://www.youtube.com/user/coalesse>

<http://www.youtube.com/user/turnstonefurniture>

<http://www.youtube.com/user/nurture09>

Blog

<http://blog.steelcase.com/>

<http://blog.nurture.com/>



KEEPING OUR COMMITMENTS

The Steelcase 2010 Corporate Sustainability Report highlights our environmental achievements and benchmarks over the past year. With breakthroughs in sustainable packaging, PVC reductions and environmental education to name a few, Steelcase continues to improve its products and operations, and to meet goals that coincide with our 100-year anniversary in 2010. For more information on our environmental efforts, download or view the report at:

<http://www.steelcase.com/en/company/sustainability/pages/sustainability>



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