Learning Spaces

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Challenging Traditional Assumptions and Rethinking Learning Spaces

Nancy Van Note Chism

Indiana University-Purdue University Indianapolis and Indiana University
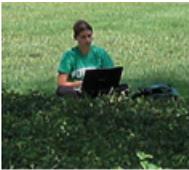
- ▶ A student relaxing in the grass with a laptop
- ▶ Several hundred students listening in a lecture hall
- ▶ Students working together at an outdoor table
- ▶ A student studying in his residence hall lounge
- ▶ A student reading a book in a window well
- ▶ A group of students mixing solutions in a laboratory

These learning scenarios occur whether we arrange the spaces or not. We can facilitate deeper and richer learning when we design spaces with learning in mind.

Learning takes place everywhere on a college campus. In fact, learning arguably happens everywhere—on city sidewalks, in airplanes, in restaurants, in bookstores, and on playgrounds. Human beings—wherever they are—have the capacity to learn through their experiences and reflections.

Institutions of higher education are charged with fostering specific kinds of learning: higher-order thinking abilities, communication skills, and knowledge of the ways of disciplinary experts, to name a few. Educators must create structures that support this learning. Space can have a powerful impact on learning; we cannot overlook space in our attempts to accomplish our goals.

Torin Monahan used the term "built pedagogy" to refer to "architectural embodiments of educational philosophies." In other words, the ways in which a space is designed shape the learning that happens in that space.[1] Examples surround us. A room with rows of tablet arm chairs facing an instructor's desk in front of chalkboards conveys the pedagogical approach "I talk or demonstrate; you listen or observe." A room of square tables with a chair on each side conveys the importance of teamwork and interaction to learning. (See Figures 1 and 2.)

Figure 1. Traditional Class

Figure 2. Remodeled Class

Strange and Banning[2] asserted that "although features of the physical environment lend themselves theoretically to all possibilities, the layout, location, and arrangement of space and facilities render some behaviors much more likely, and thus more probable, than others." Because we habitually take space arrangements for granted, we often fail to notice the ways in which space constrains or enhances what we intend to accomplish. Chism and Bickford[3] listed a number of typical assumptions:

▶ Learning only happens in classrooms.
▶ Learning only happens at fixed times.
▶ Learning is an individual activity.
▶ What happens in classrooms is pretty much the same from class to class and day to day.
▶ A classroom always has a front.
▶ Learning demands privacy and the removal of distractions.
▶ Flexibility can be enhanced by filling rooms with as many chairs as will fit.
▶ Higher education students are juvenile:
  ▷ They will destroy or steal expensive furnishings.
  ▷ They need to be confined to tablet arm chairs to feel like students.
  ▷ They are all small, young, nimble, and without disabilities.
▶ Amplification is necessary in large rooms only to make the instructor or technology audible.

Changing Our Assumptions

Why challenge these assumptions? Because of

▶ literature on the influence of physical space on human activity,

▶ cognitive theory, and

▶ descriptions of the new student demographics.

Space and Activity

The influence of physical space on human activity has been studied from both psychological and physical perspectives. The field of environmental psychology explores such topics as place attachment, psychological comfort with space, and the motivational and inspirational effects of space. Those who study space from a physical viewpoint are interested in the effects on activity of light, temperature, and physical closeness. From the literature applied to learning spaces in higher education, we can extrapolate some general patterns.

Strange and Banning[4] emphasized the ways in which the physical aspects of a campus convey nonverbal messages—welcoming or discouraging, valuing or disrespecting—even more powerfully than verbal messages. They cited research that links the physical attractiveness and lighting of a space to the motivation and task performance of those in the space. Graetz and Goliber[5] summarized research that links lighting to psychological arousal, overheated spaces to hostility, and density with low student achievement. Scott-Webber[6] reviewed research on how space makes us feel and related it to knowledge creation, communication, and application, arguing that space configurations exert powerful influences on these activities.

Cognitive Theory

Advances in learning theory[7] have clear implications for the ways in which learning most likely takes place. The emphasis today is on active construction of knowledge by the learner. The importance of prior experience, the fitting of knowledge into existing schema or the establishment of new schema, and the active processing of information are all components of this model that emphasize high learner involvement. Environments that provide experience, stimulate the senses, encourage the exchange of information, and offer opportunities for rehearsal, feedback, application, and transfer are most likely to support learning.

Additionally, social constructivists point out that the social setting greatly influences learning. Picture the limitations of the standard classroom or study carrel in terms of these ideas. The decor is sterile and unstimulating; the seating arrangements rarely allow for peer-to-peer exchange; and the technology does not allow individual access to information as needed. Rather, the room supports a transmission theory whose built pedagogy says that one person will "transfer" information to others who will "take it in" at the same rate by focusing on the person at the front of the room.

Moving beyond classrooms to informal learning spaces, the typical unadorned corridors where students pass from class to class and sit on benches looking forward in parallel or sit on the floor outside classroom spaces say something similar: students do not learn until they are in the "learning space" where a teacher presents information. The segmentation of faculty offices from classrooms increases this distance and lack of agency on the part of students and reinforces the transmitter image of the faculty member. Rather than appearing to be a co-learner, the faculty member is set apart. Similarly, computer labs that do not provide for multiple viewers of a monitor or libraries that do not permit talking convey a built pedagogy contrary to the ideas of social constructivism.

Demographics of the Student Population

Descriptions of the characteristics of traditional-age college students provide a rationale for challenging our space use. The entry of large numbers of previously underrepresented students—students from ethnic cultures that stress social interaction, older students, students blending work and learning—also calls for environments in which social interchange and experiential learning are valued. This demographic picture also favors standard adult furniture over juvenile tablet arm desks.

The argument doesn't include just nontraditional students, however. Characterizations of Net Generation students[8] extend similar considerations to current traditional students in reinforcing the need for social space and technology access. Brown[9] listed these implications for space, depicting a different built pedagogy than normally present in higher education. He cited the preference of Net Gen students for:

▸ Small group work spaces
▸ Access to tutors, experts, and faculty in the learning space
▸ Table space for a variety of tools

- Integrated lab facilities
- IT highly integrated into all aspects of learning spaces
- Availability of labs, equipment, and access to primary resources
- Accessible facilities
- Shared screens (either projector or LCD); availability of printing
- Workgroup facilitation

The advent of distance courses has done much to dispel the idea that learning happens only in a classroom, yet the reality of how dated our standing assumptions are continues to unfold. Podcasting of lectures can both extend the lecture hall and make its spatial arrangement far more specialized than normally assumed. As Mitchell[10] pointed out, "If you get wireless reception under a tree, there really isn't any need to be in a classroom." Smaller places for debriefing, project work, discussion, and application of information become paramount. Outdoor spaces, lobby spaces, cafés, and residence halls all need to be considered in terms of how they can support learning.

Intentionally Created Spaces

Spaces that are harmonious with learning theory and the needs of current students reflect several elements:

- **Flexibility.** A group of learners should be able to move from listening to one speaker (traditional lecture or demonstration) to working in groups (team or project-based activities) to working independently (reading, writing, or accessing print or electronic resources). While specialized places for each kind of activity (the lecture hall, laboratory, and library carrel) can accommodate each kind of work, the flow of activities is often immediate. It makes better sense to construct spaces capable of quick reconfiguration to support different kinds of activity—moveable tables and chairs, for example.
- **Comfort.** At a recent town hall meeting on the campus of Indiana University-Purdue University Indianapolis (IUPUI), faculty were startled to hear two of four student panelists confess that they had dropped classes because of uncomfortable chairs in the classrooms. Such testimony takes our normally casual attitude about comfort into the realm of attrition. Campus seating must take into account different body sizes and the long periods of time students must sit without moving. Discomfort makes a compelling distraction to learning. We should also provide surfaces for writing and supporting computers, books, and other materials. The small, sloping surfaces

on most standard tablet arm chairs are inadequate for these purposes. The chairs also presume a standard space for the girths of the occupants and their arm reach.

▶ **Sensory stimulation.** Antiseptic environments consisting of white rectangles with overhead lights and bland tiled floors create a mood for the occupants of these spaces. Human beings yearn for color, natural and task-appropriate lighting, and interesting room shapes. The current generation of students, attuned to home remodeling television shows and examples of stimulating spaces in the coffee shops and clubs they frequent, seem particularly sensitive to ambiance. One study[11] found that the majority of students, male and female, continually rearranged their living spaces to be more attractive. In evaluating a model learning space, they noted the paint colors, carpeting, and lighting without prompting.

▶ **Technology support.** As Oblinger,[12] Oblinger and Oblinger,[13] and Brown[14] pointed out, the current generation of students expects seamless technology use. Their older counterparts and teachers would appreciate the same capability. As technology changes, smaller devices will probably travel with users, who will expect wireless environments, the capacity to network with other devices and display vehicles, and access to power. Rather than cumbersome rack systems and fixed ceiling-mounted projectors, learning spaces of the future will need more flexible plug-and-play capabilities.

▶ **Decenteredness.** Emphasizing the principles of socioconstructivism, spaces must convey co-learning and co-construction of knowledge. Implications for architecture include thinking of the whole campus as a learning space rather than emphasizing classrooms. Within the classroom, it means avoiding the message that the room has a front or a "privileged" space. Outside the classroom, it means providing ubiquitous places for discussion and study. It means that the flow of spaces—from library to faculty or administrative offices to classrooms and the corridors and outdoor passageways in between—must be rethought in terms of learning. Spaces should center on learning, not experts.

Consider the following examples of experiments with spaces centered on learning:

▶ **The studio classroom.** This arrangement introduces flexible furniture arrangements, decenters the room from teacher to student activity, and stresses collaboration. From the early models at Rensselaer Polytechnic Institute

to current spaces at North Carolina State University (http://www.ncsu.edu/ PER/SCALEUP/Classrooms.html, ch. 29) to current models at the University of Dayton (http://ltc.udayton.edu/faculty/studio.htm, chs. 3, 4, 13) and Stanford University (http://wallenberg.stanford.edu/, ch. 36), such spaces are becoming more common. An example of an extended studio model is the Math Emporium at Virginia Tech (ch. 42). The new auditorium design employed at Iowa State University is another example described in this book (ch. 22).

▸ **Information Commons/Collaboratory.** Increasingly, campus libraries are recognizing the need for study spaces that permit interaction among students. Furniture, computer displays, and space arrangements all support group work. Examples can be found at <http://www.brookdale.cc.nj.us/library/ infocommons/ic_home.html>. Examples of information commons arrangements described in this book include those at the University of Georgia, Duke University, Northwestern University, and The Ohio State University.

▸ **Living-learning spaces.** Moving academic work into student residences through scheduling classes or other learning activities within living facilities integrates courses with student life. The ArtStreet project (http://artstreet .udayton.edu/, ch. 13) at the University of Dayton integrates studios, a café, living facilities, and galleries in one complex. New campus residences elsewhere include meeting rooms for classes right in the living facilities.

▸ **Corridor niches.** No longer simply passageways, corridors in some buildings serve as study and meeting space. See the case study in this book on the ES Corridor Project at IUPUI for an example. An additional example in this book is found in the commons spaces near faculty offices and informal study spaces at Hamilton College.

Opportunities and Barriers

Our current learning spaces present several opportunities, as well as substantial barriers. The opportunities include enrollment growth and the competition for students—factors already leading to construction of new facilities with modernized learning spaces, as well as climbing walls. Technology, which allows ubiquitous access to information and learning environments, also enables different uses of physical space. Yet traditional space standards on the books of most colleges and universities direct those planning and constructing new facilities in "old paradigm" ways of thinking. Moreover, faculty

who are uninformed of new advances in learning theory or unwilling to make adjustments in their normal approaches pose significant barriers to change. Tight fiscal conditions, especially in public and small private institutions, also constrain what can be done.

Moving Forward

In their recent study of institutions that do exceptionally well in engaging their students, Kuh et al.[15] discovered that the physical environment is an important characteristic of such campuses. One of the main recommendations from their study is that institutions "align the physical environment with institutional priorities and goals for student success." To exploit the potential for physical space to advance learning, conversations about campus priorities must include space as a critical factor affecting learning. The perceived urgency of the conversation changes dramatically when framed in terms of learning impact rather than student comfort or preference.

Helping the campus community understand how spatial arrangements preclude or support retention, graduation, pedagogical innovation, and a host of campus priorities is an essential first step. From governing boards and legislatures (in the case of public institutions) to central administration, facilities planners, maintenance operations, faculty, and students, all must realize that good space is not a luxury but a key determinant of good learning environments.

Understanding then must lead to advocacy on a number of issues:

▸ Changing antiquated space standards and decision-making processes
▸ Dispelling long-held assumptions about students and space ("I learned in hard chairs in the heat, and they can too," "Students will steal anything not nailed down," "Students will ruin anything upholstered or carpeted with their carelessness," "Windows distract students from paying attention")
▸ Putting learning considerations at the heart of space-planning conversations
▸ Arguing for resources for space renovation and construction

The cultural change required in thinking of space in a new way should not be underestimated. We need to ask such basic questions as "Should rooms have a front and a back?" "Should faculty offices be separate from classroom facilities?" "Should food and talking be allowed in the library?" As Scott-Webber[16] pointed out, our sense of space is one of the most primal of human instincts. Deeply engrained attitudes about space in colleges and universities mean it will take patience and persistence to make changes, particularly more radical ones.

We also need to rethink the finances of space. Many public campuses, for example, have no base funding allocations for furniture replacement. Furniture is generally funded with the construction of a new building or when major renovations take place, but routine replacement of furniture and updating of lighting and decor depend on the chance administrator with a little end-of-the-year cash. It is not unusual to see 40-year-old chairs in classroom buildings. In addition, universities often have no designated funding source for informal learning spaces. On most campuses, it is not clear who has authority for these spaces, especially hallways or lobbies—which most people do not think of as learning spaces anyway.

Fortunately, physical space is one aspect of campus need that lends itself to collaboration with donors. While naming physical spaces has long been a standard practice of campus development units, enlisting community partners in the design and construction of learning spaces, even renovated spaces, is one way to approach the frequent lack of funding. An example is the Education–Social Work Corridor project at IUPUI (see the case study in this book), constructed with donations from nearly 30 businesses in Indianapolis. Furniture manufacturers also increasingly show interest in fostering innovation. The partnership of Herman Miller and Estrella Mountain Community College in Phoenix offers another example of how to create good spaces through partnerships (see the case study in this book).

Finally, we need more research on the impact of existing and experimental spaces on learning. We need basic research on the influence of the physical environment on creativity, attention, and critical thinking. We need applied research on the effect of different kinds of lighting and furniture on comfort, satisfaction, and interaction. We need to study carefully the model environments we have created to determine how they influence students and faculty so that we can construct future ones in ways most likely to foster our goals. Fortunately, this research is growing in volume and quality. Professional associations and furniture manufacturers, architects, and academic scholars all are making contributions to what will hopefully become an important body of literature.

Hope for the Future

If campuses exist to foster specific kinds of learning, they should inspire and foster this work physically as well as intellectually. Choosing chairs should receive the same kind of attention to learning as choosing textbooks; decisions on building

layouts should be made with the same focus on learning as developing curricula. In short, a campus should proclaim that it is a location designed to support a community of scholars. It should say this physically—from the inscriptions on its buildings to the spaces for study and reflection created by its landscaping, from the placement of furniture for team work and intellectual discourse to the way in which light is used to support energy and creativity. No longer can we assume that any old furniture and any old room arrangement will do—we know better. Like all academicians, we should ensure that current knowledge informs practice.

Endnotes

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About the Author

Nancy Van Note Chism is the associate vice chancellor for academic affairs and associate dean of the faculties at Indiana University-Purdue University Indianapolis, as well as a professor of higher education at Indiana University. She is a past president of the Professional and Organizational Development Network in Higher Education and was previously the director of Faculty and Teaching Assistant Development at The Ohio State University. She has written about learning spaces in *The Importance of Physical Space in Creating Supportive Learning Environments* and coedited the volume with Deborah J. Bickford for Jossey-Bass (2003).

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