

# Bridging Gaps and Creating Spaces: Health Education in the New Millennium

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## Abstract

This paper focuses on the integration of technology and pedagogy in the design and utilization of the newly constructed 160,000 square foot health and human sciences (HHS) building at Western Carolina University, located in rural western North Carolina. The authors explore key theoretical connections between learning and space, and how these theories were employed when creating the learning spaces throughout the building. The design and technology in the building allows faculty to teach differently, bring the world into the classroom, and share their expertise with others outside of the western North Carolina region. The technology and space/furniture arrangements enhance collaborative learning, modeling the increasingly interdisciplinary and patient centered approach in health care. The authors share their experiences related to some of the logistical and administrative challenges they faced in the design and construction phases of the project, and emphasize the importance of ensuring that the architects and contractors work collaboratively with the academic representatives to maximize the positive impact on student learning.

## Keywords

Health Education, learning spaces, built pedagogy

## Introduction

When we think of the dimensions of teaching, it is surprising that we do not usually talk about the physical dimension of space. On the surface, the study of instructional space has been largely neglected until the last decade. The physical infrastructure of an educational institution often receives the highest amount of investment and capital funds (as much as \$20 billion in 2002), and that infrastructure is one of the most enduring and often iconic aspects of a campus (Nair, 2002). That being said, the design and construction of educational buildings were usually in the hands of outsiders such as architects or builders, for whom such projects were about meeting a set of physical requirements, like creating a building to hold a set number of offices or classrooms (Johnson & Lomas, 2005). Because expertise in teaching and learning and expertise in physical design and construction are held by different sets of people, the two remained, for all practical purposes, separated. This practical separation, however, belied a growing body of theoretical literature that was making significant connections between the physical environment of the classroom and learning outcomes.

In this essay, we will look at five key theoretical connections, or bridges, between space and the work of the university and how these connections were applied to the design, construction, utilization, and development of a new 160,000 square foot Health and Human Sciences (HHS) building at Western Carolina University (WCU), a medium-sized regional comprehensive institution located in rural Appalachia. Opened in the summer of 2012, the building provides a rich case study for the challenges and opportunities inherent in bringing together physical and conceptual space to order to meet the needs of twenty-first century college students.

### **Connecting Space to Learning**

The historical process of linking learning theory with space involves challenging some traditional assumptions about teaching (Bransford, Brown & Cocking, 1999; Chism, 2006). For example, much research on learning has focused on the experiences of the individual learner. In the 1920s, Russian psychologist Lev Vygotsky posited a theory of learning that emphasized the importance of social interaction in cognitive development. His theories became the basis for a field of study known as social learning theory, which emphasizes the significance of environmental factors in promoting motivation, retention, and application of learning (Bandura, 1977). It is now generally accepted that learning is a social activity, and constructive interactions with instructors and peers is a critical factor in achieving higher order thinking. Currently popular offshoots of social learning theory include collaborative learning, situational learning, and team-based learning. (Harding-Smith, 1993; Lave & Wenger, 2001; Michaelsen, Knight, & Fink, 2002). These theories challenge us to think of the classroom not as a collection of individual learners, but rather as a collective, cohesive social space in which interaction can be managed and cultivated.

Architect Pravesh Nair said that much of our current educational architecture is based on a “misguided nostalgia” (2003) for a classroom environment and structure that no longer exists. Although instructors were adopting more social learning activities, physical classrooms continued to be designed to support the traditional lecture format. Experiencing this disconnect, frustrated faculty began to research the effects of a limiting physical environment on learning. Researchers have uncovered close connections between physical space and levels of interaction, motivation and meta-cognition through the influence of such factors as furniture, layout, lighting, attractiveness, temperature, and density. (Beichner, et al, 2006; Chism, 2006; Cornell, 2002; Graetz and Goliber, 2002; Scott-Weber, 2004; Strange and Banning, 2002). The increasing connection between learning theory and space has also made its way into the parlance, with the traditional term “classroom” being replaced with the broader expression “learning space.”

By the 2000s, design theories were starting to catch up with learning theories and Torin Monahan coined the term “built pedagogy” to characterize this connection between learning theory and space (Monahan, 2002). The progenitor for much of the recent applications of built pedagogy is the CDIO (Conceive, Design, Implement, Operate) model conceived by Phillip Long and Ed Crawley, and brought to fruition with MIT’s Aerospace Research Laboratory (Fielding, 2002; Johnson and Lomas, 2005; Nair, 2003). The CDIO model has been used to develop other learning spaces with the specific intention of increasing low attendance rates and decreasing failure rates and these have been largely successful (Long, 2005).

The potential impact of the physical environment on student learning was a major focus when designing the new HHS Building at WCU. After selecting an architectural firm that was willing to work collaboratively with their customers, the college dean began to identify the appropriate individuals who should participate in the planning process, which helped to bridge the older divide between builder and instructor. Because of the importance of getting faculty buy-in and input early in the process (Villano, 2010), faculty leaders were invited to accompany the dean when visiting academic health buildings on other college campuses to help them create their own unique visions for the building. The architects also met with various program representatives during the building design phase, enabling the architects to develop an in-depth understanding of the unique learning needs of the diverse health programs within the college. As a result, the academic department heads and program directors played a central role in designing their own learning spaces and labs and experienced a shared ownership of the building when the project was completed.



**Figure 1. Athletic Training Lab**

The design of the building includes a number of unique learning spaces designed to fit the needs of contemporary health care education. For example, the athletic training lab in Figure 1 provides screens above the student work spaces so that students view a demonstration as they practice their skills in simulated settings. In addition to specialized labs for hydrotherapy, athletic training/performance, audiology, and others, there are also two-way interview rooms, clinical spaces for adults and children, and an adaptive living suite, which simulates a real-world apartment where students can work with real or standardized patients who have a physical disability and must learn to negotiate/adapt within their physical living space at home.

The framework of learning as construct also means that learning continues to take place outside of the classroom, even if the instructor is not present. Formal instruction, then, can effectively be supplemented with informal instruction outside of the classroom. The implication for space design is that, institutions must address real and virtual spaces outside the classroom to ensure that they, too, “encourage learning” (Brown 2006; Oblinger & Oblinger, 2005). The architects worked closely with the dean and faculty to design well-lit and comfortable public spaces throughout the building to facilitate student/faculty conversations and exchange of ideas. There are a number of small intimate spaces in the building where students can gather, using large wall screens to project their computer images when working together on class projects or sharing information. The rooftop garden, shown in Figure 2, is located outside the second story atrium and provides a soothing light filled area where students might take a relaxing break while enjoying the beautiful mountain vistas.



**Figure 2. Rooftop Garden**

Part of the vision of the HHS building design was to encourage students to spend quality time at the building in between and after their scheduled class times. Graduate students have electronic card swipe access to their own labs giving them flexible times in which to practice and enhance their clinical skills. The large student collaborative area on the ground floor has computers and printers set up for student use, a number of small student collaborative spaces with large wall screens, and three private student seminar rooms to accommodate small study groups. There is a seven mile walking and biking trail being developed on the mountainside behind the building and there are three showers available for student and faculty/staff use near the clinic areas. The graduate programs housed in the building each host their own private student lounges that include convenient amenities such as refrigerators and microwaves. There is a similar student lounge area that is shared among the undergraduate students. In addition, there is a coffee shop in the main atrium of the building that sells a variety pastries, sandwiches, and frozen foods, as well

as coffee and specialty drinks. All of these spaces help students feel comfortable but connected, and encourage students to spend time in the building outside of their scheduled class times.

The move into the HHS Building allowed the various health programs previously housed in four different buildings on two different campuses to come together under one roof. Prior to the move the majority of the faculty interactions were limited to annual college meetings or other university functions, making it easier for faculty (and students) to maintain their focus on their individual, more homogeneous programs rather than interacting with colleagues who might have more diverse viewpoints and backgrounds. Interestingly there was a great deal of positive anticipation prior to the move, and the words “when we move into the new building” became an overarching faculty mantra as they projected how collaborative activities between the programs would begin to improve once the physical move took place.

### **Connecting Space to Students**

With the learning-centered revolution occurring throughout higher education, another assumption that needed to be overturned was that classrooms, or learning spaces, were built for instructors (Valenti, 2005). With the increasing demise of instructor-led teaching, learning spaces have come to focus increasingly on the needs of the students, particularly those of the generation known alternatively as Generation Y, Echo Boomers, Net-Gen or Millennials (Howe & Strauss, 2008). Researchers have identified several characteristics of this generation of students that are relevant to space design, including their propensity for social and experiential learning (Brown, 2006). Perhaps the most salient feature of this generation, however, is their digital nativism and the integration of technology tools into all aspects of their lives and lifestyles.

One of the most fundamental ways in which technology has transformed instruction is not through now-familiar educational technologies such as presentation software, course management systems, or flash drives, but rather by dramatically increasing the accessibility of information. Because of this, effective teaching can no longer focus simply on the transmission of information, but rather has shifted towards the acquisition of cognitive skills for interpreting that information. Classrooms, whether physical or virtual, become the center for learning experiences that are not designed to impart knowledge, but to provide opportunities for application, evaluation, and analysis. In this way, learning spaces become the nexus of design, learning theory, student traits, and technology (Brown, 2005).

If used correctly, technology has the potential to expand learning opportunities and enrich student achievement. The technological tools included in the HHS building are sophisticated and varied, from extensive wireless capacity to accommodate a large number of electronic modalities, to video-capture and video-conferencing capacities, to simulation labs. The building technology infrastructure is intended to prepare students entering the ever changing technology-laden world of healthcare, where tele-health, electronic medical records, and personal digital assistants are common tools being utilized in hospitals and healthcare agencies. In all of these areas, the technology connects students to learning through a strategic re-conceptualization of what constitutes learning space.



The video capture capabilities can be found in the classrooms, student seminar rooms, conference rooms, practical exam rooms and in the clinical spaces. This capability allows content (e.g. faculty lectures, presentations, clinical demonstrations) to be added to web-based or hybrid courses. It can also be used to share content with students who must miss classes or to augment students' learning during planned faculty absences or because of inclement weather. Video capture might also be used to record guest lecturers that are viewed later in subsequent classes. In the health programs video capture is a perfect tool for students to use when assessing/practicing their own clinical skills and it allows faculty to evaluate the students' clinical skills at the end of the course.



**Figure 3. Lecture Hall**

As shown in the picture of the lecture hall above, many of the classrooms and conference rooms are also equipped with video streaming and video conferencing capacities. Video conferencing technology allows students and faculty to overcome geographical boundaries and to interact and collaborate with experts from around the globe in real-time. This technology can also be used when students choose to share their presentations or demonstrations with their parents and family members who reside in different physical locations. Video streaming content into a number of different physical or classroom spaces might be used when there is not a room large enough to accommodate the number of audience/participants in one physical space.

The HHS Building contains three simulation labs to assist students in the nursing, emergency medical care (EMC) and other health-related programs when practicing their clinical skills using patient simulators. The patient simulators/manikins are used to train students as they practice their assessment and treatment skills on lifelike simulated “patients” without any degree of risk to real-life patients (see Figure 4). The manikins mimic body functions, such as breathing and blood pressure, and allow students to practice CPR, intubation, dress wounds, and collect vital signs such as heart rate and rhythm and oxygen saturation. These new lab spaces have generated much excitement and interest among faculty and students from programs that had not previously

used patient simulators. As a result, faculty are now beginning to collaborate and develop more inter-professional teaching and learning opportunities where students from diverse programs can practice working as a team to respond to situations and health conditions that do not often present themselves during a typical clinical internship. The picture below shows physical therapy and nursing students working as a team during a collaborative simulation exercise.



**Figure 4. Simulation Lab**

### **Connecting Space to Teaching**

Teaching and learning are two sides of the same coin and so changes in our understanding of how our students learn have produced concomitant shifts in our understanding of how to teach them. Traditional teaching relied on a one-size-fits-all model, with instructors bringing a class full of students along through well-established common goals. Under constructivist theory, however, instructors are recognizing that student outcomes can be more varied, and that students construct knowledge based on such factors as previous experiences, interests, talents, and future goals. Acknowledging this requires a shift towards differentiated instruction, which allows for students to explore multiple paths of learning. Because teaching must be flexible to meet an increasing variety of student outcomes, instructional space, too, has to become more flexible to meet an increasing variety of instructional outcomes.

Architect Prakash Nair calls for the creation of what he calls living architecture through “maximum flexibility and change so that the mix of learning areas - individual, team, small group and large group can be adjusted easily as needs vary” (Nair, 2002). The shape and size of the classrooms in the HHS building were carefully designed to promote flexibility of the learning spaces while also supporting collaborative and active learning opportunities. With the exception

of the 100-seat lecture hall, all of the classrooms are furnished with moveable furniture that can be arranged to support a variety of learning environments, from the traditional lecture style to small, intimate collaborative activities.

The classrooms also present variable technology options, giving faculty a range of options to choose from when requesting the classroom spaces that best fit their individual teaching pedagogies. However, the faculty have not universally chosen to avail themselves of these options. As other researchers have noted, “In academia, as in the business world, one can expect a handful of early adopters to lead the way in using innovative technologies, but, unlike the business world, faculty as a whole are often more risk-averse when it comes to integrating new technology into instruction and research” (Rogers, 1995). While not all of the college faculty fully appreciate the smaller, collaborative room configurations with multiple screens and diverse technology options, others have embraced these spaces and are using them in increasingly creative ways and with positive results.

Often times there is an underutilization of technology in the classrooms when there is a lack of support for faculty development in instructional design (Cuban, 2001). Fortunately the college has access to the Coulter Faculty Commons (CFC), a teaching and learning center that supports instructional and faculty development. Prior to the fall semester and during the first few weeks of classes one of the CFC instructors facilitated several instructional sessions designed to teach faculty how to use the basic technological tools in the classroom. Additional instructional sessions are planned to support faculty who want to use the more sophisticated technology related to video capture and video conferencing.

Having fulltime technology support in the building is imperative to faculty’s successful and continued use of technology in the classroom. Through the strong advocacy efforts of the college dean as well as lengthy negotiations with the chief information officer and university administrators, the college was able to ascertain the resources to support two full-time informational technology (IT) positions dedicated to the HHS building. Although the two positions overlap, one position is meant to support the faculty and students in the classroom while the other position supports video conferencing and oversight of master control. After a few months in the building, it has become apparent that as the use of the technology and video conferencing increases, so will the needs for additional technological support. While traditional teaching is primarily the parvenu of instructors, the innovative use of learning spaces broadens the community of support for teaching and learning.

An academic building project often involves a blending of very different cultures and perspectives between informational technology staff, space designers, and academics, each who bring in varying levels of expertise as it relates to student learning. Thus it is imperative to provide adequate education for those outside of academia to ensure that they understand the space and teaching/learning vision of the building all of the way through the project. It is advisable to comprise an agreement from the beginning of the project stating that the academic dean or his/her representative is consulted on all decisions regarding changing the structure and space of the building. For example, any decisions related to “value engineering” (e.g. budget cuts) of building spaces or furniture should be vetted through the academic representative so that s/he can help to prioritize these changes to minimize the negative impact on student learning.



## Connecting Space and the Community

Starting with MIT, institutions that have embraced built pedagogy are providing a wealth of resources, including advice, lessons learned, and best practices. One of the revelations that has arisen from these early adopters is the idea that a university is not just a site for learning, but can also be an important liaison for engagement with the community. As Wedge and Kearns (2005) emphasize, institutions that are looking to incorporate learning theory into design also need to take their institutional missions into consideration when creating space. WCU was deeply influenced by the stewards of place model championed by AASCU (American Association of State Colleges and Universities) (AASCU, 2002), which calls upon public institutions to be better neighbors, to re-imagine their relationship with local communities, and to become key players in community development (Mayfield, 2001). WCU's efforts to integrate the mission of the university with regional development led to an "engaged institution" designation, bestowed by the Carnegie Foundation.

The HHS Building design is aligned with the university's Mission Statement which emphasizes the values of improving individual lives and enhancing economic and community development through engaged learning opportunities. For example, the learning spaces throughout the building are intended to enhance the professional and clinical knowledge and skills of the students who will be providing healthcare services to the citizens in the region and beyond. The clinic spaces on the ground floor are available to support needed clinical services to the community while providing engaged learning opportunities for students. The Speech and Hearing Clinic is run by WCU faculty and staff and students enrolled in the Communication Sciences and Disorders program. This clinic provides over 2700 sessions annually, many of them at low or no cost to the patient. Two current clinical activities include a support group for patients and families dealing with dementia, and a social skills group for children with autism. Other developing specialized clinics include a fall and balance clinic, aquatic and other rehabilitation clinics and primary care clinics, with a focus on underserved and underinsured patients.

At WCU, recent strategic planning efforts had identified five core areas of community demand, including both education and health care to which the university wishes to respond.

Learning spaces can often serve as conduits for being a good neighbor and, as one researcher states, "higher education institutions are finding out that community and business partnerships are good for business and good for learning" (Nair, 2003). As part of WCU's Millennial Initiative which encourages private/public partnerships, the university is partnering with the local hospital system to relocate their physical therapy sports clinic to the new HHS Building. This clinic will continue to provide physical therapy services to university athletes and community members while creating engaged student learning opportunities through student shadowing experiences and internships and by partnering with students and faculty on research initiatives. The clinic staff will become affiliate faculty who can serve as guest lecturers in appropriate classes and/or partner with the WCU faculty to provide continuing education opportunities for working professionals. Though its use of space, the HHS building and the developing millennial campus links academics with the community, to the betterment of both.

## Connecting Space to the Marketplace

Economist Richard Florida has gained international recognition for his theories about the rise of a creative class, and how the needs of this class will dictate new ideas about geographic space. Already a significant economic force, the creative class, Florida predicts, will continue to grow exponentially within the American economy over the next fifty years. Included in his conception of the creative class is the concept of creative professionals. Creative professionals, according to Florida, may be defined as those who “draw on complex bodies of knowledge to solve specific problems” using higher degrees of education to do so (Florida, 2002). Such professionals are largely clustered in key areas that require intensive knowledge backgrounds, such as education and health care. While Florida’s work certainly has its critics (Peck, 2005), his conception about a changing connection between economics and geography, or space, has entered mainstream discussions. According to his model, the creative class will be motivated to learn, live, and work in different places than the working and middle classes before them. Instead of moving to a place just to hold a job, creative professionals will seek places that foster the creative process and the lifestyles, both inside and outside of work, that support them. Florida calls upon cities looking to attract members of the creative class to be cognizant of their “people climate” and to invest in options, amenities and surroundings that appeal to well-educated, creative professionals.

Following this theoretical bridge, just as cities should invest in the full lifestyle options if it wishes to attract creative professionals, universities that wish to attract future creative professionals to its doors should pay attention to its people climate as well. A university campus, particularly one that is the dominant employer in a rural area as WCU is, often serves the role of a small city. For such a university, paying attention to the people climate in design can serve to recruit and retain students, as well as talented faculty and staff to support those students. And universities need to pay attention. Faced with declining state support dollars, many public universities are finding themselves having to think more strategically about what programs they invest in and to be more market savvy in competing for and attracting students with the highest chances for success in focused areas.

Like most universities, WCU is cognizant of the value of recruiting and retaining top students, faculty and staff, and WCU has successfully completed a number of new building projects and renovation spaces on the main campus to help them meet this goal. The HHS building, which is located approximately a mile and a half from the main campus, has additional features that are certain to attract additional faculty and students to this area. For example, the building has silver LEED (Leadership in Energy and Environmental Design) certification, resulting in a great deal of shared, natural sun light flowing throughout the building. The large, open atriums, the rooftop garden filled with native and healing plants and the state-of-the-art labs and technology are all attractive features for potential students and faculty.

Even in challenging economic times there continues to be a plethora of job opportunities for students majoring in the health professions. Health-related jobs grew by 54% between 2000-2010 overall and professions in allied health showed a 61% increase (Bureau of Labor Statistics). According to the Occupational Outlook Handbook distributed by the Bureau of Labor Statistics, projected employment opportunities in the health disciplines over the next ten years are expected to grow much faster than the average (e.g. physical therapy, athletic training, emergency medical

technicians,) or faster than the average (e.g. nutritionists, registered nurses, speech-language pathologists, social workers and substance abuse counselors) in comparison to other professions (www.bls.gov). In response to the demand, student enrollment in the college has increased around twenty percent over the past five years. In addition to the using the enhanced physical spaces, the college is exploring additional ways to use technology to support the needs of the healthcare market by increasing its online degree and certification options (e.g. RN to BSN and Nurse Educator programs) and through its use of video conferencing to engage working professionals throughout the region.

## Conclusion

This paper has addressed five ways in which a space can be connected to learning, students, teaching, community, and the marketplace, through the lens of a real world application, via the newly-built Health and Human Sciences Building at WCU University. The experience of the faculty and administrators at WCU suggests that bridging the gaps between theory and application provides both challenges and opportunities. Creating innovative learning spaces provides challenges both in design, particularly finding common ground among previously disparate groups of educators, architects, and support staff; and in utilization, particularly finding ways to maximize the potential of innovative spaces for teaching and learning. Creating effective learning spaces provides opportunities to expand how, when, and where students learn and to engage students, faculty, staff, and community in meeting the demands of a dynamic marketplace. The full promise and potential of WCU's new HHS building will only be realized as the building, and its occupants, continue to evolve but the intentional connections inherent in its design leave it well poised to meet diverse and growing needs in health education.

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