

Converging Pedagogies: Human Health and Sustainable Design

KIMBERLY ROLLINGS
University of Notre Dame

Drawing from architecture, landscape architecture, urban planning, environmental psychology, and public health, this paper discusses an innovative syllabus for an interdisciplinary undergraduate course that covers a range of concepts underlying the complex interaction between people and the physical environment on health and sustainability. The course first introduces theories and methodologies, then divides remaining content into three units outlining key concepts across a range of environmental scales: healthy people, healthy places, and healthy planet. Each unit identifies how the range of both physical (built and natural) and social factors contribute to the design of healthy, sustainable, functional, aesthetically pleasing, and socially just environments people wish to maintain and preserve. A variety of course activities and assignments engage students from multiple disciplines in evaluating existing and planning for future healthy, sustainable buildings and cities. Course learning objectives, success, and challenges are also discussed.

INTRODUCTION

The intersection between healthy living and sustainable design presents a unique pedagogical opportunity to introduce students to the interdisciplinary field of environments and health. In order to create healthy, sustainable buildings and cities, architects, planners, public health practitioners, and policy makers must understand design and construction processes as well as social and cultural factors that support and constrain what can be accomplished via design. The interaction between people and the environment – both built and natural – affects physical health, mental health, and social well-being. These effects have further consequences for environmental, economic, and social sustainability, including energy and resource use. An introductory course for upper-level undergraduates called, “Social Factors and Sustainability: Effects of the Built Environment on Health” was created to engage students from multiple fields,

including architecture and design, in the field of environments and health and consider implications for sustainability.

COURSE DESCRIPTION

Drawing from architecture, landscape architecture, urban planning, environmental psychology, and public health, the course covers a range of concepts underlying the complex interaction between people and the physical environment on health and sustainability. Embedded in this interaction are also issues of universal design, culture, and social and environmental justice. The course extends the typical “healthy places” course agenda via inclusion of environmental psychology content and implications of healthy environments for environmental, economic, and social sustainability. Now in its fourth semester, the semester-long, three-credit course satisfies elective requirements for Architecture and Psychology majors; Sustainability, Poverty Studies Interdisciplinary, and Energy Studies minors; and is a community-based learning course. Undergraduate and graduate students enroll from architecture, psychology, planning, design, sustainability, poverty studies, premed, social science, environmental science, civil engineering, and business.

The course focuses on health in terms of physical, mental, and social well-being¹⁰ and considers implications for environmental, economic, and social sustainability.³ After a course overview and history of urban planning and public health lecture, students are introduced to key theories, frameworks, and methodologies used to examine and support healthy, sustainable buildings and cities in both research and practice. Students are briefly introduced to methodologies from architecture, social science, and public health, including direct observation, architectural programming, patterns, design guidelines, post-occupancy evaluation, and health impact assessment. The class learns to identify which method is appropriate to use in research and practice depending on the question and audience.

Next, three units outline key concepts across a range of environmental scales: healthy people, healthy places, and healthy planet. Each unit identifies how the range of both physical (built and natural) and social factors contribute to the design of healthy, sustainable, functional, aesthetically pleasing, just, and culturally appropriate



Figure 1. Students participate in a “privilege walk” before discussing effects of the built environment on health disparities and vulnerable populations.

environments people wish to maintain and preserve. The healthy people unit focuses on the urban planning-public health literature^{2,5} and social-ecological models.^{1,6} The healthy places² unit relies on environmental psychology concepts referred to as attributes of place and discusses them within the context of specific building types (housing, schools, workplaces, healthcare). The healthy planet unit focuses on especially larger-scale environmental sustainability implications of the way we build our buildings and cities.

LEARNING OBJECTIVES

The course has four learning objectives:

1. Explain built and natural environment influences across scales on health and sustainability, across multiple scales. The course acknowledges micro- to macro-level influences per the social-ecological model, but focuses on interior spaces, buildings, neighborhoods, and cities.
2. Recognize design & research projects that respond to course concepts.
3. Think critically to apply course content to real-world contexts.
4. Communicate effectively, both orally and in writing, related to environment, health, and sustainability issues.

COURSE ACTIVITIES

Course activities include not only traditional lectures, readings, and exams, but also guest lectures; videos; discussion; interactive individual and group exercises (Figure 1) in class and on campus; two small assignments; and a community-based semester project that, after in-depth study of a topic selected by each student, requires application of course content to a real-world problem defined by a community partner. The variety of course activities promote student interest in and in-depth engagement with course content; critical thinking and application of content to required real-world projects in the local community; and effective communication of content to a variety of audiences. Students meet with the instructor individually at the beginning of the semester to discuss skills and semester project interests. Three in-class semester project work sessions allow

students to ask questions and obtain informal feedback prior to final project submission.

Additionally, the syllabus provides students with optional readings that allow students to further study a particular topic of interest, as well as to assist students with small assignments and the semester project. Students are awarded extra credit for attending relevant campus and community lectures that relate to course content. Extra credit is also awarded to students who identify articles, images, videos, or design projects that illustrate or apply course content and that the instructor can use in class. Successful examples are also shared via social media.

ASSESSMENT

The course uses both formative and summative assessments. Formative assessments include in-class exercises and two small assignments involving systematic observation of public space, in-class group presentations, and reflection via discussion. Additionally, the first two parts of the semester project are formative. Students receive early project feedback that also assists the instructor in addressing differences in student skill level and familiarity with course content. Summative assessments include two exams and the final two parts of the semester project. Short-answer, take-home exams test student comprehension and application of course concepts. Example items include assessing whether or not their home town is a healthy and sustainable community; analyzing local public space; and describing experiences with elderly relatives related to social and physical environment factors. The final two parts of the semester project require students to communicate the results of their work via formal writing, visual communication, and verbal presentation to the class and community partners.

ASSIGNMENTS

In addition to two exams, students are required to complete two small assignments and one four-part semester-long project focusing on a topic of each student’s choosing. In addition to serving as both formative and summative assessments, the different types of assignments promote different levels of engagement with course content, faculty, and other students.

Small assignments are worth 10-15 percent of the course grade and have three purposes: 1) To intrigue students with new topics; 2) to



Figure 2: Students observe campus public space according to W. H. Whyte's *Social Life of Small Urban Spaces*.

motivate students without fear of losing points; and 3) to bridge course content and real-world applications. Small point allocations and less critical assessments motivate students to become familiar with topics beyond readings and lectures via hands-on, interactive activities. The assignments also bridge course content to real-world applications, preparing them for their semester project and some exam questions. Small group assignments also help students from multiple fields get to know each other and feel more comfortable asking questions and presenting their own perspectives.

The first small assignment occurs early in the semester when discussing observational methodologies and evidence-based design guidelines. Students read William Whyte's work⁹ and watch *The Social Life of Small Urban Spaces* companion video.⁸ Using direct observation, Whyte clearly identifies and illustrates seven principles of successful small public spaces. To deepen comprehension of Whyte's work, students are asked to apply Whyte's work to a campus public space with which they are already familiar (Figure 2). Students complete a structured observation and evaluation of the space based on the seven principles. All students, regardless of field, draw a plan of the space, observe use of the space, and then complete behavioral annotations¹¹ related to each of the seven principles.

The exercise achieves three outcomes. First, it challenges students to complete detailed observations and visually document space and human behavior, as well as support those observations with Whyte's research rather than personal experience. Second, students quickly learn to appreciate the skill sets of their multidisciplinary classmates. Architecture and design students tend to excel at drawing and noting relevant physical components of a space, while other students excel at the behavioral annotations linking observations and human behavior to Whyte's principles. Although each student completes the assignment individually, they are permitted to discuss their work with each other during the exercise. Disciplinary boundaries begin to weaken and students experience the need for interdisciplinary work that is critical in building healthy environments. Third, the exercise empowers students who are typically nervous about interdisciplinary course content. Whyte's principles provide easy-to-understand concepts that build students' confidence before engaging in more advanced coursework.

The second small assignment occurs at the beginning of the healthy places unit. This unit, which discusses specific building types, previously began with several lectures on "attributes of place" from the environmental psychology literature (e.g., meaning, place identity, accessibility, adaptability, sensory stimulation, restoration, legibility, privacy and sociality, comfort, crowding, personal space, territoriality, and defensible space).^{4,7} Students struggled with this unit because the attributes are less intuitive and clear than, for example, Whyte's work discussed earlier. Instead of using lectures to introduce the attributes and their relation to health and sustainability, the class is divided into small groups after an introductory lecture. Each group researches two attributes of place, creates an informational and illustrative handout, and presents work to the class. Completed handouts are shared with the class and provide students with attribute definitions, descriptions, examples, and illustrations that prepare students for discussion of specific building types (e.g., housing, schools, workplaces, healthcare), and also to relate the attributes of place relevant to their semester project topic. This active learning experience brings together groups of students from different fields and allows them to apply what they have learned thus far, collectively learn about a new topic, and identify effective communication methods to convey that information clearly to their classmates.

While the course provides students with an introduction to a wide variety of topics, not all content is covered in-depth. Therefore, the four-part semester project allows students to select and focus on a topic of interest. The project, which is worth 45 percent of the course grade, offers students from multiple fields with varying interests the opportunity to study a topic of interest in-depth; explore thesis project ideas; engage with the community and a real-world context; and bridge a gap between research and practice.

The four parts of the project consist of: an initial project proposal after completing field observations and interviews; an annotated bibliography; a structured literature review; and an evidence-based final product in partnership with a relevant community

	Benefits	Challenges
Small Assignments	<ul style="list-style-type: none"> -Students acquire hands-on experience. -Remove fear of making errors when learning new topics & skills. -Leads to lively in-class discussions. -Instructors & students receive feedback. 	<ul style="list-style-type: none"> -Class time limits exercise possibilities. -Observation location availability. -Larger classes require multiple smaller discussion groups & more presentation time.
Semester Project	<ul style="list-style-type: none"> -Students pursue individual interests in-depth. -Community-based, real-world experience. -Address a research-practice gap. -One-on-one discussion w/ faculty. -Project framework is adaptable to varying topics, skill levels, and class sizes. 	<ul style="list-style-type: none"> -Requires instructor time commitment: grading, face time, & engagement. -Does not scale to very large class sizes. -Risk of damaging community partnerships if students do not deliver quality work.

Table 1. Benefits and Challenges of Small Assignments and a Semester-Long Project.

organization. After selecting a topic and community partner, students interview their partners, observe facilities, and work with partners to identify an appropriate evidence-based final product, such as a research brief, brochure, or design guidelines, in response to community partner needs. Then, students work with the campus library to identify sources from various fields related to their topic's history and evolution; relation to health & sustainability; user group needs and goals; attributes of place; policies, codes, and guidelines; and successful published examples of similar projects and organizations. The structured topics expose students to books, peer-reviewed articles, and periodicals from the humanities, public health, policy, planning, and architecture that are critical to addressing their project topic, and expand their knowledge of how to access relevant sources. Students write a structured literature review based on their bibliography before completing and presenting their evidenced-based final products.

Instructors can use the semester project for both formative and summative assessment; to adapt to various student skill levels, fields of study, and interests; and to provide opportunities for students to work in groups, promoting communication across academic fields and allowing the project to scale for larger enrollments. Both the small assignments and semester project present benefits and challenges (see Table 1). All assignments, however, rely on a fairly small class size without substantial teaching assistant support.

COURSE SUCCESSES & CHALLENGES

The course approach benefits students, faculty, and community partners. First, the variety of activities offers a broad introduction to many topics while allowing students to apply concepts, interact with their classmates, and pursue a topic of interest in-depth. This balance of broad overview and in-depth exploration promotes student interest and engagement in the course, as well as encourages interaction with classmates from multiple fields and perspectives. The

real-world semester project further motivates student engagement and application of course content. Second, the course structure and activities provide faculty with flexibility to address the needs and varying skill levels of multidisciplinary students. Course activities and assignments can be adapted to different student interests and skill sets, as well as accommodate various academic program requirements and class sizes ranging from five to 30 students. Partnering with community organizations also increases the impact of the course beyond the classroom and students. Third, community partners benefit not only from the evidence-based product developed by students to address their needs, but also from working with the course, meeting other partners, and continuing to work with the course or other resources on campus.

The innovative course approach has challenges related to 1) students and enrollment, 2) depth of course content, and 3) community-based learning. 1) First, larger class sizes limit the number of project options and partners, as well as time the instructor can spend with students discussing the semester project. Student interests, engagement, and skill levels vary each year, so both course content and activities must be adjusted each semester. Struggling students require extra attention and assistance adjusting the scope of the semester project to ensure delivery of quality final projects to community partners. 2) Second, the broad introductory course content limits in-depth exploration of topics as a class, beyond topics selected by students for their semester projects. Ideally, this course would serve as the first of a series of "healthy places" courses that would allow students to further pursue their interests, but currently no other courses exist. Direct application of the broad course content is also limited for architecture and design students. Because the course attracts students from multiple disciplines, design projects are not completed as part of the course. 3) Third, the community-based semester project requires a significant amount of time for preparation, communication, and management before, during, and after the semester. Instructors must identify community partners and project possibilities in advance, manage communication between students and partners, and support positive experiences

for students and partners throughout the semester. Some flexibility in scheduling is required by students, partners, and the course syllabus especially at the beginning of the semester. Instructors must encourage a sense of project ownership among students so they work to manage their own projects. Although rewarding, community engagement must be carefully considered and managed to successfully accomplish course learning goals and provide mutually beneficial experiences for students and partners.

COURSE OPPORTUNITIES

The course framework presents two future opportunities for exploration: bridging gaps between research and action, and building a replicable course model. One course theme is bridging gaps between research and design, practice, and policy. The final, evidence-based product that results from the semester project provides students with the opportunity to bridge a gap between course content and community partner organization needs. The real-world experience has led to further student engagement beyond the course. Some students have submitted their projects to campus conferences while others have been built upon by future students. Faculty instructors can also use data collected by semester projects for research and extend the impact of student projects. Additionally, the course framework presents opportunities to establish lasting partnerships with local community organizations for further community-based teaching and research. Students and instructors can also contribute to the academic community by publishing relevant student semester projects in academic journals and conference proceedings. Furthermore, some semester projects allow for testing translation of design guidelines and research in practice at a small scale. The course framework and semester project flexibility also allow instructors to test models of community-based learning, as well as build and test capacity for interdisciplinary courses on campuses traditionally lacking disciplinary cross-over.

CONCLUSION

Too frequently and routinely the design of the built environment fails to support healthy, sustainable environments and lifestyles. "Healthy places" coursework and joint-degree programs that are emerging in architecture, planning, and public health programs will start to educate the next generation and increase awareness of these issues. The course described here not only introduces a range of relevant topics, but also integrates real-world, community-based partnerships to promote interest in these issues beyond the classroom.

REFERENCES

1. Bronfenbrenner, U. *The Ecology of Human Development: Experiments by Nature and Design*. Boston, MA: Harvard University Press, 1979.
2. Dannenberg, Andrew L., H. Frumkin, and Richard Jackson, J., eds. *Making Healthy Places: Designing and Building for Health, Well-Being, and Sustainability*. Washington, DC: Island Press, 2011.
3. Elkington, J. "Enter the Triple Bottom Line." In *The Triple Bottom Line: Does It All Add Up?*, edited by A. Henriques and J. Richardson, 1-16. New York, NY: Earthscan, 2004.
4. Evans, Gary W, and Janetta Mitchell McCoy. "When Buildings Don't Work: The Role of Architecture in Human Health." *Journal of Environmental psychology* 18, no. 1 (1998): 85-94.
5. Jackson, Richard, J., and Stacy Sinclair. *Designing Healthy Communities*. San Francisco, CA: Jossey-Bass, 2012.
6. Sallis, James F, Robert B Cervero, William Ascher, Karla A Henderson, M Katherine Kraft, and Jacqueline Kerr. "An Ecological Approach to Creating Active Living Communities." *Annu. Rev. Public Health* 27 (2006): 297-322.
7. Weisman, G. "The Place of People in Architectural Design." In *The Architect's Portable Design Handbook. A Guide to Best Practice*, edited by A. Pressman, 1-9. New York, NY: McGraw-Hill, 2001.
8. Whyte, William H. "Excerpts from the Social Life of Small Urban Spaces." In *The Essential William Whyte*, edited by A. LaFarge. New York, NY: Fordham University Press, 2000.
9. Whyte, William H. "The Social Life of Small Urban Spaces." 80 minutes. Santa Monica, CA: Direct Cinema Limited, 1980.
10. World Health Organization. "Constitution of the World Health Organization." Geneva: World Health Organization, 1948.
11. Zeisel, John. *Inquiry by Design: Environment/Behavior/Neuroscience in Architecture, Interiors, Landscape, and Planning*. New York, NY: WW Norton & Co, 2006.