CHAPTER SEVENTEEN

Honors Colleges, Transdisciplinary Education, and Global Challenges

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In addition to providing challenging and enriching educational opportunities, preparing students for "what's next," and ensuring that students graduate with a strong sense of purpose, honors colleges must adapt to institutional expectations that are increasingly attuned to the demand for active and experiential learning, "bridge" experiences, and transdisciplinary capabilities. For students to understand the complex challenges they will face after graduation, they must learn how to work effectively with others who may have fundamentally different ways of approaching, talking about, and responding to professional and public issues. Many of the most interesting research projects that graduates may encounter will be situated at the intersection of two or more traditional academic

disciplines, while employers increasingly seek graduates with collaborative problem-solving skills developed through well-designed and effective experiential learning opportunities (Roberts). Transdisciplinary capabilities are especially critical in the context of the challenges posed by issues such as climate change because of the complexity and interdependence of the factors involved (Nowell et al.). Whereas interdisciplinarity involves the integration of knowledge and methods from different disciplines, transdisciplinarity provides a holistic intellectual framework for understanding issues and the interdependence between them. (Cross-disciplinarity, meanwhile, simply involves viewing one discipline from the perspective of another; multidisciplinarity involves people from different disciplines working together, each drawing on their disciplinary knowledge.)

Universities must lead the way in identifying and understanding the complexities of global challenges and national economic and social development (Foray and Sors), and honors colleges are well positioned to play a significant role because they are able to bring together multidisciplinary groups of students and faculty from a wide range of disciplines needed to address complex societal and environmental issues. Just as honors programs were reimagined and grew exponentially as part of the massive U.S. educational response to the Soviet launch of Sputnik I in 1957, amid "urgent calls for better training in science and technology and improved preparation of future national leaders" (Andrews 22), honors colleges today can help reimagine undergraduate education to address urgent matters of national security, national competitiveness, and social well-being in the context of contemporary global challenges. And in this context the latest international rankings are sobering. The United States sits behind Japan, South Korea, and China in technological expertise and behind Japan and Germany in entrepreneurship (*U.S. News & World Report*/Wharton School). More worryingly, the United States stands fourteenth on the United Nations Development Programme's education index and twenty-eighth on its Human Development Index when accounting for internal income inequality (UNDP). The United States is nineteenth in terms of "social purpose" (human rights, care about the environment, gender equality and religious

freedom, respect for property rights, racial equity, animal rights, commitment to climate goals, and social justice) and twentieth in terms of quality of life (affordability, employment opportunities, economic stability, income equality, political stability, public education, and public health care) (*U.S. News & World Report*/Wharton School). Education is the key to improved national standing across these issues, and honors colleges have the potential to play a crucial role in that project.

GLOBAL ISSUES AND TRANSDISCIPLINARITY

Global issues such as climate change, environmental degradation, human health, food and water security, income inequality, migration, and gender inequality involve complex interdependencies that affect large populations and impact individuals in multiple locations and occupations; they cannot be effectively tackled by any single community, organization, or academic discipline. Rather, they need coordinated and collaborative efforts across organizations and disciplines. Such efforts, then, require systems thinking as well as transdisciplinary capabilities. Honors colleges have a significant advantage here: gifted and motivated students from every academic discipline on campus and the ability to establish interdisciplinary curricula that train students to integrate diverse perspectives. This essay will discuss how to harness this advantage to provide a truly transdisciplinary education through collaborative, project-based learning, both on campus and beyond.

Transdisciplinary, systems-thinking approaches to undergraduate education have been recognized as effective in many disciplinary fields—from agriculture (Bawden et al.) to business (Seiler and Kowalsky), chemistry (Nagarajan and Overton), ecology (Hiller Connell et al.), engineering (Zou and Mickleborough), hydrology (Lee et al.), and even aesthetics and design (Sevaldson)—as well as in general education (Mobus). Using project- and problem-based learning and cultivating systems thinking allow students to identify interdependencies and contingencies within complex systems, identify feedback, understand dynamic and cyclical behavior, and learn to develop conceptual models, think

temporally, make predictions, and evaluate policies (Ison; Thornton et al.). As Jacobson and Wilensky observe, "The conceptual basis of complex systems ideas reflects a dramatic change in perspective that is increasingly important for students to develop as it opens up new intellectual horizons, new explanatory frameworks, and new methodologies that are becoming of central importance in scientific and professional environments" (12). Additionally, incorporating collaborative and experiential approaches increases the impact on students' overall academic success (Kuh 20–21), and honors education has been centrally preoccupied with high-impact practices that enhance a student's academic experience.

The siloed structures of academia, however, often pose a major barrier to establishing transdisciplinary capabilities among undergraduates: "Centuries of tradition have produced institutional silos, reinforced by layers of policy and cultural differences between academic departments, between colleges, and between academic and non-academic units" (Amoo et al. 5). Gibbons et al. characterize the siloed character of academia as producing "Mode 1" knowledge, which as Stoller notes is "often context-free and validated by standards of logic, measurement, or consistency of prediction within the context of a traditional discipline" (47). But Mode 1 knowledge "is inadequate for honors as an occupation because it severs theory from practice, reduces epistemic diversity, and thereby inhibits the transformational potential of our work" (Stoller 49). All too often, even multidisciplinary efforts are lost in a Bermuda Triangle of disciplinary hierarchy, departmental silos, and institutional barriers (Association of American Colleges and Universities; National Academies). Macfarlane notes that in addition to being constrained by disciplinary rigidities, academia is siloed in terms of sector (e.g., humanities versus social sciences), level of analysis, methodology, ideology (e.g., structuralist versus neoliberal), and regional focus. Institutional frameworks and practices also tend to reinforce disciplinary silos (Dymond et al.). Governance structures mean that much information and decision-making, including productivity ratings and rewards, faculty reviews, and promotion and tenure processes, sit squarely in disciplinary departments. Honors curricula with an emphasis on theses and capstones can also reinforce

the culture of disciplinary silos because students often opt for in-major topics at the encouragement of faculty members with an eye to supplying graduate schools and the future professoriate with mini-me's.

BEYOND "BUSINESS AS USUAL"

Yet, honors colleges are in a unique position to circumvent these silos by convening multidisciplinary groups of students guided by faculty from a wide range of disciplines. This long-standing, underappreciated subversive aspect of honors—its ability to formalize dialogue across disciplines so as to expose participants to new ways of thinking—has never been more important. As Stoller suggests, honors education can provide a "Third Space" that transcends not only disciplinary silos but also the binary distinction between academic and applied approaches. Honors colleges can do so by focusing on "Mode 2" knowledge that is integrative, applied, and socially accountable, "committed to innovative and exploratory applications of the disciplines that directly bridge and integrate diverse forms of understanding in the service of engaging complex, real-world problems" (Stoller 49). For us, this goal means developing a curricular vision with structured flexibility (not student-driven serendipity or faculty preferences); incorporating active learning in collaborative project- and problem-based contexts; exploring critical, real-world problems; collaborating across disciplines to research the problems from a variety of viewpoints; and working through multiple iterations of design thinking toward better understanding and potential interventions.

Studios and workshop-style classes provide the ideal pedagogical setting. Architecture and allied design disciplines, for example, have long relied upon the strengths of the studio: collaborative settings that facilitate shifting between analytic, synthetic, and evaluative modes of thinking; formal and informal communication; and self-directed learning. Project- and problem-based work in studio settings allows students to learn from failure, handle ambiguity, develop the capacity to think across scales, and learn the practice of reflective inquiry. It is a teaching model "in which the

functional and the structural, the social and the technical, must be successfully blended" (Kuhn 349). The extended presence of faculty in studios provides the necessary scaffolding: continuous, formative feedback; asking "directing" questions; setting appropriate goals; nurturing required skills; ensuring everything is recorded; helping to keep student work focused; summarizing the learning that has occurred; and encouraging self-reflection (Chance et al; Lin et al.). As a result, studios become social spaces, important seedbeds for a "relationship-rich" education (Felten and Lambert). After all, the undergraduate experience, at best, is fundamentally about conversations and encounters (Giamatti). The conversations must be constant: between students, among faculty, between students and faculty, between the certainties of the past and the possibilities of the present. The encounters are both with people and with ideas. Like good conversations, they will challenge students' assumptions, stretch their imagination, and develop their self-awareness.

One criticism of studio pedagogy in architecture programs is that it is too often framed around competition among individual projects instead of promoting cooperation and collaboration. Another is the isolation of students from their peers in other disciplines because they are cloistered in the studio. The studio becomes the center of their social lives, and consequently the world outside the studio becomes less important. Inside the studio, students are easily gaslit by faculty who are overly ardent followers of the taken-for-granted ideology and precepts of the field, reinforcing certain ideas and dispositions while making others invisible (Knox). Thus, a "hidden curriculum" of unstated values, attitudes, and norms that stem tacitly from the social relations of the school and classroom as well as the content of the course can emerge (Dutton 16). Meanwhile, the studio inevitably propagates a distinctive habitus among students:

> All the subtle signs of cultivation—accent, manners, deportment, dress, attitudes, tastes, dispositions—cannot be obtained second-hand. They must be slowly absorbed from those who are already cultivated. . . . By saturating students with the objects of architectural culture, by presenting

them with role models, living examples of embodied cultural capital . . . ; by displaying in all the slight ways of manner, dress, and taste that one is becoming what one wishes to be, students absorb cultural capital in the only possible way, by presenting to the studio master's gaze their whole social being. (Stevens 199)

By the end of their course, "the students are fully assimilated into the social mores of the architectural world. Students enter as normal, situated, humans and come out as rather abnormal, detached, members of the tribe" (Till 18).

Such criticism can be precluded in studio settings designed for students from a wide spectrum of majors and supported by faculty from several different disciplines. Honors colleges can not only convene such settings but also provide the kind of curricular structure or framework that maximizes their impact. Precedents for multidisciplinary studio pedagogy exist, including the Wissenschaft, Technologie, Gesellschaft workshops at the Center for Technology in Society at the Technical University of Munich and the cross-disciplinary "ecosystem" connecting science and society through design at the University of Twente's DesignLab. Such programs signal a huge opportunity for honors colleges because of their ability to convene students with foundational knowledge and experience from a broad spectrum of disciplines. A studio setting, as Kuhn notes,

lends itself well to multidisciplinary teaching and learning. Because of the heterogeneous issues considered in studio courses and the way in which students are encouraged to look at the totality of what they are doing, multiple perspectives on the problem at hand are more easily introduced and assimilated into the flow of the course. Faculty may teach in multidisciplinary teams, students may work in multidisciplinary teams, and judges, critics and clients may introduce multiple perspectives. (352)

How, then, might honors colleges take advantage of studio-based pedagogy? Establishing an honors curriculum featuring active,

collaborative, and project-based learning in multidisciplinary studio settings requires a carefully structured curricular vision.

COLLABORATIVE, PROJECT-BASED, AND MULTIDISCIPLINARY

The Virginia Tech University Honors Program was transformed into an honors college in 2016 as part of the university's Beyond Boundaries visioning process that identified transdisciplinary Destination Areas to foster faculty members' collaborative research and teaching efforts, including Adaptive Brain and Behavior, Data and Decisions, Equity and Social Disparity in the Human Condition, Global Systems Science, and Intelligent Infrastructure for Human Centered Communities. The honors college was tasked with developing the kinds of collaborative, project-based, and multidisciplinary pedagogies that would support students' transdisciplinary learning in the Destination Areas and similar spaces. Our signal resources in these efforts are three collegiate professor positions, a large studio space, and an honors diploma that specifically requires students to engage in honors-level transdisciplinary learning.

First, the collegiate professor positions are non-tenure but career-track positions with long-term, renewable contracts and with job descriptions and expectations that value teaching, research in the scholarship of teaching and learning, and service, in that order. Our three current faculty hold terminal degrees in computational biology; public administration; and design, innovation, and sustainability. They teach two courses a semester and publish research on their ongoing, collaborative pedagogical experiments in these courses. Second, the Honors College Studio space—formerly a ballroom in the Virginia Tech student union building—is a large and flexible space with mobile furniture, whiteboards, projection equipment, secure storage spaces, a PA system, and secured access, a place where students from every discipline on campus can meet to work on collaborative projects ranging in size from five to ninety-five participants. Third, the Honors Laureate Diploma at Virginia Tech requires students to engage in two equally weighted kinds of honors-level learning: collaborative discovery and experiential learning.

While students will bring foundational knowledge and experience from their individual disciplines when they enter the honors college transdisciplinary curriculum and learning spaces, they will also tend to bring siloed approaches to methodology and analysis. Calling out those disciplinary perspectives explicitly can be an initial step toward transdisciplinary self-awareness. Another early consideration is helping students understand just how complex contemporary global challenges are and thus appreciate the need for transdisciplinary approaches to addressing these challenges. Global migration, for example, is a challenge to be tackled by historians, economists, geographers, political scientists, sociologists, climatologists, and many others working in concert. Faculty in the Virginia Tech Honors College have, therefore, recently instituted a series of 3-credit honors transdisciplinary seminars in which students from any disciplinary background can meet to explore the difficulties in addressing "wicked problems" (Rittel and Webber), such as climate change, sustainability, homelessness, health care, hunger, refugees and displaced populations, obesity, poverty, and terrorism. In a recent seminar entitled "Understanding the Global Socio-Environmental Emergency," for instance, students synthesized perspectives and data from natural sciences, philosophy, engineering, technology, social sciences, and the arts. They also explored environmental history, meteorology, economics, agriculture, psychology, urban studies, ethics, biology, wildlife studies, environmental justice, and literature in an effort to grasp the interconnected complications involved in addressing this emergency and the value of harnessing multiple domains of knowledge in those efforts.

A second consideration in helping students move toward transdisciplinary thinking and action is to provide them with a shared understanding of the ways in which focused research questions can be generated, research protocols can be designed, different kinds of data can be managed, and findings can be analyzed and reported. Recognizing that students will have different levels of appetite or ambition regarding undergraduate and graduate research, faculty in the Virginia Tech Honors College have created a suite of four 3-credit courses to help students develop their understanding and

skills in integrated quantitative/qualitative research methods. These courses begin by helping students generate focused research questions, find scholarly literature, organize data, and conduct ethical research; they then offer instruction and experience in how to identify funding opportunities for research, how to collaborate across disciplines, how to design introductory research protocols, and how to manage transdisciplinary research projects; and finally, they help students learn to collect and work with multiple types of data, report primary and secondary data, evaluate the work of others, and communicate conclusions to general audiences. While these courses can be taken sequentially, we employ careful advising and multiple "on ramps" and "off ramps," so students can enter and exit the sequence at individually appropriate junctures.

Some thought also must be given to the most effective ways of organizing studio-based courses to best foster transdisciplinary capabilities among students. At Virginia Tech, we offer both stand-alone 3-credit discovery and innovation studios and a massively collaborative 4-credit SuperStudio model, which brings together students from across multiple sections. The stand-alone sections are available to students from any major, may be taken up to four times for credit, and offer instruction and experience in discovering and defining critical, real-world problems, transdisciplinary collaboration, design thinking, reflective evaluation of both the students' individual and collective problem-solving efforts, and communication of solutions to diverse stakeholders. Recent topics for these studios include "Big Data and Social Justice," "Natural Disasters and Eldercare," and "Wildfire and the Human Condition." The stand-alone studios offer strong preparation for the SuperStudio experience. In SuperStudio, students enroll in concurrently scheduled discovery and innovation studios and a one-credit transdisciplinary studio course. All these classes meet at the same time in the same large, modular learning space so that students can both meet in their separate sections for in-depth topic exploration and combine with students from the other sections for vertically integrated, massively transdisciplinary collaborative activities. Through a set of carefully coordinated practices, the SuperStudio

empowers students to engage confidently in the collaborative work they will need as professionals and citizens to address critical twenty-first-century issues (Lewis et al.). For example, a recent SuperStudio included discovery and innovation studios on environmental policy and social change, data analysis for health reform, drone technologies for the public good, the future of higher education, and the future of employment. These studios converged into a SuperStudio through their collective examination of the promises and challenges of the Green New Deal, an emerging framework for addressing interconnected crises in climate change and economic inequality.

The Virginia Tech Honors College has taken a similar approach in its honors study abroad program, creating a semester-long transdisciplinary, collaborative research community known as the VT Presidential Global Scholars Program (PGS), based at the university's study center in Ticino, Switzerland. The goal of PGS is helping students become global citizens, public intellectuals, and change agents, people capable of addressing "wicked problems" in the civic/public sphere. First, the program helps students identify an exigence, that is, "an imperfection marked by an urgency" (Bitzer 6), a wound in the body politic, a tear in the social fabric, something they feel is wrong and needs to be fixed, something they personally care about and feel compelled to work on. Second, PGS helps students engage in transdisciplinary research to understand the various ways we think about, talk about, and respond to that exigence/issue here in the United States. Third, the program gives students access and resources to engage in transcultural research and study how various European cultures think about, talk about, and respond to that same exigence/issue. The students' semester abroad concludes with their comparing and contrasting the many differing disciplinary and cultural responses they have encountered to synthesize a set of best practices to guide their advocacy and actions on their exigences when they return to the U.S. Recent PGS student research projects include "Abuse of Prescription Stimulants by College Students in the United States and Switzerland," "Elder Abuse Programs in the United States, the United Kingdom, and the

Netherlands," "Prison Education in the United States and Norway," and "Black Rhino Breeding Programs in American and European Zoos."

Finally, however progressive our goals and however valuable our collaborative, project-based, and multidisciplinary honors offerings may be, honors programs and colleges need to compete for their students' attention and commitment in the highly competitive institutional space outside their primary majors, a marketplace in which second majors, minors, second minors, and extracurricular and co-curricular activities of all kinds vie for their students' finite time, attention, and tuition dollars. Such competition has become even more acute in light of the pressure state legislatures are putting on universities to accelerate student learning and the related inflation of equivalency credit that students—especially honors students—bring to our doors as a result of concurrent enrollment work, AP testing, and early college experiences. The VT Honors College has thus recently configured all of our recent curricular innovations—our transdisciplinary seminars, transdisciplinary research courses, discovery and innovation studios, SuperStudio, and experiential learning opportunities like PGS—into a new minor in Honors Collaborative Discovery, offering students a clear and unified path toward a highly incentivized credential that will appear on both their transcripts and diplomas.

CONCLUSION

University educators stand at an inflection point. Much like the beginnings of the Space Race, the United States again faces unprecedented threats to its security and survival. The difference today is that these threats do not stem from a single nation but rather from an intricately connected set of wicked, global, transdisciplinary, environmental, economic, scientific, social, and political problems, a dynamic that current, siloed, undergraduate educational efforts seem ill-prepared to address. Honors colleges, however, seem uniquely positioned to address these critical needs as they work with gifted and motivated students from every academic discipline on campus. Careful development of an honors curriculum

featuring active, collaborative, and project-based learning in multidisciplinary studio settings can lead the effort to provide the kinds of transformative curricular and pedagogical change that students will need to be scholars, professionals, and citizens capable of addressing issues of critical national and global interest.

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