

Notes on Problem-Focused Interdisciplinary Education

Andrew Austin
University of Wisconsin-Green Bay
June 2015

From its select mission:

The University of Wisconsin-Green Bay provides an interdisciplinary, problem-focused educational experience that prepares students to think critically and address complex issues in a multicultural and evolving world.¹

Many institutions boast of interdisciplinary centers, courses, and programs, but the University of Wisconsin-Green Bay is one of the few institutions that organizes its curriculum around a core of problem-focused interdisciplinary units. Although this structure has changed over time, and, as is to be expected, some faculty and other interested observers have occasionally expressed skepticism about its approach, UW-Green Bay has an enviable record in graduating productive workers and successful citizens, generating novel and useful research projects, and providing quality services to the region for nearly half a century.

Drawing on the substantial body of literature on interdisciplinarity, this essay clarifies problem-focused interdisciplinary practice and asserts its usefulness, indeed, its necessity in addressing the problems of a complex world. In the sections that follow, I review the literature on interdisciplinary education and research, as well as the history of and reasons for interdisciplinary studies; highlight the advantages of budgetary structures and requirements; provide examples of interdisciplinary programming; and examine the concept of the discipline and the limitations of disciplinary approaches to complex problems. I conclude with a discussion of UW-Green Bay's distinct institutional character and its continuing relevance to our present and future.

Defining Interdisciplinarity: Highlighting the Necessity of Problem Focus

Developing a consensus around the meaning of interdisciplinarity allows for a deeper exploration of thinking and practice that crosses disciplines. Operating with a common definition permits advocates to distinguish interdisciplinary practice from other practices, showing how the former contributes something unique and valuable to the institution and community. A shared definition helps evaluators formulate and make more meaningful assessments of programmatic efficacy (e.g. curricular design and learning outcomes). It helps researchers define their scholarly agendas. It helps faculty better measure student performance and progress. A common definition facilitates communication across domains and disciplines. The ability to define interdisciplinary in a consistent manner increases faculty and student confidence and morale by enabling them to convey the nature and relevance of their work to the public.²

I define interdisciplinarity in the following manner: *An interdiscipline is a unit-level research and/or curricular program in which practitioners and participants bring multiple relevant disciplines to bear on phenomena that transcend the range of traditional disciplines. A problem focus or orientation typically organizes an interdiscipline.*

A review of the literature finds support for this definition, including the near-ubiquity of problem focus in organizing successful interdisciplinary practice.

In their chapter “Advancing Interdisciplinary Studies,” published in Gaff and Ratcliff’s *Handbook of the Undergraduate Curriculum*, Julie Klein and William Newell define interdisciplinarity as “a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession,” adding that the approach “draws on disciplinary perspectives and integrates their insights through construction of a more comprehensive perspective.”³

Allen Repko, former director of the interdisciplinary studies program in the School of Urban and Public Affairs at the University of Texas at Arlington, coeditor of the interdisciplinary journal *Issues in Integrative Studies*, and board member of the Association for Interdisciplinary Studies (AIS), emphasizes the problem focused character of interdisciplinary study: “Most interdisciplinary study examines contested terrain — problems, issues, or questions that are the focus of several disciplines.” He uses the example of crime in Washington, D.C., “an interdisciplinary problem because it is an economic problem and a racial problem and a cultural problem.”⁴

The University College London Interdisciplinary Arts and Science program notes the range of problems that interdisciplinarity is designed to tackle: “Many of the world’s great problems require an interdisciplinary approach in order to solve them. This is true of problems in the ‘real world’ – e.g. problems to do with health, politics, engineering or cities – but also important intellectual problems – e.g. the relation between reasoning and emotion, the study of culture and identity, the link between music and learning.”⁵

In *Interdisciplinary Research: Practice and Theory*, Repko cites William Newell concerning the role of disciplines in problem-focused interdisciplinary approaches, emphasizing that “the test of the interdisciplinarity of a problem is not its distance from each contributing discipline but whether the problem is fundamentally multifaceted or complex. The important point is that the disciplines are not the focus of the interdisciplinarian’s attention; the focus is the problem or issue or intellectual question that each discipline is addressing. The disciplines are simply a means to that end.”⁶

The problem orientation shapes the selection of disciplines organized into interdisciplinary units. The global dynamic of development and underdevelopment has cultural, economic, political, and social dimensions that call for the expertise of anthropologists, economists, historians, political scientists, and sociologists. Addressing the problem of human biology benefits from the contributions of anatomists, anthropologists, biologists, epidemiologists, physicians, psychologists, and sociologists. Since much of the causal force behind climate change is human-behavioral, political science, psychology, and sociology are as relevant as the natural sciences traditionally brought to bear on the subject of global warming.

In 2005, the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine formed the Committee on Facilitating Interdisciplinary (CFI) to study this question. The resulting compendium of evidence defines interdisciplinary research as “a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance

fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice.”⁷

CFI’s *Facilitating Interdisciplinary Research* identifies four primary drivers of interdisciplinarity: the inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems, and the power of new technologies.⁸

In the realm of health sciences and practices, the NIH identifies interdisciplinary work as a priority, defining it as an approach that

integrates the analytical strengths of two or more often disparate scientific disciplines to solve a given biological problem. For instance, behavioral scientists, molecular biologists, and mathematicians might combine their research tools, approaches, and technologies to more powerfully solve the puzzles of complex health problems such as pain and obesity. By engaging seemingly unrelated disciplines, traditional gaps in terminology, approach, and methodology might be gradually eliminated. With roadblocks to potential collaboration removed, a true meeting of minds can take place: one that broadens the scope of investigation into biomedical problems, yields fresh and possibly unexpected insights, and may even give birth to new hybrid disciplines that are more analytically sophisticated.⁹

To advance the practice, the National Institutes of Health funds several interdisciplinary centers, e.g. Center for Evidence-Based Practice in the Underserved, Center on Population, Gender, and Social Inequality, and Interdepartmental Neuroscience Center.

In a whitepaper produced by the Social Science Research Council’s Working Group on Interdisciplinary Education at Liberal Arts Institutions, Diana Rhoten and colleagues associates define interdisciplinary education as “a mode of curriculum design and instruction in which individual faculty or teams identify, evaluate, and integrate information, data, techniques, tools, perspectives, concepts, or theories from two or more disciplines or bodies of knowledge to advance students’ capacity to understand issues, address problems, and create new approaches and solutions that extend beyond the scope of a single discipline or area of instruction.”¹⁰

In their article, “Women, Science and Interdisciplinary Ways of Working,” Rhoten and Pfirman identify degrees of interdisciplinarity, the third and fourth degrees involving *field creation*, i.e. “the bridging of existing research domains to form new disciplines, subdisciplines or ‘interdisciplines’ at their intersections,” and *problem orientation*, which “entails interdisciplinary research that is oriented toward problem solving, especially ‘real world’ questions that confront society.” “Researchers with an interdisciplinary problem-orientation engage in topics that not only draw on multiple fields but also serve multiple stakeholders and broader missions outside of academe.”¹¹

Veronica Mansilla, a research associate at Harvard’s Graduate School of Education, writes in her article “Assessing Student Work at Disciplinary Crossroads” that interdisciplinarity concerns “the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines to produce a cognitive advancement — for example, explaining a phenomenon, solving a problem,

creating a product, or raising a new question — in ways that would have been unlikely through single disciplinary means.”¹²

Finally, the Associated Colleges of the South defines interdisciplinary practice this way: “Interdisciplinary courses, programs, and/or activities link together and integrate information and methodologies from two or more separate, traditional, and/or artificial disciplines. Such linkages and integration create a multi-faceted picture of a topic through the exploration and synthesization of various approaches/views.”¹³

As with any term, definitions do vary; however, the meaning of interdisciplinarity, as the foregoing survey indicates, enjoys a remarkable degree of consensus. We can attribute this consensus to the fact that the authoritative definitions of interdisciplinarity share common elements. In clarifying the meaning of interdisciplinary research, Repko distills these elements. Interdisciplinarity (1) has a particular and substantive focus; (2) focuses on a problem or question that is complex; (3) extends its focus beyond a single disciplinary perspective, yet draws explicitly on the disciplines; (4) is characterized by an identifiable process or mode of inquiry; (5) has integration as its goal; and (6) has a pragmatic goal – to produce a cognitive advancement in the form of a new understanding, a new product, or a new meaning.¹⁴

From these, elements Repko fashions the following definition: “Interdisciplinary studies is a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline, and draws on the disciplines with the goal of integrating their insights to construct a more comprehensive understanding.”¹⁵

Why Interdisciplinary Studies? The Limits of Disciplines in the 21st Century Academy

Interdisciplinary practice emerged historically partly in response to the tendency of disciplines to become self-limiting over time, a problem often characterized as “siloining,” an insularity failing to provide the range of theoretical perspectives and methodological strategies useful, indeed necessary for addressing complex multidimensional/layered problems. Siloining is a historically emergent phenomena associated with (but not in every instance reducible to) the development of bureaucratic rationality inherent in the corporate structuring of social arrangements.

Writing in the 1960s, economists Paul Baran and Paul Sweezy identified the problem in the traditional disciplinary fragmentation of social science:

[S]cience has become more and more compartmentalized, with his practitioners turning into ever narrower specialist – superbly trained experts in their own fields but knowing, and indeed able to understand, less and less about the specialties of others. As for society as a whole, which in the past has been the chief preoccupation of the great social thinkers, since it transcends all the specialties, it simply disappears from the purview of social science. It is taken for granted and ignored. ... But just as the whole is always more than the sum of the parts, so the amassing of small truths about the various parts and aspects of society can never yield the big truths about the social order itself, how it got to be what it is, what it does to those who live under it, and the direction in which it is moving.¹⁶

A notable feature of the spirit of the 1960s was a conscious effort to bring the sciences and the humanities back to the grand tradition of critical inquiry and civic purpose by having experts teach and research *across* disciplinary divisions. Unfortunately, it took hold in only a few places, and only because there was a conscious effort to design the institution around the project. In other places, it foundered. Without institutional support, interest in interdisciplinary studies was not enough to sustain the project.

In 1997, education sociologist Pat Duffy Hutcheon, speaking at the Conference on Interdisciplinary Studies at the University of British Columbia, explored these failures. “All the earlier efforts to be interdisciplinary had two common problems”:

In the first place, all were dependent on the willingness to co-operate of a number of concerned individuals housed in a variety of academic departments – including administrators in charge of budgets. If those people left, or became discouraged, the project faltered; and if money became scarce for established departments, interdisciplinary studies were the first to feel the axe. Second, all these attempts were based on no firmer scientific foundation than a mere openness to a sort of trial-and-error eclecticism in the approach to the studies involved. This meant that there was no real logical or empirical basis for continuing research and knowledge building within the interdisciplinary frame of reference.¹⁷

To illustrate the problem, Hutcheon turned to Copernicus’ remark concerning the field of astronomy prior to his own breakthrough: “It is as though an artist were to gather the hands, feet, head and other members for his images from diverse models,” Copernicus writes, “each part excellently drawn, but not related to a single body, and since they in no way match each other the result would be more monster than man.”¹⁸

Copernicus’ metaphor creatively illustrates the problem of knowledge fragmentation. The disciplines and their subfields are based on domain-specific observation and thinking, lensed by the condition of insulating walls of disciplinary language, useful within but without currency beyond those parameters. Operating as an external and crosscutting force, the disciplines represent a powerful influence organizing the modern university. Knowledge fragments under bureaucratic and disciplinary pressure. Yet complex problems transcend the domains that are the subject matter of the disciplines. Interdisciplinary approaches, in contrast, represent a project to join the various disciplinary approaches in common purpose: organizing domain-specific models around a problem in order to think beyond disciplinary limitations.

Interdisciplinary survived the period of experimentation to become a cutting-edge force in higher education. According to statistics gathered by the U.S. Department of Education’s Center of Educational Statistics, which defines as interdisciplinary a program “that derives from two or more distinct programs and that is integrated around a unifying theme or topic that cannot be subsumed under a single discipline,” the number of interdisciplinary bachelor’s degrees has risen substantially.¹⁹ (Later in this essay, I provide examples drawn from the universe of successful interdisciplinary programs and institutions).

However, the threats to problem-focused interdisciplinary practice have not disappeared. Stuart Henry, director of the School of Public Affairs at San Diego State University, asks why, “at a time of increased recognition of the value and significance of interdisciplinarity, a time when interdisciplinarity is in its ascendancy,” we face forces threatening “to undercut experimental and innovative programs in undergraduate interdisciplinary teaching and learning.” It is not the weakness of the intellectual project itself, Henry observes, but the failure to provide robust support for the project through institutional support and commitment, as well as the weight of disciplinary hegemony against the practice, problems exacerbated by adverse financial conditions.²⁰

Organizing Problem-focused Interdisciplinarity

Lisa Lattuca and Louis Voigt identify three primary organizational forms of interdisciplinary major and minor programs: “(1) established programs with permanent staffs and program budgets; (2) interdepartmental committees, programs, or colleges with defined curricula but no faculty members appointed solely to the unit; and (3) individually designed majors or other programs that permit students to design, with faculty guidance, customized degree programs to meet their educational needs.”²¹

Interdisciplinarity at the University of Wisconsin-Green Bay is representative of the first organizational form, which provides the most comprehensive, depth, and stable interdisciplinary experience. Given the size and traditions of our institution, this form of organization is optimal. In the case of larger and/or wealthier institutions, dependable flows of resources into programs organized by committees or colleges, granting a necessary level of commitment to the project, are often sufficient to sustain interdisciplinary programming. However, these institutions typically have a traditional disciplinary structure, with the interdisciplinary programs representing special projects; fiscal problems and disciplinary resistance are perennial threat to interdisciplinarity in this model. For a smaller campus, especially given a mission that guarantees students a problem-focused interdisciplinary experience, a dedicated institutional structure organized around interdisciplines with program budgets serves as a bulwark against the problems of financial vagaries and disciplinary power. Moreover, budgetary authority gives executive committees of the interdisciplines effective control over curriculum and recruitment, retention, and promotion of relevant faculty lines, activities dedicated to serving the problem-focused interdisciplinary mission.

Imperative to the mission of an institution organized around problem-focused interdisciplinarity is the requirement for students to enroll in an interdiscipline. Without such a requirement, fewer students will have the opportunity to experience the power of the interdisciplinary approach and the interdisciplines will suffer declines in enrollment. A prominent argument against the requirement has been that, if interdisciplinarity is useful to students, then they will enroll in interdisciplinary program without being required to do so. Yet few would entertain this line of reasoning in a discussion about general education. Without a requirement to participate in general education, fewer students would enroll in general education courses. The university compels students to participate in general education because of the value of general education. This reality plagues another objection, namely that the interdisciplinary requirement is a barrier to timely graduation. The same argument could be said of general education. In the final analysis, requiring students to enroll in an interdiscipline (major or minor) sustains the university’s distinctive

approach by directly involving students in the problem-focused mission, just as requiring participation in the general education program serves the mission of the university.²²

It is important to recognize, as Hutcheon emphasizes,²³ that the interdisciplinary project does not survive merely on a conversation across disciplines or the desire of some to work in this way. A budgetary structure based on the integration of a plurality of disciplines with an organizing purpose and a requirement for all to be involved – at least at some definite level of experience – is conducive to sustaining the project. This is one of the reasons interdisciplinarity thrives on the UW-Green Bay campus.

Interdisciplinary Programming: Examples

There are many examples of interdisciplinary programs across the nation. These programs achieve interdisciplinarity in different ways, but have in common an institutional commitment to problem-oriented research and education.

The Fairhaven College of Interdisciplinary Studies at Western Washington University, established in the late 1960s, encourages students to develop their own interdisciplinary concentration.²⁴ Recognizing that students, while creative and resourceful, are not yet experts in pedagogical and scientific matters, Fairhaven has established programs, such as the Center for Law, Diversity and Justice, American Cultural Studies, and The World Issues Forum, to guide students in developing concentration.²⁵

Another Washington school, The Evergreen State College, founded the same year as Fairhaven, offers a unique model of undergraduate interdisciplinary education. “Since opening our doors in 1971, Evergreen has established a national reputation for leadership in developing innovative interdisciplinary, collaborative and team-taught academic programs.”²⁶ Evergreen lists interdisciplinarity among its five foci: “Students learn to pull together ideas and concepts from many subject areas, which enables them to tackle real-world issues in all their complexity.” They close the list with this: “Students understand abstract theories by applying them to projects and activities and by putting them into practice in real-world situations.”²⁷

Interdisciplinarity exists at the graduate level, as well. The Law School of Chicago is a useful example of an interdisciplinary graduate program.²⁸ From the program’s literature:

Chicago's devotion to interdisciplinary...grows out of our conviction that the law does not exist in a vacuum; we can understand the law and legal methods only if we understand both how the law affects the behavior of the society it governs and how the law reflects the values of that society. For this reason, students do not study law as an autonomous discipline. Faculty draw students' attention to insights from the social sciences, the humanities, and the natural sciences beginning on the first day of class.

Chicago makes this happen not by incorporating the perspectives and findings of these fields into the courses, but by directly involving representatives from these fields in their curriculum: “Faculty members include historians, economists, philosophers, and political scientists.” The program crosslists courses with other departments as a way of expanding interdisciplinary range.

Stanford's Interdisciplinary Graduate Program in Environment and Resources (IPER)²⁹ and Stanford's Undergraduate Program in Human Biology,³⁰ the latter involving "an interdisciplinary approach to understanding the human being from biological, behavioral, social, and cultural perspectives," stand at the cutting edge of interdisciplinary problem-focused education. The undergraduate program pulls together anthropology, biology (developmental, human, micro), chemistry and biochemistry, earth sciences, economics, education, epidemiology, genetics, immunology, infectious diseases and disease prevention, medicine (emergency, obstetrics and gynecology, sports), neurology, pediatrics, pharmacology, psychology, and sociology.

Renowned theoretical physicist Lawrence Krauss, when asked in a recent interview why he left Case Western Reserve University for Arizona State University,³¹ responded that when he met with Arizona State's Michael Crow, the president explained to him that, in order to compete with elite private universities, Arizona State organized its curriculum around interdisciplinarity, weaving a network of departments and centers that bring a range of relevant disciplines to bear on crucial areas of concern and promise – areas that transcended the domains upon which the traditional disciplines rest. Crow described the model as entrepreneurial, producing innovative knowledge that people could use to solve the problems that confront them in the global capitalist marketplace.

One of the strengths of UW-Green Bay is that it offers programs that one usually only finds at the top research universities in the country. ASU's graduate program in Justice Studies is a case in point. The program – its purpose: "educating generations of social change agents and justice studies scholars" – offers five areas of emphasis: citizenship, migration and human rights; globalization, sustainability and economic justice; law, policy and social change; media, technology and culture; and social identities and communities. "The goal is to enable students, faculty and graduates to use their skills to find solutions to complex social problems."³²

Democracy and Justice Studies, the unit that I chair, is a useful example of not only problem-focused interdisciplinarity, but also how UW-Green Bay's institutional arrangements afford the opportunity for dynamic programming and innovation. In many ways, Democracy and Justice Studies is an undergraduate analog to Arizona's graduate program. That the similarities were unintentional suggests a logic common to problem-focused interdisciplinary approaches to complex problems.

Democracy and Justice Studies grew out of Social Change and Development,³³ which sought to cultivate historical, comparative, and critical perspectives useful for comprehending and engaging the world. The program met the university's mission by supporting exemplary interdisciplinary and general education founded upon historical and comparative perspectives, critical thinking and problem solving, engaged citizenship, relevant skills, and lifelong learning. SCD faculty was composed of anthropologists, economists, historians, political scientists, and sociologists.

In the late 2000s, the faculty, working together and through governance, revised the curriculum, changed its approach, and renamed the unit Democracy and Justice Studies. Building on its traditions, it announced its new mission:

Democracy and Justice Studies explores diverse ideals and practices of democracy and justice in the United States and the world through interdisciplinary social and historical studies. We ask why and how societies develop and whether their political, economic,

cultural and social relations and activities promote justice, freedom, equality, and democracy. By cultivating critical and problem-focused thinking, students become engaged citizens and professionals.

Aligning its personnel decisions with its mission, DJS's faculty hired an economist, historians, and political scientists, each with relevant areas of specialization, thus retaining its unique arrangement of faculty drawn from the social sciences and the humanities. The new major saw the introduction of a team-taught introductory course, a comprehensive and adaptable tool set, a shared core for major and minor, four emphases (American Studies, Law and Justice Studies, U.S. and the World, and Women and Gender Studies), and a senior capstone.

There are other exciting problem-focused programs at UW-Green Bay. The point I wish to make here is that the structure of UW-Green Bay curricula, organized as problem-focused budgetary units (in contrast to Fairhaven and Evergreen), more closely approximates the structure of interdisciplinary graduate programs at prestigious research institutions. This organization is one of the reasons our graduates are recognized as having a special quality over graduates from other area institutions.

What is a Discipline? Why Disciplinary Tools are Useful. And Their Limitations

As noted, the disciplines play a major role in organizing the modern university. The structuring force of the traditional academic disciplines is a global phenomenon. It is not the intent of this essay to diminish the significance of disciplines to intellectual pursuits. As the foregoing review illustrates, the practitioners of interdisciplinarity use disciplinary tools and lens to carry out their work; interdisciplinarity is built upon the fruit of disciplinary labors. The aim of interdisciplinarity is not to dilute the intellectual power of disciplines, but to harness that power for interrogating problems that transcend disciplinary boundaries.³⁴

In the academy, the concept of a discipline refers to a body of knowledge or a mode of learning organized around a domain of reality, such as biology, physics, or sociology.³⁵ According to the American Association for Higher Education and Accreditation (AAHEA): "Disciplines have contrasting substance and syntax—ways of organizing themselves and of defining rules for making arguments and claims that others will warrant. They have different ways of talking about themselves and about the problems, topics, and issues that constitute their subject matters."³⁶ Huber and Morreale write that "each discipline has its own intellectual history, agreements, and disputes about subject matter and methods" and its own "community of scholars interested in teaching and learning in that field."³⁷ Other factors that distinguish disciplines include assumptions, core concepts, methods, questions, theories, and worldview.³⁸

Repko writes,

Academic disciplines are scholarly communities that specify which phenomena to study, advance certain central concepts and organizing theories, embrace certain methods of investigation, provide forums for sharing research and insights, and offer career paths for scholars. It is through their power over careers that disciplines are able to maintain these strong preferences. Each discipline has its own defining elements — phenomena,

assumptions, epistemology, concepts, theories, and methods — that distinguish it from other disciplines.³⁹

Traditional disciplines may be grouped into three broad areas which rest on logics that have been supposed to be, at least on certain points, incommensurable: (1) the physical and natural sciences (which may themselves constitute two incommensurable areas); (2) the social sciences (which some have supposed to be a collection of proto-sciences rather than science proper); and (3) the humanities. The latter two are, for the most part, concerned with uniquely human matters, the former seeking explanation, while the latter seeking understanding, although there is considerable overlap in these. Indeed, there is considerable overlap of interests across all three, such as in neuroscience, which seeks explanations of human subjectivity in the biochemistry and neuronal structures of the human brain.

A commonly used conception of “discipline” is found in Thomas Kuhn’s *The Structure of Scientific Revolutions*. Kuhn’s work is rather dense, so I am borrowing the succinct summary of Kuhn’s thoughts by Stephen Sapp of Iowa State University. A discipline is

a particular scientific community, united by education (e.g., texts, methods of accreditation), professional interaction and communication (e.g., journals, conventions), as well as similar interests in problems of a certain sort and acceptance of a particular range of possible solutions to such problems. The scientific community, like other communities, defines what is required for membership in the group.⁴⁰

An important part of Kuhn’s concept of discipline is his notion of “paradigm.” Kuhn uses the concept in two ways, one being the idea of paradigm as *exemplar* (exemplary model or practice), and the other being what he calls the “disciplinary matrix,” which refers to a constellation of assumptions, concepts, methods, problems, and theories. Disciplinary matrices are manifold evaluative, methodological, and theoretical frameworks in which scientists work.

Thus, a paradigm defines “the practices that define a scientific discipline at certain point in time.” As such, the paradigm shapes what is studied, what questions are asked, the character and structure of the questions asked, and how the results are interpreted. According to Kuhn, “law, theory, application, and instrumentation together provide models from which spring particularly coherent traditions of scientific research.”⁴¹

The disciplines are not always paradigmatic in the Kuhnian sense (sociology is a useful example), however pre-paradigmatic disciplines (sometimes referred to as the “soft” disciplines or proto-sciences) fit the broader definition of discipline as Sapp summarizes above. The point to be made here is that disciplines, while providing working models and a body of knowledge, require structured collaboration to effectively address complex multifaceted problems.

According to Janice Beyer and Thomas Lodahl, disciplines provide knowledge structures in which faculty members are socialized and empowered.⁴² Disciplines are subcultures that shape the work of teachers and researchers, as well as the direction of the institutional context. The professor’s disciplinary affiliation, because it is the stamp of her expertise, her identity, and her loyalties are to discipline as much if not more to institution, moves the institution in powerful ways. Promotion and

tenure, funding for research, and so forth are directed by disciplinary commitments and criteria. Siloing is reinforced further by the organization of disciplines into departments, clusters of departments into schools and colleges, and so forth. As noted, the interdisciplinary project is designed to overcome this, while harnessing the power of disciplines and specializations.

Disciplines emerged out of the developments of the nineteenth and early twentieth century academy. While continuing to represent useful lenses for highlighting domain specific problems and refining theories and methods for the study of these problems, disciplines are no longer sufficient in themselves for addressing the problems humankind now confronts – problems that transcend the domains upon which disciplines are founded. While this essay is not advocating a postdisciplinary academic environment, it nonetheless recognizes that advancing knowledge lies in combining disciplines in creative ways that transcend their respective limitations.

Conclusion: The Essential Structure of UWGB's Problem-Focused Interdisciplinarity

UW-Green Bay is entering the fiftieth year of its existence. This is an opportunity to reflect upon our extraordinary history, examine our current structure and practice, and imagine the even more exciting future we will build together. Given the necessity of a clearly defined problem focus to building robust interdisciplinary programs, we might ask whether units have a sufficiently compelling focus, or whether they have the right array of relevant disciplines to address the questions that they ask. We might also ask what resources they may need to reformulate their curriculum so that it speaks to the most pressing problems of the region and beyond. Whatever reforms we may envision in this process, the ethos of our university reflects the character of its institutional arrangements. These must be preserved.

Two traditions have played a vital role in sustaining UW-Green Bay's identity as an innovator in higher education. Substantial budgetary authority in the hands of the interdisciplinary units affords the problem-oriented units significant degree of control over mission, recruitment, promotion, and curricular design, while limiting the power of the disciplines to shape the program array in the direction of more traditional models of programming. This structure, while limiting the external and crosscutting influence of academic disciplines, harnesses them for the good of the problem-focused enterprise. Requiring students to enroll in an interdiscipline (major or minor) sustains the university's distinctive approach by directly involving students in the problem-focused mission. Without such a requirement, fewer students will have the opportunity to experience the power of the problem-oriented interdisciplinary approach. These traditions constitute the necessary foundation for building tomorrow's UW-Green Bay.

Therefore, as we prepare to celebrate our golden anniversary, let us remember that UW-Green Bay was founded upon a unique institutional arrangement that compels faculty and students to sustain a commitment to problem-focused research, teaching, and service. By fostering cross-fertilization of ideas, encouraging and facilitating collaboration, shaping research agendas and curriculum, and linking scholarly production to human needs, problem-focused practice integrates the work of faculty and students with the larger community. The intricate problems of the day demand a mission that dedicates the academy to problem-focused interdisciplinary endeavors. We should not doubt the value of what we do at UW-Green Bay. Instead, we should be bold and inspire other institutions with our example.

Endnotes

- 1 UW-Green Bay Mission Statement. URL: <http://www.uwgb.edu/univcomm/about-campus/mission.asp>. Interdisciplinarity at UW-Green Bay is notable for meeting the depth educational needs of students through the problem-focused majors, while addressing breadth multidisciplinary with its general education program.
- 2 Allen F. Repko, *Interdisciplinary Research: Process and Theory Second Edition* (Sage Publications, 2012), 15.
- 3 Julia T. Klein and William H. Newell, "Advancing Interdisciplinary Studies," in *Handbook of the Undergraduate Curriculum*, ed. Jerry Gaff and James Ratcliff (San Francisco: Jossey-Bass, 1997), 393-394. Klein, professor of humanities at Wayne State University and former president of the Association for Integrative Studies, is the author of *Interdisciplinarity: History, Theory, & Practice* (Wayne State University Press, 1991). William H. Newell is Professor of Interdisciplinary Studies at Miami University.
- 4 Repko, *Interdisciplinary Research*, 5.
- 5 "More about interdisciplinarity." University College of London. This page is usefully organized as a FAQ. URL: <http://www.ucl.ac.uk/basc/faq/interdisciplinarity>. For a discussion of how this works in connecting campus to community, see Daisy Rooks and Celia Winkler, "Learning Interdisciplinarity: Service Learning and the Promise of Interdisciplinary Teaching," *Teaching Sociology* 40 (2012): 2-20.
- 6 Repko, *Interdisciplinary Research*, 7.
- 7 Committee on Facilitating Interdisciplinary Research, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, *Facilitating Interdisciplinary Research* (The National Academies Press, 2005), 26.
- 8 Julie Thompson Klein, "A Taxonomy of Interdisciplinarity," in *The Oxford Handbook of Interdisciplinarity*, ed. Robert Frodeman, Julie Thompson Klein, and Carl Mitcham (Oxford University Press, 2012).
- 9 Sally W Aboeela, Elaine Larson, Suzanne Bakken, Olveen Carrasquillo, Allan Formicola, Sherry A Glied, Janet Haas, and Kristine M Gebbie, "Defining Interdisciplinary Research: Conclusions from a Critical Review of the Literature." *Health Services Research* 42 (2007): 329-346. Available on line at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1955232/>.
- 10 Diana Rhoten, Veronica Boix Mansilla, Marc Chun, and Julie T. Klein, in "Interdisciplinary Education at Liberal Arts Institutions" (2006), 3. This whitepaper paper explores the range of definitions and approaches to interdisciplinary education and those approaches that approximate interdisciplinarity. Available at <http://info.ncsu.edu/strategic-planning/files/2010/10/2006ssrcwhitepaper.pdf>. Note: Rhoten was the founder and director of the Knowledge Institutions Program for the Social Science Research Council.
- 11 Diana Rhoten and Stephanie Pfirman, "Women, Science and Interdisciplinary Ways of Working," *Inside Higher Education*, October 22, 2007. URL: <https://www.insidehighered.com/views/2007/10/22/rhoten>. Research gathered by Rhoten and colleagues of Integrative Graduate Education and Research Training programs "indicate that enrollment rates of female students in new interdisciplines tend to be higher than the enrollment rates of female students in cognate disciplines" demonstrating the power of interdisciplinary work in reaching groups previously marginalized within the traditional disciplinary structure. See also Rhoten, "Women, Minorities, and Interdisciplinary Research."
- 12 Veronica Boix Mansilla, "Assessing Student Work at Disciplinary Crossroads," *Change*, Jan/Feb (2005), 16.
- 13 URL: <http://www.colleges.org/newmodels/interdisciplinary/definition.html>. An artificial discipline is a system in which two or more areas are combined in a way that awaits an underlying framework, or paradigm, e.g. materials science. (There's a nice metaphor here, namely the difference between synthetics and composites, or mixed disciplines.) This is closely related to the idea of a synthetic discipline, e.g. synthetic biology, which is an interdisciplinary branch of biology integrating such cognates and subdisciplines/specializations as biophysics, bioengineering/technology, evolutionary biology, molecular

biology, and systems biology. Biochemistry is representative of a cognate discipline. Traditional disciplines are those resting on a paradigmatic understanding of the evidence and operation of a domain of reality. To the extent that one can call a discipline “problem focused,” the problems traditional disciplines focus on are more abstract and basic.

- ¹⁴ Repko, *Interdisciplinary Research*, 13.
- ¹⁵ Repko, *Ibid.*
- ¹⁶ Paul A. Baran and Paul M. Sweezy, *Monopoly Capital: An Essay on the American Economic and Social Order* (Monthly Review Press, 1966).
- ¹⁷ Pat Duffy Hutcheon, “An Interdisciplinary Approach to Social Science,” keynote address to the Conference on Interdisciplinary Studies at the University of British Columbia in April, 1997. URL: <http://www.humanists.net/pdhutcheon/Papers and Presentations/An Interdisciplinary Approach to Social Science.htm>.
- ¹⁸ Thomas Kuhn, *The Copernican Revolution* (Harvard University Press, 1957).
- ¹⁹ URL: <http://nces.ed.gov/>. See also Lisa R. Lattuca and Lois J. Voigt, “Interdisciplinary Courses and Majors in Higher Education - Rationale for Interdisciplinary Courses and Programs, Interdisciplinary Study in U.S. Higher Education.” URL: <http://education.stateuniversity.com/pages/2106/Interdisciplinary-Courses-Majors-in-Higher-Education.html>.
- ²⁰ Stuart Henry, “Disciplinary Hegemony meets Interdisciplinary Ascendancy,” *Issues In Integrative Studies* 23 (2012): 1-37. Decades earlier, Martin Trow made a similar argument in “Interdisciplinary studies as a counterculture,” *Issues in Integrative Studies* 3 (1984): 1-16. The term “disciplinary hegemony” was coined by Ben Agger. See *A Critical Theory of Public Life* (London: Falmer Press 1991).
- ²¹ URL: <http://nces.ed.gov/>. See also Lisa R. Lattuca and Lois J. Voigt, “Interdisciplinary Courses and Majors in Higher Education - Rationale for Interdisciplinary Courses and Programs, Interdisciplinary Study in U.S. Higher Education.” URL: <http://education.stateuniversity.com/pages/2106/Interdisciplinary-Courses-Majors-in-Higher-Education.html>.
- ²² There has been some suggestion that problem-focused interdisciplinarity can be addressed through a general education program. However, the purpose of general education is to expose students to different, and usually contrasting descriptions, explanations, and understandings of the world without integrating these different views in an overarching thematic or organizing them around a concrete set of problems. The multidisciplinary logic of general education is designed to address the breadth needs of the student. The purpose of problem-focused interdisciplinarity meets the depth requirement of a university education, that is a major or minor area that prepares the student for a career or advanced study.
- There has been renewed attention in the value of team teaching to the mission of our university. This method has been suggested, at least by some, as an alternative way of achieving problem-focused interdisciplinarity. Team teaching can indeed be an effective way of bringing different disciplinary views to bear on a topic or problem, one that faculty should be aggressively promoting. However, without programmatic purpose, the method has limited value to our mission; team-taught courses are a means to an end, not an end in themselves. Optimizing the power of team teaching requires inclusion in interdisciplinary majors and minors. There has also been a suggestion that interdisciplinarity can be achieved through the accumulation of a requisite number of courses bearing an interdisciplinary designation. While this method has been employed at other institutions, the practice is not widespread. Given the character of interdisciplinarity as an integrative approach of multiple areas of expertise, courses taught by a single expert weaving together knowledge drawn from multiple domains falls short of substantial interdisciplinarity. There is nothing extraordinary about the practice; designing courses that incorporate knowledge from multiple disciplines is standard in disciplinary curriculum. In the final analysis, designating courses as interdisciplinary when taught by a single instructor cannot substitute for interdisciplinary curricula.
- ²³ Hutcheon, “An Interdisciplinary Approach to Social Science.”

- 24 URL: <http://www.wvu.edu/fairhaven/>
- 25 Programs at UW-Green Bay were originally called “concentrations.”
- 26 URL: <http://www.evergreen.edu/>
- 27 Evergreen is different from Fairhaven in that students enroll in a single, comprehensive program rather than a series of separate courses. However, both approaches provide crucial skills that serve students throughout their life course. “You’ll explore many aspects of a theme or topic through different but related academic subjects. By tackling topics in an interdisciplinary way, you’ll learn not only about a broad range of subjects and issues, but you’ll become a critical thinker and a skilled communicator.” URL: <http://www.evergreen.edu/>
- 28 URL: <http://www.law.uchicago.edu/>
- 29 URL: <https://earth.stanford.edu/eiper>
- 30 URL: <https://humbio.stanford.edu/>
- 31 Lawrence Krauss, interviewed by Leo LaPorte. URL: <https://www.youtube.com/watch?v=3lkeUvhOspY>
- 32 MIT has a long history of interdisciplinary excellence. Programs in Comparative Media Studies and Science, Technology, and Society are representative. URL: <http://cmsw.mit.edu/education/comparative-media-studies/masters/>
- 33 This was not the first time the program changed its name. Social Change and Development emerged from the program Modernization Processes, which has been established at the founding of the institution.
- 34 The contrary view, found, for example, in Jean Lyotard’s *The Postmodern Condition: A Report on Knowledge* (Minneapolis: University of Minnesota Press, 1984, remains a marginal statement of purpose for interdisciplinary activities.
- 35 Joe Moran, *Interdisciplinarity* (Routledge, 2010), 2. The several quotes that make up this paragraph came to the author’s attention by way of Repko’s careful work.
- 36 Lee Shulman, “Foreword,” in *Disciplinary Styles in the Scholarship of Teaching and Learning*, ed. Mary Taylor Huber and Sherwyn P. Morreale (Washington: American Association of Higher Education, 2002), vi–vii.
- 37 Mary Taylor Huber and Sherwyn P. Morreale, *Disciplinary Styles in the Scholarship of Teaching and Learning* (Washington: American Association of Higher Education, 2002), 2. See also Marietta del Favero, “Academic Disciplines,” *Encyclopedia of Education* second edition (Macmillan Reference USA, 2002).
- 38 William H. Newell and William J. Green, “Defining and Teaching Interdisciplinary Studies,” *Improving College and University Teaching* 30 (1982): 23-30, 25.
- 39 Repko, *Interdisciplinary Research*, 4.
- 40 Stephen Sapp. URL: <http://www.soc.iastate.edu/sapp/soc401kuhn.html>
- 41 Thomas Kuhn, *The Structure of Scientific Revolutions* (University of Chicago Press 1962), p. 10.
- 42 Janice B. Lodahl and Gerald Gordon, “The Structure of Scientific Fields and the Functioning of University Graduate Departments,” *American Sociological Review* 37 (1972): 57–72.