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PROJECT LEAD
University of Minnesota Sustainability Education Network

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The opinions expressed in this report are those of the Sustainability Education Network and do not necessarily reflect the views of the University of Minnesota or any of affiliated member colleges, schools, institutes, and centers.

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EXECUTIVE SUMMARY

The Project

This report synthesizes the perspectives of faculty across the University of Minnesota in an ambitious project to determine priorities, preferences, and challenges for creating a more coherent set of graduate sustainability education offerings across the University. Thirty interviews were conducted with faculty from twelve of the University’s schools and colleges. As a descriptive synthesis of these interviews, this report provides important evidence about faculty and staff priorities for sustainability education at the University of Minnesota.

Graduate Sustainability Education

According to interviewees, graduate sustainability curricula at the University must promote interdisciplinary capacities and experiences, in addition to disciplinary skills. Such experiences allow students to develop some fluency in the language and perspectives of other disciplines, in particular developing capacities for “bridging” across disciplinary and professional boundaries. Specific approaches to sustainability curricula that should be further developed include design thinking, holistic and systemic approaches to problems of sustainability, “challenge-based” learning, and the practice or application of these problems to complex and multi-stakeholder situations.

Major Issues and Recommendations

Faculty and staff identified five central issues that should be addressed in order to improve the suite of sustainability education offerings at the University.

Sustainability Initiatives are Disconnected

The University offers a broad range of opportunities for graduate students to engage in issues of sustainability. However, interviews with faculty and staff from across the University indicate faculty and students involved in sustainability-related courses in one department or college are unaware of, or have difficulty connecting to, initiatives in other parts of the University. The University should promote the development of a “systems model” for sustainability education at the University, in which existing and emerging sustainability initiatives remain independent, but are much more connected through a network coordinated by a convener at the center. The recommendations for this issue are:

- Support a central convener for the suite of initiatives across the University.
- Promote a faculty and graduate student community.
- Enhance collaboration among leaders across colleges.
- Strengthen institutional support at the University.

Insufficient Communication among Sustainability Initiatives

Opportunities for collaboration among faculty and interdisciplinary study for students are diminished by a lack of information on relevant courses, and fragmented information about programs and other opportunities. The University should improve and coordinate internal communications to provide coherence around sustainability education. The recommendations for this issue are:
• Improve web-based information resources.
• Use digital media to proactively communicate about sustainability opportunities.
• Develop a web-page to support convening functions.
• Improve course-level information tools.

CRITICAL GAPS IN CONTENT AND SKILLS OFFERINGS

There is a conflict between the disciplinary structure of the University and the need for holistic and transdisciplinary approaches required to engage effectively in issues of sustainability. However, there are many opportunities that allow students to focus their academic study on issues of sustainability without creating new requirements or programs. The recommendations for this issue are:

• Develop short-courses and workshops for common interdisciplinary skills.
• Create graduate minors or concentrations that integrate with existing offerings.
• Encourage new initiatives at “untapped nexuses” of strength at the University.
• Offer object-based or thematic interdisciplinary courses.
• Incentivize interdisciplinary problem-solving in doctoral dissertations.
• Offer accessible international experiences.
• Facilitate the development of a sustainability minor or certificate.
• Combine traditional programs with sustainability-related programs in joint degrees.

INTEGRATING COMMUNITY-BASED PROJECTS INTO CURRICULUM

Experiential opportunities to work on sustainability-related issues in communities are generally too brief in duration and lack sufficient coordination for both students and clients. The transaction costs for faculty to design experiential learning elements in sustainability-related courses can be reduced. The recommendations for this issue are:

• Support faculty in coordinating experiential opportunities.
• Incubate cross-college initiatives.
• Partner with existing sustainability-related initiatives in the Twin Cities.

FACULTY INCENTIVES

Faculty generally have few incentives to participate in the formation of new sustainability curricula, including the departmental accounting model that discourages teaching courses outside the home department, and the lack of course waivers for curriculum development. The recommendations for this issue are:

• Improve the incentive structure for interdisciplinary collaboration.
• Work within current administrative initiatives to build support.
INTRODUCTION:
CHANGING THE FACE OF SUSTAINABILITY EDUCATION

This report describes the perspectives of faculty in many colleges and schools across the University of Minnesota in an ambitious project to determine priorities, preferences, and challenges for creating a more coherent set of graduate sustainability education offerings across the University. During the Spring 2011 semester, the Graduate Sustainability Education Network (the Network) conducted in-depth interviews with faculty and staff from across the University. A critical mass of over fifty faculty and staff members from twelve schools and colleges across the University are now active Network members (See Appendix A, Network Members). They represent disciplines within the humanities, the natural, physical, and social sciences, and professional schools.

The Network was formed in Fall 2010 with funding from the Graduate School, and continues today as an independent network of faculty with direct staff support from the Institute on the Environment. The group’s purpose is to identify opportunities for a more cogent and effective set of graduate educational offerings for sustainability studies within the university. This purpose is broad, and the potential activities spurred by Network dialogue are ambitious. In its first year, the Network has:

• Supported working group meetings among Network members to identify opportunities, articulate a collective vision, and build a community of faculty.
• Developed resources to support curriculum development, including a literature review for graduate sustainability education; an inventory of national and international sustainability education models.
• Solicited graduate student input through conducting focus groups and discussions with faculty and students.
• Acted as an incubator of new initiatives, providing organizational support for faculty working groups to pursue funding.
• Conducted 30 in-depth interviews of U of M faculty about sustainability education opportunities.

This report synthesizes the results of the in-depth interviews. The interviews reflect the broad content expertise of Network members, as well as their experience and opinions about how initiatives related to graduate sustainability education at the University can be better developed and connected. Collectively, these interviews lend powerful evidence of opportunities for further development of sustainability education, and provide a strong justification for pursuing them.

The report describes the methodology used to complete the data collection and analysis and then provides specific insights from the interviews related to the content and purpose of sustainability education. The remainder of the report outlines a series of issues, strategies, and recommendations informed by the interviews and intended to move graduate sustainability education forward at the University of Minnesota.
METHODOLOGY: ASKING THE RIGHT QUESTIONS

The findings in this report are based on semi-structured in-depth interviews conducted in the spring of 2011. The project assumed that, in order to understand common priorities across a large-scale institution like the University of Minnesota, interviewees should represent the breadth of colleges and departments across the University as well as possible. While the target population for the interviews was all faculty members at the University engaged in sustainability education at the graduate level, the sample frame for the interviews were members of the Network.

A small group of faculty and staff supporting the Network collaborated to develop the questions and format, while interviewees were recruited through email and a list serv. The actual interviews took place between January 13th and May 24th, 2011, usually at the University office of the faculty or staff interviewee, and all were conducted by the Network graduate research assistant. The interviews were not recorded; instead, the interviewer took detailed notes on a computer.

After completing the notes from the interviews, the Network graduate research assistant analyzed the data in four general stages. First, the notes were read closely for persistent themes, commonalities, and differences across cases. Second, based on this first reading, the research assistant developed an initial “tree” coding scheme that included general categories and uniquely coded subcategories. This coding scheme was shared with the small team of faculty and staff advising the Network and revised based on their comments (See Appendix C for the coding scheme). The initial coding scheme was then used to formally code the notes from the interviews using NVivo coding software, an iterative process that involved initial coding, review, then further revision. Finally, the coded sections were then sorted in NVivo as needed to aid in data analysis and interpretation. In reviewing the data, the research assistant evaluated the data for validity by asking guiding questions such as: Are the results reasonable? Is there consistency in themes across the interviewees? If not, why? Revision relied upon re-reading, but also on conversations with Network members advising the project.
Interviewees were asked about which elements of sustainability education curriculum are most important, how curriculum should be designed, and what most needs to be improved upon at the University. Themes from interviewees comments are detailed below, with themes interviewees commonly emphasized listed first.

**INTERDISCIPLINARY CONNECTIONS**

Interdisciplinary experience is a critical component to sustainability education, according to nearly all interviewees, though the balance between disciplinary training and interdisciplinary exposure varies according to a program’s objectives. No interviewees advocated eliminating the disciplines, but most discussed a need for increased interdisciplinary courses and other opportunities in order to make students more effective in applying their particular disciplinary training to a problem of sustainability. One professor explained that, to be successful, interdisciplinary classes should be student-driven and involve scenario creation to improve students’ perspectives on problems of sustainability:

Someone majoring in mathematics can have all the things they need in math, but with the right [interdisciplinary] courses they...can see how to use math concepts and apply their skills to sustainability problems. Their approach will be quite different from someone in political science [...] who will look at the same material but look, for example, at what do we have to change in the international law to make this work. So students would actually have to communicate with one another—it forces the math person to see that there is a political side; and the political scientist person to see the math things.

Developing interdisciplinary as well as disciplinary fluencies is, according to nearly all interviewees, a key part of a sustainability curriculum. While nearly all disciplines can be relevant to an issue of sustainability, many interviewees also warned this does not imply that all students need training in all areas. “This leads to a mile wide and an inch deep understanding,” another professor explained. Instead, enough interdisciplinary exposure to understand the role and application of varied disciplines could be a more desirable goal. While a disciplinary focus is essential, some interviewees considered interdisciplinary knowledge a defining aspect of sustainability studies:

If you’re going to be a sustainability expert, you could be an expert in one area, but have a good working knowledge about one or two other areas. I think that’s what distinguishes a sustainability scholar from an environmental engineer.

A primary goal of **INTERDISCIPLINARY CURRICULA** is to understand the **LANGUAGES** and **PERSPECTIVES** of other disciplines.
According to many interviewees, a primary goal of interdisciplinary curricula is to understand the languages and perspectives of other disciplines. Interviewees differed in their opinions about how disciplinary barriers can or should be surmounted. Some explained that, while disciplinary communities are tied to the history of academia, borders are also inevitable since an individual can only absorb so much knowledge. Many professors explained that they have found a lot of value in putting their students in the role of other fields (e.g., in an extended role-playing exercise) or, ideally, having classes involving students of several different fields. As one professor noted:

Most of the problems of sustainability are just too big for one discipline to solve, and it’s essential for us to be able to communicate. Multidisciplinary thought is something that is necessary; it gives me a perspective. When they say jump, you understand that it’s not how high, but that it’s about a connection. You understand enough of their jargon to translate between your jargon into a common language.

“...If you’re a science person, how do you learn to communicate and be able to translate knowledge into PRACTICAL ACTION?”

students who have some comfort in engaging with other disciplines are much more prepared to work on problems of sustainability. One professor noted:

I’m not a scientist, but I have to hang around with scientists all the time. Science knowledge is necessary to make good policy decisions and recommendations.... How do you get [students] to embrace science knowledge—not to the same degree as a graduate student in the sciences, but to be able to use it? And vice versa, if you’re a science person, how do you learn to communicate and to be able to translate knowledge into practical action?

Many members identified concrete bridging skills that are common, no matter what a student’s field. Several members noted that these bridging skills may not require a full semester-long course, but could be taught in short-course settings. These include communication skills. Possibilities include a course in linguistics for science communication, the effective use of story and narrative to explain a complex issue and, more broadly, how to develop an effective public relations strategy to advance a campaign or issue.

Finally, several interviewees noted the need—especially in interdisciplinary graduate programs—for students to work with and be exposed to

“How do you get students to EMBRACE science knowledge?”
practitioners who use bridging skills in their professional lives. As one interviewee put it:

Students need to be exposed to people who have been trained in communication, and who know how to get their message across. This is bridging. We need to show students examples of what it would be to have a career in something like that.

**ROLE OF THE HUMANITIES**

Many interviewees noted that, in sustainability studies, discussions about the need for multidisciplinary approaches do not always extend to the humanities. However, several interviewees gave examples in their own work of people who’ve had key roles in sustainable development work as writers, artists, and historians. One interviewee noted, “There is an important ethical dimension to sustainability studies that overlaps with the humanities,” and that reading literature and interpreting texts should be part of sustainability studies. Another insisted that in an integrative course, for example on climate change, a focus on discourse is as essential to affecting the issue as understanding the physical evidence is.

The humanities have an essential role in developing students’ ability to communicate effectively through narrative, in teaching how to persuade, and helping people to come to a consensus. Several interviewees noted the essential skill of narrative or story creation for most issues of sustainability. Interviewees also noted that humanities play a role in helping to understand cultural drivers of sustainability studies. One humanities faculty member explained that:

If you think about the social movements that have occurred in the last 60 years, all of them had a cultural component. Civil Rights, Womens Movement, etc. A movement toward sustainability will have a public piece that binds people together….In Freiburg, a city with some of the most interesting initiatives related to sustainability, they’ve involved the citizenry…in performance and sports related to sustainability, and you do see things like poetry slams related to sustainability.

**VARYING SCALES TO STUDY SUSTAINABILITY ISSUES**

A few interviewees noted the need to be attentive to issues of scale when designing sustainability education curriculum. One professor noted that an effective curriculum should, at a minimum, expose students to problems at varying scales, from the global to the local. He explained that, “We’re not going to change the environment by just looking at details, but we also can’t solve problems by just looking at the R-value of insulation.” Similarly, some interviewees noted that it is important for students to develop an appreciation for the range of epistemologies, or ways of knowing, across disciplines, and the tradeoffs inherent between varying epistemologies. For example, a professor explained that:

Molecular virologists have an utterly different way of doing things than
ecologists….Sustainability has two aspects; it has a global aspect, in which we can’t know exactly what will happen—for example, CO2 levels—and a particular or local aspect, in which we can determine the exact mechanism with which a pathogen infects its host, or the amount of heat loss from a single building.

According to several interviewees, effective curricula should acknowledge and require both the global and local or particular aspects of sustainability.

**Design Thinking**

Several interviewees suggested that the capacity for design thinking is important for confronting problems of sustainability, and that it could be formalized as a foundational skill in much of the University’s current graduate curricula related to sustainability. Design thinking refers to processes that the design disciplines developed to, as one interviewee put it, develop “an empathetic understanding for the users’ needs.” In confronting an issue of sustainability, design thinking protocols can be used to guide a group in identifying both possible solutions as well as problems for implementing a proposed solution. Interviewees suggested that design thinking is critical as it allows practitioners to imagine new futures, including the design of new systems that could lead to these alternative futures.

**Systemic Understanding**

Many interviewees emphasized that both undergraduate and graduate students, regardless of their area of study, must develop a holistic understanding of systems, and how their discipline relates to larger systems. In fact, for many interviewees, a systems approach to issues and problems defines the study of sustainability. Systems thinking, as applied to problems of sustainability, includes how particular disciplines, epistemologies, and professional practices can be weaved into the bigger, or long-term context of a larger system.

A striking number of interviewees noted their undergraduate students and many graduate students lack an understanding of basic ecological principles.

Additionally, a striking number of interviewees noted their undergraduate students and many graduate students lack an understanding of basic ecological principles. This is a challenge that certainly limits the ability of students to develop systemic understanding, as well as other capacities.

A subset of interviewees is currently working together on a research project to understand common thresholds and limits for graduate students in developing a philosophical understanding of systematicity. This group of interviewees proposes that, if practitioners bring systemic understanding and communicative practices together to confront problems that are complex or cumulative in nature, it is more likely that strategies will be successful.
ROLE OF PRACTICE

Every faculty or staff member interviewed described practice (the terms engaged or experiential education were also used) where students are challenged with applying knowledge in a real-world setting as an essential component of sustainability education. Most also recognized that the appropriate role of practice varied between graduate and professional programs, as well as by discipline. In explaining the critical need for integrating real-world experience with traditional courses, one interviewee noted that:

I have a lot of professionals come into my sustainable land use planning class. They need exposure to how professionals are addressing these problems, and the opportunity to critique those perspectives….[Students need to be] exposed to the different career opportunities there are, and what the hard decisions are that have to be made. [For example]…tradeoffs within land use management, etc.

Faculty who advise students in research-oriented graduate programs, however, noted that practice is inherent to the programs already through the requirements of graduate assistantships and research. Many interviewees noted that experiential opportunities are important, but must not detract from graduate students’ primary responsibilities. As one professor described:

It is hard to get students to do what they should be doing, which is research and writing…. [New PhD students] come in excited about everything, and the challenge is to get them to focus on completing one project. To the extent that this can coincide with more cross-disciplinary and collaborative work,

that’s great. To the extent to which you can foster PhD education that gives someone the obligation to do focused, independent study with the opportunities to collaborate, that’s even better.

For some disciplines, interviewees suggested a focus on combining community-based participatory methods in sustainability education. Especially in the design and planning fields, members noted that one limit to effective work on issues of sustainability is that practitioners work in isolation from communities on problems of concern. To this end, sustainability education needs to better embody participatory methods in order to develop these capacities for students.

Several structures for balancing the need for engaged learning with the duties of a traditional, research-based graduate program follow.

CHALLENGE-BASED LEARNING

While faculty varied greatly in their opinions about the prospects for multidisciplinary research, many considered developing

Applying knowledge in a REAL-WORLD SETTING as an essential component of sustainability education.

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multidisciplinary courses possible and attractive. Challenge-based learning is a curricular structure that was mentioned frequently during interviews. In challenge-based learning, a complex challenge, or a “boundary object”, is a theme or problem that requires many disciplines or ways of knowing to be adequately understood. A challenge is chosen as a kind of case study to develop skills in sustainability studies. One professor described that, in her conception of challenge-, or object-based learning:

A network of professors comes together and focuses on a problem, bringing life scientists, social scientists, and practitioners together, as an example of what we need to do to deal with a problem adaptively, and understand when these
kinds of problems require us to reach across domains...coffee is an example of a boundary object, in which sustainable coffee production brings together business marketers, ecologists, etc...

“A network of professors comes together and focuses on a problem, bringing LIFE SCIENTISTS, SOCIAL SCIENTISTS, and PRACTITIONERS together, as an example of what we need to do to deal with a problem ADAPTIVELY.”

Another professor suggested that most foods are examples of boundary objects that are particularly tangible for studying challenges of sustainability. A different professor explained how understanding sustainable food production requires understanding “....how writers and activists have shaped this movement, which is a movement of discourse and framing as much as it has been one of fact and science.” Issues of sustainability with food, as an example of a boundary object, require students to engage with techniques in the humanities, as well as the social and natural sciences.

**PERCEPTIONS OF STUDENT DEMAND**

Interviewees’ perceptions of student demand varied. Many considered there to be a strong demand among both undergraduate and graduate students for sustainability programs, citing the number of students who have asked for their advice on sustainability-related courses. But a few interviewees had not noticed significant demand for sustainability-related offerings. Other faculty, however, argued that part of a university’s role is in creating offerings that then engender demand: “Universities create demand for programs by creating programs. More often, we’re shaping the audience we’re trying to reach.” One administrator questioned whether sustainability-related programs would prepare students for job opportunities, explaining “We can’t move forward [with new programs] until we get more feedback from market research.”

Another interviewee voiced a common perspective, remarking that, “Some people are interested, or would be interested [in new sustainability-related curricula]—I think students in general are interested in sustainability. But the reason to do it would be the intellectual or academic need. Not to fill a particular demand.”

“The reason to do it would be the INTELLECTUAL OR ACADEMIC NEED. Not to fill a particular DEMAND.”
“All of the issues, strategies, and recommendations are **IDEAS GENERATED by NETWORK MEMBERS.**”

These five issues provide a useful framework for organizing concrete strategies and recommended actions for improving graduate sustainability education. The issues include: coordination, communication, community building, and the curriculum itself. These issues are not separate, but are strongly interrelated. Following each issue are strategies, which describe general approaches for what should be done about the issue. Strategies are followed by much more specific recommendations for action on how to accomplish these strategies. All of the issues, strategies, and recommendations are ideas generated by Network members—this framework reflects our analysis of how these ideas might be best organized and pursued.
A general challenge mentioned by interviewees was that, given the scale and size of the University, faculty and students involved in sustainability-related courses in one department or college are unaware, or do not know how to connect to, a related sustainability initiative in another part of the University. Some professors lamented that there is little strategic conversation between faculty and administrators about how to develop sustainability offerings over time. One faculty member described that:

One of the great things about the U of M is that it is so vast, but I am only vaguely aware of respective programs…. Part of the challenge for me, as a graduate advisor, is even knowing what’s out there…educating faculty about these programs would be a good service. One of the best functions that IonE fulfills is to pull together programs and resources related to the environment so that they are accessible. If the sustainability minor wasn’t in IonE, I would never know about it….Having one central place or portal would be really important.

In addition, some interviewees noted that, given that new programs or courses imply lost revenue for a particular department and increased revenue for others, competition between departments is a potential challenge. The desire to offer similar opportunities in order to meet student needs and maintain revenue could lead to redundant course offerings and competition for resources. One professor framed the question well: “How do we offer required [sustainability] courses without draining each other…? We must figure out how to tie back [interdisciplinary sustainability classes] to revenue, and more specifically who will teach what content.”

Finally, there is potential for “green washing” of curriculum. As sustainability could confer a marketing advantage for departments, some professors noted the danger that existing curriculum could be “green washed” by simply “recasting preexisting courses.” Indeed, a major issue mentioned by faculty is the need to construct stronger sustainability curriculum. One professor described that:

[There is] a very serious problem with not knowing how to construct sustainability curriculum. In particular, there are distinctly different models of sustainability education. The more extensive they are, the more they conflict with established activities. Universities have enormous

“One of the great things about the U of M is that it is so VAST, but I am only vaguely aware of respective programs….Part of the CHALLENGE for me, as a graduate advisor, is even knowing WHAT’S OUT THERE.”
Nearly all faculty and staff interviewed would prefer a model of **CONNECTING** existing sustainability-related programs...

... without a **FUNDAMENTAL CHANGE** in the structure of departments or colleges.

In addition to improving the quality of sustainability-related education, some interviewees described how there is a need for faculty to get to know each other, or build a community of collaboration around themes of sustainability.

**STRATEGY**

Nearly all faculty and staff interviewed would prefer a model of connecting existing sustainability-related programs that improved coordination without a fundamental change in the structure of departments or colleges. One oft-cited model for sustainability programs is Arizona State University’s School of Sustainability, but several faculty singled out ASU’s model as a poor fit for the U of MN. Interviewees noted that, in many respects, research and programs around sustainability issues are already developed, but the suite of programs should be better coordinated, connected, and marketed both internally and externally. As one professor described, “The product I’m thinking about is increased collaboration among faculty—how to increase collaboration without compromising existing connections?”

**BUILD CAPACITY FOR AN ECOSYSTEM/CONSTELLATION MODEL**

**PROMOTE THE DEVELOPMENT OF A “CONSTELLATION MODEL”** for sustainability education at the University, in which existing and emerging sustainability initiatives remain independent, but much more connected through a network coordinated by a convener at the center. This network, or constellation of programs, would be a federated and financially light organization with resources directed at the essential communications, facilitation, and fundraising capacities of the convener. One professor explained that:

Strategically, it might be a good idea for coordination. I’m fearful that we’re headed down the road that if each program has a separate sustainability program, it will lead to stripping each other of revenue. If we were to coordinate activities...in less of a competition model, and more of a coordinated or

The purpose of a constellation model is to strengthen **CONNECTIONS** and improve **COLLABORATION** where possible and minimize competition.
collaborative model, this could be helpful.

The purpose of a constellation model is to strengthen connections and improve collaboration where possible and minimize competition.

DEVELOP CAPACITY FOR A CONVENER

A frequent suggestion was the need for a coordinator or convener with the capacity to provide basic services in connecting sustainability initiatives. There are several entities that are not based in a particular college that could be supportive as conveners. These include the Graduate School, the Institute on the Environment, and other cross-campus centers such as the Institute for Advanced Studies. The many issues related to sustainability do not overlap perfectly with any of these entities. At the same time, if any one of these entities were to take on a convening role, it is likely that they could increase connectivity by providing discrete coordination services, without significant conflicts of interest.

A.1 Recommendation: Build capacity of a central convener. The responsibilities of the convener should include
i. Facilitate communication among existing programs. Use web-based resources for information sharing around course opportunities, etc. Convene Network meetings to strengthen a cross-university faculty community around sustainability issues.
ii. Improve external marketing of programs. Work with the relevant university-wide staff to develop a communications strategy with a narrative that gives clarity and continuity to the constellation of sustainability studies opportunities. Include a wide array of institutional partners to develop a coordinated University-wide marketing effort to attract students.
iii. Build a resource base for coordination and incubation of programs. Dedicate staff time to identifying public and private grant opportunities, convening grant writing groups, etc. to support the convener as well as existing or emerging sustainability initiatives. Highlight how the initiatives being developed at the University can be replicable at other institutions. Organize for new funding opportunities, which could include gatherings where faculty, administrators, University lobbyists, and development staff are convened to discuss how to position research for money and to use language that connects with possible University or legislator allies. Revisit the idea of the “expertise database” as a tool for seeing who is doing what across the University.

A.2 Recommendation: Promote faculty and graduate student community around sustainability issues
Activities involving faculty and graduate students should all have the concurrent goal of strengthening community. Initiatives that allow formal and informal opportunities for people to gather will increase trust and investment in the initiatives, and make it more likely for collaboration in the future. In addition, the Network should include graduate students, along with faculty and administrators, in its meetings and other activities to ensure student perspectives and input inform the work.

A.3 Recommendation: Support the Network as a forum for faculty organizing
Use the Network to focus on development of other initiatives at the faculty level. A bottom-up approach to developing sustainability curricula could be supported by at least one Network meeting per semester, with spinoff working groups as needed. The location of the Network meetings could rotate between St. Paul and Minneapolis campuses to ensure that a wide scope of faculty are able to attend. As there are ample opportunities at the course-level, small subgroups of the Network could focus on collaborating on a particular issue, allowing the freedom to innovate at a fast pace on a local level.

A.4 Recommendation: Inter-college collaboration
Increase communication at the upper level of administration among colleges. Greater familiarity among senior administrators about each college or school’s respective sustainability initiatives could facilitate increased collaboration. As one professor noted, “If you have someone at a school say, ‘We need more interaction with other schools within the University on sustainability issues it gives faculty the incentive or freeness to do that. Even though the U of MN isn’t hierarchical, there are people in positions at higher levels that can precipitate and make room for faculty to work across departments and schools.”
A.3 RECOMMENDATION: STRENGTHEN INSTITUTIONAL SUPPORT AT THE UNIVERSITY FOR ENHANCED GRADUATE SUSTAINABILITY CURRICULUM

Communicate faculty priorities around sustainability education, using this report as primary evidence.

i. Graduate School: Solicit continued and increased support for the Network from the Graduate School—this should be in the form of funding, as well as in ensuring sustainability studies is identified as a curricular priority.

ii. University President and upper level academic leadership: Meet to discuss the comparative advantage a more coordinated suite of sustainability programs would bring to the University. Emphasize branding and recruiting opportunities.

iii. Directors of graduate studies and heads of schools: Ensure these leaders are aware of efforts to better coordinate and connect existing sustainability initiatives, and the wide support among faculty for these efforts.
ISSUE B:
INSUFFICIENT COMMUNICATION BETWEEN SUSTAINABILITY INITIATIVES

ISSUE STATEMENT

Many interviewees cited frustration with communication among the constellation of sustainability efforts across the University. As one professor noted, “We have nothing tying sustainability programs together.” Professors remarked often about this missed opportunity for communication:

A lot of the folks in the Network are in the scientific colleges, or…at the Humphrey. I think Carlson students are beginning to have an interest in this. What are we doing to reach out into colleges? Are we reaching into CLA, and how are we reaching into some of the areas that we might not think of involving sustainability? There’s a new economic policy institute in the CLA Department of Economics. Are they working on sustainability as one of their issues? In fact, their first forum is on climate change.

Whatever the example, interviewees noted the difficulty in understanding what was occurring in other colleges and departments across the university that could lead to opportunities for collaboration. A general lack of easily accessible information for faculty and students was one of the most commonly mentioned issues. Network members frequently cited the difficulty in being aware of existing courses, programs, study abroad trips, and other opportunities. This challenge seems especially acute across departments and colleges, but some professors noted the difficulty even within their own departments.

STRATEGY

USE WEB-BASED TOOLS TO COMMUNICATE information on sustainability study opportunities across academic units and disciplines, and for marketing sustainability education opportunities. The graphic design and content should be consistent with the Network’s communication strategy. Develop a tool that provides easy access to updated information on sustainability-related courses.

B.1 RECOMMENDATION: EXPAND USE OF PUSH COMMUNICATIONS

Use list servers and social networking platforms to disseminate timely updates on upcoming opportunities (e.g., workshops, classes, program events, etc.).

B.2 RECOMMENDATION: DEVELOP WEB PAGE TO SUPPORT CONVENING FUNCTIONS

In addition to acting as an integrating platform for related resources at the University, the web page should include:

i. All Network publications (e.g. literature review, interview report, implementation strategy).
ii. Network “toolkits” for course development: resource that supports faculty in identifying the process, and potential challenges in, developing a new sustainability-related course.
iii. Calendar of events.

B.3. RECOMMENDATION: IMPROVE COURSE-LEVEL INFORMATION TOOLS

To improve course-level information, work with the Registrar’s office and other partners to modify existing resources (e.g., One Stop course search) or, if that is not possible, develop new course-level resources. Create a live crowd-sourcing tool that provides basic information on sustainability-related courses, and allows students to describe the courses they have taken, and to offer their feedback on the course content and delivery.
ISSUE C: CRITICAL GAPS IN CONTENT AND SKILLS OFFERINGS

CONFLICT BETWEEN DISCIPLINARY STRUCTURE AND “WHOLENESS” IN SUSTAINABILITY ISSUES

The disciplinary structure of the University can itself challenge collaboration across departments, and the development of strong sustainability curriculum. One humanities professor described this conflict:

I think it’s a real challenge on the graduate level in part because of the structure of the university that emerged out of the enlightenment. While there is overlap, and while we share some common understandings about the academic enterprise, there are different methodologies, and different cultures. In order for anyone to speak intelligently, they need a certain language. And so, it’s not that there is antagonism but that the disciplinary cultures and habits of mind at IonE are going to be very different than the ones at IAS. This is necessary, but it gets in the way of what Orr calls ‘wholeness’. The challenge of sustainability is the challenge of addressing that wholeness.

One interviewee who collaborates often with health scientists noted that the disciplinary language and culture of the health sciences might be one reason that there has been, to date, less collaboration with the health sciences and other parts of the University. “Everyone comes to sustainability with an attitude, it’s a very loaded term. I don’t think it really does resonate in the health sciences, well being resonates very strongly. The health-sciences emphasize health and well-being.”

According to most interviewees, sustainability is not broadly infused into curricula. Many graduate programs provide little flexibility for taking new or additional classes, from the perspective of some of the department heads interviewed. As graduate programs are understandably circumscribed by the need to develop particular disciplinary skills in a short period of time, development of sustainability curricula must acknowledge these requirements. Faculty are required to teach a certain number of courses within their departments—unless the course is recognized by their department, teaching a new sustainability course would require them to overload their schedules. One professor explained this challenge simply and bluntly: “Things that prevent me [from teaching more sustainability-related courses] is the time. I’m not going to do it with a teaching overload.”

Some faculty also noted a generally poor level of scientific literacy among some students that challenges their ability to engage in interdisciplinary work and to access some existing sustainability course offerings. Several faculty remarked that graduate students often have insufficient ecological background to engage with sustainability-related problems. As one professor noted:

The scientific literacy of some of the students is lacking. This includes some of the basic scientific principles, orders of ten, basic units of energy, even some of the basic high school level biology. Maybe that’s not about the university, or maybe it’s about the public education system. Many students are not learning about ecology, environmental impacts, even civics. With the exception of Humphrey Students; few have written a policy statement before…a general lack of education in civics and scientific literacy; mostly ecological literacy.
Finally, some faculty noted a need for more emphasis on systems thinking in graduate curricula. Several interviewees noted systems thinking as a core methodology for addressing sustainability-related issues, forming a foundation of emerging curriculum. However, there are few focused opportunities—whether courses, non-credit short courses, or otherwise—currently offered for graduate students at the University.

**STRATEGY**

Provide opportunities for graduate students to focus their study on issues of sustainability without creating entirely new requirements or graduate programs. Pursue programmatic and course opportunities that build on the strength of existing programs and initiatives. Where possible, connect existing courses and opportunities across departments and colleges, and when needed develop new courses to address critical skills and competencies required for study and work on issues of sustainability.

**C.1 Recommendation: Develop Interdisciplinary Short-Courses and Workshops**

Short-courses—or skills workshops held outside regular academic courses—focusing on transdisciplinary skills required for students to competently assume professional roles was recommended by multiple interviewees. Short courses could be open to graduate students of all levels and disciplines, range from a few hours to a few weeks, and not necessarily be offered for academic credit. These courses could aim to provide training in skills necessary for sustainability-related work across multiple disciplines, and as such also be an effective structure for bridging student and faculty communities.

i. Provide short workshops on skills needed for engagement in sustainability-related problems, but not currently offered formally or for credit. Skills workshops could include:

- Systems dynamics and modeling
- Life cycle analysis
- Science communication
- Presentation skills
- Sustainability research methods
- Leadership and followership skills

ii. In addition, provide short workshops that bring together interdisciplinary groups of graduate students to collaborate on projects or grant writing. These workshops could include:

- Interdisciplinary grant-writing (faculty led).
- Interdisciplinary grant workshops, or well-structured but still informal processes for students to run proposals for grant funding by their peers.
- Research planning workshops: oriented toward graduate students at the beginning phases of their research to discuss possibilities for interdisciplinary and/or collaborative work within their project, to identify potential collaborators, and the resources needed to accomplish such a project.

**C.2 Recommendation: Create Graduate Minors or Concentrations**

Interviewees proposed new graduate minors or program concentrations much more often than full masters or PhD programs. As one professor explained,

I would be less interested in a sustainability proper program, than in... a concentration in sustainability. Something that is a robust element to a doctoral program, instead of a school in itself. To me, that seems more intellectually interesting and practically useful. We are an R1 Land Grant institution with a strong commitment to doing something for the public good. What kinds of opportunities will produce people that can actually do something about problems? A wildly popular concentration...I think that's intellectually and practically very exciting. And a whole lot less difficult institutionally.
Interviewees repeatedly suggested opportunities at the level of a minor or certificate because these structures complement existing programs while reinforcing other efforts to build an interdisciplinary student and faculty community.

C.3 Recommendation: Encourage new initiatives at “untapped nexuses” of strength at the University
The size and comprehensive nature of the institution poses some challenges to collaboration across disciplines, but it also makes truly transdisciplinary approaches to sustainability challenges within the same university more feasible. Nexuses of scholarship at the University could be more deliberately connected to problems of sustainability, including the ecosystem human health nexus; ecosystem services and connectivity; and the food, fuel, and energy nexus. In addition, several faculty members mentioned a general interest in getting beyond the single PI-driven approach to research—sustainability initiatives that focus on the University’s “untapped nexuses” could encourage more collaborative research.

C.4 Recommendation: Develop object-based/thematic interdisciplinary courses
A course focused on a theme, or object, bringing students and faculty together from multiple schools, could contribute to a stronger sustainability curriculum and offer a natural forum for the development of an interdisciplinary community.

C.5 Recommendation: Incentivize sustainability problem solving in doctoral dissertations
There are promising opportunities for improved sustainability scholarship for doctoral research. In the natural sciences, dissertations need at least three chapters. One professor suggested that, “...if one of these chapters was an application to a sustainability problem, this would help shift it from the icing on the cake to a more core problem.”

C.6 Recommendation: Improve connections with international community
The University of Minnesota’s office of International Programs has significant capacity, and should be enlisted to assist in developing opportunities abroad to help graduate students engage in issues of sustainability while recognizing the constraints of a graduate students’ academic and/or research responsibilities.

C.7 Recommendation: Facilitate development of a minor or certificate
Support the development of a minor or certificate program centered on sustainability studies. The minor could include many existing courses, as well as new courses that focus on skill and content relevant to sustainability issues. To be successful, the minor should focus upon community building across units and disciplines, and meet the need for students and faculty to collaborate in a transdisciplinary manner.

C.8 Recommendation: Combine traditional programs with sustainability major for a joint degree
A few faculty noted models of joint-degree programs at other universities in which a traditional program—such as a masters program in a foreign language—is paired with sustainability studies. Finding opportunities to cross-link traditional skills with broader sustainability training could expand demand by students, and better prepare students to engage with problems of sustainability after graduation.
ISSUE D: INTEGRATING COMMUNITY-BASED PROJECTS INTO CURRICULUM

Experiential opportunities to work on sustainability-related issues in communities, according to many of the faculty interviewed, are generally too brief in duration and lacking in sufficient coordination for both students and clients. This shortcoming was attributed first to the limits of semester-based classes, and a lack of coordination among courses or across semesters in working with a particular external partner. In general, interviewees noted that a challenge to maximizing experiential learning was the lack of capacity to coordinate such projects. As one professor who frequently teaches interdisciplinary graduate courses noted:

I think experiential learning, and collaborative learning, should be a major priority for development, so that students learn by doing, as well as learn by working together. This is a challenge because this requires resources. You need to be creative and build those programs deliberately, they don’t just happen. May need resources…—if you’re working with clients you want to be able to give something back. It often takes a lot of coordination on the part of clients….

Other faculty echoed this sentiment: in order to overcome the challenges of matching student skills and schedules with community needs, there is a strong need for more coordination. As one faculty member and professional noted,

The students aren’t going to be the solution to the continuity: it’s got to be a staff-level connection to the community client. Right now, I see that the staff puts the two together, and the student and community client go forward. The staff don’t add much to making that jump to the next semester. It made me realize that inserting a community-based project into a class is not always the best.

Ultimately, as one faculty member noted, “Here you can get more theoretical without always having to face how sustainability is going to work.” This inevitably depletes the quality of experiential opportunities available for engaging in issues of sustainability.

Strategy

Reduce barriers of entry for faculty to design experiential learning elements in sustainability-related courses. Secure resources and develop coordinating capacity to help faculty connect with external partners, and prioritize an organizational model that provides economies of scale by engaging the same partner over multiple semesters and through collaborating with several courses.

D.1 Recommendation: Incubate cross-unit initiatives

Convene focused working groups within the Network, using the Network as a forum for connecting faculty interested in a particular interdisciplinary problem. Using these forums as an organizational vehicle, pursue funding and other support for curricula and other experiences for graduate students. In a coordinating and incubation role, the Network can provide resources and credibility for transdisciplinary groups of faculty to pursue the concrete development of new curriculum. Prioritize incubation of programs that reduce the transaction costs of coordinating meaningful experiential, or field-based opportunities between faculty teaching courses and community partners.
D.2 RECOMMENDATION: SUPPORT FACULTY IN COORDINATING EXPERIENTIAL OPPORTUNITIES
To give greater support to community-based classes, dedicate staff time to managing relationships between courses and community clients. Centralizing support for community-based classes in sustainability, could improve effectiveness and continuity of the projects across semesters and, ideally, across several classes and disciplines.

D.3 RECOMMENDATION: PARTNER WITH OTHER PROGRAMS IN THE METRO
Establish or expand relationships with existing sustainability-related initiatives in the Twin Cities, such as the Higher Education Consortium for Urban Affairs (HECUA). HECUA’s programs are for undergraduates, and include the semester-long program Environmental Sustainability: Science, Public Policy, and Community Action.
ISSUE E: FACULTY INCENTIVES

A striking number of interviewees recognized that faculty members currently have incentives to continue with the status quo rather than participate in the formation of new sustainability curricula. These incentives include that, unless recognized by their department, teaching a new sustainability-related class would be in excess of faculty teaching requirements. Similarly, faculty members are rarely given waivers for new course development. One professor expressed the consequences of this challenge bluntly—“Things that prevent me from teaching more sustainability courses? The time. I’m not going to do it with a teaching overload.”

Many other faculty members pointed to the departmental accounting model, in which departments lose money if their students take courses outside their department. One professor and administrator noted that, “[…] we lose money if other people are taking classes in other colleges. It’s also administratively difficult; anything we could do to normalize that. Right now, there is no incentive, in fact, there is a disincentive, because we lose money. If we really want to make this an interdisciplinary University we need to address that financial disincentive.”

STRATEGY

E.1 RECOMMENDATION: IMPROVE INCENTIVE STRUCTURE FOR INTERDISCIPLINARY COLLABORATION

Identify funding sources to pay for course releases from current teaching obligations so that faculty can develop and teach new sustainability-related courses. Determine an equitable shared-funding structure to enable faculty to team-teach courses without disrupting the financial health of their department.

E.2 RECOMMENDATION: WORK CLOSELY WITH EXISTING ADMINISTRATIVE INITIATIVES

A few faculty suggested the need to ally with the administrative processes and initiatives that might lend support for sustainability at the University, including the The Curriculum and Academic Workteam of the University of Minnesota Systemwide Sustainability Implementation Committee and its subcommittee on education. By communicating regularly about progress within existing and emerging programs, it is more likely that administrators will understand, and support their development.
## APPENDIX A: THE GRADUATE SUSTAINABILITY NETWORK MEMBERS

### CENTER FOR URBAN AND REGIONAL AFFAIRS

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
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<tbody>
<tr>
<td>Mike Greco</td>
<td>Community Growth Planning Assistance Center</td>
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### COLLEGE OF BIOLOGICAL SCIENCES

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Jeannine Cavender-Bares</td>
<td>Ecology, Evolution, and Behavior</td>
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<tr>
<td>Sarah Hobbie</td>
<td>Ecology, Evolution, and Behavior</td>
</tr>
<tr>
<td>Clarence Lehman</td>
<td>Ecology, Evolution, and Behavior</td>
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<tr>
<td>Jennifer Powers</td>
<td>Ecology, Evolution, and Behavior</td>
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### COLLEGE OF CONTINUING EDUCATION

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>JoEllen Lundblad</td>
<td>Liberal Studies</td>
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<td>Sherry Wagner Henry</td>
<td>Director of Graduate Studies</td>
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### COLLEGE OF DESIGN

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<th>Name</th>
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<tr>
<td>John Carmondy</td>
<td>Center for Sustainable Building Research</td>
</tr>
<tr>
<td>John Comazzi</td>
<td>Architecture</td>
</tr>
<tr>
<td>Mary Guzowski</td>
<td>Architecture</td>
</tr>
<tr>
<td>Lance Neckar</td>
<td>Landscape Architecture</td>
</tr>
<tr>
<td>David Pitt</td>
<td>Landscape Architecture</td>
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<tr>
<td>Virajita Singh</td>
<td>Center for Sustainable Building Research</td>
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<tr>
<td>Richard Strong</td>
<td>Center for Sustainable Building Research</td>
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### COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Fred Finley</td>
<td>Curriculum &amp; Instruction</td>
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### COLLEGE OF FOOD, AGRICULTURE, AND NATURAL RESOURCE SCIENCES

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<th>Name</th>
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<tbody>
<tr>
<td>Lawrence Baker</td>
<td>Bioproducts and Biosystems</td>
</tr>
<tr>
<td>Dennis Becker</td>
<td>Forest Resources</td>
</tr>
<tr>
<td>Jeffrey Conney</td>
<td>Cedar Creek Ecosystem Science Reserve</td>
</tr>
<tr>
<td>Mae Davenport</td>
<td>Forest Resources</td>
</tr>
<tr>
<td>Nick Jordan</td>
<td>Agronomy &amp; Plant Genetics</td>
</tr>
<tr>
<td>Name</td>
<td>Department/Program</td>
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<tr>
<td>Helene Murray</td>
<td>Minnesota Institute for Sustainable Agriculture; Agronomy &amp; Plant Genetics</td>
</tr>
<tr>
<td>Ingrid Schneider</td>
<td>Forest Resources</td>
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<tr>
<td>Ingrid Schneider</td>
<td>Forest Resources</td>
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<tr>
<td>Kathy Draeger</td>
<td>U o f M Regional Sustainable Development Partnerships; Agronomy and Plant Genetics</td>
</tr>
<tr>
<td>Jon Foley</td>
<td>Director, Institute on the Environment</td>
</tr>
<tr>
<td>Mary Hoff</td>
<td><em>Momentum</em> Magazine</td>
</tr>
<tr>
<td>Beth Mercer-Taylor</td>
<td>Sustainability Studies Minor</td>
</tr>
<tr>
<td>Pat Nunnally</td>
<td>River Life Program</td>
</tr>
<tr>
<td>Jennifer Schmitt</td>
<td>Northstar Initiative for Sustainable Development</td>
</tr>
<tr>
<td>Alexandra Klass</td>
<td>Associate Dean for Academic Affairs</td>
</tr>
<tr>
<td>Jean Coleman</td>
<td>Sustainability Law Clinic</td>
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<tr>
<td>Valentine Cadieux</td>
<td>Sociology</td>
</tr>
<tr>
<td>Charlotte Melin</td>
<td>German, Scandinavian, &amp; Dutch</td>
</tr>
<tr>
<td>Dan Phillippon</td>
<td>English</td>
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<tr>
<td>Steve Kelley</td>
<td>Center for Science, Technology, and Public Policy</td>
</tr>
<tr>
<td>Jennifer Kuzma</td>
<td>Science, Technology, and Environmental Policy program</td>
</tr>
<tr>
<td>Greg Lindsey</td>
<td>Associate Dean</td>
</tr>
<tr>
<td>Guillermo Narvaez</td>
<td>Social Policy</td>
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<tr>
<td>Kathryn Quick</td>
<td>Public and Nonprofit Leadership Area</td>
</tr>
<tr>
<td>Carissa Schively Slotterback</td>
<td>Coordinator, Graduate Sustainability Education Network; Urban and Regional Planning program</td>
</tr>
<tr>
<td>Jane Davidson</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Paige Novak</td>
<td>Civil Engineering</td>
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<tr>
<td>Katey Pelican</td>
<td>Veterinary Population Medicine</td>
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APPENDIX B: NETWORK ROLE

This section provides additional content gleaned from the interviews related to the role of the Network. While the content does not relate specifically to the issues addressed in the main report, it offers important insights into faculty members’ connections with the Network and with each other.

Faculty and Student Community

Interviewees consistently cited the role of the Network as a connector and community builder among faculty as its most critical function. The Network’s initial focus—providing a forum for faculty across the University to meet, get to know each other, and collaborate on sustainability curriculum—provides immediate benefits to faculty. One professor explained that:

Any time you’re working with faculty, a level of interest and trust must be developed. There is a lot that comes through individual conversations. It [the Network] allows the chance to exchange potentially interesting ideas for which there might be a funding opportunities.

In particular, faculty noted that fostering a community of faculty that is not explicitly tied to a particular college or discipline is much needed. It seems that faculty already have ample opportunity to discuss sustainability issues with colleagues from within their disciplines, but a pan-campus, cross-disciplinary community in which faculty are able to get to know each other is greatly needed. One professor reflected how:

There have been benefits already through making connections to people. I’m grateful to have access to the Network, better connections to [the dean of the professor’s school and to faculty in other departments….It gives me more access because otherwise I’d have to seek them out individually. I’ve learned about curriculum in other areas; I’m hoping to reinforce the message about needing to think in an applied manner to others, hopefully I can bring that to others in the Network. It’s given me more confidence that the U of M is responding.

Indeed, some faculty mentioned that new connections fostered through the Network have already opened new opportunities in the courses they teach. A humanities professor described how, after meeting a faculty member from the department of Ecology, Evolution, and Behavior and another faculty from the Humphrey School, they will be guest lecturing in each others’ classes:

It was enormously helpful for me to meet people and find out about what they do. At some point we will have [the ecology professor] come into our class. Could we team-teach a course? I’m not sure, but it certainly would be interesting to have her come into my course. I could see this happening with other individuals as well, such as [a Humphrey School professor].

In fostering a community of faculty focused on graduate sustainability education, the Network

“It’s given me more CONFIDENCE that the U of M is RESPONDING.”
“Just getting information to people—I still don’t have a sense of where to send them to find out that information, nothing that is PRACTICAL.”

indirectly has a role in fostering graduate student community around the same issues. One professor mused on how the Network could develop in this way:

Certainly, having a [faculty] network is important and we need to think increasingly about it. If there was a community where we could discuss programs and have some kind of active interaction—in terms of my students, I guess again, it’s an issue of community. Trying to build a community of people who are thinking in a certain way.

Indeed, as many faculty noted, these communities overlap to some degree, and can reinforce each other. Some faculty discussed the difficulty in finding students from other disciplines who might bring important skills to an interdisciplinary research area. The Network could be a natural intersection point for developing interdisciplinary collaborations among students and faculty.

DISSEMINATING INFORMATION

The need most commonly emphasized was ACCESS to up-to-date information on classes, programs, and other opportunities around sustainability issues for graduate students. Many requested a sustainability information portal, or clearinghouse, that would provide information on which courses are offered in each department. Easily accessible information on sustainability courses might reduce barriers to taking classes in other schools or departments and, as one faculty and administrator described, “convince other graduate students [outside of their school] they shouldn’t be scared of [our] class.”

A central and accessible online resource would meet the most basic needs of graduate students, and also support connectivity among faculty and students alike. A faculty member described that there is a:

[...] need for some kind of web presence and also to provide guidance for graduate students to pursue these kinds of issues. If there is no formal program, at least a virtual network that could point students toward how to use current resources who are interested in sustainability. Might also be a way for students interested in sustainability, but who don’t want to study sustainability directly for their degree, but still want to learn. This could help them see how.

In addition to lists and descriptions of sustainability-related courses and programs across schools and colleges, other suggested information include links

The need most commonly emphasized was ACCESS to up-to-date information on classes, programs, and other opportunities around sustainability issues for GRADUATE STUDENTS.
to faculty biographies, and disseminating updated information on seminars, short-courses, or guest speakers, as well as about initiatives outside the university.

One professor explained that:

Just getting information to people—I still don't have a sense of where to send them to find out that information, nothing that is practical. I just need to know what are courses that I could work with and refer students to, would it make sense to co-teach, etc. A lot of it is just trying to access resources….

Other faculty noted that a central “portal” for such information would also be effective for external marketing to students and funders. One department head noted that:

Identifying and creating these connections, and finding a way to make something cohesive so that we can advertise to students through a portal, go after funds, and promote ourselves to the University. […] A single program] can only do so much in and of itself, but collectively we can go to the new president and say, look! We need to find the connections, create them, and help them grow.

Several mediums for this information were suggested, including “liquid mediums” that are easily updated, such as a wiki, or easily searchable and browsable database.

**ARTICULATING A VISION**

A primary role for the Network is to articulate a vision for the purpose and structure of graduate sustainability education at the University. Interviewees generally were open to many outcomes from this visioning process, but considered it critical for the conversation to occur. One professor noted that:

Or perhaps we’ll end the semester and say, “It shouldn’t look like anything”. We should not foreclose any option, including one that says there isn’t going to be a solution. But the main goal of the Network is to try to figure that out. To determine what, if anything, we are trying to do.

**INSTITUTIONAL ADVOCATE**

As the Network is broad-based, including members from most of the colleges and schools within the University, many interviewees suggested that the Network could do more to represent faculty priorities regarding sustainability curriculum in formal administrative structures. The Network could play an important role in representing its members in university-wide committees and other forums that could usefully advance the development of programs on an institutional level.

**INCUBATOR FOR SUSTAINABILITY CURRICULUM DEVELOPMENT**

One of the Network’s core functions, according to many interviewees, is in providing a forum and support for innovation around sustainability curricula. How can existing course offerings be better leveraged and connected with other initiatives? What are areas of sustainability curriculum at the university most in need of further development? By identifying opportunities and providing organization to pursue new initiatives, the Network’s role as incubator is also useful.
Appendix C: Interview Questions

Background
• How does your current teaching address sustainability? (Examples?)
• How does your research address sustainability? (Examples?)
• Are you affiliated with any of the existing sustainability programs at the U of M? (e.g. undergrad Sustainability Studies minor, the proposed graduate minor in “Sustainability: a program in whole earth dynamics” or the “Whole Earth Dynamics graduate group”, MS Arch – Sustainable Design Track, planned CCE masters degree)

Curricula and Teaching
• What do you think is most important about the design and content of sustainability programs?
• To what extent do you see interdisciplinarity as fitting into sustainability education?
• To what extent do you see practice or experiential education opportunities fitting into sustainability education?
• From your perspective, what are the greatest challenges to teaching sustainability-related courses?
• From your perspective, what are the greatest challenges to developing sustainability-related programs at the University of Minnesota?

Priorities and Goals
• What opportunities do you see for more comprehensive sustainability programs and/or curricula at the University of Minnesota?
• Have you observed a demand from students for more sustainability courses and/or programs? If so, what are students seeking?
• Are there any models of sustainability courses or programs that you would recommend we explore?
• How do you think current and future sustainability programs should be connected to each other? (Note that some interviewees may be unfamiliar with existing or planned programs – might need to prompt)

Network Functions
• What do you consider the most important functions of the Network? (Reminder: goal of Network is to enhance graduate sustainability options at the University.)
• In what ways can the Network most support you in developing sustainability curriculum?
• What would you like to see the Network focus on during this academic year?

Other
• Is there anything we haven’t talked about yet today that you’d like to mention?
# Appendix D: Coding Scheme

## Network Interview Codebook

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<tr>
<th>Nodes Based on Revised Framework</th>
<th>Additional Nodes not Based on Framework</th>
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<tr>
<td><strong>Major Coding Categories (i.e. Parent Nodes)</strong></td>
<td><strong>Description (numbers indicate sub-nodes)</strong></td>
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<tr>
<td><strong>Vision</strong></td>
<td>Statements on vision of graduate sustainability education at the U of MN</td>
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<tr>
<td><strong>Sustainability Curriculum</strong></td>
<td>1) Conflict: possible barriers to action for new initiatives 2) Essential questions: how the curriculum should connect with student motivation through identifying compelling questions. 3) Core Content: what elements should belong in sustainability curricula. 4) Design thinking: content, and ways of incorporating. 5) Bridging skills: definition, the importance of. 6) Integrating into existing: reasons for incorporation, rather than new programs.</td>
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<tr>
<td><strong>Interdisciplinary</strong></td>
<td>1) Connections between disciplines: the need for students to know each other across disciplines. 2) Disciplinary foundations: balance between disciplinary depth and interdisciplinary breadth.</td>
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<tr>
<td><strong>Ecosystem Model</strong></td>
<td>1) Function of convener. 2) Candidate conveners: institutions within the grad school that could feasibly fund and support. 3) Limits to model: how far a new effort should go, and need to not reinvent the wheel. 4) ASU Model: comments on ASU as a symbol of opposite model.</td>
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<tr>
<td><strong>Network Role</strong></td>
<td>1) Community building among faculty: connecting members and engaging their participation. 2) Broad membership: a Network with geographic and disciplinary breadth. 3) Administrative connector: Network’s role in communicating with administration. 4) Vehicle for new initiatives. 5) Long-term project: need for Network to not be a one-off initiative. 6) Role of grad students. 7) Coordinating capacity: need for and functions of a coordinating entity. 8) Assisting members: how the Network can best accomplish this.</td>
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<tr>
<td><strong>Strategy</strong></td>
<td>1) Administrative: need and strategy for connecting with sympathetic administrators. 2) Member organizing: how to align interests of various faculty &amp; staff. 3) Scenario/implementation planning. 4) Funding strategy: both internal to UofMN and from external sources.</td>
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<td><strong>Student Demand</strong></td>
<td>Extent and character of observed student demand.</td>
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<tr>
<td><strong>Current Programs</strong></td>
<td>1) UMN programs: comments on the status of any existing sustainability-related program at U of MN–TC. 2) External programs: comments on other programs. 3) UMN Partners: Entities Network should connect with (i.e., offices, institutes, depart at UMN)</td>
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<tr>
<td><strong>Proposed Initiatives</strong></td>
<td>1) PhD Minor: description &amp; financial model. 2) Skills Workshops: description &amp; financial model</td>
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<tr>
<td><strong>Tools</strong></td>
<td>1) Institutional mapping: of current committees, programs, and classes. 2) Information portal: for internal communication, external marketing. 3) Class descriptions: better communication of sustainability-related offerings.</td>
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<tr>
<td><strong>Connections outside UMN</strong></td>
<td>How programs can connect with people &amp; resources in the greater community.</td>
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</tbody>
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