

Coastal Community Resilience Studio: Transdisciplinary Collaboration to Solve Transdisciplinary Problems

The problems facing coastal communities today and into the future are indeed complex. An integration of disciplines will be necessary to understand and respond to the social and environmental drivers that affect our changing world.

The Professional sphere, although adapting, is still not structured to address these issues across disciplines. The Academic sphere, where we both conduct research and educate the future professionals, is even less adept at crossing disciplines. This paper discusses and critiques a new transdisciplinary initiative that seeks to better understand the problems of coastal Louisiana through both research and education while engaging in a design studio approach to education. Transdisciplinary scholarship, in this case focused on understanding the issues of coastal Louisiana, necessitates a new vision informed by lived experience and a systems approach to understanding complex issues as a foundation for developing solutions for coastal community resilience. The success of the Resilience Studio hinges on the expertise of people from different disciplines in a common area of interest, the creation and maintenance of shared space and scholarship time, and the commitment of and communication between faculty, students, administration, and stakeholders. As an emerging model of research and education within a traditional university this initiative is subject to particular challenges and constraints.

INTRODUCTION

The Coastal Community Resilience Studio (also known as the Resilience Studio) is a collaborative effort between researchers, faculty, and students from across the University of Louisiana at Lafayette. The Institute for Coastal Ecology and Engineering (ICEE), School of Architecture and Design (SoAD), School of Geosciences, Department of Sociology, Anthropology, & Child and Family Studies, and the Regional Application Center all contribute to the productivity of the group. Dedicated to professional project development and project-based student learning, the Resilience Studio addresses the complexities of restoration and preservation along the Louisiana coast.

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Figure 1: Brant Patout, graduate student in architecture, presents his work in the Resilience Studio. The first semester participants included 2 research scientists in ecology, 1 ecology faculty, 11 ecology students, 2 architecture faculty, 4 architecture students, 1 sociology faculty, and 4 sociology students.

Since the summer of 2012, the program has been creating a new framework that is transdisciplinary and systems-oriented to link disturbances, land-use transformations, and climate change to natural processes and human system adaptation, with special emphasis on the Atchafalaya Basin and Chenier Plain in southern Louisiana.

The Resilience Studio uses transdisciplinary techniques to study how principles of landscape, ecosystem, and human dynamics can be incorporated into elements of systems design in an effort to reduce environmental vulnerability, enhance ecosystem resilience, and promote cultural sustainability. In the Resilience Studio, students and faculty view local communities as clients whereby they design resilient systems in the natural and built environments with adaptations that reduce community vulnerability associated with diverse scenarios of coastal hazards, habitat degradation, and global environmental change. The coastal communities' challenges provide a laboratory to develop new alternatives to current practices that have the potential to reduce risks to social, economic and natural resources, while developing a sound basis for policy recommendations that are focused on adaptations through sustainable regional and land-use planning.

The origins of the Resilience Studio are attributed in part to the research and educational model created by the SoAD's Community Design Workshop (CDW). The CDW's core principles are founded on providing design services to coastal communities who often have been dis-empowered and debilitated in the wake of natural disasters and desire the agency and vision required to navigate local, state, and national governmental protocols to rebuild their communities.

The value of this entity was recognized by the former Vice President for Research at the university, a systems ecologist by training, who worked towards connections between theory and practice across ecology and social sciences as well as other disciplines to create adaptive solutions to dynamic issues.¹ It was from this sentiment that the Resilience Studio was conceived as an alternative model for research and education in the coastal restoration arena.

The Resilience Studio expands on the university's current curriculum content to focus on current issues, new perspectives, and authentic learning within the context of multiple disciplines. We focus specifically on issues of the coastal environment. The topic of coastal land loss and restoration is relevant to our students as most of them grew up in south Louisiana and have long standing ties to the region. The problem is one that is complex and requires multiple perspectives to address a myriad of relations and generate meaningful solutions. This paper offers a description and critique of the first year experience of the Resilience Studio as a means to critically examine the pedagogical contributions of a transdisciplinary studio course.

TRANSDISCIPLINARY SCHOLARSHIP

Disciplinary impasses are more the product of institutional habit than of scholarly necessity. There are, however, several approaches to integrate multiple disciplines into one project or experience. Multidisciplinary approaches incorporate contributions from various disciplines while remaining limited to the framework and advancement of disciplinary research. Interdisciplinary approaches typically work within closely aligned disciplines and are concerned with the transfer of methods from one discipline to another concerning application, epistemology, and the generation of an entirely new discipline.² Traditionally, both forms of integration fall short by only reaching out to disciplines that are programmatically similar, or they simply 'outsource' information from one another. As a result, the disciplines may not necessarily 'cross-pollinate'. Professional architects are an excellent example of interdisciplinary practitioners, but they do not regularly branch out from the few disciplines with which they engage, i.e. civil engineers, landscape architects, city planners, etc. Scientists, on the other hand, are classic specialists who hold specificity and a deep, albeit singular, understandings of one's subject as the metric for distinction.

Transdisciplinary research, however, opens project development to the kinds of synergies that can advance one's field(s) of study, especially where clear research questions or solutions are not possible within a given field or discipline. The principle of transdisciplinarity can guide a project or research agenda to incorporate a wide variety of disciplines that indirectly affect the object of inquiry. It can provide a form of organization that builds on the integration of seemingly disparate disciplines to create unique perspectives and understandings of the whole system than can only emerge from such an integrative approach. Basarab Nicolescu, considered the father of the modern day transdisciplinary movement, explains, "...transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all discipline. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge".²

The complexity of the coastal problems that confront decision-makers across the globe calls for broad approaches from a new generation of scholars who want to address these pressing social, environmental, and spatial issues using new ideas, tools, and methods.

THE RESILIENCE STUDIO: A SPECIAL TOPICS COURSE

The Resilience Studio is offered as a three-credit Special Topics course simultaneously team-taught by architecture faculty, sociology faculty, and

environmental research scientists. Program principles established at the conception of the Resilience Studio inform project selection, student learning outcomes, and student project evaluation criteria.

The Resilience Studio leads faculty and students toward the following objectives: (1) Provide an integrated academic home for the emerging programmatic needs of systems design in the Louisiana coastal area (e.g. ecosystem restoration, regional planning, and water resource management); (2) Facilitate a transdisciplinary educational model that integrates undergraduate and graduate students involving at least three of the following fields of study: coastal science, environmental science, landscape architecture, architecture, civil engineering, systems engineering, environmental engineering, sociology, anthropology, political science, economics, and Geographic Information Systems; (3) Create community partnerships; (4) Use the design process as an organizing principle and methodology for student-driven research.

Moving from guiding principles to the writing of the syllabus disciplinary differences become poignant giving rise to debates about teaching methods, project deliverables, and student assessment. To those in the disciplines of architecture and design, it is assumed that the studio is the working environment where teaching and learning primarily takes place. To the other disciplines present in the Resilience Studio, the studio environment represented a break from the “traditional” classroom in both structure and process.

Borrowing from the design studio pedagogy, The Resilience Studio teaching is facilitated through semester-long group projects, lectures, field trips, critical readings (3 from each discipline), desk critiques, informal pin-ups, and mid- and final semester reviews. Students coming out of the Resilience Studio possess a unique set of skills and capacities as they learn to practice the following learning objectives:

- Analytical thinking- the ability to analyze social, environmental, spatial and/or numerical data within and outside of students’ home discipline.
- Critical thinking - the ability to systematically execute appropriate research methods and to build a whole-system understanding of causal relationships, both theoretical and practical.
- System modeling - the ability to visualize and describe social, environmental, and spatial systems.
- Transdisciplinary resolve - the ability to discover an appropriate resolution of a problem that belongs to no single field.
- Reflexive collaboration - the ability to work in transdisciplinary teams in order to propose dynamic multi-dimensional solutions to complex problems.

In the process of navigating these learning objectives, the participants in the Resilience Studio move from disparate, multidisciplinary teams toward integrated transdisciplinary scholarship.



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OPEN STUDIO FORMAT: A TRANSDISCIPLINARY METHOD

For the last year the Resilience Studio has occupied nearly 1,000 square feet in the university's research park and benefited from its proximity to the Regional Application Center, Coastal Protection & Restoration Authority, the USGS National Wetlands Research Center, and the NOAA Estuarine Habitats and Coastal Fisheries Center. The Resilience Studio provides an open studio space, office, plotter room, and conference space. The open design studio is an excellent facilitator of transdisciplinary research where contact time is the key to productive collaborations between students and professionals of different disciplines. Such spaces provide support for extensive interactions, continuous feedback, extended work periods, and group sharing in addition to recurrent presentations, demonstrations, critiques, and discussions.

Working as a team is a challenge when the team members work in separate buildings on campus. Having regularly scheduled meetings in a singular open studio space allowed all team members to work on the same project simultaneously. As time passed and the interactions within the studio space were established, the space became energized as a center of creative thought and practice where the group came to gel into a single entity. Members relaxed and offered their contributions freely knowing that the constructive criticism to follow would result in a deeper understanding of the meaning behind the project, with a focused intention toward project improvement. Our space became a place of collaborative transdisciplinary scholarship built on disciplinary strengths and credibility that were viewed as complementary, not competitive.³

As much as we valued our studio experience, substantial fieldwork was needed to collect the necessary data. This fieldtrip-studio combined experience was a welcome break from the traditional classroom environment that our typical student, and professors, expected. As Ryker⁴ explains about the immersive fieldwork...

Figure 2: Resilience Studio professors and students immersed in the wetlands of the Chenier Plain during overnight fieldtrip in the Fall of 2012 .



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...the value in the work lies in the lessons that students gain from immersing themselves in the landscape, from the path they take from readings to drawings, hikes and slow physical transition from Lafayette to the Chênrière Plain, and the accumulation of these experiences that generate the carefully articulated creative expression of an idea that is shared with others.

On our first trip to the coastal community of Pecan Island, students and professors conducted bird and vegetation surveys, employed methods of direct observation throughout the community, and completed interviews with locals and visiting duck hunters at the local restaurant and in resident's homes, and initiated an architectural survey of building typologies. A more complete understanding of place would soon follow, with a vivid picture of our study site, and insight from many perspectives fresh in the minds of all involved.

Back in the Resilience Studio, it was the discipline of design that became the organizing principle for integrating the various perspectives and disciplines into a unified whole. Similar to the systems approach in the field of ecology, or the layering approach in the field of geospatial sciences, the process of design seeks to identify relationships in space and time in an effort to elucidate new understandings of the subject matter. This approach is especially useful when studying complex problems such as coastal restoration or community resilience.

The generative nature of the design method was a natural fit for the research questions posed in the Resilience Studio. Coastal restoration science is an applied science that builds on the basic principles of ecology and civil engineering to re-produce natural conditions that can sustain wetland productivity. The premise of the science and engineering disciplines, however, are based on deductive reasoning and do not have substantial capacity to create new solutions that are outside of their respective scope. Design, on the other hand, is generative and can create solutions that are iterative.

Figure 3: Resilience Studio professors and students birdwatching in the wetlands of the Chenier Plain during an overnight fieldtrip in the Fall of 2012 .

The generative capacity of the design method also can facilitate 'gestalt' understandings built on unified fields of thought that emerge where new synergies of various disciplines converge.

PARTICIPATION AND COMMUNICATION: THE MORE YOU GIVE, THE MORE YOU RECEIVE

From the onset, commitment to participation involved a buy-in on the part of participants. Offering the course through Special Topics allowed students to customize their education and allowed faculty another method of advancing their research interests helping to achieve a greater sense of individual agency. Integration of the course into the various departmental curricula, however, will be necessary for sustained student enrollment and departmental buy-in.

Prior to the initiation of the first Resilience Studio course, there was a considerable investment of time on the part of the faculty who ultimately became the participating members of the Studio. Once the core team emerged, their commitment to the time needed to create the working environment was essential. The regularly scheduled class times institutionalized the interactions of the faculty and students which allowed relationships to be nurtured and time for trust to develop. Spending time together in the field resulted in a deeper level of bonding at a quicker pace than the usual classroom environment provides. Allowing the students' access to the Studio space outside of class time, without the faculty present resulted in their creating relationships that extend beyond the course and possibly into their careers.

Even with all of these time related successes, there never seemed to be enough time. Students stated that they would have benefited from being able to spend more time in the field and from a faculty perspective, we are only now realizing the amount of coordination and patience that this type of work requires, that we cannot be as efficient in this working environment as we are in our own disciplines, and that no matter how much time we give, our list of what we need to do continues to grow. Finally, we all learned that we needed to change our work timeline, with designers having to slow their process in order to incorporate the environmental and behavioral sciences, while the sciences were required to increase the speed of their usual work processes in order to accomplish the desired deliverables.

Regular participation and a commitment to communication were the keys to gaining from the studio experience. The transdisciplinary team-teaching approach allowed for the questioning of basic assumptions, learning new ways of thinking, and dispelling the jargon that can often prohibit communication. The Resilience Studio allowed us to begin to communicate about the issues that are important to us, as creative brainstorming sessions were a regular occurrence with the conversations rarely involving only one discipline, but rather the discussions focusing on how the integration of disciplines would benefit a particular project. The mixture of weekly readings all with a systems' focus resulted in discussions actively engaging the students and faculty with one another and successfully encouraged and stimulated student participation. The interactions among students from different disciplines became very valuable for project-based decision making as the various options and ideas became successful as they built upon each other.

It was through these interactions that the meaning behind the project decisions came into focus as the intentions came to be articulated in terms of the problem, solution, and end goal of each task. With each pin-up the bar was raised to a higher level with the students and faculty reaching for a refined understanding of what could be achieved. Abstraction became concrete through the visualization of the end product. The range of expertise available allowed for students questions to be addressed from many dimensions from the diverse faculty. These regular interactions led to better understandings of the “other” disciplines that resulted in a truer synthesis of contributions. Our philosophy from the beginning was that “we are not spokes in the same wheel, we are a wheel.”

TRANSDISCIPLINARY UNIVERSITY COLLABORATIONS

The studio environment created catwalks between the disciplinary stovepipes. For the environmental scientists and designers, geospatial thinking and workflows were very similar in concept and use of vocabulary. The two disciplines are very compatible as geospatial science can inform the planning process with accurate information and design can inform geospatial analyses with appropriate questions housed in a larger framework. This cross pollination of design and geospatial science was readily apparent in the Resilience Studio and has been identified by others as an emerging field called GeoDesign.⁵ There is tremendous potential for the process and methodology of design to inform the typically geographic approach to regional ecosystem management. Sustainable design solutions, conversely, must be properly referenced and vetted within an accurate context that is rich with environmental data.

For the social scientist, the design studio environment contributed another step to creating solutions to problems by encouraging the visualization of what a solution would look like if implemented. Much of social science research is describing what occurred in the past, or projecting what might occur in the future, but rarely do we work to see the solution beyond the abstract. The discipline of design is intended to harness “something” to better serve human purposes. Designers work to make things more accessible, usable, and available to all users. Rather than bringing users to design, they bring design to the users. They design today in anticipation of what society will need tomorrow. This was truly empowering for non-designer faculty and students.

Designers learned that the social scientists have a greater-than-expected understanding of how space is used, how culture affects this use, and that research in this area is extremely important and exacting. The steady presence of scientists also reinforced the understanding that you cannot always design yourself out of a problem. The design discipline makes it easy to skip steps that sometimes help us move more quickly towards solutions, but it does not necessarily help us identify the best solutions.

CHALLENGES AND LESSONS LEARNED

There are expected challenges to such a transdisciplinary endeavor due to the disparate nature of our disciplines, and a university’s organizational culture that must adjust to the needs of cross-campus collaborations.

There was support for the Resilience Studio at all levels of governance within the university system, but the sheer number of people that become involved increased the time, and decreased the efficiency, of any exercise that we took on. Additional challenges arose when crediting faculty and departments for student contact hours, student-instructor evaluations, and other metrics necessary for a public university to seek educational support funds. Knowing how to “credit” a faculty member or department who participate in any transdisciplinary project is paramount to its long-term success and needs to be addressed if transdisciplinary scholarship is to become a mainstay of the university.

Transdisciplinary scholarship presents challenges on multiple levels. Accepting challenges means being willing to fail, and using the learning opportunity as a means to ultimately achieve success. It was necessary to accept the messy beginnings, to sometimes work inefficiently in order to create the organizational workflows necessary to get it right. We had to embrace the fact that the process was sometimes more valuable than the product being created and that the learning experience was more important to the long-term success of the group than the professional and production aspects of the newly created studio.

Giving the students considerable leeway did not always produce the results we intended. We learned that if the students were allowed to organize themselves, students would group into their respective disciplinary units. We had to require transdisciplinary groupings and have the faculty create the working groups in order to achieve a truly transdisciplinary team structure. We also struggled to attract equal numbers of students from across the disciplines. The faculty had to actively recruit students to have representation of the participating disciplines. Even with disproportionate student representation from each of the disciplines students and faculty biased the production of design artifacts (that is boards) rather than challenging deliverable expectations. Part of this could be attributed to discipline-specific curricula that require so many pre-requisites and required courses for graduation that the students have few options for taking a transdisciplinary elective.

Students coming into the Resilience Studio without upper-level experience in their home discipline were sometimes left to feel misunderstood or overpowered by others when they were unable to articulate their discipline’s approach to a particular problem. Students not experienced with the studio model took a chance on a high risk initiative that sometimes resulted in their being intimidated by the process and taking more time and effort to become engaged. However, by focusing on a bottom-up approach to student learning through active research with questions formulated by the students, they were able to take ownership over their own ideas, resulting in a level of commitment rarely found in group work. We learned that a balance between the disciplines is important and that having a design-heavy enrollment sometimes left the students from the other disciplines feeling unappreciated, muted, or simply outnumbered.

For the faculty and students alike, clearly defined roles were necessary to keep activities on track. Occasionally, faculty struggled to understand their contribution, and waited for instruction on what to do, rather than creating a place for their particular disciplinary knowledge and expertise. One student



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Figure 4: Resilience Studio environmental science student Lilli Voorhies immersed in the brackish marsh of the Chenier Plain during an overnight fieldtrip in the Fall of 2012.

noted that while he understood the assignment, that knowledge did not automatically produce the clarity or direction that he needed and found himself questioning his role in the class. Active engagement from participating faculty as to the status and trajectory of student productivity was an essential component to the successful completion of studio projects.

CONCLUSION

To succeed in creating scholars that are able to address the complex problems and multifaceted solutions needed in the 21st century, an appropriate pedagogical approach is necessary. Our experiment with transdisciplinary scholarship within the Resilience Studio has been a learning experience and a success with some hiccups along the way. The design studio model became the transdisciplinary access for a systems approach to education about a complex problem and innovation concerning transdisciplinary solutions. On a broader scale, the task of turning the university from a passive servant of various elements of society into an institution actively involved in the process of planning for society implies profound change in educational purpose and institutional behavior. The approach of the Resilience Studio may be expected to give an entirely new focus to the social and geosciences, concerned primarily with the feedback interaction between humans and the environment by engaging another step in the process, visualizing and analyzing the interactions and feedback mechanisms necessary to solve complex problems.

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