

Abstract

The designer in the 21st century does not work alone. The complexity and expertise required to produce innovative design is too vast for any one individual, therefore new collaborative design models are needed. The **Applied Research Collaborative (ARC)** is one such model. ARC is a trans-disciplinary design thesis studio in the School of Architecture + Landscape Architecture. **The studio attempts to test and demonstrate new collaborative models of working that challenge conventional modes of pedagogical and professional practice.** The studio includes students from various schools and departments within the College of Design: Architecture, Landscape Architecture, Energy, Industrial Design, Interior Design, Planning, and Visual Communication Design. This trans-disciplinary student team collaborates with local design professionals and city and state organizations on actual projects that serve as testing grounds for developing deeper investigations than are currently conducted through conventional academic or professional endeavors. ARC aims to develop a *hyper-collaborative* environment that embraces multidisciplinary expertise toward establishing a common design objective. Through the collective expertise of the trans-disciplinary teams, design is approached as the synthesis of qualitative experiences and quantitative research processes. This methodology is an attempt to inform the design process not only through intuitive and imaginative means, but also through studied application of research and analysis. The studio instructors are from a number of different design disciplines and emphasis in the studio is placed on collaborative skills that are taught by a college professor trained as a clinical psychologist who meets with the team throughout the semester. This collaborative model is producing a deeper and more developed proposal than any one designer could produce individually.

When design practice is enlarged and superimposed on the creation of content, the designer takes part in the same process of wandering and refinement as the author does. While the pathways followed by designer and author occasionally diverge, it is the separation and tension between them that generates ideas and qualities that could be produced in no other way. **The new approach replaces division of labor with synthesis, clients and commissions with collaborators and partners, executing tasks with negotiating terrain, maximum output with maximum feedback, and form applied to content with form and content evolving and enriching each another simultaneously. We replace resource extraction with investment, efficiency with depth, speed with growth, and professional classification with integration.** We are not sure whether this new way of working means the end of design, or whether it means that designers become authors, or authors become designers, or all three. We are convinced that this approach is rich with potential and capable of producing results not otherwise possible.

Twelve Strategies, Essay on collaboration, *Life Style*, Bruce Mau

Description

The Applied Research Collaborative studio is comprised of 12 students from different programs within the College of Design and three primary studio instructors (architecture professor, creativity professor, and an academic associate). Additionally, there are 10 other professors and experts who act as consultants to the studio. The 12 students are formed into two teams of 6. Each team works in an entrepreneurial manner on their specific design problem during the course of one semester. What is unique to the ARC experience is that collaboration is not taught as "group project" but as "emotional intelligence." One of the faculty team members is a professor of practice who teaches creativity and is a doctor of clinical psychology. Each week the studio is mentored in the practice and techniques of creating collaboration that promotes excellence over consensus. One of this year's projects involves the University as client and a local/national architecture firm. The project is the adaptive reuse of the former Nursing Building on the campus into the new Global Institute of Sustainability (GIOS) and the School of Sustainability. The original project brief produced by the University and contracted to the architectural firm called for asbestos abatement, code compliance, paint, and carpeting. The Global Institute of Sustainability, concerned with both the working environment (a multi-disciplinary institute) and the impending image that the 1970s Brutalist building might convey, turned to the Applied Research Collaborative Studio for help in pushing both the brief and the University. The Studio took the opportunity to not only expand the brief to include the desires of the Institute, but also to develop the design as a prototype for all buildings on the campus based upon the University President's mission for a "New American University". (SEE ATTACHED DOUCMENT "GLOBAL INSTITUTE OF SUSTAINABILITY"). The studio worked with GIOS, the University, the architects, and the contractor to develop the project. Leveraging the multi-disciplinary degrees of the students in the studio, the team conducted analysis and employed the following tools: Building Information Modeling (extensive Revit modeling was

produced and later given to the professional architecture firm), building simulation using eQuest, lighting using AGI software, solar exposure and shading, landscape materials, construction systems, campus circulation patterns, water usage, interior finishes, office systems, and extensive programming. The design teams proposal considered construction costs, schedule, and constructability.

The final design proposal by the student collaborative was so convincing and provocative that it halted the initial project, expanded the architects' brief, and secured 8 million dollars more from a private donor to implement many of the studio's design proposals. The project is scheduled for completion by the end of June 2008. The success of the spring 2007 studio attracted other organizations to engage the Applied Research Collaborative, and this semester the studio is working with the City and the a major local Theater for the Performing Arts on an expansion scheme s for the Theater in the downtown of the City.

Methodology

The framework for the studio consists of five sections: **Swarm**, **Mirror**, **Discovery**, **Matrix**, and **Milestone**. **Swarm** is a set of team building exercises that create trust between team members (see course schedule sequence). **Mirror** is a collaborative dialogue meeting between team members and instructors that works through challenges and opportunities in collaboration. **Discovery** is a system of presentations by each team that identifies design opportunities within the construction of six design imperatives; History, Program, Technology, Construction, and Representation. **Matrix** is a set of "Hyper-collaborative" workshops in the seven-screen supercomputer decision theater. These workshops promote real time decision making between team experts, clients, and professionals. **Milestone** is an assessment and valuation of the design process. These meetings are deadlines that allow for diagnostic results to be evaluated. Each milestone is a step forward in the design process. The studio prepares a final presentation at the end of the semester where students present their findings, iterations, design, and process. In addition to the external collaborators, national architecture, and design critics are brought into engage in dialogue that helps to continue the refinement and innovation of the studio.

Issues Addressed

The studio utilizes an inclusive mission that simultaneously broadens scope and knowledge base of the studio while demonstrating the value of design within the broader community.

1. Leverage

The Applied Research Collaborative Studio leverages the cross-disciplinary programs within the College of Design (Architecture, Landscape Architecture, Industrial Design, Visual Communication, Interior Design, Energy) as well as programs across the University (engineering, construction, nursing, education). The “applied research” component of the studio integrates research endeavors conducted by other programs within the University into the design problem. In this manner, typically isolated innovations are synthesized into a synthetic demonstration of their use. For example, the GIOS project incorporated new paving materials being developed by the College of Engineering to reduce the “heat Island effect” of the buildings urban landscape. One of the missions of the studio is to engage the University in design education. This mission not only expands the design discipline, but also demonstrates the value of design within the University setting. This was demonstrated with the great success of the GIOS adaptive reuse project (see attached letter)

2. Intent

The intent of the Studio is to broaden the students’ and the faculties’ awareness, understanding, and ability to engage a multi-disciplinary approach to problem definition and solution. Unlike most conventional collaborative endeavors, the studio considers the collaborative process equally as important as the design product. The studio recognizes that in order to be trans-disciplinary one must first be disciplinary. Each discipline brings with it an expertise that cannot singularly define or solve the design problem, but when put into a collaborative environment the expertise is challenged and often results in innovation. This was demonstrated in the GIOS project when the program combined with the energy analysis and mode of production helped to define the form of the buildings exterior fenestration.

The studio is a graduate thesis studio that promotes trans-disciplinary education. The graduate studio recognizes that the undergraduate degree prepares students for the discipline and the graduate studio prepares students for the profession. At this level professional ethics, mindset, and the emotional intelligence of the students is paramount toward furthering the profession.

1. Trust

The most important factor in the success of the studio is establishing trust between students, between faculty, and each other. The collaborative model promotes critique, discovery, and implementation-- none of which can be achieved at high levels without trust. Students are guided through a series of experiences that build trust and promote teamwork. These innovative events operate in parallel to the design process. (see SWARM on schedule)

2. Value

Collaborative teaching models work best with multi-disciplinary teams. Individual members of the team bring their own unique experiences and expertise to the project. The ARC promotes cross-disciplinary understanding of related design disciplines toward establishing each student's value in the greater design process. Within this arena, architecture students gain greater understanding of related disciplines thereby creating a value mindset for collaborators expertise.

3. Ethics

The Studio establishes a code of ethics that allow the students to perform in a professional manner. The success of the collaboration and the studio is hinged upon a professional mindset that fosters critique without personal attack, advancement without ownership, and a common goal of creating the very best design possible.

The Studio aims to create a synthetic environment to test and develop contemporary models for an integrated practice. By integrated practice we mean an integral approach toward people, concepts, expertise, and tools. The studio emphasizes the development of an entrepreneurial collaborative mindset and equips the students with those skills to advance the larger project of architecture.

1. Hyper-Collaboration

The studio is a response to specific trends in contemporary architecture practice that are employing collaborative design and business models. Large architectural firms are expanding their in-house design services, graphics, interiors, engineering, landscape, etc. Most graduates from architecture schools have not worked together with these related disciplines and enter firms without the skills to effect collaboration, values, ethics, and trust. ARC students begin the second phase of their design education as architects in training with a greater appreciation and awareness of expertise and value collaboration. These students enter practice without the conventional silo mentality looking to interrogate the design problem through integration.

2. Tools

Technology is rapidly changing architectural practice. Digital fabrication, communication, and Building Information Modeling are all having a profound impact on the future of architectural practice. The ARC studio employs all of these technologies within the integrative model. The studio employs BIM software as a platform for digital collaboration. Student teams working through a BIM model test its possibilities as both a collaborative tool and integrative interface. Additionally, the University's Decision Theater (7 screen supercomputer) is used as a tool for hyper-collaborative meetings we call Matrix (see schedule).

The studio is designed as a prototype for 21st century design education. Toward this end conventional notions regarding studio layout, props, and tools are reconsidered. Intensive data of the design process and studio culture are documented. As a collaborative endeavor, the studio contaminates other disciplines and related fields.

1. Collaborative/Creative Environment

The inclusive, open, and shared nature of the studio requires an alternative spatial construct for promoting collaboration. The studio space was modified as a prototype for creating a new educational learning environment.

Linear Desks-	Through a brainstorming and development process the students opted to replace the conventional studio desks with a smaller linear counter-like desk to keep their laptops and personal items. This configuration was deployed to facilitate individual work needs and the necessity for territorialization.
Conference Table-	A large conference table was created for more formal meetings with clients, and consultants.
CoLab Tables-	A series of coffee table sized tables are made that "puzzle" the units together to make a larger table. Each unit is covered in white board for erasable marking. The tables are digitally designed and made with an industrial laser cutter.
Writing Walls-	Studio walls that are not used for pin-up are painted with black chalk board paint for writing larger studio beliefs, ethics, and notes.

2. Documentation

Multiple modes of recording the collaborative design process are implemented during the semester. These records are used to evaluate in real time both the decision making process and archive the iterative evolution of the projects (see website).

Sketch books-	Each student is given a dedicated sketch book to record their personal thoughts and ideas for the studio. The contents of the books are referenced throughout the semester and are made available during the reviews.
Informal Collaboration Tables-	The first design exercise is to fabricate a collaborative tool. Whiteboard coffee tables that puzzle together are fabricated and used for impromptu sketching and recording. Photographs are taken of the ideas conceived.
Video-	During the programming and client interview process, both audio and video records are kept for reviewing content, bio-feedback, and archiving purposes.

3. Transparency

The studio promotes integration with other professors, researchers, and professionals. The studio enlists academic and professional consultants who make themselves available for students on an as-needed basis. Additionally, cross-college programs are opened to allow students from other disciplines to participate.

The Applied Research Collaborative represents a new pedagogical model for teaching design to architects in the 21st Century. New collaborative environments and methodologies are employed that embrace the complexity of contemporary architectural design practices. The ARC strives toward excellence, depth, and innovation through an integrative collaborative framework.