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Designing Collaborative Education

In today's A/E/C industry, collaboration between designers, builders, engineers and constructors has become increasingly more important. Buildings are more complex. Clients demand better performance. Climate change is placing demands on how we build for the future in a sustainable way. Costs, efficiency, liability issues and more—all are impacting the outcomes of design and construction. Strategic collaboration, while not a new concept, is shifting the way that A/E/C professionals work together to build a better world. Mississippi State University's (MSU) School of Architecture and Building Construction Science program recognized the changing trends in delivery methods as well as the importance of teaching their students how to be industry leaders.

DESIGNINTELLIGENCE WITH HANS & MICHELE HERRMANN

Recently, DesignIntelligence talked with Mississippi State University's Hans Herrmann and Michele Herrmann about the College of Architecture, Art and Design's cross-disciplinary program for architecture/design/construction management students and how they went about resourcing faculty to be more effective in teaching IPD content.

DesignIntelligence (DI): Tell us what inspired you to develop the cross-disciplinary education program as well as the context in which you began your work.

Michele Herrmann (MH): From the Building Construction Science (BCS) side, it started when Jim West, former dean of the college, was approached by construction industry professionals who saw a need for a different type of construction management professional, someone with a collaborative skillset, more soft skills. Those involved in creating the BCS program saw a unique opportunity to create a program within the College of Architecture, Art and Design that would facilitate this type of collaboration by strategically modeling the pedagogy of the BCS Program to be studio-based, which

is common in architecture and other design disciplines but unheard of in construction education.

The School of Architecture was already well established, but the BCS program was a clean slate—a tremendous opportunity but overwhelming at first. There was always a goal to eventually have collaborative studios between architecture and construction, but the initial idea was to build toward that in incremental steps. It began with cross-disciplinary lecture courses—such as structures, active and passive building systems—that were required for both disciplines. The students took them together so they could start to collaborate and interact with each other.

The first studio-based collaboration began in 2011 when Brasfield & Gorrie General Contractors approached the college about sponsoring a two-week interdisciplinary student competition. They recognized the industry's need for emerging professionals who were knowledgeable in collaborative project-delivery methods. For that competition, we gathered fourth-year students from architecture, construction and

interior design. We still do that competition every fall and have since included graphic design. In addition to the competition, all architecture and building construction science students now take part in two semesters of collaborative studios—first in fall of their second year and again in spring of their third year.

DI: Initially, you looked for overlaps in the curriculum between construction and architecture. Would you recommend that to others or would you start with a different approach?

Despite the introduction of, and increase in, collaborative project delivery methods in recent years, the academy is still ill-equipped to prepare students for collaborative practice. Approximately 70% of faculty members surveyed who identified as teaching collaborative project-delivery methods, such as Design-Build and Integrated Project Delivery, also acknowledge a lack of firsthand industry experience with the project-delivery method. In an effort to improve the teaching of collaborative skills, as a foreground for collaborative practice, the authors conducted a two-day interactive symposium—“Integrated Project Delivery Theater”—for nearly 80 third and fourth year level bachelor of architecture and building construction science students in which the students actively engaged in exercises exploring the six topics central to IPD as outlined in the American Institute of Architects’ Integrated Project Delivery Guide. These topics included: process, team formation, communication, compensation, risk, and agreements.

Source: Mississippi State University School of Architecture and Building Construction Science Program; IPD Theater Presentation 2017.

MH: From BCS’s point of view, as a clean slate, we had tremendous opportunity and freedom to define what we wanted to be from the beginning. Because the School of Architecture was already well established, they had important decisions to make in terms of identity.

Hans Herrmann (HH): Yes, I would recommend beginning where curricula overlap. In our case, we asked some questions of ourselves: who will we be teaching to, what will the faculty be capable of, what will students be capable of, and how could we implement this new approach at the undergraduate level? Since we didn’t have graduate students with which this content might more readily resonate, what would be the common ground on which we operate such that undergraduates might find traction and value?

That’s how we wrote the construction, materials, methods, and technology courses, which needed to be taught jointly with BCS faculty. We felt that if the students were going to partner with each other, they should all learn the same content simultaneously. We didn’t want a hierarchy to exist that would give one group an advantage or engender an academic disparity.

The School of Architecture has historically been focused on technology and design rooted in craft and materiality, so we held to that context and introduced that as the ground for collaborative learning. Because building technology is fairly objective, we felt students could get a solid footing with something relatively straightforward to understand and later deploy within more advanced collaborative-design thinking.

DI: Ultimately your effort focused on 1) developing interdisciplinary courses for students and 2) studying the state of interdisciplinary education in architecture and construction programs. Why include both directions?

MH: Hans and I, along with former colleague Emily McGlohn, saw the industry shift toward collaborative IPD (Integrated Project Delivery). The longer we’re in academia, the further away we get from firsthand experience with emerging project-delivery methods, so we needed to do some homework ourselves. We found in other programs that they were just

figuring it out as they went. So, we developed the Integrated Practice Theater with funding from the Architecture and Construction Alliance. We explored and developed ways to make our teaching of IPD principles as effective as possible, not only for our students but also so we could share our findings with colleagues in other programs.

DI: When you looked at other institutions, what positive examples did you find?

MH: As educators, we struggled to find examples that gave us enough substance and detail to use in our teaching. Case studies that are a synopsis of an IPD project don't help you understand how and why those projects were successful from an interdisciplinary perspective. We did learn that the more the different disciplines respect, understand, and work with each other, the more effective collaboration is.

HH: We knew that Auburn University had, for a brief time, a graduate program that focused on integrated practice and other institutions such as Cal Poly San Luis Obispo [California Polytechnic State University at San Luis Obispo, California] had been experimenting in limited ways and those served as models for us. Other schools offer collaborative experiences as electives, but students who want those experiences aren't guaranteed to get them. That helped us commit to the idea that this would be a curriculum-wide requirement for graduation. With that, we set about developing institutionalized ways of working.

DI: You were breaking new ground in that sense.

MH: In terms of it being a requirement for every student in these programs, yes.

HH: That helped get the faculty on board. This wasn't going away, so they began to take it seriously.

Because we don't have graduate students and our teaching load is high, everyone involved needed to get some benefit out of this effort with regard to scholarship and publications for promotion and tenure. We had to make a strong case for why it was necessary, how to implement it, and substantiate that work with peer-re-

viewed research. Sole authorship, as you know, is a cornerstone of academic performance so working this hard to only have co-authored research was a big request. People needed to know their joint efforts would be acknowledged and rewarded accordingly.

We established a sincere and rigorous approach. The dean and department heads were very supportive and paid faculty during the summer to record and study our efforts. We did significant documentation of successes and failures of exercises as well as developed and evolved learning modules so we could build on them and share it with the faculty. It legitimized the effort in their eyes, to see that the administration wanted us to succeed and was trying to figure out how to do it in a meaningful way.

DI: What were some challenges?

HH: We decided to work with young, inexperienced students because we felt they may not have developed preconceptions about their discipline or the other yet. Consequently, their understanding of the most basic design/bid/build formats for project delivery are limited. It was difficult for them to grasp and hard for us to model the nuances within various types of project delivery. Plus, there's very little collaborative industry work in our immediate area so it's difficult for students to find internships or co-ops to build on that education.

Another challenge is getting our colleagues to understand that the artifacts of this work won't be the same as in traditional education. If an architecture student is presenting a flowchart, estimate or spec sheet, we need to be open minded about why they're doing it and how it's a manifestation of their skill in cross-disciplinary or collaborative-design work.

70%

FACULTY ACKNOWLEDGING LACK OF
FIRSTHAND INDUSTRY EXPERIENCE WITH
PROJECT-DELIVERY METHODS

DI: It seems like your students need both hard and soft skills for a collaborative, IPD practice environment. What would that ideal student look like?

MH: Someone open-minded, willing to listen, who understands that others have valid contributions. Someone who doesn't think education stops when they graduate but will continue to learn and adapt.

On the construction end, our graduates get jobs with regional and national companies. Industry professionals appreciate our students' collaborative experience because they have to talk with other disciplines every day. And even design/bid/build projects benefit from professional understanding, mutual respect, and effective communication on any project.

When I ask industry professionals for advice for students, they always recommend a psychology course. If you can't work with others, it doesn't matter how smart you are, how much you know, or what you can do individually.

DI: Are the hard skills different when you're teaching architecture and construction students a collaborative approach?

MH: They may be different but still related. We have to make sure the individual disciplines are fulfilling their objectives for each course. We still have to fulfill our accreditation requirements.

DI: What goals did you set to guide and measure your progress on the effort?

MH: It's hard to measure in a truly objective way. The output of the fourth-year student competition has changed drastically. We didn't have collaborative studios in 2011, but now the students taking part in the competition are used to working with each other, so they hit the ground running. When we talk about our efforts, the process is equally as important as final output, but the process is hard to measure.

HH: In the big picture, one obvious metric is graduates taking positions with firms that focus on this kind of work. But that's also a challenge because those firms operate largely in the

Pacific Northwest, and many of our students don't want to move far away from home, especially without having had an internship, co-op or some form of professional experience in this area. Another metric is feedback from our advisory boards and hearing what firms think of our graduates and whether they're supportive of this. This information we do get steady access to, and it has been overwhelmingly positive.

On metrics specifically for each student, we have every student in both programs participate in building something full scale. Graduates can then show that work in their portfolio or resume. Within that project, we've developed other goals, such as whether it's done on time and on budget. It gives students a sense of accomplishment and understanding that this approach allows you to make guarantees to your client.

On the research side the faculty made a pact that what we do in the classroom (i.e. the scholarship of teaching) will whenever possible be shared such that it may be acknowledged by our colleagues through organizations such as the ACSA, BTES or AIA, whether with awards or recognition through publication. That external assessment then feeds back into the students' portfolios, benefiting both students and faculty.

DI: What advice would you offer other educators who want to build similar programs?

MH: Start small with a project of limited scope and duration and set realistic expectations. The amount of coordination that's required can be overwhelming at first. You have to have buy-in from the faculty as well as the administration, which we've been fortunate to have here. Also, as faculty, you have to model the behavior you're trying to teach students. It's a lot of collaboration and time on the faculty's part.

HH: In shared work, like shared scholarship, you want to avoid territorial behavior. Sit down at the beginning with administration and faculty and develop a collaborative-teaching-culture document that establishes guidelines for behavior on how you're going to publish, share, and talk about the work. That way, everybody is clear. Practicing this

The ability to work effectively in teams has become increasingly important because of the complexity of projects requiring expertise from a variety of specialties and demands from clients for better building performance. Collaboration is a meaningful response to the ongoing marketplace mandate for buildings that are faster to design and construct and at a lower cost than those built in the past. And, perhaps most important, it could be argued that the final outcome—the design work—is actually better.

Source: Andrew Pressman, *Designing*

Relationships: The Art of Collaboration in Architecture.
New York: Routledge, 2014.

same form of directness and transparency is similarly useful in defining the pedagogy, right down to the day-to-day assignments and exercises.

DI: What do you see as the future of interdisciplinary education in architecture and construction?

HH: I see architecture moving away from risks related to the execution and administration of a project, choosing more and more to engage only the schematic design phases. Our definition of a good architecture student is still linked with their ability to make beautiful compositions, but I have witnessed that not every student is good at that. Plenty of students excel in technology, history or theory courses, as well as communication, organization, and systems-thinking,

which are required to work in integrated practice. We need to find a place for students with those skills in the architectural profession instead of dismissing them because they can't make a beautiful figure on a piece of paper. I believe that schools need to think about the future and open up the field to some expanded definitions of accomplishment and skill in design-thinking and design-making if we hope to remain relevant within both the academy and the A/E/C industry.

MH: On the construction side, the labor shortage will eventually affect how clients demand projects be delivered, whether it's fast scheduling, integrated practice, or public-private partnership. A different type of professional is needed to facilitate those projects. Students like ours with an interdisciplinary education will be in higher demand.

Hans Herrmann is associate professor of architecture at Mississippi State University focusing on foundational design, comprehensive/integrative design, and building technology. With degrees in architecture and landscape architecture, both his professional work and teaching have received numerous national awards and recognitions from organizations such as the Cooper Hewitt Smithsonian Design Museum, American Institute of Architects National and State level, Association of Collegiate Schools of Architecture, American Society of Landscape Architects National and State level, and Architecture + Construction Alliance.

Michele Herrmann is associate professor with the Building Construction Science Program at Mississippi State University focusing on construction law. She earned her bachelor of science in design from Clemson University and her Juris Doctor from New York Law School, where she worked at the Center for New York City Law. She is a member of the New York State Bar.

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