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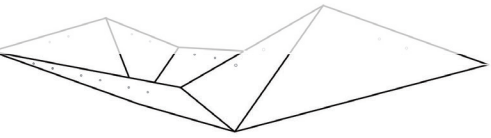
a Forum for Interior Design Education

Issue 2, 2019



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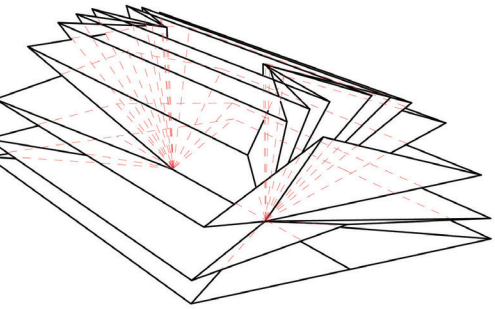

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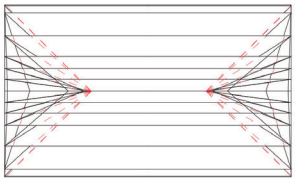

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ASSOCIATE **EDITORS:**

MESSAGE FROM THE PRESIDENT

Susan Ray-Degges, IDEC

I hope that summer allowed you to refresh and recharge. Welcome back to a wonderful academic year! I am reminded each fall that change, whether experienced through the seasons, my career, or personal life, I must run towards it with open arms and embrace what opportunities it offers otherwise it will depart and leave me wishing for what might have been rather than taking a chance to see what new doors may have opened. It could be new friendships that will last a lifetime, affiliations for student opportunities, new research agendas, or partnerships—all of which can guide a program, and its students to the next level of achievement.

I am excited that we are moving forward with a Sponsorship and Partnership Steering Task Force, chaired by past president, Hepi Wachter, to explore short and long term relationships with possible funding to support the mission of IDEC. We have also activated an IDEC History and Archives Task Force, chaired by president elect, Ellen Fisher, to identify possible mechanisms to manage the IDEC archives and make them accessible to individuals that are interested in researching the timeline of interior design education. This group will actively explore existing IDEC archives, record oral histories, and other memorabilia relevant to IDECs history. Be sure to watch for a call requesting membership engagement so you can have a role in capturing IDEC history!

IDEC wants to support each member's professional goals. Whether you need to be part of a community through research support, an online forum or mentorship; a member of an organization whose members share your ideas, or an organization that will recognize you for your accomplishments—IDEC wants to be the community that provides this type of support. Over the last four months the IDEC Membership Committee, co-chaired by Migette Kaup and Rebekah Radtke, have been hard at work connecting with many of our members to identify best practices that will create a successful community for our members. If you want to have a voice in this conversation please reach out to **Migette or Rebekah**

We are working on a communication plan as well as activating communication tools to more effectively engage the interest of members. Once such tool is Slack. Slack is a powerful tool for communication, a hub of sorts, where users can share files, photos, group discussions, and private communications, all without adding clutter to your inbox! Slack is available as an app on your phone or tablet and also as a desktop application. Slack users will be able to search for the IDEC Workspace and join existing Channels, or feel free to create new ones. Members already on Slack can look for the IDEC Workspace as idec-org and join existing Channels, or feel free to create new ones.

Finally, I want to share that various committees are hard at work in preparation for providing an outstanding conference experience as we head to the birthplace of Route 66 in Tulsa, Oklahoma for our 2020 Annual Conference, Past-Present-Future. This year's conference will include workshops and round table discussions recommended by membership feedback. We also have some exciting tours and activities lined up for conference attendees. Continue checking in on the conference web site for regular updates and registration information. I hope you all are ready to be 'livin' on Tulsa time on March 4-7, 2020.

Susan Rey-Degges
IDEC President, 2019-2020

MESSAGE FROM THE PRESIDENT-ELECT

Ellen Fisher, IDEC

STEM, STEAM, STEAMD

The profession and practice of interior design is rooted in both art and science. Historically, interior design was an aesthetic practice of decorative arts, art, and culture, led by architects and artisans. In the United States, interior design was introduced through European design for the wealthy and continued to evolve through the impact of the home economics movement. Scientific principles were the foundation for the design of the home for efficiency and health, the influence of industrial design in the post-war period due to the rise of commercial design and even the advancement of the study of geography, in which mapping of people's behavior became wayfinding. Today, no one ignores the fact that scientific research about the interaction of people and their environments is plentiful and reliable, and should be used to undergird design decisions in both commercial and residential interiors. What is less understood, though, is the role of artistic thinking and the effects of artistic characteristics, gestures, and elements in creating environments that support the health, welfare, and wellbeing of people. In spite of great research on biophilia, aesthetic choices—such as color, texture, pattern, rhythm and repetition, scale and proportion coupled with attributes such as culture and climate—still remain somewhat ineffable.

When the world talks about "STEAM," it is as if STEM has woken up and realized that it is missing something. The "A" for art was the first attempt to include the elegance and beauty of a good answer or solution in science education. But, that was not quite sufficient. Adding "D" makes design the matchmaker between science and art, and marries research and art in a methodical, purposeful life of elegant, beautiful problem seeking and solving.

As interior designer educators we could have told them that.

Professional design practice has roundly embraced "evidence-based design," seeking out, understanding, and applying scientific "evidence" to design problems and challenges. Practitioners have always looked to higher education for science, and as educators, IDEC members have created new scientific knowledge for use by designers. Educators have been solidly training their students to use research at every phase of their studio projects, and across the curriculum. STEM is old hat today. STEAM doesn't quite cover all the bases. STEAMD is where it—no, where *we*—are at.

MESSAGE FROM THE EDITOR-IN-CHIEF

Dana E. Vaux

STEM to STEAMD: An interiors perspective

This issue of the Exchange explores ways that interior design educators and professionals are engaging with STEM/STEAM/STEAMD initiatives relating to interior design pedagogy and collaboration in research and education.

As we know, design bridges disciplines, creating links in interdisciplinary problems because of the way that we, as designers, approach problem solving. Designers are concerned with "how things ought to be," focusing on normative, human behavior and experiences that inform solutions. The natural sciences are concerned with "how things are," focusing on governing rules that often leave out normative dimensions of experience (Simon, 1969, p 4-5). Because designers must create the problem out of the circumstances before it can be solved, our integrative methods are beneficial for addressing complex STEM-based problems (Repko, 2008).

The essays in this issue reveal the many levels at which interior designers are impacting STEM/STEAM/STEAMD projects and thinking, as well as opportunities for continued impact in education, leadership, and research. Gaines raises awareness of the unique perspective interior designers can bring to leadership roles traditionally held by STEM disciplines. Ray-Degges explains how the interior design "studio model" is now being replicated in STEM-based SCALE-UP classrooms, but also notes what interior design educators can in turn learn from STEM/STEAM practices for twenty-first century learning. Separate essays by Jani and Asojo address how teaching the next generation of students to think like designers builds interdisciplinary understanding and awareness of design careers. Harper, Crooks, and Khew each explore issues that impact interior design education and pedagogy from varied perspectives. A column from Stantec highlights an intergrated design strategy for STEM buildings and interiors. Finally, Hadjiyanni discusses how integrating design research methods into a study funded by the National Science Foundation allowed for a broader scope of knowledge in study findings and Lorusso and Gilfilen merge design thinking and STEM methods of inquiry to inform research-informed design solutions.

This issue would not have come together without the dedicated work of Sarah Urquhart, Dan Harper, and Gloria Stafford (associate editors) and IDEC's professional staff. We are grateful for their contributions.

The widespread proliferation of the term and iterations of the design thinking model (Brown, 2009) reveal the rise in recognition of the value our profession brings to interdisciplinary problems. As President-elect Ellen Fisher states in this issue, "We interior designers could have told them that." And we are—through interdisciplinary research projects, outreach to K-12 STEM programs, studio learning and teaching models, and engagement with STEM/STEAM/STEAMD design projects.

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NETWORK SPOTLIGHT

IDEC Networks present our membership with vast opportunities for communication and collaboration. Given the appropriate platform to thrive, Networks can keep members connected throughout the year, not just at Conference. However, the fluid and ever-changing nature of our Networks requires a robust tool that can dynamically facilitate the many needs of its users. At the conclusion of our Annual Conference in Charlotte, NC, IDEC began pilot testing a new digital platform that can host our Networks through an online presence. It is with great excitement that we unveil the IDEC Workspace on the Slack platform to our members. Slack is a powerful tool for communication, a hub of sorts, where users can share files, photos, group discussions, and private communications, all without adding clutter to your inbox! IDEC has begun its activity in Slack through a select few Networks, however all Networks now have a "Channel" in Slack.

Currently IDEC has a Network Channel on Slack for each of the following Networks:

- 2 & 3 Year Programs
- Advocacy
- Canada
- Community Engaged Scholarship
- Distance Learning
- Diversity
- Emerging Faculty
- Emerging Technology
- Gerontology
- Graduate Education
- International Member Assistance
- Leadership
- Lighting
- Program Chairs & Coordinators

Some of you may have experienced Slack at your institution or a previous position. Current Slack users will be able to search for the IDEC Workspace and join existing Channels, or feel free to create new ones. For those of you who may be new to Slack, we invite you to visit the IDEC website for more information on how to join! Best of all, you may join a Channel at any time to chat with others on topics of shared interest. There is no obligation to participate or share; members are perfectly allowed to consume information at their convenience. Simply browse the Channel list and pop in to see what members are talking about.

Slack is a valuable tool for Networks but also presents great opportunities for our Regions as well as other IDEC groups such as Fellows, New Members, and various other committees. Sensitive information can be shared in private channels within our Workspace, with invitation-only access to participants. What's more, Slack is available as an app on your phone or tablet and also as a desktop application. This allows seamless communication no matter your hardware preference. Information is posted and available in real time but users can also discover and research at their leisure by scrolling back through conversation history. Staying in touch with your colleagues has never been so easy! The Service Collaborative welcomes any questions you may have regarding communication through the new Slack platform. For more information you may email Stephanie Sickler, Director of Service at **ssickler@fsu.edu** or visit us on the website at **www.IDEC.org**

PERSPECTIVE

THE ROLE OF INTERIOR DESIGN IN STEM/ STEAM/STEAMD INITIATIVES

STEM jobs have grown an astounding 79% since 1990 and are projected to grow an additional 13% over the next 10 years, compared to just 9% for other occupations. With statistics like this, it's no surprise that pedagogy has made a shift toward hands-on, interdisciplinary learning for STEM (Science, Technology, Engineering, Math) education.

To meet the market needs and growing workforce gaps, colleges and universities across the globe are offering STEM programs that engage, educate, and inspire their students. These spaces help break down silos and create authentic interdisciplinary learning opportunities that put students in hands-on environments that more closely reflect the real world.

Camosun College in Victoria, British Columbia brought in Stantec to design the new Alex & Jo Campbell Centre for Health and Wellness (CHW). Previously limited by traditional classrooms that were spread amongst several buildings on campus, the program needed a consolidated modern facility to accommodate their groupwork-centric teaching model. To address this issue, Camosun worked closely with Stantec to create a new learning environment that promotes collaboration and brings students from various disciplines together.

Aligning with the college's mandate to build a better future for their community, Stantec designed the Centre to promote sharing assets across different academic programs, while creating pockets of space for student engagement. With feature stairs, a healthy café, and bike changeroom facilities, the building itself promotes health and wellness for students and staff, and has a sustainable design that promotes good air quality—including real trees in the atrium.

Stantec asked Carly Hall, Health & Human Services Building Coordinator in the School of Health and Human Services at Camosun College, to share her thoughts on how the new facility design enhances the curriculum and impacts their students.

Tell us about the process involved in planning and designing your new facility.

The process used to plan and design the Alex & Jo Campbell Centre for Health and Wellness (CHW) can be described as engaging and participatory. Right from the start, the Stantec team understood the value Camosun College places on the ensuring our stakeholders were able to share their needs. We held more than 70 engagement sessions during the design phase of the project. Stakeholders providing input included students, faculty, and staff from the School of Health and Human Services (HHS), and faculty and staff from across Camosun (including the Indigenous Education and Community Connections Department, Centre for Accessible Learning, Facilities Services, Information Technology Services, Ancillary Services, etc.).

The backgrounds of those engaged in the process varied considerably — with expertise ranging from

health and social service to education to design and facility management. This interdisciplinary approach contributed to ensuring the CHW is a great place to learn and work.

How does the design of your new Health and Wellness Centre support cross-disciplinary STEM/ STEAM education?

Camosun is committed to interdisciplinary education, ensuring students across programs have opportunities to learn about and with one another. Ultimately an interdisciplinary approach enhances patient and client health outcomes, so it is an essential part of health and human service education.

The design offers spaces for cross-disciplinary STEM education with numerous small meeting and breakout rooms for students; "social stairs" where we can bring large groups of students together; and collaboration spaces for students to interact within courses or informally between classes.

What interior features make your new facility a great learning environment?

The flexible classroom design includes furniture and technology which makes CHW a dynamic learning environment. The furniture is easily moveable so the class can be seamlessly structured in lecture format, small groups, or circles. Modern technology allows the "front of the room" to be anywhere, and promotes active learning strategies in the classrooms, while "in-between spaces" allow for spontaneous collaboration.

We found our students value the realistic labs experience in CHW — 10 healthcare labs shared across the programs, four high fidelity simulation rooms, an apartment simulation lab, three x-rays labs, a medical laboratory lab, and an Early Learning and Care lab. These spaces provide students with immediate skill application in preparation for their career transition.

What benefits do students get from cross-disciplinary education?

Interdisciplinary learning allows students to deepen their understanding of various related professions, ultimately contributing to improved problem solving, strong interpersonal skills, and better patient care.

Stantec's integrated design strategy reflected Camosun's interdisciplinary approach to education. The result? A modern space for learning and collaboration where students can excel.

STEM: FOR BETTER OR WORSE

DANIEL J. HARPER, OHIO UNIVERSITY

The U.S. Department of Education describes the role of STEM education as preparing students with knowledge and skills to "solve problems, make sense of information, and know how to gather and evaluate evidence to make decisions" (Science, Technology, Engineering, and Math). This aligns near perfectly with the theories, philosophies, and conceptual frameworks of evidence-based design, design thinking, and the design process, all of which exist in contemporary interior design education and which are reinforced by program-level accreditation and professional certification.

STEM though, challenges us to consider the role and purpose of higher education as it is often more casually interpreted as education that leads to jobs. Because STEM is contextualized in and often closely associated with employment, it has become part of the gradual erosion of higher education. From its earlier and loftier goals of preparing students to be active and engaged citizens higher education is increasingly focused on skills-based training and jobs-oriented majors. At the 2016 Annual Conference, the topic of interior design education as education versus training surfaced during the town hall as a point of evidence.

We see this academic reality in both subtle and obvious ways as it unfolds in campus conversations and in the discourse about the value of a college degree juxtaposed against rising tuition and increasing student loan debt. As we strive to help others understand the discipline of interior design, the general lack of knowledge about what interior design is and the role design plays in society quickly becomes obvious. Conversely, recognition of interior design education as STEM curriculum has proven to be helpful in the funding of programs, marketing and recruiting efforts, and general support by the university at large. This is in stark contrast to other, non-STEM disciplines who find themselves struggling to survive in the current reality of higher education.

As STEM, STEAM, and STEAMD initiatives continue to gain momentum, we must be diligent to advocate for increased understanding of interior design education as such, education rather than job training. To not do so puts at risk the very foundation on which the discipline exists.

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IDEC COMMUNITY ARTICLES

STEM EXPERIENCES FOR UNDERREPRESENTED K-12 STUDENTS IN MINNESOTA USING MAKER MINDSET

ABIMBOLA O. ASOJO AND HOA VO, UNIVERSITY OF MINNESOTA

Literature shows that minority communities are underrepresented in design and STEM professions (National Center for Education Statistics, 2018). In addition, they lack equal access to maker movement traditions in K-12 education. Similarly, K-12 underrepresented students are seldom exposed to design opportunities at schools and are unaware of design career prospects. Hence, the lack of exposure to design and maker mindset led to the establishment of the College of Design STEM Experiences for underrepresented K-12 students.

STEM Experiences for Underrepresented K-12 Students program In summer 2018 and 2019, K-12 diverse students were guided through ideation, concept sketching, and modeling exercises in the STEM and making camps. The camp focused on daily hands-on activities in interior design, three-dimensional modeling, fabrication and their intersection with math and science through making and LEGO experiences. Feedback was obtained through pre- and post-surveys from student participants to learn about program impact. Making experiences such as woodworking and laser cutting are found to nurture STEM related skills such as problem-solving, creativity, and innovation in K-12 students (Brie & Daniel, 2017). Similarly, we engaged underrepresented K-12 students in designing their name tags on the laser cutter and open-ended experimentation building imaginative objects from recycled wood in the woodshop. As our group walked the students through the digital fabrication and woodshop equipment of the College of Design, we explained the different design careers in the college and their making processes.

At the University of Westminster, Gauntlett (2014) found LEGOS to be a powerful tool to facilitate creative thinking due to their compact size, flexibility, affordability, and adaptability for different ages and genders (Gauntlett, 2014). Consequently, we engaged K-12 underrepresented students in different LEGO making experiences from small to large scale. For the small-scale project, students created the American Society of Interior Designers (ASID) logo. For the large-scale project, they recreated the Sugar Hill Building designed by British architect, Sir David Adjaye, who designed the African-American Museum in Washington DC (Figure 1).

A thematic analysis was conducted on the qualitative data collected from the open-ended questions (n=112). The following five themes emerged:

[1] Awareness of design thinking and making processes. One student noted: “I now know a design career is building, aesthetic, thinking, working, making, and trying. I think that’s right.”

[2] Design career exposure. A student expressed: “The camp helped enrich my experience in design and was educational. It gave me insights about design career, too.”

[3] Design digital technology. A student noted: “I loved building and learning about the tools and trying them out.”

[4] Design networking. A student recalled: “Being exposed to all different things so we could talk to people in the career path we liked.”

[5] Teamwork and Collaboration. As a student reflected: “I also learned how teamwork is so important.”

It is evident that many of the thematic outcomes dovetail with the literature about the benefits of the Maker mindset and STEM. When asked to describe the best experience(s) in the programs, students replied: “Model design shop, LEGO structure.” “LEGOS. Because now I know how to make houses with the LEGOS I have at home.” Our findings highlight the importance of exposing underrepresented children to STEM and making experiences in interior design early in their K-12 education.

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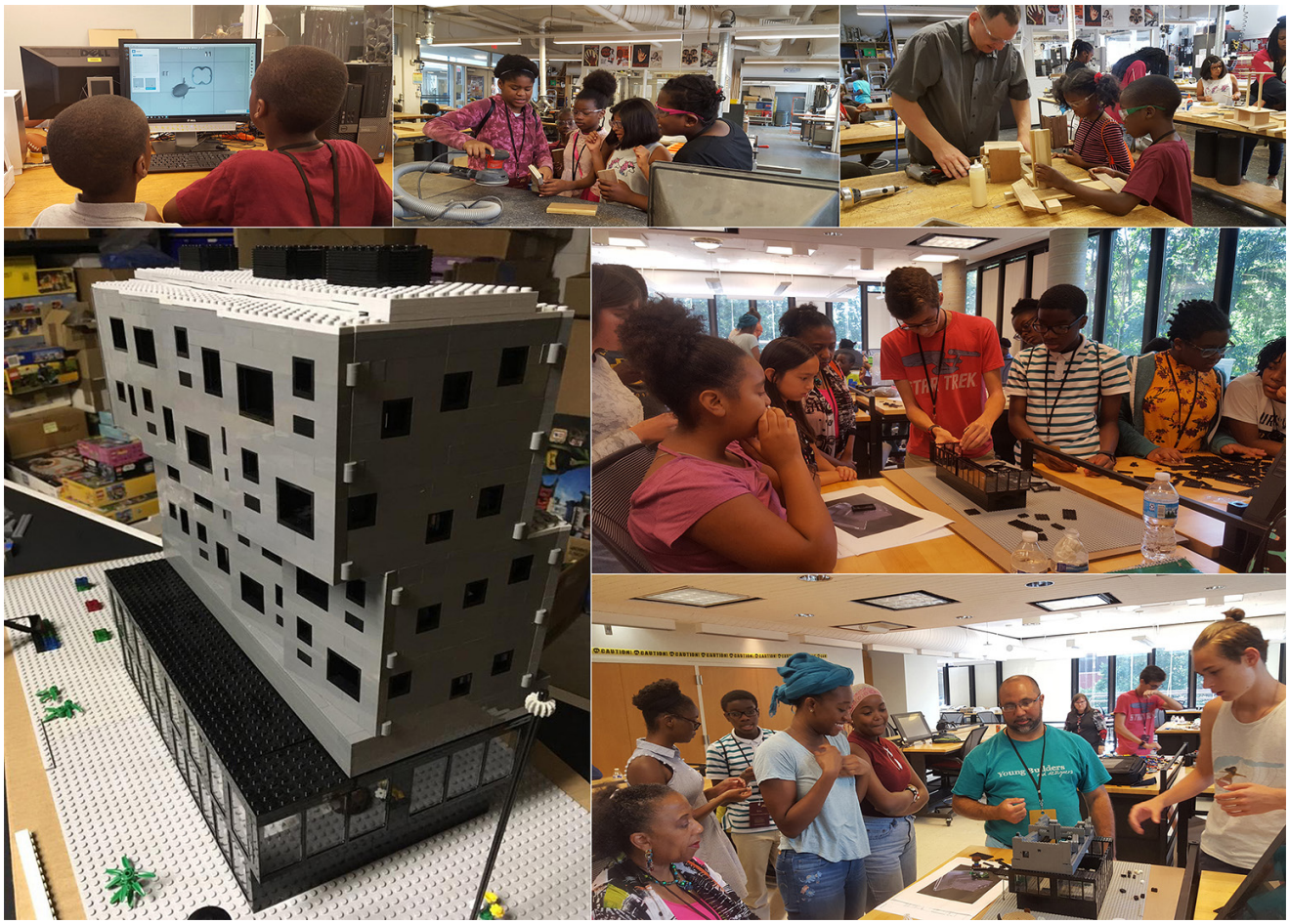


PARTNERSHIP OF INTERIOR DESIGN AND STEM

RYAN CROOKS, GEORGIA STATE UNIVERSITY

Interior Design and STEM/STEAM/STEAMD education must work hand in hand to improve the built environment. Both areas have qualities that reinforce one another, and the increasing technological complexity of the world demands that students of design are also students of STEM or its variants.

Interior designers develop space to improve the user's comfort and wellbeing. STEM education also promotes improved conditions through discrete and quantifiable means using the subjects of Science, Technology, Engineering, and Math. Similarly, STEAM and STEAMD do this, but they also offer the quality, craft, and meticulousness inherent in the subjects of Art and Design. In support, the field of Interior Design can encourage these forms of education by showing its students how the highlighted subjects are used in actual interiors practice.

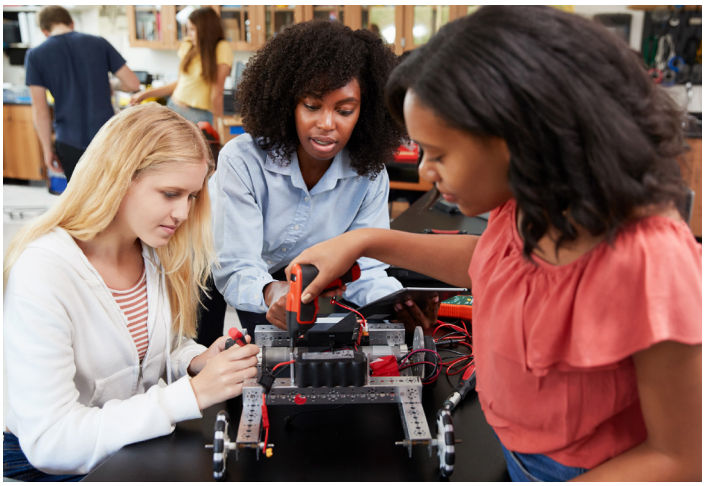
The variations of STEM education foster creativity through problem-based learning. Interior Design requires innovative, creative solutions to various issues, and so the design field can be bolstered by the inclusion of those STEM students who can develop creative projects through engagement with specific problems. In return, Interior Design can help STEM education by providing real-world examples of interiors projects, all of which come with defined constraints and problems.

STEM/STEAM/STEAMD education requires the development of rigor through the design and engineering process. This process requires one to define the problem, research possible solutions, propose a solution, test the solution, analyze the outcome, and develop a new solution that addresses issues exposed during testing and analysis. Like with the variations of STEM education, interior designers use this process in practice to create the most effective designs. So, Interior Design can be strengthened with the inclusion of STEM students. In exchange, Interior Design can help STEM/STEAM/STEAMD by presenting practical problems that must be overcome in the design process, especially those of budget, quality control and assurance, and scheduling.

Along the same lines, the design and engineering process requires strong analysis and monitoring of existing conditions to predict the future. In both Interior Design and the STEM variations, understanding current and past conditions allows a logical and appropriate solution to be developed. Interior Design can provide the experience and history of using monitoring with building systems to STEM/STEAM/STEAMD schools to show current use and how to improve forecasting and modeling of systems.

Finally, the technical sophistication developed in the STEM programs is very helpful for current and future Interior Design practice. The STEM/STEAM/STEAMD students understand the ways equipment works through their experiences with coding and hardware, as well as science. Technology is not going away, and with the increased use of building automation, the interior designer must be able to understand both the information provided and how to use the information to create a better interior environment. On the other hand, interior designers can help STEM education by sharing how technology is used in the interior environment, such as the use of energy modeling, smart thermostats, proximity sensors, and motion sensors. In this way, STEM/STEAM/STEAMD students can innovate new ways to interact with the interior that may one day be used in practice, creating a more interactive space.

Great opportunities for research and development are possible through the partnership of STEM education and Interior Design. In fact, STEM/STEAM/STEAMD education offer opportunities for future interior designers as we create more efficient buildings and rely more and more on technology.



THE DESIGN EDUCATOR AS CAMPUS AND INDUSTRY LEADER

KRISTI GAINES, TEXAS TECH UNIVERSITY

Disciplinary knowledge is crucial for educators; however, the role of leader requires proficiencies beyond a degree in a specific STEM, STEAM or STEAMD field. Leadership may be defined as "... getting a group of people to enact a vision of what needs to be accomplished" (Fund, 2006). Leadership encompasses many different aspects. For some, the role of administrator defines leadership. For others, being acknowledged as a campus or nationally recognized researcher, educator or industry professional is the way the term is characterized. Whatever the definition, the path to successful leadership encompasses a common set of skills that reach beyond disciplinary competence. Moving past the role of design educator into leadership has traditionally been a difficult transition. One reason is that in the U.S., STEM fields have been traditionally valued as priority. Unconscious bias is another contributing factor. A number of studies have shown that unconscious and conscious bias are present when it comes to advancement and leadership (this prejudice is a complex issue that could be expanded upon in a follow-up essay). However, the need for artists and designers in combination with STEM is emerging as a means to solve complex human problems. Effective leaders accomplish goals through effective management and by influencing other people (Fund, 2006). This study investigated preferred skills of individuals in leadership and found that soft skills may be more valued that disciplinary knowledge.

A literature review was conducted to evaluate current studies on leadership, professional competencies, and the complexities of moving into leadership roles. Some of the challenges identified for designers included 1) siloed communities (McCarthy 2017), 2) balancing disciplinary and professional training (McCarthy 2017), and 3) lack of resources (Urban & Linver, 2019). Next, a focus group of university and business leaders was interviewed to identify desired leadership proficiencies. The professionals represented two different universities and business leaders from a representative sample of disciplines including science, technology, engineering, math (STEM), art (STEAM), and design (STEAMD). Based on the findings from this study, disciplinary knowledge ranked below several desired skills for potential leaders. Disciplinary knowledge or academic credentials were found to be important for some leadership positions; however, the findings show that individuals with degrees in art & design are competitive with their STEM counterparts in leading multidisciplinary teams in academia and industry. Soft skills were deemed most relevant. Several current leadership models (Rao, 2013; Den Hartog et al., 2009; Avolio et al., 2009) were found to be lacking key issues or provided redundant information within the individual models. Therefore, a new set of competencies was developed utilizing a "Six Cs" format to include 1) Critical thinking, 2) Creativity, 3) Collaboration, 4) Communication, 5) Culture, and 6) Commitment. The result is a new paradigm for developing leaders. The 6 Cs were implemented as a campus-wide professional development plan through workshops, bootcamps, conferences, and other cross-disciplinary programming targeted at each of the competencies and offered in addition to disciplinary coursework.

Traditionally, many leadership roles have been disproportionately represented from STEM fields. However, the STEAMD model represents a multidisciplinary approach to problem solving that is gaining traction. Anecdotal evidence of the limited number of design educators in campus and industry leadership roles indicates that soft skills and

a multidisciplinary approach to scholarship are key in being recognized as leaders. For interior design faculty to become competitive, they need to move beyond the discipline and work with multidisciplinary teams (collaboration). Designers have a head start on some of the competencies such as critical thinking and creativity. They should work to hone these skills and address the other competencies in the model.
Leadership is not a set formula or one size fits all. Design educators interested in leadership should identify their strengths and strive to enhance the skills emphasized in the "Six Cs" model. The findings from this study show that the desired competencies (6 Cs) translate across environments. The model is applicable for academia, government, private foundations, consulting, think tanks, corporations, or nonprofits. Many design educators may not consider leadership positions outside of the field because they do not feel qualified. However, designers possess unique strengths that can be developed and polished to lead diverse teams in solving complex problems.

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APPLYING AN INTERIOR DESIGN LENS TO INTERDISCIPLINARY STUDIES OF MENTAL HEALTH

TASOULLA HADJIYANNI, UNIVERSITY OF MINNESOTA

Understandings the ways environmental parameters intersect with daily living for children with mental health challenges is currently limited. Part of the reason for this is that studies of mental health have been primarily grounded in fields such as psychiatry and neuroscience and as a result, elements of interiors were treated lightly. This study is an example of how infusing interior design inquiry into interdisciplinary studies of mental health can inform and challenge assumptions about how mental health is studied and approached, expanding the questions asked and the methodologies employed in early diagnosis and treatment of Obsessive-Compulsive Disorder (OCD).

The pilot study was funded by the National Science Foundation and supported a three-college collaboration at the University of Minnesota: the College of Design's Interior Design and Architecture programs, the Medical School's Department of Psychiatry, and the College of Science and Engineering's Department of Computer Science. The study's focus was Obsessive-Compulsive Disorder (OCD), a debilitating anxiety disorder experienced by 1% to 3% of the population (APA, 2013). As up to 80% of OCD cases begin during childhood, early diagnosis and treatment can have life-transforming outcomes. Many of the compulsions, such as repeating, ordering, and cleaning rituals involve physical objects such as bathroom sinks, faucets, tubs, showers, mirrors, door openings, and light switches (Vickers et al., 2017; Wahl, Salkovskis, & Cotter, 2008; Zor, Fineberg, Eilam, & Hermesh, 2011).

Interior Design's perspective contributed to the study in the following two ways. First, the team narrowed the study's purpose down to a better understanding of how environmental factors relate to OCD behaviors, an area that is currently under-researched. And second, Interior Design was instrumental to the construction of tactile physical environments through which experiments could be conducted that would enable researchers to see first-hand a patient's interactions with environmental parameters.

Conventional methods and approaches primarily involve patients' reflections of symptoms during visits to doctor's offices.

Subjects were videotaped to allow for observations and data analysis using computer vision tools of behaviors that are too complex for parents and others to observe in real time and nearly impossible for doctors to witness during an office visit. In 2015, experiments were conducted with 40 subjects, 18 children and adolescents with OCD and 21 matched healthy controls without OCD. Variables measured using the videos included total time spent doing the different tasks, number of times an object is touched during a task, and repetitious behaviors during the tasks.

The study's findings were cited as a "High Impact Paper" (Bernstein et al, 2016) partly due to allowing for a more nuanced glimpse into how aspects of the environment are viewed and interpreted by OCD patients. Examples include Task 3, where children organized school supplies on a plain rug and also on a bold rug to test whether pattern had an impact on children's ability to function (Figure 1). Although pattern did not affect how the two groups of children arranged objects, children who were rated by parents as having greater severity of attention problems and greater conduct problems used significantly less space during the task. Similarly, during Task 4, where the space was arranged to represent a typical bathroom interior to examine children's relationship to a sink during a handwashing activity, OCD participants were significantly more likely than controls to exhibit "other" behaviors (e.g., touching/tapping the sink, washing/drying the sink, drinking water, investigating the setup, and rubbing the countertop).

Next steps for interior design scholarship include expanding the study to the assessment of environmental factors, such as lighting, color, and spatial layout/views and settings, from the home to school and work environments.

Note: The author would like to acknowledge the other Co-PIs of the study: from the College of Design (Dr. Julia Robinson), the Medical School's Department of Psychiatry (Dr. Gail Bernstein and Dr. Kathryn Cullen), and the College of Science and Engineering (Dr. Nikos Papanikolopoulos and Dr. Vassilios Morellas).

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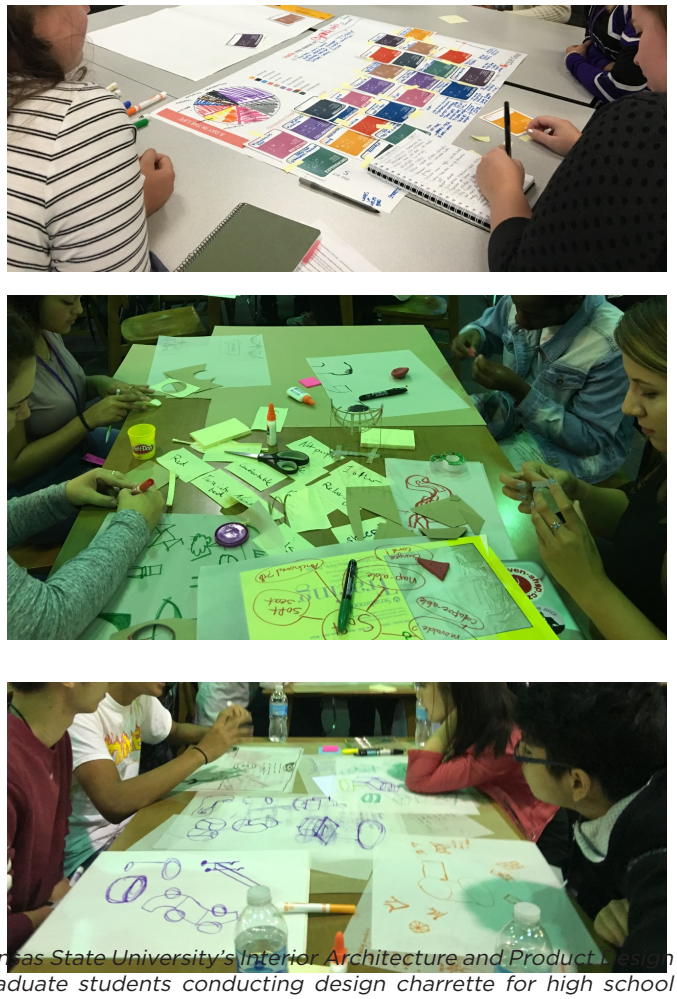
The two contrasting environments test for the impact of pattern on children.

EDUCATING THE NEXT GENERATION OF STUDENTS TO UNDERSTAND AND SUPPORT STEAMD EDUCATION

VIBHAVARI JANI, KANSAS STATE UNIVERSITY

The advent of 21st century technologies has changed the way we design and build, and the way we educate the next generation of designers. It has also given designers the ability to educate the general public, and STEM (Science, Technology, Engineering, and Math) based educational programs in particular on why design education is important, and how project based learning and design thinking approach boosts students' creativity and provide critical thinking, collaboration, and many other twenty-first century skills they need to survive in this fast changing world. Art and design education provide a much needed human-centered approach for STEM disciplines. If we want interior architecture/design to be included in the STEAMD education, design educators will have to focus on how to educate the next generation of students to understand, want, and support STEAMD education and take a lead role in this transformation. One way to educate the next generation of students about STEAMD education is to collaborate with K-12 educators and students to develop an inclusive curriculum where students apply design thinking approaches to learning STEM subjects.

Over the past three years, this author worked with two different school districts to develop collaborative projects for their STEM and STEAM programs to cultivate a strong affinity towards the design disciplines among high school students. Semester long service-learning projects were designed as a mentoring program, where graduate design students worked with high school students from music, education, and architectural engineering carrier pathways to teach them design thinking methods. The high school students then used design thinking methods to redesign an area of their choice within their high school. Throughout the semester, the graduate design students worked with the high school students to introduce them to each phase of the design process for the high school renovation including site analysis, program, concept development, schematic design, prototyping and final design. After the concept development phase, the graduate design students conducted design charrettes for high school students and asked them to employ design thinking methods to design furniture, products and spaces they want in their high schools.



Kansas State University's Interior Architecture and Product Design Graduate students conducting design charrette for high school students.

Photo Credit: Vibhavari Jani

Applying the newly learned design thinking process to solve these problems, the high school students learned how to collaborate with each other, to think critically about their safety and security, and to consider sustainable design for their school renovation. These collaborative efforts uncovered innovative design ideas including scanning devices for their safety, sustainable features like daylight and rainwater harvesting to irrigate their garden, and mobile furniture to enhance their classrooms for active learning. Through this process the high school students understood how design plays a crucial role in protecting their health, safety and welfare.

At the end of the semester the graduate students presented their design ideas for the high school renovation to the high school students, faculty and administrators. The high school students provided insightful design comments during these presentations. This collaborative program has spanned three consecutive years with the participation of more than 300 high school students in the program. The positive outcomes from these projects demonstrates that for STEAMD education to become a new model of education, design educators will have to play a major role in helping STEM educators and students understand the importance of design, and how to incorporate design thinking into STEAMD curriculum.

GAINING STEAM/D: DESIGN AT THE GOVERNMENTAL LEVEL NOW

NADIA ELROKHSY AND YU NONG KHEW, PARSONS SCHOOL OF DESIGN

Science, Technology, Engineering, and Mathematics, known collectively as STEM (Christenson 2011), began as a government initiative (Kimbell 2011) to strengthen the competitive edge of the United States in a global economy (dhs.gov). The 'S' in STEM refers to the branches of science that include physics, chemistry, and biology; the social sciences are grouped with the humanities and arts. This distinction between the hard and soft sciences contributes to some design disciplines, such as interior design, not being part of STEM. However, interior design education inherently involves STEM learning. Quantitative, evidence-based design strategies--daylighting, thermal comfort, zero consumption, less toxic materials--are the work of interiors and STEM.

The global economy is propelled by creativity and innovation, skills honed in art and design education. Our practices are increasingly more integrative, responding to a more varied and complex professional context. Therefore, the artistic and iterative design process offers STEM a distinctive insight into solving for such complexity. We need to shift the focus from quantitative STEM to advancing programs that integrate the quantitative and qualitative through Science, Technology, Engineering, Arts, Mathematics (STEAM) and Design (STEAMD).

At Parsons School of Design, a graduate elective, Soft Fab(rication), set out to dispel concerns around STEM through Project Based Learning (Blumenfeld et. al. 1997). The class scaffolded students' learning across three projects over the course of one semester. The first project was to design a window covering for a south-facing classroom; students explored human thermal comfort, glare, and applied mathematics to translate concepts into full-size prototypes that they fabricated. The second project was to design and fabricate a series of wall coverings. Using applied geometry to design a pattern repetition of nine hexagons, students extracted the mathematical systems behind ancient Islamic art for inspiration. Students built upon the knowledge of the first project to consider the impact of their material selection on the environment and the fabrication process. What is the chemical composition of the material? How biodegradable is the material at the end of its useful life? How might the chemical composition of the material impact fabrication techniques?

By the third project, students were ready to expand their material studies to include acoustics and bio-fabrication, developing a series of wall coverings made of mycelium and installed in an existing internal conference room that had poor acoustics. A guest lecturer from the Queens Botanical Gardens supported students' understanding of the biology of spores and the necessary conditions required to grow their own mycelium from mushroom spawn. Understanding the biological processes of the material helped students with design considerations such as thicknesses and production time required for their specific acoustical treatment.

Through human-centered and ecological design strategies, interior design programs graduate students who are uniquely positioned to tackle the problems of climate change in the twenty-first-century and the fourth industrial revolution. By studying interior design through the lens of science, technology, engineering, and mathematics, students are better equipped to adapt to the rapidly changing and increasingly multi-disciplinary nature of the profession and are better prepared to be innovators (Obama 2013). Interior design schools, together with the interior design

profession and its professional organizations, need to advance curricula and stake their claim as essential members in the STEM arena, and/or advocate for the addition of STEAM/STEAMD designated-degree programs at the governmental level.

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FROM STEM TO STEAM: AN INTERIOR DESIGN STUDIO AS A MEANS FOR CROSS-CAMPUS INTERDISCIPLINARY COLLABORATION

LESA LORUSSO AND CANDY CARMEL-GILFILEN, UNIVERSITY OF FLORIDA

To successfully achieve interdisciplinary collaboration in practice, interior design students must learn to work efficiently on diverse teams and coalesce divergent thinking into impactful solutions. Real-world projects are fast-paced, and client needs continue to grow given the role of technology and data-driven, evidence-based design. Moving from STEM to STEAM incorporates art and creativity into science, technology, engineering and mathematics and is a critical skill for emerging interior designers.

The opportunity to prepare students for this critical skill through a real-world simulation arose when the Dean of the College of Liberal Arts and Sciences at the University of Florida was tasked with transforming the campus landscape into state-of-the art, technology-integrated, STEAM-focused spaces for departments including Psychology, Biology and Mathematics. A cross-campus interdisciplinary collaboration was developed between interior design students and faculty, staff and students from the other departments. The purpose of this project was to create impactful, STEAM-inspired learning spaces and to foster multi-disciplinary collaboration using human-centered design methods.

Faculty were first faced with two problems: (1) How can interior design students gain an in-depth understanding of the complex needs of the target users to design impactful learning spaces? (2) How do interior design educators learn from precedents in private industry to translate established human-centered design methods from professional practice into a design curriculum?

In order to address these questions, the interior design team created a mixed-methods approach utilizing human-centered research methods including narrative inquiry (Portillo, 2000), design thinking sessions, and industry-based exercises. Design thinking is a term that describes a creative brainstorming process that is human-centered (Brown, 2008) and has proven impactful across disciplines (Orthel, 2015). This method focuses on clearly identifying a problem in order to gain a deeper understanding and ultimately arrive at a more holistic solution (Carmel-Gilfilen & Portillo, 2015). Empathy and design thinking methods played a vital role in the process, enabling interior design students to better understand their team members and the various programmatic needs facilitated through innovative learning and teaching methods (Kouprie & Sleewijk, 2009). Skills acquired in this model included: pre-design research, stakeholder engagement, design thinking process with research, programmatic analysis, observation, conceptual development and visual and verbal presentations.

The team incorporated design thinking exercises from IDEO's design kit and narrative inquiry to research end-user groups in depth, optimize performance for students across ability levels, foster creativity through design thinking workshops and charrettes, and evaluate ideas using criteria focused on analyzing the learning process. Narrative inquiry, online surveys and design thinking were used as a teaching tool during the design process and as a method of analysis to understand perceptions of the efficacy of the design. Overall, these Design Thinking STEAM strategies differed from design thinking in general because they were incorporated into the teaching curriculum as engaging activities expressed in artistic sculpture, photography and project renderings. These activities were valuable tools that facilitated successful teaching and learning strategies.

The exercise was a resounding success. Students and faculty reported positive feedback from the experience. Students felt that the design thinking exercises enabled better understanding of the needs and desires of their client and improved teamwork. Further, faculty and staff responded positively to the collaboration and engagement with the interior design students.

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STEAM/STEM EDUCATION SPACES: BRIDGING THE GAP TO INTERIOR DESIGN EDUCATION SPACES

SUSAN RAY-DEGGES, NORTH DAKOTA STATE UNIVERSITY

STEM and STEAM learning spaces, often identified as active learning or SCALE-UP (Student-Centered Active Learning Environment with Upside-Down Pedagogies) classrooms, predominate the higher education landscape as educators move twenty-first century learning to the next level.

SCALE-UP classrooms, first implemented by North Carolina State University, are large "studio-like" classrooms designed to facilitate active learning (Beichner et al., 2000). Often accommodating upward of 100 students, equipment and technology are used to establish highly collaborative, hands-on, interactive learning environments. These spaces often make extensive use of technology with multiple projectors, television screens, and laptop connections located throughout the room.

In a recent STEM building post-occupancy evaluation (POE) at North Dakota State University, faculty and students had high levels of satisfaction in using a building which incorporates various types of SCALE-UP classroom formats. POE results indicated active learning strategies implemented by faculty in various disciplines were enhanced by the design of the classrooms, and most students welcomed more active participation during class as part of their learning experience (BWBR, 2017). In addition, data collected by STEM faculty, supports that student DFWs have decreased in general education courses, clearly supporting the success of combined interactive teaching strategies by engaged faculty presenting in a SCALED-UP learning setting can result in successful student outcomes (Hodgson & Momsen, 2019).

Similar to SCALE-UP classrooms, interior design instructional facilities and workspaces require specific settings that facilitate lectures, demonstrations, and problem-based learning activities. Are these spaces different than successful accomplishments seen in STEM/STEAM design solutions? Many design studios carry these same characteristics, where faculty engage students in reading, writing, discussion, and problem-solving to promote synthesis and deeper learning. The approach that active learning instructors take is to engage students in order to learn what students are thinking and why they are thinking that way. This results in rich design problem solving.

At North Dakota State University, a portion of the upper division interior design instructional facilities have fully embraced an active learning context to create an effective studio setting. The third year interior design studio, much like the STEM building, employs mobile tables, chairs and storage units; individual marker boards, electrical outlets and computer connection capabilities for laptops; and projection units to facilitate evolving project types and the dynamics of team collaboration and responsibilities. Much like the "studio-like" environment promoted by SCALE-UP classrooms, this type of environment allows for highly collaborative team interaction and quick reconfigurations necessary to support different learning styles and curricular needs.

As suggested by Tim Brown, CEO of IDEO, "In order to produce 21st-century learners, we [cannot] use 18th-century methods" (The Room 241 Team, 2018). It is time to review the traditional design studio layout and reconsider facilities, in tandem with curriculum delivery, to bridge the chasm and embrace elements proposed in STEM/STEAM – transforming and energizing the learning experience for the next generation of interior designers.

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3rd Year Studio Space at North Dakota State University

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One Parkview Plaza, Suite 800 | Oakbrook Terrace, IL 60181 USA
Ph: 1-630-544-5057 | Email: info@idec.org