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EXCHANGE
a Forum for Interior Design Education

MESSAGE FROM THE PRESIDENT
Hepi Wachter, IDEC

I have three important announcements to share.

First, we are in the midst of preparing for our annual meeting in Charlotte, March 2019. The Academy of Reviewers is diligently working through the abstract and creative scholarship submissions. We are scheduled to have feedback back to you in November. In Charlotte, we will continue our condensed presentation schedule with the same amount of presentation as in previous years. I am very excited to share that our keynote speaker at the conference will be Julieanna Preston from the Massey University, College of Creative Arts in Wellington, New Zealand. Julieanna is an inspiring educator and scholar, and I am sure some of you have read her work spanning theory and making. Perhaps *Performing Matter: Interior Surface and Feminist Actions* will make it onto your pre-conference reading list.

We are working on the second community outreach charrette presented in Charlotte, and I am hoping that the community outreach charrette will become a staple at all future conferences. One of the opportunities IDEC has is to give back to the community in which we hold our annual meeting. I am happy that Lisa Phillips has agreed to chair the community outreach charrette task force.

Secondly, we are working on a better understanding of our membership. Migette Kaup has agreed to chair the membership task force, and she will work with the regional councils to investigate member retention, strategies to recruit new members, and how we can serve millennials better. The task force will also give our dues structure a "good look."

Lastly, we are repositioning IDEC and moving the IDEC office to Washington DC. The IDEC board had lengthy and very thoughtful discussions about the administrative needs of IDEC after our executive director recently resigned. The Kellen team and executive director in the Washington DC office are well suited to meet the needs of IDEC and its membership.

IDEC remains a dynamic organization. Look for more information about what we do and the changes we are making at idec.org and in our weekly eNews in your email inbox.

Hepi Wachter
IDEC President 2018-19

MESSAGE FROM THE EDITOR-IN-CHIEF
Bryan D. Orthel

Thinking is different from Copy/Paste/Undo.

This issue of the Exchange explores ways technology is influencing design education through changing media, pedagogy, and expectations. Shifting technology has been a hallmark of human progress. Our abilities to create and use tools have regularly altered how we understand the world and manipulate it to our purposes. Recent shifts in the technologies available to designers continue this process. Global communication, rapid prototyping tools, virtual modeling, and other technologies change how designers interact and the solutions they design. How are technological changes altering interior design education, its pedagogy, and the expectations of students and the profession?

In the creative industries, we are proud of our abilities to solve complex and wicked problems. Yet, there are efforts underway to create artificial intelligence (see figure 1) or computer applications that can design satisficing solutions faster and more economically than human designers can (e.g., Eastman, 1973; Anderson, Bailey, Heumann, & Davis, 2018, Autodesk, 2018). Sometimes technological approaches to design aim to support the design process. These generative design initiatives automate the iterative process to explore and evaluate thousands of design permutations quickly. While the technology can use brute force to consider the many options, it remains the uniquely human ability to understand design within a deep context of emotion, culture, and human interaction.
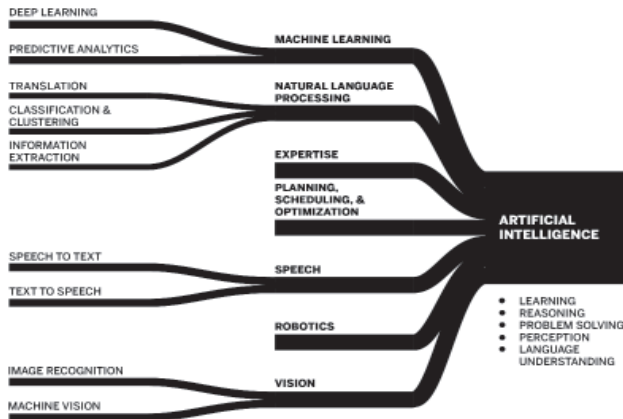
Transforming data into intelligence requires more than analyzing raw data (see figure 2). The contrast between human cognition and artificial intelligence is telling. Our ability to recognize the satisficing design solution from a set of alternatives relies on distinct ways of knowing. Technology does not replace human cognition. Technology does enable us to recognize information that might remain unseen to the unaided mind.

The simple commands Copy, Paste, and Undo represent technology's efficiency. Such tools speed up the process, but do not fundamentally alter designers' thinking (e.g., Bilda, Gero, & Purcell, 2006). Technological tools are changing how designers work by more quickly presenting permutations that the designer must mentally process. Design decisions that were once a slow sequence are now simultaneous and compounding (e.g., Sun, Xiang, Chai, Yang, & Zhang, 2014). As a result, the novice designer has a much steeper cliff to climb as they develop their cognitive capacities in design.

As we think about how technology continues to alter interior design education, we must remain focused on what our students need to be effective designers. The essays in this issue frame ways interior design educators are thinking and working towards these goals. Separate essays by Vaux and Wu address ways technology shapes how educators guide students' cognitive growth. Swiertz and Nutter, Nybor and Dunham, Ghamari, Khew and Christian, and Matheny explore integrations of technology into interior design studios and support courses. Pearson and Imbimbo each discuss the ways changing technology alter educators' perception of the classroom. Finally, Chandrasekera and Pulay explain how technologies can introduce interior design to new audiences. The range of viewpoints and ideas in these essays highlight how much technology is changing how we teach and practice design.

Figure 1. *The components of artificial intelligence emphasize the breadth of human intelligence and the depth of cultural understanding necessary for thought and interaction. Image adapted from Oracle, 2017.*

Figure 2. *The intelligence funnel guides how we convert data into useable knowledge. Image adapted from Cappra.cc, accessed via wikimedia.org.*
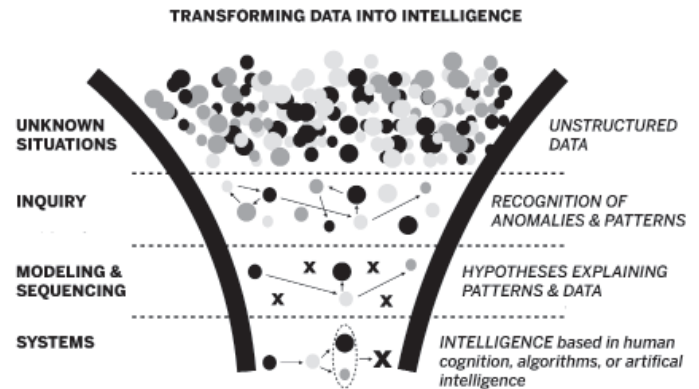

As always, the issue would not have come together without the dedicated work of Sarah Urquhart, Dan Harper, and Gloria Stafford (associate editors) and IDEC's professional staff. We owe them enthusiastic gratitude.

The technologies we use alter how we think about the world, as well as the problems and solutions that are required. This setting is not unique to us. In 1831, Victor Hugo wrote about these same concerns in his paean to Notre Dame de Paris. He noted the technology of each age unmoored the way things were and resulted in fundamental changes to how people valued and interacted with each other. Design education is facing such a moment.

Bryan D. Orthel, PhD
Editor-in-Chief, IDEC Exchange, 2017-2019
Indiana University

Reference

Anderson, C., Bailey, C., Heumann, A., & Davis, D. (2018). Augmented space planning: Using procedural generation to automate desk layouts. *International Journal of Architectural Computing, 16*(2): 164-177.

Autodesk. (2018). Generative design [webpage]. Retrieved from https://www.autodesk.com/solutions/generative-design

Bilda, Z., Gero, J.S., & Purcell, T. (2006). To sketch or not to sketch? That is the question. *Design Studies, 27*, 587-613.

Eastman, C. (1973). Automated space planning. *Artificial Intelligence, 4*(1): 41-64.

Sun, L., Xiang, W., Chai, C., Yang, Z., & Zhang, K. (2014). Designers' perception during sketching: An examination of creative segment theory using eye movement. *Design Studies, 35*, 593-613.

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CELEBRATING DIVERSE FORMS OF SCHOLARSHIP

In March 2018 the *Journal of Interior Design* published the Special Issue on Creative Scholarship as a means to recognize and celebrate the diverse methods by which we acquire new knowledge. While standard articles were accepted, we also launched a new "type" of submission, the visual essay. Spearheaded by guest editor Julieanna Preston, visual essays opened up new opportunities for scholars to reposition and reprioritize the relationship between imagery and text. Unlike the standard article, the layout of the components provide an additional layer by which the author can communicate not only information, but also the critical concepts offered in the essay. As stated by Preston in the original call for submissions, "while demonstrating and presenting speculative research and practice-based visual media, the visual elements of the essay form an integral part of an argument, interpretation, reading or idea expressed in an interior design. Rather than rely on the authority of textual language, images, photographs, drawings, sketches and diagrams play a pivotal role in shaping an intellectual inquiry."

During this inaugural year of the launching of the visual essay, the *Journal of Interior Design* will have published a total of six ranging in topics from experimentations of cork as a potential interior furnishings material, to digital fabrication and interactive technologies that investigate body-space relationships. We have been fortunate to publish such provocative works. However, while we have seen great interest in the visual essay as noted by the many submissions we have received, the editorial staff has also come to realize that the visual essay is foreign to many. In order to remedy the situation, the *Journal of Interior Design* is offering an Author's Workshop at the annual conference in Charlotte, NC (March 2019). Led by Dr. Preston, associate editor of creative scholarship, this workshop will review the guidelines for what constitutes a creative scholarship submission to the *Journal of Interior Design* and then follow with an in-depth hands-on interactive workshop that explores the opportunities in conceptualizing, visualizing, and structuring a visual essay. Participants are to bring images and any existing text in digital and/or hard copy form on a recent design project of their choice. The goal of this workshop is to develop first-hand experience at shaping a visual essay for a creative scholarship submission.

We anticipate this will be an engaging and exciting event as participants share and discuss their ideas. Unlike the workshop offered in 2017, this one will focus specifically on creating a visual essay. More information will be forthcoming from IDEC HQ. We hope you will join us.

John Turpin, JID editor-in-chief, and Julieanna Preston

Image adapted from Marcus Spiske, Unsplash.

NETWORK SPOTLIGHT

IDEC members at the 2018 conference enjoy the Network Happy Hour at Allsteel's Boston showroom.

The **IDEC Service Charrette** will return as part of the annual conference in Charlotte, NC. Lead by a Service Charrette Task Force comprised of members of the Engaged Scholarship Network and the Conference Host Committee, the Charrette will bring together IDEC members and a special community partner in the Charlotte area. The goal of this outreach event is to connect our members with the host community through a mutually beneficial and engaging design charrette. Why simply visit a community when we can create a bigger impact by serving it?

Once again, the charrette will be offered as a half day workshop on the Saturday of the annual conference. IDEC members can participate free of charge. Look for more information in the coming months regarding the venue and schedule for the Service Charrette.

The **Network Happy Hour** will also return again this year. Allsteel of Boston graciously hosted the 2018 Network Happy Hour in their recently renovated showroom. Their showroom provided a beautiful backdrop for networking and socializing for all who attended. Be on the lookout for information about the 2019 Network Happy Hour planned for Charlotte. You will not want to miss this conference tradition!

If you are interested in serving on the Service Charrette Task Force, or in any capacity with the Service Collaborative, please contact Stephanie Sickler, Director of Service, at ssickler@fsu.edu. The Service Collaborative invites any and all perspectives from the membership and encourages those interested in outreach, connectivity, and service to members to apply.

IDEC COMMUNITY ARTICLES

TECHNOLOGY: SKILL OR CREATIVE TOOL?
DANA E. VAUX, PhD, UNIVERSITY OF NEBRASKA - KEARNEY

Design is a profession in which both technical skill and abstract innovation contribute to successful problem solving (Cross, 1982; Archer, 1984). Design thinking is intrinsically connected with physical making and iteration, a "failing forward" that provides the confidence and intelligence for generating creative solutions within a business context. Armed with this knowledge, a question arises for design educators with regards to teaching technology in the design process: how can technological skills advance rather than hinder abstract innovation and problem solving? As many educators know, there is no simple answer to this question. However, understanding connections between theories of cognitive and learning processes can aid educators in guiding students to the mastery of technical skills, and clarify the instructor's role in progressing the use of technology as a creative tool.

Cognitive load theory posits that skills requiring complex learning simultaneously require substantial cognitive resources to attain learning mastery. This information is particularly useful in conjunction with Vygotsky's theory of scaffolding. For the novice, scaffolding allows the segmenting of learning actions into manageable pieces and promotes intermediate successes in transitional steps, which keeps the cognitive load within developmental reach and aids in learning mastery (Vaux, Krikac, Nordhues, & Urquhart, 2016). For example, in teaching a software program, the process might begin with a tutorial—analog or digital—that a student is able to access at their own pace to teach basic and rote skills, then develop to replicating a project for practice of skills with greater autonomy, and finally progress to utilization of acquired knowledge in an independent project. However, in design education and design practice, mastery of technological skills is not sufficient. The ability to implement rote skills independently does not ensure critical problem solving.

Design problem solving requires strategic as well as creative processes in order to generate creative solutions. With emergent technologies continually on the horizon, an instructor must concentrate on utilization of skills for contextual learning that requires critical thinking and a transference of tacit knowledge from master to apprentice. Initially, the role of the master (instructor) is oversight of the apprentice (student) in rote learning; with advancement, the role of the master is to challenge the apprentice to utilize rote skills for creative thinking. In this process, mastery of technological skills become a means to an end, rather than an end in itself. Each time a student masters a new skill, they add to their problem-solving tool belt, so that critical problem solving becomes the

focus of their work, rather than the wielding of the tool. Students can then critically assess how to "employ the right tool for the desired production aesthetic [and]... not simply the technology itself" (Nordhues & Vaux, 2015). Technology becomes a tool only when wielded with understanding towards the creative outcome. No 'one size fits all' technology exists for design problem solving, just as no 'one size fits all' learning model exists for acquiring design technological skills. Designers must master the *learning of technology* in order to advance abstract innovations and maximize successful problem solving.

References

Archer, L. B. (1984). Systematic method for designers. In N. Cross (Ed.), *Developments in design methodology.* NY: John Wiley & Sons.

Cross, N. (1982). Designerly Ways of Knowing. *Design Studies, (3) 4*: 221-227.

Nordhues, J. and Vaux, D. (2015). Technology, practice, and education: A model for mastery. *Interior Design Educators Council Annual Conference Proceedings,* Fort Worth, Texas.

Vaux, D. E., Krikac R., Nordhues, J. & Urquhart, S. (2016). Thinking through making: An analysis of design making through the lens of cognitive theory. *Interior Design Educators Council Annual Conference,* Portland, Oregon.

Creating with fabrication technologies. Photo by Corbey Dorsey. Courtesy of University of Nebraska-Kearney.

FROM PAPER FOLDING TO DIGITAL MODELING IN BEGINNING INTERIOR ARCHITECTURE STUDIO

JIANGMEI WU, INDIANA UNIVERSITY

The notion of the computer's ever-increasing power and our ever-increasing reliance on computer-aided design tools can be very misleading for the beginning design students. Frei Otto, one of the most brilliant architects and designers of our age, once said: "The computer can only calculate what is already conceptually inside of it; you can only find what you look for in computers. Nevertheless, you can find what you haven't searched for with free experiment" (Otto, Songel, and Otto 2010). In beginning Interior Architecture studios, it is extremely difficult for the design students to generate innovative forms directly using 3D modeling tools which they are just beginning to learn. However, when they are asked to work with pieces of paper using their hands in free experiments, they will learn to discover new ideas and find new forms, which then inspire them to generate digital alternatives that can be used in various scales in their interior design.

Paper folding is commonly known as origami, a Japanese and Chinese traditional craft. Paper folding is easy to do by hand and does not require sophisticated tools. The form generation in paper folding is a direct result of material manipulation through a series of actions by hand. Current CAD technologies, including 3D modeling tools, are inadequate for such a tactile design process. In an introductory interior design and architecture studio, paper folding was introduced to the first-year students to help them understand basic design principles and how to generate novel forms. They were asked to use the assembly and construction process in paper folding to produce a small-scale light sculpture. The project was divided into three small parts that serve as learning scaffolds. In the first part, the students were asked to create small units of paper folds from pieces of small square paper based on simple line drawings they made using straight edges and compasses. In the second part, the students were asked to connect a few units of their paper folds together. Students were taught to connect the units by using ways to make symmetries, such as translation, rotation, reflection, glide-reflection. They were also taught to use geometries to connect the units into polyhedral volumes. The beginning students often had great results in making the paper light and

they were very proud of their works, which motivated them for their future works in digital environment. In the third part, Rhinoceros, a 3D modeling tool, was introduced to the students. After they learned a series of commands such as Trim, Extend, Intersect, Surface from Planar Curve, Rotate 3D, Mirror, and Offset Surface, they were asked to produce digital alternatives of their paper structures to be used later in their other interior design projects either as small-scale light shades or as large-scale interior volumetric surfaces.

Reference:

Otto, Frei, Juan María Songel, and Frei Otto. 2010. *A conversation with Frei Otto.* English ed, *Conversations: a Princeton Architectural Press series.* New York: Princeton Architectural Press.
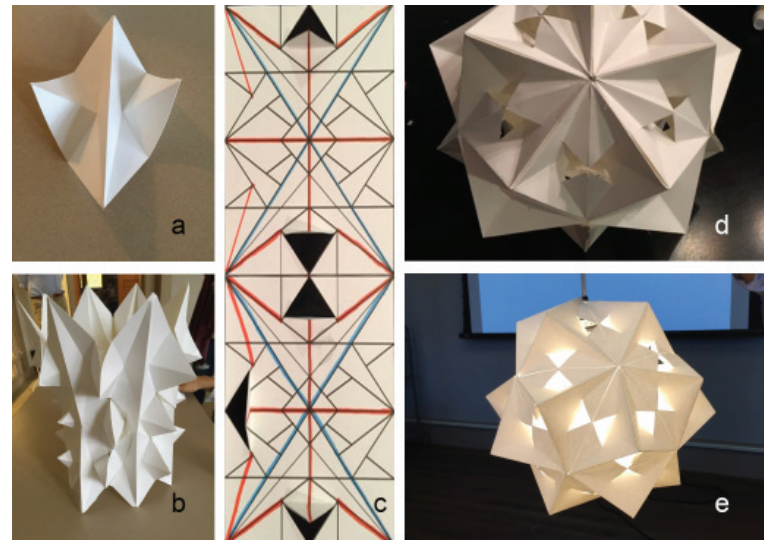
Student works in paper folding. a. A folded unit. Student: Abigail Stawick. b. A structure constructed by translational and gliding symmetries using folded unit above. Student: Abigail Stawick. c. A crease pattern drawn by hand. Student: Noelle Zeichner. d. An icosahedron construction based on the crease pattern on the left. Student: Noelle Zeichner. e. A lighted view of above. Student: Noelle Zeichner.

USING TODAY'S BUSINESS TOOLS TO TEACH TOMORROW'S DESIGNERS

MATTHEW SWIERTZ, ART INSTITUTE OF PITTSBURGH ONLINE &
KRISTA NUTTER, ART INSTITUTE OF PITTSBURGH ONLINE

Few factors affect the human experience in the twenty-first century more than technology, and its effects on interior design education are significant. As technology influenced the professional design field, education responded by adopting advanced instructional methodologies of researching, designing, creating, and presenting thoughtful solutions for spaces in the built environment. One pivotal aspect of design education has come in the form of distance instruction through online programs. We teach for an institution offering a fully online Bachelor of Science in Interior Design degree. This degree, previously associated with studio classrooms, drafting boards, and ample space for critique sessions, is no longer bound by these constraints. The online environment enhances many aspects of design education such as flexibility, communication, internship placement, presentation skills, collaboration, portfolio shows, organizational student chapters, and the use of social media to increase student engagement. With the advent of CAD and the myriad of software systems now required for any successful firm, educating budding designers using current and future tools of our industry can be achieved in virtual classrooms.

We have found success in online courses by using a project-based learning structure that places students in real-world scenarios, and asks them to complete an industry-style project for each course. Breaking down the project into tasks and milestones helps students see how they would work through the project. Tasks are posted to discussion forums where classmates and instructors respond with constructive criticism (written and video), redlines, and suggestions. The students further develop and revise their work based on feedback received, and post it as a milestone submission. We even ask students to submit milestones with transmittal sheets. Task grading is based on timeliness and participation while milestone grades are based on content and understanding. This use of revisions in the work flow allows students to implement their learning and reinforce the ideas and skills being taught.

Lectures are created as Learning Activities (LAs)—rich with interactive videos, diagrams, text, audio content, URLs, and textbook pages that coincide with the focus of the project. Courses that teach drafting and presentation (hand and software) take a skill-building approach. The LAs in these courses contain faculty-built video tutorials demonstrating the tools and techniques. Task submissions receive video feedback emulating in-person software instruction. Students do not need to take notes since all of the content is constantly available to them and can be viewed and reviewed as needed.

For team projects, digital collaboration tools are utilized as they are in the industry. Students use online collaboration software to meet synchronously from their various locations to work out the intricacies of group collaboration, deliberation, and deadlines with guidance from their instructors. Students collaborate in similar ways to in-person groups—establishing team leaders, note-takers, presenters, and so on. They hold meetings, screen-share, mark-up documents, and share files in real time. Students also use the collaborative aspects of drafting software so they learn work flows that are common in firms.

By using many of the same tools today's business workflows rely on, students in online programs are able to walk into a firm and start contributing toward projects quickly. The learning curve is almost non-existent and more time can be spent on producing
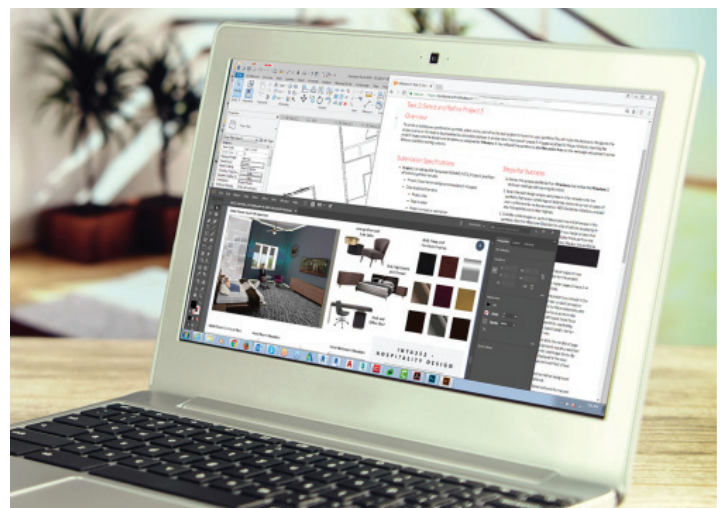
Online students utilize many of the same tools in classes that designers use to conduct business.

items that translate to billable hours. We have a lot of positive feedback from employers on how easily the students adapt to the office environments.

Digital student projects, recorded collaboration sessions, and student presentations can be easily archived, stored, and displayed within the LMS for CIDA or regional accreditation visits. Documentation is stored as it happens, allowing more time for faculty to focus on teaching while still ensuring successful accreditation visits. The virtual classroom, when capitalized on correctly can be a very successful medium for teaching new designers.

ONLINE CRITIQUE FOR A NEW GENERATION OF INTERIOR DESIGN STUDENTS
JODY NYBOER, PhD, SYRACUSE UNIVERSITY & ZORIANA DUNHAM, SYRACUSE UNIVERSITY

Critique is an essential form of assessment for design, activating a dynamic exchange of ideas and facilitating student growth. Schön (1987) describes dynamic reciprocity of dialogue as fundamental for practice-based learning. Davies (2007) suggests that students learn more when descriptive feedback is increased, and that it optimizes the development of ideas. Ice et al. (2007) suggest that verbalized feedback conveys more nuance, and that expressive communication makes learners more likely to use feedback to develop their work.

The benefits of fluid, descriptive dialogue are clear. However, maintaining it beyond intermittent studio sessions is a challenge. Considering that today's generation of learners are accustomed to digitally-enhanced learning (Seemiller & Grace, 2017; Turner, 2015), we decided to explore the potential of online critique. We asked our design students to complete an anonymous, online questionnaire designed to reveal their perceptions of both traditional and online critique. The analysis of the responses revealed that students perceive distinct attributes of effective critique, and value online methods despite limited experience using them. These findings were instrumental to implementing an online method into the course.

VoiceThread was selected because it allows asynchronous audio comments and drawing on visual content, and because students identified the act of drawing and talking as an important attribute of effective in-person methods. We introduced students to the program at the beginning of the semester and encouraged its use to facilitate project development outside of studio.

After the course, students were asked to complete a second questionnaire to share their experiences. The positive experiences suggest that VoiceThread enhanced aspects of access. Students described how the program improved access to their professors, allowing them to "get feedback from the professors every day" and negotiating disadvantages of studio scheduling. One student wrote, "The gap between Thursday and Tuesday is so large, that being able to receive feedback on a Saturday was really helpful in terms of being prepared more for a desk critique." The students also identified that VoiceThread enhances access to the comments shared during a critique. They described it as an improvement to comments obtained in-person because with VoiceThread, they can log in and "go over again and again to find more useful details."

The challenging experiences suggest that online critiques fall slightly short of in-person methods. While 19% of the students reported that they did not experience program-related challenges, several highlighted negative attributes of VoiceThread. Students expressed a preference for in-person interactions, frustration with broken conversations, and annoyance concerning technical issues. Asynchronicity was described as a drawback. One student wrote, "I find it hard to receive a critique without being face-to-face and being able to have a fluid conversation." Another wrote, "It's a lot easier to get feedback in class and to have a conversation versus going back and forward online."

The qualitative data we collected was also informative. 70% of students shared that VoiceThread supported project development and 72% said it supports design studio learning. 63% expressed a desire to use the program again, and the remainder expressed willingness.

The insight that emerged from our design students suggests how online programs can be implemented into studio. Despite the diversity of responses, this exploration presents strong evidence that the new generation of students respond positively to online, asynchronous methods of critique and embrace it as an alternative method that compliments a traditional studio.

References

Davies, A. (2007). Involving students in the classroom assessment process. In D. Reeves (Ed.), *Ahead of the curve: The power of assessment to transform teaching and learning* (pp. 31-57). Bloomington, IN: Solution Tree.

Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and students' sense of community. *Journal of Asynchronous Learning Networks, 11*(2), 3-25.

Schon, D. A. (1987). *Educating the Reflective Practitioner. Toward a New Design for Teaching and Learning in the Professions.* The Jossey-Bass Higher Education Series. San Francisco, CA: Jossey-Bass Publishers.

Seemiller, C., & Grace, M. (2017). Generation Z: Educating and engaging the next generation of students. *About Campus: Enriching the Student Learning Experience, 22*(3), 21-26.
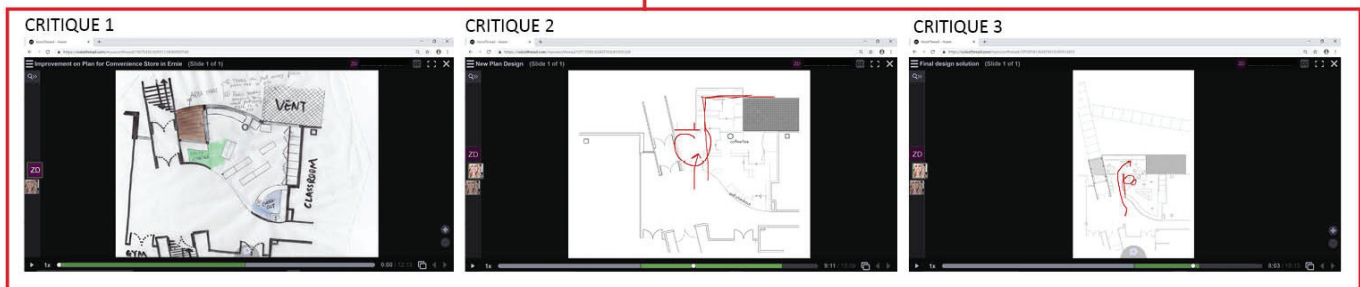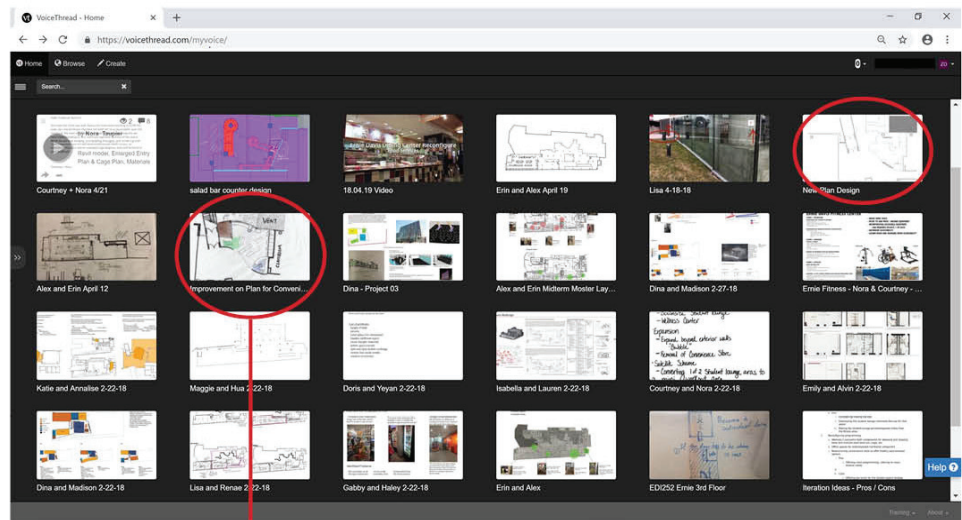
Turner, A. (2015). Generation Z: Technology and social interest. *The Journal of Individual Psychology, 71*(2), 103-113.

PROJECT DEVELOPMENT THROUGH A SERIES OF INTERACTIVE CRITIQUES

VoiceThread is an online program that simulates in-person feedback by allowing asynchronous audio comments and drawing on visual content.

MILLENNIALS ARE TEACHING GENERATION Z?
MICHELLE PEARSON, TEXAS TECH UNIVERSITY

I am an Assistant Professor and a Millennial.

I am older than my Generation Z (GenZ) students but younger than my colleagues, most all of whom are Baby Boomers. I often find myself polarized between the two. Millennials are born between 1980 and 2000. GenZ (a subcategory of the Millennials) are born between 2000 and 2020 (Jones, Jo, and Martin, 2007). Millennials and GenZ are similar in that both generations are technologically savvy. Generation Z, however, is unique in that they are they first generation *never* to experience life without the internet (Turner, 2015). GenZ is the first generation that *expects* and knows only instant access to information and communication.

As a Millennial design professor, I find I am metaphorically and generationally positioned between the GenZ students and my Baby Boomer colleagues. I see the frustrations that my colleagues have, specifically student resistance to ideation and process sketching, and the determination to "jump straight" to the computer. The dilemma of pencil to paper versus technology is one that design professors have faced for years. I have many of the same frustrations; yet, I often find myself empathizing with GenZ behaviors and their desire for fast-paced solutions in a fast-paced environment. I, at least for the time being, understand the technologies and appreciate their capabilities.

I am the link between these two generations and I have recognized that I have a unique opportunity to help both ends of the spectrum understand the other. My role is to encourage the GenZ students to further develop and apply digital design technology, while encouraging them to appreciate the tried-and-true methods of the past. My role is also to demonstrate to my colleagues how these new technologies can be incorporated into their studios to support the new style of learning.

What is the 'new style of learning' and how can we foster it in design studios?

While Gen Z students prefer a technology rich environment, they also value face-to-face interaction and collaboration. They particularly thrive in classroom discussions and desire to be an active participant in the learning process. Knowing this, design educators can create projects in a way that give students opportunities to problem solve first in peer-groups and then allowing time for self-reflection and independent research. GenZ students typically use up to five devices. Therefore, educators can aim to develop projects in a way that embrace computer usage, even in some of the earliest phases. While this group of students may come equipped with the strongest technological abilities, they also have the weakest interpersonal and presentation skills. Here, we could provide students opportunities to present in a format that works well for the Gen Z, group forum-like presentations. Finally, to support GenZ's desire to self-educate and co-create, traditional learning materials could be supplemented with online resources. Perhaps instead of fighting the age-old technological battle, we can all work together and use generational differences to our advantage.

NEUROIMAGING TECHNIQUES AND EYE-TRACKING AS NEW TOOLS TO INVESTIGATE IN DESIGN EDUCATION

HESSAM GHAMARI, CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

The current shifting technology environment has generated a climate in the design world that suggests integrating new tools in the classroom to investigate the impact of environmental attributes on the users. Emerging and evolving neuroscience studies demonstrate that the impact of environmentally related functions such as wayfinding, perception, cognitive processes and related human behavior such as stress, emotions, anxiety, etc., are influenced by electro-chemical processes as well as neural structures (Zeisel, 2006; Eberhard, 2007; Mallgrave, 2011). Technology aids students and educators to recognize the connections between the built environment and the neuroscience of how we understand that environment.

One study using fMRI techniques investigated the impact of formal attributes of healthcare environments on health and well-being in healthcare environments. This study interpreted the brain activations and deactivations during exposure of different sets of images representing the formal attributes of healthcare environments (Pati et al., 2016). Some of the other technologies such as space-syntax, head-mounted displays, mobile devices for blind users, virtual reality, and location sensing devices can investigate the relationships between human behavior and environmental impact. The application of visual character identification also could be translated into personalized accessibility maps that assist individuals with challenges of vision, hearing, and movement (Devlin, 2014).

The tracking of eye movements and eye-fixations has become a well-established method of research in psychological studies. Early on, eye-tracking methods were used to investigate visual attention in studies on reading comprehension and selective visual attention. In the context of wayfinding in indoor environments, previous eye-tracking studies have mostly explored the role of gaze in the control of locomotion behavior (Wiener et al., 2011). For instance, one study, by objectively tracking eye movements and fixation as healthy subjects navigated through a complex unfamiliar indoor setting, identified elements of the designed indoor environment that attract eye-fixation during wayfinding (Ghamari & Pati, 2018). The incorporation of the findings of such studies in interior design studios enables students to understand the

Creator Credit (Ghamari, 2014)

Creator Credit (Ghamari, 2016)

importance of Evidence-Based Design approaches and highlights the pre-design/research phase of the studio projects. Educators can impact students' approach towards design thinking and problem solving by encouraging them to base their design decisions on credible research findings. The findings of these studies using developing technologic methods may extend solid hard science data that pave the way for further research that will decipher the correlation between design, human activity, and behavior.

Creator Credit (Ghamari, 2014)

References

Devlin, A.S. (2014). Wayfinding in Healthcare Facilities: Contributions from Environmental Psychology. *Behavioral Sciences, 4*(4), 423-436.

Eberhard, J. P., ed. (2007). *Architecture and the Brain – A New Knowledge Base from Neuroscience.* Atlanta, GA: Greenway Communications, Ostberg.

Ghamari, H., & Pati, D. (2018, in press). Examining Eye-fixations during Wayfinding in Unfamiliar Indoor Environments, *International Journal of Designed Objects.*

Mallgrave, H. F. (2011). *The Architect's Brain: Neuroscience, Creativity, and Architecture.* Chichester: Wiley-Blackwell.

Pati, D., O'Boyle, M., Hou, J., Nanda, U., & Ghamari, H. (2016). Can Hospital Form Trigger Fear Response? *HERD: Health Environments Research & Design Journal, 9*(3), 162–175. https://doi.org/10.1177/1937586715624210

Wiener, J., Berthoz, A., & Wolbers, T. (2011). Dissociable Cognitive Mechanisms Underlying Human Path Integration, *Experimental Brain Research, 208,* 61-71.

Zeisel, J. (2006). *Inquiry by design: Environment/behavior/neuroscience in architecture, interiors, landscape, and planning.* New York: W.W. Norton & Company.

INSTAGRAM AND THE INTERIOR DESIGN CLASSROOM: RESOLVING EXPECTATIONS WITH REALITY

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Upon initial consideration, incorporating social media into the classroom seems appealing as it appears to offer ways for students to connect via platforms that are already part of their daily online routines. Instagram is used by 71% of Americans aged 18-24 (Pew, 2018), a key demographic in traditional Higher Education and close in age to most MFA Interior Design students at Parsons School of Design (21-28). These students are digital natives: highly connected individuals who respond well to inventive ways of acquiring knowledge. Instagram has filtered how we see the world, and, as designers, given us virtual contexts in which our work is viewed. Coupled with its collaborative nature of enabling instant online sharing and discussions, it seemed like a match for inclusion in the classroom. The example below discusses how students' personal use of Instagram varies significantly in academic settings. This platform was utilized to promote class dialogue across students and professors, through comments, "likes", etc., but it may not offer the intended outcome.

MFA Interior Design students in the *Materials and Performance* class at Parsons were asked to post images to Instagram reflecting their observations of the built material world. The goal for this assignment was to encourage communication beyond the physical classroom and discuss students' selections through social media while thinking critically about how materials influence experience in the everyday built environment. A unique weekly hashtag (#) was provided to direct students to look for particular material conditions.

Despite students posting the requisite images, professors noted insufficient interactions (via likes and comments) among students on the platform. Professors themselves noticed their own lack of Instagram usage for communication. Informal interviews revealed that students were unaware of the other students' accounts, did not always feel comfortable sharing class images on personal accounts, and felt that professors were not sufficiently active on the platform to inspire their participation. Students preferred to maintain a firewall

between their personal and academic online presence, potentially undermining the organic dialogue among former and current students, their faculty, and even the general public.

While students did develop an online image bank (#Parsonsmfaidmaterials represents over 5,100 images covering a wide range of materials) inspiring their future classes, other students, and the global public, curation of the content remains problematic and relies primarily on hashtag organization, limiting its use to those with knowledge of the hashtags. Lastly, professors noticed that students often did not credit the original author of products or buildings when posting images. Intellectual property issues can be difficult for students to navigate, and the proliferation of imagery and re-shares online further complicate these matters.

Integrating Instagram for image archiving and student interaction requires a keen understanding of how students use technology. Instructor expectations for students' willingness to collaborate also need to be adjusted to reflect and respect the boundaries of personal and academic life. Additionally, access to social media privileges those with the means to afford smartphones and service. While incorporating social media into an interior design class can bridge students' increasing preference for "user-driven"

education (Tess, 2013), this assignment shows there are still barriers to using these tools for reflection and analysis, not to mention communication. Students, like their professors, value privacy, and social media in the classroom may infringe on that treasured space, rendering its effectiveness in the classroom inorganic and challenging.

References

Anderson, P. (2007). What is Web 2.0?: Ideas, technologies and implications for education. *JISC, 1*(1). Bristol, UK.

Eijkman, H. (2008). Web 2.0 as a non-foundational network-centric learning space. *Campus-Wide Information Systems, 25*(2), 93–104.

McLoughlin, C., & Lee, M. J. W. (2010). Personalised and self regulated learning in the web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology, 26*(1), 28–43.

Selwyn, N. (2010). Looking beyond learning: Notes towards the critical study of educational technology. *Journal of Computer Assisted Learning, 26*(1), 65–73.

Tess, P.A. (2013). The role of social media in higher education classes (real and virtual) - A literature review. *Computers in Human Behavior, 29*(1), 60–68.

Pew Research Center. (2018). http://www.pewinternet.org/2018/03/01/social-media-use-in-2018/. Web, Accessed September 28, 2018.
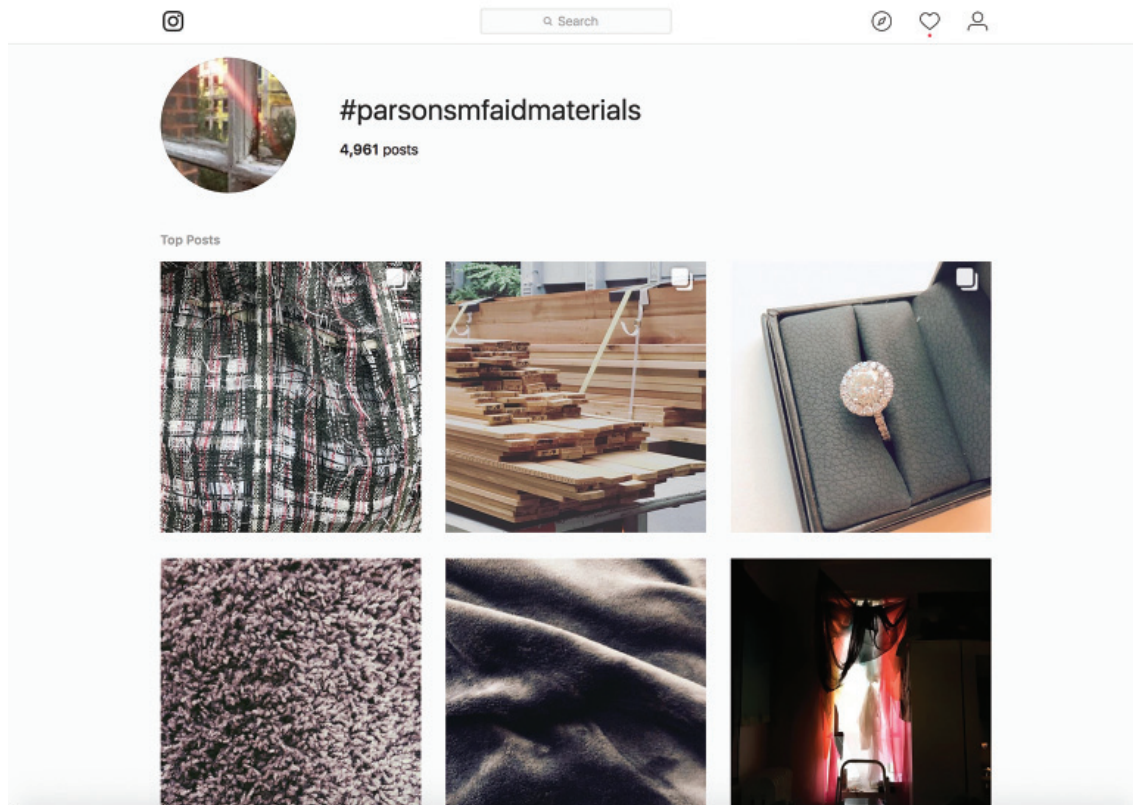
Hashtag search for #parsonsmfaidmaterials; Thumbnails of posts by Xuerui Shen, Shi Yan, Srinaina Polavarapu, and Robyn Bohn.

MILLENNIALS AND MATERIALS: INTEGRATING A DIGITAL CULTURE INTO AN INTERIOR FINISH MATERIALS COURSE

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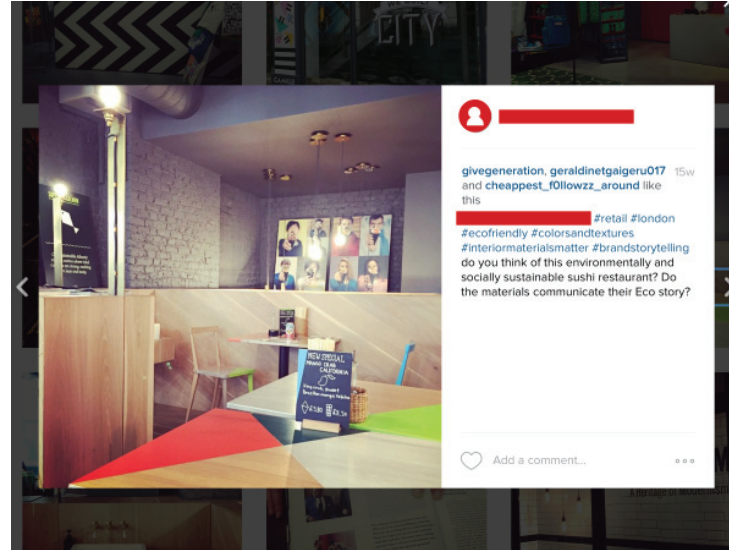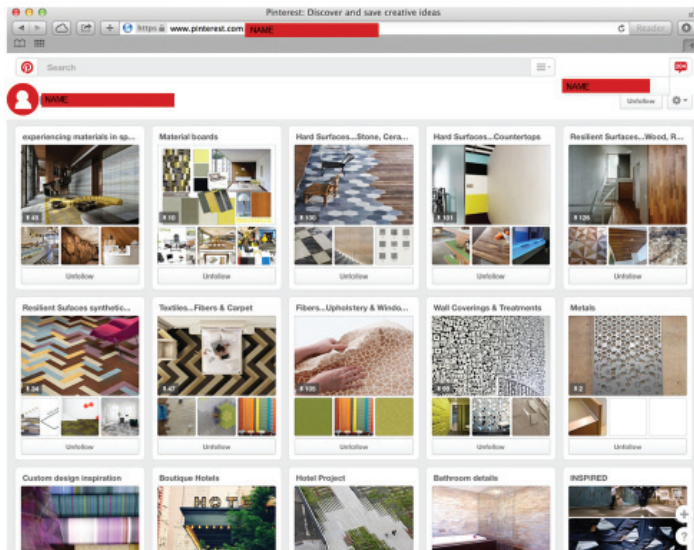
Example of Pinterest as text page and Instagram post with comments from professional and students.

As universities look to develop more curricular areas for on-line education, what advantages do digital tools offer the on-ground interior design educator? How might educators foster both peer-to-peer and peer-to-professor discourse when millennials seem more comfortable texting than speaking? By understanding Millennial's behaviors—connection and comfort through social media—educators can leverage social media in technical courses to expand learning beyond the classroom.

According to Dengler (2008), utilizing on-line discussion boards and chats helps students apply course knowledge and learn from peers. A recent study indicates that investment in photography, video, digital storytelling, experiential learning, and other visuals is worthwhile when inspiring Millennials (Feldmann, 2015). Educational advantages of social media can be summarized by the 5C's: communication, collaboration, community, creativity, and convergence (Friedman and Friedman, 2008). Using course evaluations from the past 4 years of an interior Finish Materials course, this paper presents three successful strategies identified by Millennial students for creating a relatable digital learning culture. The three strategies were developed specifically to address Millennial's needs based on Friedman and Friedman's 5C's between peers and instructor: blog-based

assignments, a digital textbook through Pinterest, and an instructor-curated Instagram.

Blog-Based

As a familiar vehicle, blogs extend peer-to-peer and peer-to-professor discourse beyond the classroom. Developing two blog-based assignments, Photo Journal and Discussion Forum, students explore materials in virtual and built environments. The Photo Journal assignment uses the blog to discuss discoveries and analyze material properties, selection logics, installation methods, sensorial perceptions, and functional/emotional contributions of physical spaces. The discussion forum leverages the latest manufacturer's websites and videos to facilitate outside-the-class discourse.

Pinterest As Textbook

Millennials, who have grown up with information in the palms of their hands, struggle with outdated inspiration and information in textbooks. With the popularity, accessibility, and intuitive ease of Pinterest, a virtual textbook brings the curricular structure of the course into real-time information sharing. Pinterest's platform allows for creating digital chapters that are easily updated with new content such as publications

from on-line journals and blogs, instructional videos from material manufacturers, and inspirational images for innovative material applications.

Website & Instagram

Millennials value trust through lifestyle storytelling (Sparks & Honey, 2014); thus, it is critical to cultivate relationships between students and instructor that go beyond the classroom. A curated instructor's Instagram allows them to share their continuous story of everyday observations through their own design lens, illustrating how design is an integral element of the world around us and inspiration for design can come from many different places. This will begin to build trust and forge a bond with students, extending education beyond the classroom.

Outcome

Course evaluations from the past four years reveal the following:

- Blog assignments allowed students to became less inhibited about engaging with peers and the instructor, resulting in greater frequency of participation and increased engagement, producing deeper subject matter discourse.

- All social media tools encouraged students to participate outside the class room fostering deeper contemplation on the subject matter.

- Blog assignments allowed students to become more reflective, responding more thoughtfully and honestly.

- Students saw the materials class as relevant and contemporary due to the custom Pinterest textbook, resulting in greater trust of the instructor's knowledge of the course material as current and on trend.

- The constantly updated Pinterest text keeps students continually inspired and is a resource they appreciate after the class has concluded.

References (APA)

Dengler, M. (2008). Classroom active learning complemented by an online discussion forum to teach sustainability. *Journal of Geography in Higher Education, 32*(3), 481-494.

Feldmann, D. (2015). A Generation for a cause: A four-year summary of the Millennial impact report. Available at: https://static1.squarespace.com/static/55cbb6d4e4b0f9228ad80414/t/57bc65e7b3db2bd0d11a6403/1471964647887/MIP_4Year_Summary.pdf

Friedman, L.W. and Friedman, H.H (2008). High impact areas of the new media technologies: A review, *Management Online Review,* July, http://www.morexpertise.com/download.php?id=97

Sparks & Honey (2014). "Meet Generation Z: Forget everything you learned about Millennials." Achieve & the Case Foundation. Available at: http://www.slideshare.net/sparksandhoney/generation-z-finaljune-17

ROBOTS TAKE OVER THE [DESIGN] WORLD
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A Revolution in technology will lead to more diverse and dynamic design.

Design and Construction are rapidly evolving and are already presenting this generation with some stark realities and very clear benefits. Design will never be the same again. This change is not being brought about due to a reduction of resources but rather the introduction of game-changing advancements and technology in ROBOTICS.

Robotics and computer-aided design are not new to the design profession. We have used them for decades in the way we design and manufacture many of our most commonly used items, such as millwork, steel, and plastics. Truthfully, the profession has not embraced this wholeheartedly, and is still using strategies that are quickly becoming obsolete. Until recently, robots were relegated to the realm of manufacturing, and it was assumed that they could not meet the flexible demands of jobsite construction or rapid prototyping for design analysis. This is no longer true. The manufacturers of many of the construction products we use today know the real barrier to their profitability is in finding enough qualified labor at a price that is competitive with lower-end construction techniques. Influential construction materials manufacturers (CLT, steel, and masonry to name a few) are investing significantly in bringing robots onto the jobsite. Architects, Engineers, and Designers should be leading the way in seeing these machines being the generators of our future. They can liberate our designs, as they become the perfect laborer, always willing to produce to our hearts content, so long as we know how to communicate our desired result to them.

Due to rapid growth in self-learning programming languages and lower cost robotic components, we may be less than five years from seeing the first robots, unaided by construction labor, being implemented on jobsites to perform many of the repetitive and mundane tasks currently being completed by workers. Designers who embrace this shift will be able to develop designs not previously thought possible in construction. As designers and educators, we need to strive to push our students to become more technologically flexible, while at the same time fluidly embracing the notions of artistic expression through machines.

If we abandon the older, more rigid notions of education in favor of more fluid tactics, we can free our young designers of their artificial constraints, which in turn will free the educators to teach them to be pliable, allowing them to readily embrace new systems with enthusiasm. This explorative process will free the designers to embrace the new robotic paradigm being presented to them and accept it as the partner it can truly be. By bringing the human/machine partnership into our creative learning process we can teach young professionals how to see it as a liberating extension of themselves, and to nurture that growth the same way we would nurture the mind in training the hand to draw a line. We should strive to bring this medium into our designs innately, so that it becomes an extension of our profession, as we proceed into the future.

Students not prepared to embrace this more fluid medium will tend to deliver mundane and outmoded responses to design and will meet an uninterested profession — basically, having learned Latin, just as it dies.

Out of this disruption will rise a robotic design space that is rapid and economical but still fluid and expressive. If properly harnessed, the new design strategies will free designers to reclaim the mantle of Master Builder. Like their historic predecessors, they will be fluent in the new design and construction process but will have little place at the table for those not willing to earn their place. This technology is fast approaching, and if design professionals and educators are not prepared to lead and prepare the new generation, we will see our profession sidelined the way we have been with other treasured aspects of the older profession.

CONNECTING WITH COMMUNITY THROUGH TECHNOLOGY

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Public perception plays a major role in making a case for the legitimacy of the Interior Design profession. As stakeholders of the profession, we can enhance this perception through active engagement with the community. As educators, one tool we have is educating the public. There is a critical need in educating the public and future generations on what the Interior Design profession is and how it benefits the public's health, safety, welfare, and quality of life. This understanding starts with making the public aware of what Interior Designers do.

In order to connect with the public, the Interior Design program at Oklahoma State University works through the Mixed Reality Lab. Annually, the lab conducts workshops and events on the theme of using Technology and Design. These workshops are focused towards kids who will become designers in the future. Teaching children the basics of design through something that they enjoy has been the main objective of our programs. These workshops often start by demonstrating 3D modeling using simple software such as SketchUp and then move on to look at how to use these 3D models through Virtual Reality(VR), Augmented Reality(AR), and 3D printing.

The software we use in our workshops are often free, so the participants are able to go home and try these by themselves. SketchUp is a free software (that has a paid option as well) that can be used to model 3D environments/objects. In our lab, participants have used the Enscape plugin for SketchUp with Head Mounted Display systems. However, participants are also instructed on how to upload their model to free model hosting websites such as Sketchfab and view their models through inexpensive VR Headsets such as Google Cardboard. We often provide these heads sets for participants to take home. In one particular design exercise, participants work on a small design project, where they design a dorm room for two students at OSU. While designing, they are able to visualize it in VR and experience the space they design. Participants are instructed to design and model pieces of furniture using SketchUp, which they then visualize through AR, using applications such as Augment. Participants are also asked to model a

small house using SketchUp and then 3D print it in the lab. Through these projects, participants not only experience the fundamentals of Designing and 3D modeling, but also get an understanding of applying that skill through VR, AR and 3D printing which will help them in their future carriers.

During the summer of 2018, the lab hosted four workshops. We have conducted workshops for Grandparent University, where members of the alumni association (grandparents) bring legacies (grandchildren) to campus and participate in a variety of intergenerational workshops and campus activities. During the last four years that we have conducted these workshops, we have hosted individuals ages 6 to 75. We also hosted Latino youth through a program called Unidos. In a two-week long summer camp, we hosted Native American middle school girls. We also hosted participants for a Design Institute event. Apart from these, we have hosted participants from local high schools and middle schools for one-day workshops. We continue to bring the community together and work on design related projects to solve problems through technology-focused events such as CANstructions and Hackathons with the objective of connecting the Interior Design profession with the community. Details about our programs and workshops can be found at our website: www.mxrlab.org.