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# Table of Contents

## Oral Presentations

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Evidence-Based Design Approach to Redesigning Graduate Student Center</td>
<td>6</td>
</tr>
<tr>
<td><em>Ahmad Al-Ansari, Iman Bokhari, Nahlah Yousef &amp; Kristi Gaines</em></td>
<td></td>
</tr>
<tr>
<td>Redesigning a Cardiac Intensive Care Unit through Employing an Evidence-Based Design Approach</td>
<td>8</td>
</tr>
<tr>
<td><em>Ahmad Alansari &amp; Debajyoti Pati</em></td>
<td></td>
</tr>
<tr>
<td>The Villa as Embodiment of Cultural Ideology: A Cross-Cultural Contrast of Villa Rotonda and Katsura Imperial Villa</td>
<td>10</td>
</tr>
<tr>
<td><em>M. Jean Edwards</em></td>
<td></td>
</tr>
<tr>
<td>BIM in Interior Design Program Curricula</td>
<td>13</td>
</tr>
<tr>
<td><em>Suchismita Bhattacharjee and Elizabeth Pober</em></td>
<td></td>
</tr>
<tr>
<td>FINDING ROOM IN THE MAINSTREAM: Foregrounding the Capstone with Creative Inquiry</td>
<td>15</td>
</tr>
<tr>
<td><em>Marsha R. Cuddeback and TL Ritchie</em></td>
<td></td>
</tr>
<tr>
<td>Innovative Online Applications for an Interior Design Course</td>
<td>17</td>
</tr>
<tr>
<td><em>Shelby A. Brock</em></td>
<td></td>
</tr>
<tr>
<td>Luminance Mapping: Lighting analysis in a snap(shot)</td>
<td>22</td>
</tr>
<tr>
<td><em>Erin Schambureck</em></td>
<td></td>
</tr>
<tr>
<td>Vectors, Envelopes, and Elements: An Introductory Design Studio Project</td>
<td>29</td>
</tr>
<tr>
<td><em>Conrad Marcus Rathmann</em></td>
<td></td>
</tr>
<tr>
<td>Globalization and Cultural Differences in a Construction Studio</td>
<td>34</td>
</tr>
<tr>
<td><em>Sally Ann Swearingen, Leisha M Bridwel, and Mitzi Perritt</em></td>
<td></td>
</tr>
<tr>
<td>Preparing the Millennial student to problem-solve through full-scale furniture model design and testing</td>
<td>36</td>
</tr>
<tr>
<td><em>Natalie Ellis</em></td>
<td></td>
</tr>
</tbody>
</table>
Creative Scholarship

Redefining The University Classroom
   Sally Ann Swearingen and Allysa Calvillo  51

Design for Sight: Engaging the public in low vision design research
   Erin Schambureck  57

L’eau de la Danse Installation: Water, Music, Dance, Lighting, Rhythm
   Nadya Kozinets  68

Wedge
   Hans-Peter Wachter  80

Conference Schedule  82
An Evidence-Based Design Approach to Redesigning Graduate Student Center

Iman Bokhari, Nahlah Yousef & Kristi Gaines

Background: Numerous studies were conducted with a cohort of university students to determine how they may have been influenced by their physical environment and surroundings. Waxman (2007) found that environmental design may strongly impact college students and their attachment to the campus. In surveys, national samples of graduate students report that they often felt little sense of community or connection to one another or to the larger university (Golde & Dore, 2001). One means to amend this lack for in-campus students could be an attractive third place to congregate. Such a new graduate student center specifically designed to meet the interests and preferences of students at one of the southwestern university would create an attachment to the campus as well as develop and enhance their sense of belonging. Waxman, Clemons, Banning and McKelfresh (2007) found that socialization, interior atmosphere and appropriate location are the most important characteristics that students would consider when choosing a third space to gather. The place attachment theory is used as a theoretical framework in this study.

Purpose: The purpose of this study is to determine the preferences and needs of graduate students at one of the southwestern university regarding the environmental design of the new graduate student center in terms of activities, equipment and constructively comfortable areas. The Planning and Operation division has previously developed one tentative design; however, this was rejected by graduate students since it poorly met their needs and preferences.

Method: Both quantitative and qualitative research approaches were implemented in this study through using closed-ended and partially-closed-ended questions. A survey questionnaire was used to measure the preferences and interests of a sample of graduate students at one of the southwestern university in the United States. The questionnaire was developed with use of the Survey Monkey website and distributed to subjects through their university emails. The study was conducted in the spring 2013 semester, and it targeted populations comprised of both Masters and Ph.D. students who were enrolled in-campus courses. Three hundred (n = 300) graduate students participated in the study, 124 male and 176 female students.

Findings: This study revealed that the students’ preferential third places, in order, are the coffee shop (41%), the university library (27%), restaurant (25%), a friend’s place (24%), and the gym
(23%). The primary activities that graduate students will anticipate engaging at the graduate student center are: doing school assignments (72%), eating and drinking (65%), taking a nap (51%), and having a small party (29%). The facilities that graduate students consider most essential for the new center are: Computer Facilities (81%), Study Rooms (75%), Couches (56%), Sleeping Areas (41%), Dining Room(s) (34%), and a Full Kitchen (27%), respectively. Graduate students prefer having a Cafe/Kitchenette, Dining Room(s), and Large Screen Televisions in a graduate student center, respectively. The entertainment activities that graduate student most strongly prefer for their free time are Television, Reading, Pool Table, Ping Pong, Video Games and Football Games.

Implications: Based on the findings of this study, a revised interior environment was designed and submitted for implementation to the graduate school administration.

References: APA


Redesigning a Cardiac Intensive Care Unit through Employing an Evidence-Based Design Approach
Ahmad Alansari & Debajoti Pati

Introduction: Hospitals in the United States face several challenges, including medical errors, hospital-acquired infections, patient falls, nurse back pain, and workplace injuries (Pati et al., 2009). Medical errors may involve giving the wrong medication to the wrong patient or giving an incorrect dosage. The physical design of a healthcare facility is one of the major contributors to these healthcare issues (Dickerman & Barach, 2008).

Purpose: The purpose of this project was to design a cardiac intensive care unit (Cardiac ICU) by employing an evidence-based design approach, implementing valid and credible evidence from the literature. Covenant Hospital in Lubbock, Texas approached the researcher for the purpose of remolding its existing Cardiac ICU.

Method: A pictorial case study was conducted to investigate the issues existing in the old Cardiac ICU. Then, semi-structured interviews were conducted among nurses and staff members in the unit to determine their needs and preferences related to the built environment. The researcher retrieved evidence about key design elements of the Cardiac ICU in the built environment through a review of the literature. The design focused on promoting patient health, safety, and satisfaction while reducing staff stress and fatigue as well as medical errors.

Findings/Implementations: Varieties of interior environmental elements were implemented in the design project. The designer incorporated decentralized nurse workstations, which have been shown to increase patient satisfaction and safety, eliminating two-thirds of patient falls (Hendrich et al., 2004) while reducing nurses’ walking distance and fatigue (Hua et al., 2012). Natural views also have a significant influence on nurses and patients. To illustrate, natural stimuli have improved alertness levels among nurses while reducing their acute stress levels in comparison with nurses who were not exposed to natural stimuli (Pati et al., 2008). Positive distractions like a natural view also reduce patient stress, pain, and lengths of stay while improving patient satisfaction (Choi & Beltran, 2004). Outboard bathroom locations in patient rooms, meanwhile, have higher rating in terms of patient safety, staff efficiency, circulation, infection control, patient considerations, and family amenities than inboard bathroom locations (Pati et al., 2009). Finally, exposing patients to daylighting reduces their hospitalization times and positively influences
their medical conditions (Choi & Beltran, 2004). Further design elements implemented in the design of the built environment will be shown and discussed in the presentation.

References: APA


Hua, Y., Becker, F., Wurmser, T., Bliss, J., & Hedges, C. (2012). The Effects of Nursing Unit Spatial Layout on Nursing Team Communication Patterns, Quality of Care, and Patient Safety, HERD.


The Villa as Embodiment of Cultural Ideology: A Cross-Cultural Contrast of Villa Rotonda and Katsura Imperial Villa

M. Jean Edwards

According to Ackerman “what distinguishes a villa from a farmhouse … is the intense, programmatic investment of ideological goals” (1990, p. 286). As such, villa design accords minimal attention to practical concerns, emphasizing instead formal abstraction and conceptual idealization. The selection of Villa Rotonda (1570-92) and Katsura Imperial Villa (1618-63) for this study provides an opportunity to examine two disparate cultures, Renaissance Italy and early Edo Japan, within the context of idealized expressions of those cultures. The fact that both of these villas are acknowledged “masterworks” that continue to serve as models for subsequent design, attests to their cultural endurance (Kubelik, 1986). The purpose here is to contrast these two iconic villas vis-à-vis their distinctive characterization of man’s relationship to nature (Ackerman, 1990; Lancaster, 1956).

The classical tradition of ancient Rome clearly informs Villa Rotonda, while a synthesis of Chinese Buddhism, native Shinto belief, and tea ritual pervades Katsura Villa. Both villas reinvigorate and expand the “classical” villa form, as it was understood in their respective cultures. Chronologically built within 100 years of each other, these villas also reflect social and political conditions within each country at the time of their conceptions. Distinct cultural tendencies specific to West and East are evident in the style of the villas, the use of building materials, and the relationship of the villa building(s) to interior and to exterior (Ackerman, 1990; Nishi & Hozumi, 1963).

Focusing on the most distinctive contrast between the two, their expression of man’s relationship to nature, this study examines the siting and formal organization of each. Though neither of the villas was completed within the lifetime of its respective designer/founder, this fundamental relationship remains evident in each, providing a reflection of distinctive cultural beliefs. The power of these conceptions has been sufficient to withstand the accretions over time effected by subsequent designers and theorists. Palladio’s writings and drawings in The Four Books of Architecture helped to spread the influence of Villa Rotonda throughout the West and the rest of the world, where there exist many buildings fashioned after it (Kubelik, 1986). Ironically, it is 20th c. Western architects, Bruno Taut and Walter Gropius, who publicized Katsura Villa, seeing in it a justification of and rationalization for early Modern challenges to

In conclusion, both of these structures represent inspired responses to the urban life of their day, providing sanctuary for men of privilege and their guests. Ackerman states “…the image of a refuge in the country focuses not so much on the accommodation of clearly defined rural functions as on a cornucopia of values absent or debased in the city. The city, as the locus of social interaction, is inevitably mundane and temporal, while the country, in exacting confrontations with the immanent brute forces and sensuous enchantments of nature, prompts inspired responses” (Ackerman, 1990, p. 286).

References: APA


APPENDIX

The Villa as Embodiment of Cultural Ideology: A Cross-Cultural Contrast of Villa Rotonda and Katsura Imperial Villa

Villa Rotonda sited atop a hill¹

Katsura Imperial Villa sited in landscape²

Plan and Section/Elevation Villa Rotonda³

Plan Katsura Imperial Villa⁴

²https://upload.wikimedia.org/wikipedia/en/6/63/Katsura_Imperial_Villa_in_Spring.JPG
³dbc18612d97a03bf15c71039185f2593e2130c60.jpg
⁴http://41.media.tumblr.com/a2c1e2a744e750c5e207d5881d10740d/tumblr_inline_nmnh34LohV1t9ifur_1280.jpg
A report published by National Institute of Standards and Technology (NIST) in 2004 suggested the loss of $15.8 billion per year due to poor interoperability and data management, which is approximately 3-4% of the total AEC (Architecture, Engineering and Construction) industry cost (Gallaher et. al., 2004). Many design and construction companies have adopted Building Information Modeling (BIM) as an answer to this problem. According to the 2007 publication of National BIM Standard BIM is defined as “a digital representation of physical and functional characteristics of a facility” (Smith & Edgar, 2008). On one hand there is a sector of people in this AEC industry who considers BIM as a platform for collaboration between the different stakeholders at different phases of the life cycle of a facility, and again another sector of people considers it to be a newly adopted trend which will pass over before it even caters to the whole industry. Thus, it importance to educate the students of this industry about BIM at an earlier stage in their academic career, as they will be the future professionals of this industry.

Considering the current situation, Interior Design Programs should take a similar step to prepare the students for future professional success, by familiarizing them with BIM authoring and various design analysis functions of BIM.

The primary objective of this study was to examine the baccalaureate and graduate curricula for courses on BIM offered by the Interior Design programs in the United States based on the following factors: (1) course level, (2) required prerequisites, (3) course description, (4) learning outcomes, and (5) instructional methods. A systematic search of the curricula of the CIDA accredited Interior Design Programs was conducted to identify the courses on BIM or its variants. Content analysis was used as the method for the data analyses.

Results indicated that less than 50% of the accredited programs offer independent courses which focus on BIM or its variants. Significant variation in instructor qualifications and expertise, course descriptions, course objectives and learning outcomes of the BIM courses were also observed. In order to provide the future workforce a comprehensive education about BIM, the professional organizations such as CIDA and IDEC should come forward in developing systematic and uniform curricula for courses on BIM and its variants.
References: APA


FINDING ROOM IN THE MAINSTREAM: Foregrounding the Capstone with Creative Inquiry

Marsha R. Cuddeback and TL Ritchie

What happens when a more fluid model of inquiry is introduced into the mainstream design sequence to offset preconceived expectations, monotonous solutions, and creative fatigue?

PROBLEM
The traditional design studio in Interior Design curricula often utilizes problem based learning as a positive instructional strategy to foreground the capstone project in undergraduate education. Here, problems are intentionally ‘ill structured’ (Jonassen 1997, 1) to acknowledge the potential for multiple solutions and include educational benefits from “uncertainty about which concepts, rules, and principles are necessary for the solution or how they are organized, and which solution is best (Jonassen 1997, 1).” This approach values research, integrating theory and practice, and “applying knowledge and skills to develop a viable solution to a defined problem (Savery 2002, 12).” Combined with mastery learning, it offers a strong model for sequencing design instruction with increasing levels of complexity. However, the risk of preconceived expectations, monotonous solutions, and creative fatigue exists from overburdening the student with a repetitious learning model.

METHOD
During a second semester junior studio non-traditional design investigations were introduced to unravel design expectations and habits that, “reduce themselves to routine ways of acting (Dewey 2012, 58), and create an environment for renewing creative inquiry.

Essays from Lois Weinthal’s, Toward A New Interior: An Anthology of Interior Design Theory, served as the theoretical underpinning for student investigations. Initially the projects were grounded in exploring patterns found in nature to inspire creating a three dimensional active surface. These surfaces were then reassembled at full scale to form a fictional, intimate enclosure for the human body. The final investigation encouraged teams of students to consider the disposition of an interior environment to shape physiological and psychological behaviors and state of mind. Here, students were charged to explore the full range of human senses and create a multisensory environment at full scale.

OUTCOMES
Students were asked to submit a final reflection to consider what and how they had learned, and the relevance this learning might have for their upcoming capstone project. Written reflections were submitted after grades had been assigned to encourage candid responses.

Three significant observations emerged from the student reflections and all three were common among 90% of students: the ability to renew conceptual design thinking and creativity, the value of collaborative work to inform the design process, and the unexpected challenges and outcomes from exploring design at full size.

From the instructors point of view the student observations paralleled challenges that can result from a repetitious learning model. The reflections suggest that introducing this model of inquiry prior to a capstone or senior project can reduce creative fatigue, counter preconceived expectations through shared inquiry, and stimulate design solutions through exploring design at the delivered scale.

References: Chicago


Innovative Online Applications for an Interior Design Course

Shelby A. Brock

Background:
Researchers have noted that “The traditional model of college is changing, as demonstrated by the proliferation of colleges, hybrid class schedules with night and weekend meetings, and, most significantly, online learning” (Van Der Werf and Sabatier, 2009, p. 3). Kinsey found that “Society is shifting from a face-to-face learning environment (synchronous) to an anytime online learning environment (asynchronous). Educators must rethink their delivery strategies by using new technological tools that consumers and students are demanding” (2009, p. 67). Olson and Jensrud go on to say that “Online learning is increasing exponentially. It is estimated that only one-half of students by 2020 will be enrolled as traditional full-time students” (2012, p. 2).

Purpose:
So that students would be engaged in experiential learning experiences, the author used a variety of electronic methodologies in her online course. Thus, the purpose of this analysis was to pilot several unique and innovative teaching practices developed for an online Interior Design Codes, Standards and Facility Maintenance course that could also be applied when transitioning a current on-campus Interior Design course to the online format.

Methodology:
The author developed and assigned a virtual world interior scenario to address student analysis of the built environment as it pertained to the Americans with Disability Act Accessibility Guidelines and the Texas Accessibility Standards. Written feedback was obtained from the students. The author also incorporated an instructor-created video simulation of using a wheelchair in various situations for her online Interior Design Codes, Standards and Facility Maintenance course; feedback regarding effectiveness was acquired through a discussion component of the assignment analysis. The use of pen tablet sketching, instructor-produced videos, and online submission assignments were also incorporated to guide and assist the student through the online course.

Results:
Written feedback from students pertaining to the virtual world scenario assignment was positive with minor issues occurring in the technical components of the student’s personal
computer. The results from the video-produced assignment found that students (n = 35) felt they could relate with a person encountering physical restrictions when maneuvering the wheelchair through a building (97%), felt they learned more from seeing the video demonstration than learning the material from the textbook and the audio lecture (100%), and could better recognize and analyze building codes by seeing the video demonstration (95%).

Conclusions and Implications:

Various methodologies were tested for effectiveness in the online Interior Design Codes, Standards and Facility Maintenance course. The results for the methodologies showed student learning of the course content was enhanced by using electronic techniques that simulated real-world situations. Other types of digital media were also used in the online teaching environment to enhance the students understanding of building codes. Since many of today’s higher education students are frequent users of electronic modes of communication, it is important for faculty to capture that familiarity for meeting course objectives.

References: APA


APPENDIX

Second Life Application:
Unity Application:
Wheelchair Video Application:
Luminance Mapping: Lighting analysis in a snap(shot)

Erin Schambureck

Luminance mapping is a method of analysis available to lighting designers and other professionals interested in evaluating the quality of light in a space by quantifying a number of luminance based metrics. This study looks to identify the recommended protocols identified by current luminance mapping research as well as understand how it is being applied in project design development and post-occupancy analysis and research. Lighting design is typically based on illuminance methods which design for the amount of light that falls on a given surface or task. As light is reflected off the objects in the environment it is perceived by the visual system as luminance, or the brightness of objects in the scene. Simply and accurately quantifying luminance in the visual field is the first step to correlating measured lighting values to human preference and the perception of glare, as well as analyzing the success of photo-control systems, daylighting components, and electric lighting implemented in the space.

Practitioners evaluate existing spaces and proposed designs using software, measurement instruments and qualitative assessments. Luminance mapping is one of the techniques available for such analysis. It has been employed in research by analyzing three-dimensional digital models of proposed spaces and approximating the daylight conditions using advanced ray-tracing software such as Diva (Reinhart, 2010). Other studies have used high dynamic range photography to create luminance maps using a standard DSLR camera and a full-frame fish-eye lens (Howlett, 2007). That same study also validates how luminance measurement techniques correlate to common methods of illuminance measurement in predicting successful lighting design. A third study used this photographic method to correlate glare analysis of luminance maps to visual comfort and user satisfaction in LEED certified religious buildings (Shin, 2014).

These and other studies have identified recommended protocols for employing luminance mapping techniques in research and design as well as pointed out areas where there is a need for greater simplicity and greater accuracy in predicting the visual comfort of the user. This paper assimilates the various protocols and findings to develop best practices for the implementation of luminance mapping for visual comfort analysis. Unfortunately, while the creation of the luminance map can be controlled, the interpretation of that information is still difficult to accurately quantify. The research shows there are flaws in the glare indices used to
analyze the luminance data. The glare analysis formulas do not inherently account for differences of average luminance between buildings and spaces being compared. They also do not reflect the visual comfort preferences of those 65 and older who typically need twice the light levels of a 20 year old and are more susceptible to perceive glare in the environment due to the aging eye (IES, 2007). Moving forward it is encouraging to see simplification of luminance mapping techniques and examples of its use in interior analysis. However, it is important to continue to look for research that will identify accurate glare indices for those with perceptual and cognitive disabilities and to consider the perceptual preference of alternative user groups before interpreting luminance maps.

References: Chicago

Illuminating Engineering Society. 2007. ANSI/IES RP-28-07 Lighting and the Visual Environment for Senior Living. IES.


Applying Glare Analysis:

Glare Indices
• Each is calibrated for different lighting conditions
• Manually normalized between different buildings
• Adjustments needed for the aging eye.

Glare Analysis

dgp: 0.2224 (barely perceptible)
dgi: 13.1747 (barely perceptible)
ugr: 17.1338 (perceptible)
vcp: 77.3648 (77.36% occupants are predicted to feel comfortable in the space)
cgi: 20.3849 (perceptible)
Making an HDR Photo:

- Three or more exposures are combined in Photosphere software to create the High-dynamic range image.
Luminance Analysis:

- False-color images can be created using a variety of programs but the important part is the luminance scale on the left showing the range of luminance values in the image. The strong contrast in luminance values here indicates glare from the windows.
Using Luminance Mapping:

- Luminance maps can be quickly developed to identify problem areas in client spaces.

Initial Photographic Analysis:

Signage throughout the building is “beige on beige”. While this color scheme coordinates with the wall finishes and may meet contrast requirements, the similar hues make letters indistinguishable as shown in the false color image.

Initial Wayfinding signage at building entrance is low contrast and not repeated at eye level.

Hallway lighting creates strong contrast between light and shadow. There is no delineation of architectural features.
iPhotoLux App:

Understanding approximate luminance values in any space can be helpful. One design researcher developed an app based off the photosphere software to quickly capture images and provide relatively accurate analysis.
Vectors, Envelopes, and Elements: An Introductory Design Studio Project

Conrad Marcus Rathmann

Introduction
Design Basics 3D is the introductory studio experience for students in the Interior Design program. The faculty member was encouraged to rethink the method of achieving student outcomes. In this course students make their first forays into volumetric thinking and the design of a spatial experience.

Circulation
F.D.K. Ching describes the circulation path as “the perceptual thread that links the spaces of a building…together”. Students studied the various archetypal circulation systems and their relationship to spaces of activity.

Vector + Envelope
Readings from Tschumi on Architecture: Conversations with Enrique Walker provided students with a background for understanding the circulation system as a series of vectors and envelopes. As Tschumi says:

Buildings, in their simplest form, are made of vectors and envelopes. How one enters the building and moves through it constitutes the vectors. What keeps out the rain, cold, heat, noise and burglars constitutes the envelope. Vectors activate; envelopes define.

Students were encouraged to think about the perceptual experience as the sum of the orientation of the path itself and the environment created by the surrounding materials. Studies begin by exploring various possibilities for movement through a series of vector diagrams.

Earthwork
Readings from Studies in Tectonic Culture formed a basis for students to understand Gottfried Semper’s “Four Elements of Architecture”: Earthwork, Framework/Roof, Enclosing Membrane, Hearth. Students created models made by building up the path in layers. These were then cast as plaster models.

Framework
Continuing in Semper’s elements, students studied the nature of the relationship between load and support and explored possibilities for connection between stereotomic (massive) and tectonic (framework) systems of construction. Students were required to add additional levels to their design and to find ways to support these.

**Enclosing Membrane**
Returning to initial concepts of vector and envelope, students explored the relationship of spaces across various boundaries. Considering Semper’s ideas of the evolution of the enclosing membrane from thatched materials to woven fabrics and then solid materials, students investigated various materials to create boundaries as opaque, translucent, or transparent.

**Conclusions**
Through this process, students were able to achieve learning outcomes related to the study of a design process that implemented diagrams, sketches, and models. Students critically evaluated contemporary design theories and combined these with the design vocabulary learned in the 2D Design Fundamentals course. Most importantly, students developed a habit of thinking critically about the perceptual experience of space. By simplifying the conversation of design to focus on the direction of the circulation path and the nature of the surrounding envelope, students were able to design a rich spatial experience.

**References: Chicago**


Frampton, Studies in Tectonic Culture, 87.
APPENDIX

Assignment 2.3 Framework

Purpose: To study the nature of the relationship between load and support. To explore possibilities for connection between stereotomic (massive) and tectonic (framework) systems of construction. To explore the potential of a system of vectors (circulation) in three dimensions.

Process: Working from your plans and sections, construct a 1/8” = 1’-0” scale model of your circulation system and areas of activity. Use bass wood to construct beams and columns. Use stacked layers of chip board spray painted white to represent stereotomic (massive) construction such as brick or concrete walls.

Recalling the readings and visual examples of tectonic, stereotomic, and atectonic methods of construction explore various details regarding the design of the system of support that carries the load of the stairs and floors.

Use a series of sketches to explore various possibilities for the relationship of load to support and of massive to framework systems. Consider questions such as:

- How does the column touch the earthwork?
- How does the column meet the beam?
- What is the relationship of the beam to the flooring material?
- Are connections expressed or concealed?
- How is the frame braced?

Scan, edit and format your sketches on an 11” x 17” sheet of paper.

Limitations: Plaster and bass wood model, sketches.

Product: Plaster and bass wood model, 11” x 17” page of sketches.

Presentation: Assignment is due at the beginning of Class 9.
Assignment 2.4 – Enclosing Membrane

Purpose: To explore the potential of a system of vectors (circulation) and envelopes (enclosing membrane) in three dimensions. To consider the relationship of spaces across various boundaries. To explore materials that constitute boundaries as opaque, translucent, or transparent. To study the relationship of the enclosing membrane (envelope) to the support (framework) as a sub-set of the relationship of load and support.

Process: Continuing to work with your 1/8" scale model, consider the envelope around your vectors and nodes of activity. Recalling the readings and visual examples of enclosing membranes, explore various materials and methods of support for the envelope. Remember that the envelope may include floor, wall, and roof – or even combinations or hybrids of those. Consider the varying degrees of separation, both visual and physical, that you want to create between spaces.

Revise your ¼" = 1'-0" scale plan and section drawings accordingly.

Use a series of sketches, photographs, and digital scans to explore various possibilities for the visual and tactile quality of the envelope. Consider questions such as:

- Does a boundary bind or separate?
- Is the boundary permanent or ephemeral?
- What is concealed? Revealed?
- What potential is there to visually connect but physically separate?
- What role does voyeurism/exhibitions play in the quality of the envelope?
- Is transparency truth?
- What is the relationship of the envelope to the body?
- What role does the tactile quality of the material play in reading it as a permanent or temporary enclosure?

Scan, edit and format your exploration on an 11" x 17" sheet of paper.

Limitations: Plaster and bass wood model, revised floor plans and sections, detail sketches.

Product: Plaster and bass wood model, ¼" = 1'-0" plans and sections, 11" x 17" page of sketches.
Globalization and Cultural Differences in a Construction Studio
Sally Ann Swearingen, Leisha M Bridwel, and Mitzi Perritt

Advances in internet communication are redefining interior design education and suggest new and exciting potential for collaboration and the sharing of knowledge (Matthews, Weigand 2001). The goal of this course was to explore issues related to globalization and cultural differences in an interior design construction studio. Prior to this junior level course, students developed a working knowledge of a variety of technologies required to complete a set of detail drawings. Programs such as Microsoft Office, PowerPoint, Sketchup Pro, AutoCad and Revit are taught and utilized. But, how do we as educator facilitators use the collaborative and research potential of technology to teach construction emphasizing globalization and cultural differences? Current literature supports the need for educators to present multi-faceted collaboration as a realistic and constructive model for achieving design solutions. (Matthews, Weigand). This multi-faceted collaboration is expanded through technology and strengthened when we incorporate globalization tactics. Lindberg (1995) notes that cooperative learning begins with the conviction that teams are a way of life (and that) when individuals work together toward a common goal, their mutual dependency often motivates them to work harder to help the group, and thereby themselves, to succeed. Students’ learning experiences are affected by the way in which they are taught (Nussbaumer 2001).

Planning for this studio began months prior to its offering. The goal of the course was to illustrate to students how they can work effectively with clients who are hundreds of miles away. The development of efficient long-distance communications was defined as an objective of the project. Design, like every other field, is influenced by cultural forces; (Asojo 2001) therefore, as professors in the United States, we teach construction and design elements of our country. Exploring and learning how another country approaches design and construction, poses cultural challenges as well as globalization issues. CIDA indicates an increasing need for studies that introduce diverse culture-based perspectives into design education. The complex challenge is preparing students to utilize technology, not only in communicating with their clients, but in their research of all phases of developing construction documents. This presentation will demonstrate how students’ gathered research, interviewed a client from Sweden, corresponded throughout the design process, investigated codes and spatial design issues of another country, and created a set of contract documents for the client. A residential project was selected due to time constraints, and because students are familiar with housing
components. Therefore, the main focus for students was the cultural differences that effect
design and technology used in communicating and implementing the design process. Student’s
research and enthusiasm in sharing information between teams and the class were
strengthened through technology. The presenters will outline and share the different strategies
used throughout the process as well as student outcomes.

References: APA

Matthews, D and Weigand, J “Collaborative Design Using the Internet: A Case Study; Journal
of Interior Design Volume 27 Number 1 - 2000-45

Asojo, A.A., A Model for Integrating Culture-Based Issues in Creative Thinking and Problem

Preparing the Millennial student to problem-solve through full-scale furniture model design and testing

Natalie Ellis

“Learners must face up to their existing knowledge limitations and accept the need to modify or abandon existing beliefs (Perry, 1999, p. 54). In a present academic system that often relies upon grades as a primary student-learning motivation tool, educators are finding that the system is not working. Intrinsic level student engagement provides the opportunity to construct new knowledge for the millennial learner. Furniture design studio holds great challenges for the student and faculty alike as the course focuses upon developing a student’s furniture and design knowledge. The present day millennial generation student values reciprocity, active learning opportunities. Strategic planning and sound pedagogical goals are imperative to set the stage for developing this understanding (Eagen, Cukier, Bauer, & Ngwenyama, 2011).

It is no secret in the higher education community that today’s student is much different from even a decade ago. The millennial generation characterized by being highly skilled in multi-tasking, enter the classroom with expectations to control their learning parameters (Carlson, 2005). Design studio presents an opportunity to incorporate design based learning strategies with multi-epistemic processes that engage students in abductive thinking models. The abductive model paradigm invites the students to begin to develop imaginative reasoning in the studio environment. Exemplifying the provided course pedagogy featured the final full-scale furniture model project building to test the student’s design making and was implemented during the spring of 2015 for 24 beginning students.

In preparing for the semester, past student interviews the need to move into the testing or constructing their design more quickly. The course’s central understanding is that the creating | making is the completed furniture construction documents and that building their design is the model testing and design reflection. The students are most typically part of the second year cohort group and are enrolled in their first formal design studio, a BIM studio, construction technology, and furniture design during the spring. New information is being poured on the students liberally and the furniture design course has two unique opportunities to contribute toward their growing design acumen. The class functions as a studio/lab based instruction and the students have access to a full lab with state of the art power equipment including a full bed computer numeric control (CNC) machine.

The semester’s beginning focused around the students engaging in a course agreement process of which they were in charge of their agreed contributions and engagements for
themselves, their peers, and the course instruction. The agreement serves a central purpose of providing reciprocal learning. Building iteratively upon the collaborative action-learning design instruction processes, the students focus upon experiential learning and knowing in action (Schon, 1982). The final project created a new component piece design to complete the selected iconic chair's original construction method, the context of the time that the original chair was created, and the materials that were used. The connection of multi-layered instruction and full scale model testing allowed the students the needed reflection to grow their design instruction and led to a successful course completion.

References: APA


Project 3 | Full Scale Object Building 200 pts.

Project Objectives:
- Develop fluency, flexibility, and imagination of furniture design and the design process through a complete construction opportunity.
- Integrate and become familiar with the design process through inductive and deductive reasoning, empirical knowledge, intuition, and judgment.
- Understand, select and applied appropriate materials as they relate to context, culture, technology, and production
- Continued knowledge of power and hand tools and the means to best accomplish end production object
- Appropriate use of joinery and attachment methods that best considers built component for strength, beauty, and durability
- Successful shop drawing / document interpretation and understanding as it applies to full-scale mock-up furniture component.
- Ability to complete a designed furniture full scale mock-up object from a completed set of produced furniture documents
- Prepare material stock into completed object
- Produce a final component with a market ready finish quality

Background:
Furniture can bridge the architectural practice with interior design. This project will ask you to complete a full-scale furniture object mock-up that will support, reference, connect an iconic chair element. You can convey the connection through historical president research analysis

Central to this project, you will have the opportunity to be able to begin to build upon your furniture design skills and object craftsmanship. The opportunity to construct a piece of furniture allows us insight into the way that we conceive, design, create, and make furniture designs.

The final presentation will include your final constructed object along with your object’s marketing/development poster (approximate size to be 18” x 24” as this may vary on your object’s complexity).

Furniture Object to something meant to (selection from one of the following): 15-16 cubic feet

1. Activities: Eating, Reading, typing, and writing
2. Containing: Storing, Displaying, Organizing
3. Defining Space: Enclosing, shaping, partitioning

Project Requirements:
- Discovery/ Programming Assignment
- Schematic/Design Development Activities
- Fabrication drawings
• Construction instruction process assignment, estimates (material/time). The process assignment will be the steps that you anticipate using once we move back to the Creating Making Lab.
• Cutting diagram (examples found in textbook, provided additional resources found on D2L, and from Project 1).
• Materials Legend and Key objects to cutting diagram
• Furniture Making in Creating/Making Lab
• Furniture making process booklet with working schedule with times, and reflection of each day’s completed work session along with labeled photographs. It will be helpful if you are also reflecting on things that you feel that you did well in addition to the thoughts regarding the next design, documentation, and making.
  o D2L Word format (.doc or .docx) and submit as a hard copy at final presentation.
• Full-scale furniture piece with marketing poster with grading sheet.

Please submit a high-quality image of each of your final furniture piece and documentation in JPEG or PDF with your last name as the file name: smith.pdf) to the Academic website by 5:00pm May 1st.

Materials and Supplies
To be analyzed, considered, estimated, and purchased by each individual. Keep in mind that you want to connect the materials to your original furniture object. Take into consideration innovative and sustainable practices that we have discussed.

Project Schedule: Your schedule is held within the course syllabus. As a reminder you were given an estimation of 15 hours of outside class time (for this project an additional time on top of class time) that you need to be allocating toward the completion.

This estimation is only a guideline and you may finish more quickly or it may take a bit more time depending on your present skillset or any unforeseen conditions. The only way that we begin to understanding time estimation is to keep a log project book of time. Your final submittal will include a log of work sessions and what you accomplished during that time.

Class Time should not be considered as instrumental to make large gains in production time, but is used to profit your skill development and for that reason, you will have small discussion and lecture series throughout the project building timeline. Mini lectures will be considered to take 30-40 minutes of time with 1.25 to 2 hours of work time. Remember that you will need to include clean-up time to happen prior to the end of formal class time.

Project Due: Academic Website Submittal per syllabus. Furniture component and hard copies will be due at the beginning of class with presentation and critique
Project 3 | Full Scale Object Building Background Study
20 of the 200 points

Overall Assignment Objectives:
- Integrate and become familiar with the design process through inductive and deductive reasoning, empirical knowledge, intuition, and judgment.
- Understand, select and applied appropriate materials as they relate to context, culture, technology, and production
- Appropriate use of joinery and attachment methods that best considers built component for strength, beauty, and durability
- Take considered information and content to select, program (including concept statement) and schematically design object through a historical analysis and design

Assignment Requirements, Due Tuesday, March 3rd at beginning of class:

- Precedent / Historical analysis report (following information)
- Ideation grid of object to be built (grid from Project 2 is acceptable); horizontal format.
  - Four object for consideration, minimum. Seven different ideas minimum per object.

Precedent report to include:
1. Minimum of four (4) photos of studied chair; ideally, you will have 1-2 still photos and 1-3 or more photos of chair in the space it was originally designed or in contemporary spaces currently under use.
2. Chair background history to include (but not limited to): Organize your document by these categories
   a. Idea behind original creation
   b. Designer (s)
   c. Time Period
   d. Movement/Social Issues
   e. Production intent (custom one process or mass)
   f. Dimensions
   g. Materials incorporated
   h. Was it upholstered? Upholstery options?
   i. Price
   j. Structural construction (inclusive but not limited to joinery)
   k. Analysis of chair through the design principles
   l. Summarize your object through the lens of the concepts of Firmitas, Utilitas, and Venustas (Postell, p. 132)
   m. Provide a first draft analysis using the following points for your new contributing object that will support, embrace, and connect to your selected chair. You may not know all of the answers right now, but you will be gathering this information throughout the process. Take time to try to reflect now on these items as they will be useful for creating your final concept statement.
These items are also found on page 191 of your textbook.

Who (Consider the Chair’s background Information and the way that you see your newly created object fitting in today’s market)
Who is in the market for this product?
Who will use this product?
Who will sell or distribute the product?
Who will maintain the product?

What
What is its intended purpose?
What are other things that it might do?
What is the competition on the present market? Does your new object fill an empty niche?
What functions should be included?
What is the product’s life expectancy?
What is the expected cost for the furniture?

Why
Why is the furniture needed?
Why would someone buy this product?
Why is a new design needed?
Why use hand, machine, or digital technology in its fabrication?

When
When will the furniture be used?
When will the product require maintenance?
When will it not have enough capacity?
When will it be stored or moved?

Where
Where will the furniture object be located?
Where should it not be located?
Where will it be sold?
Where will its materials come from?
Where will it be fabricated?

How
How does it work?
How is it used?
How many functions will be served?
How well does it relate to all people?
Full-Scale Model Testing

**PROGRAMMING**

**Assignment Name:** Iconic Chair Background Study Assignment  
**Assignment Point Value:** 20 points  
**Assignment Duration:** 5 days  
**Assignment Introduced:** February 26, 2015  
**Assignment Deadline Date:** Beginning of class, March 3, 2015  
**Assignment Objectives:** Explore P3 Object ideas through a focused study of an iconic chair, ideation development using design principles, and intent focus questions.

**Assignment Deliverables (Requirements) and Subtotal Point Values**

1. Photos: A total of four (4) labeled photos: 4 points
   - 1-2 of iconic chair
   - 2-3 of iconic chair in a setting with other objects
2. Chair’s History: 5 points
3. Grid Ideation Grid: 5 points
4. Concept statement development: 6 points

Completed work should consider the following:

- Document that is clear and covers the iconic chair’s focus and history
- Document that is organized, and of professional presentation quality.
- Document that has reference citations and work is clearly cited.
- Concept development statement considers:
  1. What is the project going to accomplish or how will it be useful?  
     (ie to build a full-scale mock-up object suitable to create a connection with Name of Chair and useful for item storage).
  2. What key design principles will allow the completed project to connect to original iconic chair?
# Full-Scale Model Testing

## Schematic Planning

**Activity:** Object Schematic Development  
**Activity Point Value:** 20 Points  
**Activity Duration:** approximately 7 days  
**Activity Beginning Date:** approximately March 3rd  
**Activity Milestone:** Work until class, March 10th  
**Final Delivery Date:** Through class work sessions and Final project deadline

**Assignment Objectives:** Schematically develop P3 Object ideas through completed and focused iconic chair study and ideation development

**Activity Deliverables (Requirements) and Subtotal Point Values**

1. Visual Connection via schematic sketching: 5 points  
2. Clear connection of material between object and iconic chair: 5 points  
3. Completed concept statement that demonstrates design elements that are used between iconic chair and new object: 10 points

Completed work should consider the following:  
**Consideration of Design Principles**

1. Balance  
   - (Visual weight, color, weight, space)  
2. Emphasis  
3. Pattern  
4. Repetition  
5. Movement  
6. Rhythm  
7. Variety  
8. Unity  
9. Proportion

Physical demonstration examples of schematic development are:  
Rough Sketches  
Annotations  
Material examples  
Types of materials  
Ideals of construction
Full-Scale Model Testing

FABRICATION DRAWINGS

Activity: Object fabrication drawings
Activity Point Value: 40 Points
Activity Duration: approximately 19 days
Activity Beginning Date: approximately March 5th to March 10th
Activity Delivery Date: March 24th

Through class work sessions and beginning of Object Making

Activity Objectives: Develop and complete P3 Object annotated and dimensioned fabrication documents.

Activity Deliverables (Requirements) and Subtotal Point Values

1. Plan, annotated and dimensioned, Scale 1-1/2 =1'-0": 5 points
2. Elevation, annotated and dimensioned, (2 minimum),
   Scale 1-1/2=1'-0": 5 points
3. Exploded axonometric, annotated: 10 points
4. Details (1 minimum); Scale: 3" = 1'-0"
5. Component layout (N.T.S., not to scale)
6. Component Keyed legend with sizes
7. Process / Assembly Plan: Consider the steps and machines that you will need to complete your final object. This can be a step-by-step bullet-point list with machines needed by each step.
8. Estimate of time needed to complete object from first cuts to final finish.
9. Estimate of materials needed to complete object.
10. Material purchase/procurement location.
Full-Scale Model Testing

ESTIMATES
Activity: Object fabrication drawings
Activity Point Value: 10 Points
Activity Duration: approximately 19 days
Activity Beginning Date: approximately March 5th to March 10th
Activity Delivery Date:: March 24th
   Through class work sessions and beginning of Object Making
Activity Objectives: Material and time estimation for smooth transition into project making.
Activity Deliverables (Requirements) and Subtotal Point Values
   1. Estimate of time needed to complete object from first cuts to final finish.
   2. Estimate of materials needed to complete object.
   3. Material purchase/procurement location.
Full-Scale Model Testing

BUILD

**Activity Name:** Furniture object build  
**Activity Point Value:** 60 points  
**Activity Duration:** 30 days  
**Activity First Date:** March 24, 2015  
**Activity Deadline Date:** End of class, April 21, 2015  
**Activity Objectives:** Build P3 Object focusing upon intentional craftsmanship resulting in a component designed to support activities, provide storage, or to divide interior space.

**Activity Deliverables (Requirements) and Subtotal Point Values**

1. Full scale prototype build is complete: 40 points  
   A. Prototype object connects to concept statement through material: 10 pts.  
   B. Named design principles are found in completed object: 10 pts  
   C. Joinery and construction enhances object: 10 pts  
   D. Object's scale contributes to overall aesthetic: 10 pts

2. Full scale object demonstrates successful craftsmanship: 20 points  
   A. Object's final finish is not marred by attachment method (ie: glue): 4 pts.  
   B. Object has been sanded or finish to smooth, polished quality: 4 pts.  
   C. Finish is even and enhances final object: 4 pts.  
   D. Object is free of imperfections (ie: tape, brush materials, dust): 4 pts.  
   E. Object is level and steady: 4 pts.

3. Reflection to be completed over the course of the project build and be part of the points available during the project reflection.  
   A. Date and hours worked  
   B. Labeled work photos  
   C. Final object photograph
Full-Scale Model Testing

**PRESENT**

**Activity Name:** Furniture object presentation  
**Activity Point Value:** 10 points  
**Activity Duration:** 1 days  
**Activity First Date:** April 23, 2015  
**Activity Deadline Date:** April 21, 2015  
**Activity Objectives:** Present completed full-scale object along with Marketing/Graphic poster (18" x 24")

**Assignment Deliverables (Requirements) and Subtotal Point Values**

1. **Object**
   - 2. **Poster:** 10 points

**Poster should include:**

- Object name
- Object photo
- Designer’s name for newly built object
- Iconic chair photograph with proper credit/label
- Document that is organized, and of professional presentation quality.
- Graphic quality that demonstrates clear emphasis, balance, and appropriate color
- Concept statement considers:
  
  1. What is the project going to accomplish or how will it be useful?  
     (ie to build a full-scale mock-up object suitable to create a connection with Name of Chair and useful for item storage).  
  2. What key design principles will allow the completed project to connect to original iconic chair?
Full-Scale Model Testing

**REFLECTION**

**Activity Name:** Furniture object reflection  
**Activity Point Value:** 40 points  
**Activity Duration:** 8 days  
**Activity First Date:** March 24, 2015  
**Activity Deadline Date:** May 1, 2015  
**Activity Objectives:** Reflect upon construction process through the following items:

<table>
<thead>
<tr>
<th>Assignment Deliverables (Requirements) and Subtotal Point Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fabrication As-Built drawings: 10 points</td>
</tr>
<tr>
<td>A. Updated drawings from phase 3</td>
</tr>
<tr>
<td>2. Reflection Journal: 20 points</td>
</tr>
<tr>
<td>A. Items recorded during Build phase</td>
</tr>
<tr>
<td>B. Final record of expanded time &amp; material purchases.</td>
</tr>
<tr>
<td>3. Binder completion: 10 points</td>
</tr>
</tbody>
</table>

Completed work should consider the following:  
- Final binder should have cover sheet and be organized by design process phase  
- Document that is neat and of professional presentation quality.  
- Any writing element includes reference citations and work is clearly cited.
## Full-Scale Model Testing

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Activity</th>
<th>Location</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mar 3</td>
<td>Furniture Full scale concept and design Shop Drawings</td>
<td>Gould BBD</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mar 5</td>
<td>P3: Furniture Full scale concept and design Shop Drawings</td>
<td>Gould BBD</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mar 10</td>
<td>Shop Drawings (Design Review by submittal)</td>
<td>Gould BBD</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mar 12</td>
<td>Furniture Full scale Making Preparation</td>
<td>Submit shop drawing progress documents to D2L end of class</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mar 17</td>
<td>SPRING BREAK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mar 19</td>
<td>SPRING BREAK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mar 26</td>
<td>P3: Furniture Full scale Making</td>
<td>Field Trip to Westside Furniture, Newcastle</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>9</td>
<td>Apr 2</td>
<td>P3: Furniture Full scale Making</td>
<td>Milestone: Component cut, &amp; ready to sand &amp; assemble</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>10</td>
<td>Apr 7</td>
<td>P3: Furniture Full scale Making P3 Critique and Review</td>
<td>Milestone: Component sanded and assembled</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>11</td>
<td>Apr 9</td>
<td>P3: Furniture Full scale Making</td>
<td>Milestone: Component sanded and assembled - Poster schematic cartoon layout</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>12</td>
<td>Apr 14</td>
<td>P3: Furniture Full scale Making</td>
<td>Milestone: Finishing Component - Poster back with comments</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>13</td>
<td>Apr 16</td>
<td>P3: Class Critique and Review</td>
<td>P3 Due for critique</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>14</td>
<td>Apr 21</td>
<td>P3: Furniture Full scale Making / Finish</td>
<td>P3 Gallery Set-up with completed object and poster</td>
<td>Creasing Making Lab</td>
</tr>
<tr>
<td>15</td>
<td>Apr 23</td>
<td>P3 Gallery Show</td>
<td>Object &amp; Marketing Poster</td>
<td>Gould Hall Gallery</td>
</tr>
<tr>
<td>16</td>
<td>Apr 26</td>
<td>P3: Shop Drawing Revision, Reflection, and Binder Work</td>
<td>Due by May 1st @ 5PM: Completed Binder to Natalie's office and all documents scanned and in one file submitted to D2L</td>
<td>Gould BBD</td>
</tr>
<tr>
<td>17</td>
<td>May 3</td>
<td>P3: Shop Drawing Revision, Reflection, and Binder Work</td>
<td>Due by May 1st @ 5PM: Completed Binder to Natalie's office and all documents scanned and in one file submitted to D2L</td>
<td>Gould BBD</td>
</tr>
</tbody>
</table>

**Notes:**

1. Class time in lab should always be considered to be used for progress, reflection, and coming from preparation. As you are working in advance, the student is maximizing class time for detailed instruction and group work. The largest output of work will come out of outside independent work and preparation.

**Disclaimer:** This schedule represents the current plans and objectives of this course. As we go through the semester, those plans may need to change to enhance the learning opportunities. Such changes, communicated clearly, are not unusual and should be expected.
ID2793 Furniture Design
Chairs of influence
April 23, 2015
Gallery Show
Redefining the University Classroom
Sally Ann Swearingen and Allysa Calvillo

Public education for most of our universities for the past fifty years has been very straightforward. Faculty lecture and students listen, everyone is placed in rows facing the instructor. Technology has transformed teaching and learning. The past twenty years has seen changes in pedagogy. As up to the minute information becomes increasingly accessible via technology, the role of the educator is shifting from being the sole repository of information to that of being a facilitator. More and more, today’s professors are including the integration of social media and other technologies in their classrooms. Educators today have the challenge of preparing students to solve problems we cannot yet identify in classrooms ill equipped to meet this challenge. There is a quote by John Dewery that states “If we teach today’s students as we taught yesterday’s we rob them of tomorrow” Dewey, J. (1944). Technology offers educators a way to engage students in learning that translates to real-world applications. (J. Pilgrim, C Bledsoe, S. Reily). The goal of this higher educational classroom design was to integrate technology into instruction utilizing technology to enhance a higher-level thinking skill and problem solving while incorporating furniture that could be reconfigured to allow different types of teaching styles. One of the goals is to incorporate with a touch of a button sharing of information. This is done as the faculty member being the facilitator and illustrating on the big screen at the front of the classroom and on the monitors at the back. Utilization of mobile furniture allows the room to be arranged in a traditional lecture or a collaborative group setting for faculty who has a different teaching style. Existing finishes were very institutional in their appearance with computer work areas that did not conform ergonomically. Small colorful tablet chairs were placed in center for lectures. Electrical raceways were placed above the work surfaces almost as a focal point. Walls were sterile. Fluorescent lighting was centrally located which allowed shadows on student work and computer screens. As the designer of the project creating a warm and inviting environment was important not only to the faculty but the student. Color was brought in to the classroom by painting one accent color at the end and utilizing a light warm gray color on the walls. Vinyl wood flooring replaced the VCT floor and the computer work surfaces were torn out and lowered and the depth of the surface was reduced to provide a more ergonomically work station. Chairs on casters were placed throughout the space to allow students to roll to different areas of the room to collaborate. Tables were introduced to provide a larger work surface. Today’s students bring many technological devices with them to class and the computers that surround the room are used for quick access.
Graphics that students create are displayed around the room and easily changed out to stay current. Articles that have been published by students are displayed in one area on the walls. Large monitors placed at one end of the room provide easy access for faculty to use to display a student’s work or create a discussion. A large whiteboard that doubles as a screen for the overhead projector was placed on the accent wall to create another avenue for lecture content, or displaying student work. Projector and monitors were placed and networked together so that a faculty member could display any work from the computers around the wall onto one or both screens. Sharing of information is critical into day’s classroom. A glass door entrance created a more inviting space. The new lighting system creates flexible lighting that could be lowered/dimmed or partially turned off.

**References: APA**


APPENDIX

PHOTOS BEFORE RENOVATION
Glass door entrance with graphics on wall to display student work. Vinyl wood floor to create warmth. Tables and chairs on caster to enable class to be reconfigured depending on teaching style.

Accent wall with white board that duals as a screen. Tables and chairs create a space for group work.

Classroom has dual purpose: Computer lab and classroom for teaching lecture or break out collaborate/group work.

Renovated Classroom
Area to display student articles and work published in newspaper. Monitor on wall to the right is an area for students to view student work that is being highlighted.

Space for faculty to work or facilitate class. Most faculty take iPad and walk throughout space to facilitate work environment.

Renovated Classroom
New windows with interior blinds installed to assist with glare within the classroom were installed. Overhead projector still utilized to create a focal point of student work displayed on wall or PowerPoints/lectures to be displayed. Instructor able to control and display any screen around room with a touch of a button controlled by iPad.

Renovated Classroom
Design for Sight: Engaging the public in low vision design research

Erin Schambureck

Design for Sight is the culmination of research efforts to use typologies to understand design problems that impact the visually impaired and understand how designers can improve architectural accessibility. This creative scholarship seeks to explore ways to engage designers and lay-people with this research using visual techniques and interactivity.

The research identified four root causes of poor design for low vision: Luminance Contrast, Value Contrast, Luminance Placement, and Object Placement. I chose to explore two methods of communication to share these design typologies publicly. Each method needed to clearly explain each typology, describe how to identify it in the field, and provide possible solutions to each design problem. Each experience also needed to be adaptable to users who may have vision loss, and easy to comprehend for those outside the design profession.

The first method explored is an interactive, low vision design guide. It is a pdf that can be accessed offline but that provides similar functionality to a website with links, rollovers, and buttons. Each section header summarizes the category, provides background information and contains links to each of the typology sub-pages. It can be navigated using the links or by simply paging up and down. For designers and end-users, “a picture is worth a thousand words.” Therefore, a simple, graphic icon was developed for each typology. The typology icon acts as a mnemonic device to help users remember the concept more quickly in the field. The goal of the design guide is to use imagery and consistent format to allow viewers to quickly grasp a concept and compare examples shown to spaces they see in their own buildings. Links to additional resources in the appendix enrich the experience and encourage further research.

The second presentation method is an exhibition that offers an opportunity to experience vision loss and learn more about the impact of design on perception. This interactive space engages users with the research in three ways. As you enter, photographs of a still-life with various filters illustrate a low-vision perspective. Vision simulator goggles invite users to experience low vision for themselves. Next, large-print posters define each typology with high-quality images and easy to read text. Icons are large and simple color coding defines the four categories. Visitors are allowed to get close to the posters and ambient light levels are high to facilitate navigation and
reading. In one corner, a large screen and computer is provided to allow users to explore the companion design guide to see more examples of low vision typologies.

Both methods allow multiple ways for users to interact with research. Imagery can speak volumes about an idea, and features like large-print in an exhibit and alt-text in a computer document can help make the information accessible to those with disabilities. The exhibition and design guide serve to provide opportunities for discussion of ideas and empathy for the design needs of the visually impaired.
Design for Sight:
A Programming and Design Guide for Low Vision
# Table of Contents

**Luminance Contrast**
- Silhouette  
- Sparkler  
- White Wash  
- Luminance Contrast Gallery  

**Value Contrast**
- Ghost  
- Camouflage  
- Mirror Mirror  
- Deception  
- Mood Lighting  
- Detectable Warning  
- Value Contrast Gallery  

**Object Placement**
- Kissable Signage  
- Open Waters  
- Object Placement Gallery  

**Luminance Placement**
- Transition Zone  
- Checkerboard  
- Shadow Land  
- Luminance Placement Gallery  

Appendix A: Glare Indices 26  
Appendix B: Luminance Mapping 27  
Appendix C: Value Contrast 28  
Appendix D: Evaluating the Visual Environment 29  
Appendix E: Resources 35

Items in Bold are available in this abbreviated version of the design guide as an example of the whole work. Click on a heading to be directed to that page or use the Page Up/Down buttons on your computer.  
The last four pages are not interactive and show images from the Design for Sight Exhibition.
Luminance Contrast

Luminance is the amount of light that enters the eye. It comes directly from light sources but is also reflected off surfaces in the visual field. Luminance contrast is the ratio between the luminance values of adjacent surfaces. High luminance contrast ratios are perceived as glare.

Contributing factors:

Uncontrolled light can contrast with dark adjacent surfaces or spaces. The eye cannot adjust to both the light and the dark points in the visual field.

Reflective surfaces produce glare.

Emphasis on Energy savings has increased daylighting while decreasing electric light in the interior. This high variance of light is difficult to accommodate for.

Measurements:

Luminance ratios should not exceed 1:3 according to the Illuminating Engineering Society. However, task areas can be 1.5-3 times brighter than the surrounding areas.

High luminance ratios can cause visual fatigue and glare. See the Glare appendix to learn more about measurements.

Ambient illuminance level for Offices and other activity areas should be 30 fc while task lighting should be at 50 fc.

Things to Consider:

Consider quality vs. quantity. Use low reflectance materials to reduce veiling reflectance and glare and keep finishes adjacent to windows light colored. Provide controls to adjust light from the source or window while also providing task lighting at the worksurface. Move the light to the side of a task instead of overhead to protect the eye from reflections.

Glare & Luminance Contrast: (For more information see the Glare Indices or Luminance Mapping)

Glare is the ratio between the luminance of the source and the luminance of the background. Glare index equations can be used to calculate the probability of glare. Results fall within a range of Intolerable to Barely Perceptible. To learn more about how to measure glare see the appendix, however, do not rely solely on the numbers. No system was intended for use in calculating glare for the aging eye or for those with vision loss.
Silhouette

A large area source like a window makes it difficult to distinguish shaded objects in front of it like furniture or people. The human eye has trouble adjusting to excessive luminance contrast. If the ambient light level is increased or the large source is shielded the luminance contrast will be reduced.

Problems:

Outdoors views are important for occupant well-being and wayfinding, but the variability of exterior light and the extreme contrast between outdoor light and shaded interiors is often not well considered or designed. Not enough light on task surfaces adjacent to the area source further reduces visibility.

Solutions:

Reduce luminance contrast by increasing ambient light levels and shading the source through architectural or applied shading features.

Design transition spaces so the eyes have time to adjust from dim interiors to brightly lit lobbies and exteriors.

Arrange Seating so occupants can choose their view to suit their vision needs.

Roll-over these circles for more information.
**Sparkler**

**High luminance contrast** between a small, very bright light source, and a relatively dim background causes point-source glare. These sources are often small halogen lamps or LED fixtures that are intended as accent lighting in retail or gallery spaces but instead are used as ambient or task lighting.

**Problems:**

In spaces with low ceilings, point sources are mounted too close to the line of sight causing discomfort. Point sources have a very narrow beam of light making it difficult to achieve even light distribution and increasing the contrast between the brightly lit areas and dark surroundings. Bright sources in the field of view can also scatter light in the eye further reducing visual quality.

**Solutions:**

- **Increase ambient light levels** to reduce the luminance contrast ratio.
- **Accent** with low wattage points sources.
- **Shield the source** from the line of sight.
- **Task lighting** at the work surface offers user adjustability.
**White Wash**

**Veiling luminance** reduces the contrast of a visual task and obscures detail. It occurs when a source creates a specular, or scattered reflection off a surface that reaches the eye. Like the projection screen that is hard to see until the lights are turned off, veiling luminance reduces the contrast in the visual field.

**Problems:**

**Reflective surfaces** are the biggest cause of veiling luminance. Task surfaces, especially backlit computer or e-reader screens, that reflect ambient light are difficult to see due to reduced contrast. Veiling luminance on glass makes it difficult to see objects on the other side, especially at night. Lack of adjustable lighting or window controls hinders visibility.

**Solutions:**

**Increase the contrast** ratio between the object and the surroundings. Invert the colors on screens and signage to dark backgrounds with light text.

**Control light sources** in the field of view.

**Move the light** placement to the side of a task instead of overhead to control the direction of the reflected light.
Design for Sight: Public Exhibition

“What do you see?” features information introducing the visitor to the complications of vision loss and invites them to wear a pair of goggles or review images that approximate common diseases such as glaucoma or diabetic retinopathy.

“Common causes of vision loss:

- Cataracts: A gradual clouding of the lens that reduces clarity over time. Cataracts are generally treatable with surgery and are not spread through casual contacts.
- Age-Related Macular Degeneration (AMD): The gradual degeneration of the macula, the central part of the retina, which is the inner layer of the eye. AMD affects vision in older adults but is not spread through casual contact. However, patients with AMD may have difficulty recognizing or distinguishing colors.
- Macular Hole: A small, circular hole that can occur in the macula of the eye and cause loss of vision in the center of the visual field. Patients with a macular hole may have difficulty recognizing objects or distinguishing colors.

Important conditions can be debilitating for those whose vision is compromised. Many people with low vision experience reduced visual awareness, making it difficult to recognize and interact with objects in close proximity. Optimal vision is necessary for an individual to carry out activities of daily living, including reading, driving, and recognizing people. Low vision is characterized by reduced visual acuity, which can be caused by a variety of conditions, including age-related macular degeneration, diabetic retinopathy, and glaucoma. Low vision can significantly impact a person’s ability to participate in daily activities and can lead to feelings of isolation and depression. It is important to seek appropriate treatment and support to help manage the effects of low vision and maintain independence.
Design for Sight: Public Exhibition

Luminance Placement

Transition Zone

Description:
Transition zones provide adjustable lighting between the interior space and changing exterior light levels throughout the day and night. It can take up to seven minutes for eyes to adjust from bright exterior spaces to dimly lit interiors. Space needs to be permitted for the visually impaired to step aside while their eyes adjust so they can continue to navigate safely.

Building plans and lighting designs do not account for changing light levels in daylit spaces. Lack of seating or space to step aside while the eyes adapt can make a user uneasy in a busy circulation space. Even corridors and elevators leading away from the lobby do not have adequate lighting. Transition zones are a common transition that do not have high enough light levels.

Analysis:
Inadequate lighting in transition zones creates glare-like spaces.

Solutions:
Provide space, at least 8 feet between door swings to allow users to step aside. Provide seating near doorways to step out of the path of travel while the eyes adjust.
Provide controls for lighting and windows to account for changes in luminance levels.
Place elevators in separate lobbies and area to create transitions to lobby light levels.

Each Typology is represented on an 18"x24" board with similar text, iconography and imagery to that which is used in the interactive design guide for low vision. Color coding helps identify each of the four categories.
Design for Sight: Public Exhibition

A large LCD screen with keyboard and mouse are stationed to the side to allow users to experience the companion low vision design guide pdf. A fourth wall (not shown) displays a projection of images from the pdf at a large scale for multiple viewers.

High contrast between objects and wall color as well as large, san-serif titles help visually impaired users identify the different areas.
L’eau de la Danse Installation: Water, Music, Dance, Lighting, Rhythm

Nadya Kozinets

A temporary open-air mist-producing bamboo installation called L’eau de la Danse, meaning dancing water in French, was created and constructed with interdisciplinary collaborative efforts of faculty and students in consultation with internationally acclaimed designer and school’s alumni. The installation was a highlight of the Annual Festival of the Arts’ and it emphasized hands-on approach to design.

The installation was placed on a large grass lawn in a highly visible location near the major city intersection (Figure 8). The idea started with exploration of the effects of water, light and sound built with a locally-harvested bamboo - a sustainable beautiful material that the team had experience working with.

The concept developed into a celebration of a great height of the bamboo that grows up to 40 feet high. The challenge was to see it standing on the lawn seemingly freely and unattached in all its great height and majesty as being taken out of context of its natural state, and juxtaposed against a built environment of a busy college campus (Figure 4-7).

The structure featured an installation of 40 bamboo stalks (culms) standing in straight evenly spaced rows (isles) and divided in a middle to create a wide portal culminating in Gothic-like arch. The stability of the structure came from a visibly light and airy “nest” of smaller horizontal bamboo pieces randomly placed and individually attached to main bamboo culms. A simple garden misting system were hidden inside of the “nest” (Figure 5).

Students in the School of Dance created a dance piece within the bamboo-water structure that was performed alongside flutists and percussionists from the School of Music. Dance students had a unique opportunity to perform in a non-traditional theatrical space combined with an improvisational musical element.

“Dancing Water” installation unveiling began after sunset and attendees and visitors were treated to an unique experience: the structure glistening with lights, the music and the dancing as one magic overture that made the structure come alive. Light, music and rhythm elevated the experience of viewers to be even more magical and made them feel to be inside of a huge dark
theatrical space (Figure 9). It transformed the installation into something meaningful, ephemeral, and beautiful. The intangible quality of the dance celebrated a particular moment in time that was a profound way to enhance an idea, an object and recognize a space through an intense, art-oriented focus – the experience of magic that is unlike fantasy or an illusion, but a real magic, which is about the conjuring of soulful feelings through the manipulation of reality and emotion.

The project became a wonderful example of that intangible aspect of art making that allows participants to come together and unselfishly give of themselves for the greater good of a work of art.
APPENDIX

L'eau de la Danse Installation: Water, Music, Dance, Lighting, Rhythm
Images

(Figure 1) Design: Charrettes and Skype meetings to develop ideas and explore structural possibilities of the bamboo
(Figure 2) Design: Original and final scale models
(Figure 3) Harvesting local bamboo
(Figure 4) Placing 38-40 feet long bamboo culms based on 5 foot space grid
(Figure 5) Construction: Tying cross pieces with a red tie (man-made component) and attaching the “nest” pieces to the main columns to stabilize the structure
(Figure 6) Construction: Finishing touches to increase stability of the structure and add to the “nest”
Figure 7) Structural components in place are showing two types and color of bamboo that was used
(Figure 8) Finished installation is standing on a large grass lawn in front of the museum.
(Figure 9) During the unveiling of the structure: dance/music performance with glistening in light structure.

(Screen shot from a video)
(Figure 10) Dance/music performance with audience standing behind (screenshot from the opening night video)
Since the late 80’s, my Art and furniture design has involved conceptual explorations, I think of my projects as inventories of fragments, objects and pieces that come together as strangers, creating the “whole” rather than compositions of the familiar. I often use the readymade in my furniture objects and the improvisational, arranged schematic in my installations, inviting the viewer to perceive and move through a space of speculation. I often combine the natural warmth of wood and the rigid touch of steel and stone in my furniture objects. Each piece of furniture is a unique, one-of-a-kind creation, a fragment of an environment intended to become part on the whole.

“Wedge 1”, a console table, is one of those objects. Re-purposed material and found fragments, rather common objects on their own, merge into new meaning. The materials are former pinewood wainscoting from a Bavarian dining room, a marble stone divider from a restroom cut into the shape needed for the object and polished to challenge the untreated pine, and door stoppers made from steel, that become the “lift” of the “wedge”. This “off the ground” position is playing with the consoles own identity, acting as a fragment in its new environment contributing to the whole.

The center of the console has two hinged doors that are constructed grid-like and see-through. The console has nothing to hide, the small squares give little hints on what is stored behind them and turn the objects stored in the compartment themselves into fragments that become whole when the doors are opened.

The wood is only covered with bee’s wax, to protect the surface minimally, antagonizing with the bold and polished stone. Marks of former abuse, dents and indentations, scratches and burn marks are all still visible on the wood surface and inspire speculations of what event might have caused them in the wood was re-fashioned into a furniture object.

The marble stone, topping the console, on the other hand is newly polished and dressed, contrasting the wooden case body, ready to display itself fresh and feisty.
Creative Frontiers: Person, Place, Product, Process

Thursday, 22 October

Arrive at DIA Airport\(^1\) Conference hotel: Fort Collins Hilton, Prospect Street

6:00pm Cocktails at the Hilton in the lobby (Sponsored by IIDA Rocky Mountain Chapter)

7:00pm Dinner on your own\(^2\)

Friday, 23 October

Breakfast in hotel lobby café\(^3\) CSU [d] lab (10-15 minute walk through campus)

8:00am Meet and Greet

8:30am Welcome (Regional Chair); Introductions (Conference Chair)

8:45am **Keynote Speaker:** Manuel Navarro, Interior Designer, lauckgroup, Austin, Texas

**Topic:**
Creating Design | Design Creativity Process and Creativity- letting yourself linger in design

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\(^1\) SuperShuttle Reservations: 303-370-1300, $34 roundtrip to FC

\(^2\) Choice of Mexican, Italian, Sushi, and Brew Pub or ride downtown on the MAX, all within 2 blocks of hotel

\(^3\) All hotel breakfasts accompany guests with room reservations
9:45am  Break/Snacks (sponsored by Kravet)

10:00 – 11:30am  Paper Session (30 min. each)
- Luminance Mapping: Lighting analysis in a snap(shot)
- BIM in Interior Design program curriculum

11:30 – 12 noon  Break

12 noon  Afghani Luncheon (sponsored by IIDA TX/OK Chapter)

1:00 – 2:00pm  Paper Sessions (30 min. each)
- The Villa as embodiment of cultural ideology: A cross-cultural contrast of Villa Rotonda and Katsura Imperial Villa
- Globalization and Cultural Differences in a Construction Studio

2:15 – 3:15pm  Paper Sessions (30 min. each)
- Vectors, envelopes, and elements: An introductory design studio project
- Preparing the Millennial student to problem-solve through full-scale furniture model design and testing

3:45 – 6:30pm  Site visits and design tours:
- We will be visiting two sites:
  - Odell Brewing Company with Sustainability Manager, Corey Odell (http://odellbrewing.com/) and RB+B Architects Inc (http://www.rbbarchitects.com/work/breweries/).

6:45pm  Dinner on your own, evening networking, short walk to downtown Fort Collins; return to hotel on MAX (.60 seniors/1.25 adult)

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**Saturday, 24 October**

Breakfast in hotel lobby café  Walk to CSU [d] lab

8:45 – 9:45am  1CEU Human Factors in Workplace Design: Designing Spaces that are More Naturally Human/ Dan Eaton (IDCEC + AIA + HSW)

9:45 am  Breaks/Snacks (Sponsored by Steelcase/OfficeScapes)

10:00 – 11:00 am  Creative Scholarship Sessions (10 minutes each)
- Design for sight: Engaging the public in low vision design research
- Redefining the university classroom
- L’eau de la Danse Installation: Water, Music, Dance, Lighting, Rhythm
- Wedge
11:00am – 12:00pm  Paper Sessions (30 min. each)
  - FINDING ROOM IN THE MAINSTREAM: Foregrounding the Capstone with Creative Inquiry
  - Innovative Online Applications for an Interior Design Course

11:15-12:45pm  Business Meeting, Recognitions with Fiona's Box Lunch

1:00-5:00 pm  Site visits and design tours:
  - Fort Collins Museum of Discovery, OZ Architecture, LEED Platinum (cost included in registration)
  - Avery House and/or Fort Collins, Self-Guide Historic Walking Tours (No charge)

Dinner on your own

Sunday, 25 October

Optional Site Visits (on your own):
  - Denver Art Museum ($10-13)
  - Clyfford Still Museum ($6)
  - Kirkland Museum of Fine & Decorative Art ($6, bring your teacher/student ID)
  - Union Station (no cost)
  - Rocky Mountain National Park ($20 per car)

Conference Hosts
  Colorado State University, Fort Collins (Katharine Leigh + Laura Malinin)
  Rocky Mountain College of art + Design, Denver (Nancy Bohnett)
  Art Institute of Colorado, Denver (Maryann Thornam)