2018

You Build Like A Girl

Sara Hackett
Virginia Commonwealth University

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YOU BUILD LIKE A GIRL

guiding young women to the craft & design fields

sara hackett MFA interior environments VCU 2018
shout-out to
MFA crew
Frank Hackett
James & Cindy Barrs
Virginia Historic Society
Roberto Ventura
Camden Whitehead
Emily Smith
Sara Reed
Rob Smith
Annie Frankfort
Sionne Olson
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ethos</td>
<td>1</td>
</tr>
<tr>
<td>abstract</td>
<td>3</td>
</tr>
<tr>
<td>research</td>
<td>5</td>
</tr>
<tr>
<td>district history</td>
<td>9</td>
</tr>
<tr>
<td>building history</td>
<td>11</td>
</tr>
<tr>
<td>photographic study</td>
<td>13</td>
</tr>
<tr>
<td>drawings</td>
<td>15</td>
</tr>
<tr>
<td>role models</td>
<td>25</td>
</tr>
<tr>
<td>career opportunities</td>
<td>27</td>
</tr>
<tr>
<td>precedents</td>
<td>29</td>
</tr>
<tr>
<td>precedent conclusions</td>
<td>35</td>
</tr>
<tr>
<td>program adjacency matrix</td>
<td>37</td>
</tr>
<tr>
<td>program square footage</td>
<td>39</td>
</tr>
<tr>
<td>concept model development</td>
<td>41</td>
</tr>
<tr>
<td>division &amp; classification of space</td>
<td>45</td>
</tr>
<tr>
<td>concept</td>
<td>47</td>
</tr>
<tr>
<td>concept 2D to 3D</td>
<td>49</td>
</tr>
<tr>
<td>site model</td>
<td>51</td>
</tr>
<tr>
<td>material language</td>
<td>53</td>
</tr>
<tr>
<td>presentations</td>
<td>55</td>
</tr>
<tr>
<td>thesis show</td>
<td>57</td>
</tr>
<tr>
<td>references</td>
<td>59</td>
</tr>
</tbody>
</table>
EVERY human interacts with spaces. I will always remember the person for whom I’m designing. I need to remember that my design choices impact the interactions people have with spaces, physically and emotionally.

Design is local. A designer must use local materials and resources with minimum waste and to engage the surrounding land and culture as much as possible.

Life is short. Every design project is important, both as a built artifact and as an act of human engagement.
abstract

MOTIVATION

This topic is influenced by a personal interest to learn about how things are built and give young women a resource to learn the skills necessary to enter into a variety of craftsmen, women, design, and construction careers. Expanding the future demographics of these fields must start with early education and demonstrating to young women their potential. Keeping girls interested in design & engineering as they enter into higher education helps ensure more equal representation within undergraduate degrees and, especially afterwards, in the associated professions (ECOnD Metrics, 2017). This matters locally as the area boasts a large number of hand-craft and design shops influencing the surrounding built environment – ensuring women are a part of shaping this landscape is a powerful message to future young women.

PROBLEM

Young women from primary through high school are particularly affected by the role of leadership and mentorship in their communities, receiving valuable exposure to career options that make an impact on their decisions to enter a specific field (Yancey, A. 2011). Opportunities are lacking for young women to gain exposure through hands on design, construction, wood & metal working experience, leading to an underrepresentation of females in higher education and associated professional fields (“Women in STEM”, 2019). Perceived gender barriers are still high for girls and may help explain why Science Technology Engineering Art Math (STEAM) fields are not their top career choices (Girl Scout Research Institute, 2012). By introducing female training programs at a young age, exposure is gained early enough to cultivate rudimentary skills and build confidence through practice and real world applications, cementing these skills as a viable path for employment. (Jolly, E. 2004) An approach to addressing this problem is to introduce training programs on a small scale and react to these small-scale effects within that community.

METHODS

Research includes exploring the history of local craftsmen professionals and examining STEAM-focused youth programs for precedents through case studies, interviews with industry professionals and educators, & literature reviews. In an effort to tailor the program to the local community audience STEAM job viabilities and programs focused on female training will be sought out further.

RESULTS

This research identified programs focused on youth specialty training, similar to a vocational high school which gives program examples, and roadblocks encountered. A multitude of resources conclude that building skills and confidence in young women early on has a great impact on future career choices.

CONCLUSION

To explore a hands on training and design skills space for young craftsmen and her surrounding community environment. The skills introduced will be woodworking and metal fabrication methods used in building construction, product and furniture production, & interior design application. The goal of this space is to provide the tools and location for experts and newcomers to learn, train & create under tailored project specifications; while providing a rotating canvas for the local community to make their own. Seasonal exhibitions will act as platforms for these young women to express their vision and hone their craft, and in turn draw in community activities and interaction.
Technology is present throughout our lives and has had an incredible transformative effect on careers in recent history. Understanding the changing roles of certain career fields and how they have evolved alongside the corresponding technology is important when deciding what career to pursue. When young women are shown the new definitions and paths STEAM (Science Technology Engineering Art & Math) work can take them on – the opportunities that await them are beyond what they had previously thought available. Gaining understanding about the opportunities that technology can provide in the workplace can inspire them to enter fields previously thought to be out of their reach. Creating and demonstrating real world examples and experiences encourage girls to align their job aspirations with new work opportunities.

Elementary and middle school is a crucial time to impress upon girls the opportunities they have to explore STEAM-related topics. By motivating and engaging girls early with hands-on activities and creating pathways for girls to take coding, computer science, calculus, chemistry, computer-aided-design, physics and other higher level STEM classes, we can minimize the social and environmental barriers that keep many girls from pursuing STEM fields (Scheckelhoff, T., 2015). Additionally, pairing girls with strong female leaders and mentors in these fields makes it easier for girls to pictures themselves in these careers and pursue these interests as a viable path. (Tether, B. 2017)

Microsoft conducted a study about impressions and attitudes towards STEM comprised of 11,500 girls and women from the ages of 11 to 30 in twelve different countries across Europe. According to the participants, most girls become interested in science, technology, engineering and math in school at the age of 11-1/2, but their interest started to wane by the age of 15. Most striking among the findings:

*Girls cited a lack of female role models in STEM as a key reason they didn’t follow a career in the sector.*

*Young women are not getting enough practical, hands-on experience with STEM subjects.*

*Just 42 percent said they would consider a STEM-related career in the future.*

*60 percent admitted they would feel more confident pursuing a career in STEM fields if they knew men and women were equally employed in those professions.* (Choney, C., 2017)

During high school, developing competence in STEM is critically important as preparation to pursue STEM careers, yet students in the United States fall behind other countries, ranking 35th in mathematics and 27th in science achievement internationally. Given the importance of STEM careers as drivers of modern economies, this deficiency in preparation for STEM careers threatens the United States’ continued economic growth. In a study conducted by the National Academy of Sciences of the USA, they evaluated the long-term effects of a designed intervention to help parents convey the importance of mathematics and science courses to their high-school–aged children. A previous report on this method showed that it promoted STEM course-taking in high school – as the follow-up study, they found that the intervention improved mathematics and science standardized test scores on a college preparatory examination (ACT) by 12%. Greater high-school STEM preparation (STEM course-taking and ACT scores) was associated with increased STEM career interest, the number of college STEM courses, and students’ attitudes towards STEM 5 years after the intervention. These results suggest that the intervention can affect STEM career pursuit by increasing high-school STEM preparation, which underscores the importance of targeting high-school STEM preparation to increase STEM career pursuit. (Sax, L., 2008)

In a report commissioned by the National Coalition of Girls’ Schools (NCGS) new data was contributed to the debate over single-sex education, with a focus exclusively on the experience of female students from single-sex and coeducational high schools. “Drawing from the renowned Freshman Survey, an annual, nationwide study of students entering their first year of college conducted by UCLA’s Higher Education Research Institute, the study compares the backgrounds, behaviors, attitudes, and aspirations of 6,550 women graduates of 225 private single-sex high schools with 14,684 women who graduated from 169 private coeducational high schools.” (Sax, L. 2008)

Overall, these findings demonstrate that a motivational intervention with parents can have important effects on STEM preparation in high school, as well as later effects on STEM career pursuit 5 years later. (Sax, L., 2008)

A widely debated approach to addressing gender-related education issues is the all male or female classroom setting. Sex-segregated schools and classrooms are viewed by many as a possible antidote to gender inequalities that have been documented throughout all levels of education. Others, however, raise concerns that single-sex settings run the risk of reinforcing sex-based stereotypes and widening gender gaps in educational opportunity.
teachers outside of class, especially in the independent school sector, where 37 percent of single-sex graduates reported spending three or more hours per week meeting with teachers apart from class, compared to 30 percent among women graduates of independent coeducational schools.

Higher SAT Scores. Women who attended single-sex schools tended to outscore their coeducational counterparts on the SAT. The highest SAT scores were reported by graduates of single-sex schools. Women who attended single-sex schools were more likely than women graduates of coeducational schools to report higher levels of academic engagement, single-sex graduates — especially those from independent schools — tend to exhibit slightly higher levels of academic self-confidence.

Higher Confidence in Mathematical Ability and Computer Skills. Graduates of single-sex schools also arrive at college with greater confidence in their mathematical and computer abilities. Women who attended single-sex schools are more likely than women graduates of independent schools, where 37 percent of single-sex graduates reported spending three or more hours per week meeting with teachers outside of class, especially in the independent school sector, teachers experienced discrimination, bullying and harassment is half as frequent relative to otherwise similar businesses with all-male management teams. This suggests career progression for women is key to changing the culture of a practice. However, the unfortunate trend of the lack of female representation in the professional realm after college is a roadblock to altering the gender makeup of upper level management.

Of those females who are already in the management or mid-level fields, a study was conducted with the purpose to create a theory of women’s career choice and development in the context of the construction industry. Focused on female constructors, or construction project managers, this study investigated the relevant factors, processes, and experiences of women who choose to enter the construction industry through construction management degree programs. The goal was to understand who female constructors are and those factors which led them to the construction industry and those influencing their career development. The study used a sample of 24 women who had graduated within a ten year period and were actively employed as constructors. “Participants’ views and experiences, captured through small focus group interviews, were analyzed with quantitative data of demographics, education, construction experience, self-efficacy, personality, and career satisfaction and commitment gathered from a questionnaire, to create a profile of female constructors used in this theory.” (Moore, J. (2006)

The strongest common characteristic in the career development of these women was a mentor. This is an ever-increasing staffing demands.
ESTABLISHED

According to the Department of the Interior National Register of Historic Places (NRHP), the architectural classifications associated with Highland Park are Late Victorian (Queen Anne), late 19th and early 20th Century Revivals (Colonial Revival & American movements (Bungalow/Craftsman). This embodies the distinctive characteristics of the time period and represents an aesthetic on the whole that indicates a neighborhood identity.

Boundaries of this district are defined through the National Historic Registry, a major edge to the South is Brookland Park Blvd. Located in the six points area of the Northside and Highland Park neighborhoods of Richmond. This area of Highland Park has been synonymous with high crime rates since the 90’s but is currently being looked at as an opportunity for positive community interaction and economic growth. (Richmond Magazine)
in North Side, Mizpah Presbyterian Church was erected in 1926 and remained until 1975 when it merged and was subsequently taken over by the Bethlehem Community Center. These two owners are the only two listed uses for the property. (Richmond City Directories)

The original property was built in 1885 but burned down and was rebuilt in its current location on Brookland Park Blvd (BrooklandPark.net). The structure is constructed of brick and concrete with large stained glass windows highlighted in the front by white trim. This and another church property in the neighborhood helped to bring assurance to the community that the neighborhood was a viable option for a safe and prosperous place to live. (NRHP)
role models

WWII NIGHT WITCHES volunteer aviators who performed night time bombing raids with legendary success by shutting their engines off and gliding above targets to avoid detection.

MOTOR MAIDS the oldest motorcycle club in the US is comprised solely of women - a group that caught the attention of Harley Davidson who eventually sponsored them, and to this day require matching lipstick and white gloves.

classical notions of femininity and the roles in which they were encouraged to occupy, these women are great role models for those looking for an example of pushing through discomfort and prejudice to pursue passion. All of these women are pioneers in their fields, they all encountered hardship along the way, and they all serve as a testament to the power of perseverance and work ethic.
SKILLED TRADES: AN OPPORTUNITY FOR WOMEN TO FIND SUCCESS IN TRADITIONALLY MALE DOMINATED FIELDS

On average, tradeschool training will save approximately $94,000 compared to a 4 year college degree.

In 2014, the Department of Labor announced $1.9 million in grant funding for the Women in Apprenticeship and Non-Traditional Occupations program.

The American Welding Society predicts that there will be a shortage of 400,000 operators by 2024.

About 2002 4% of welders were female, in 2016 they occupied 6%.

By 2024 the demand for HVAC technicians & electricians is expected to grow by 14%.

women make up a mere 8.9% of the construction workforce in the US.

womenmakeupamerica.com; careersinwelding.com; forbes.com; explorethetrades.org

27
Girls Garage is a dedicated work and design space for girls ages 9-13 in the East Bay region of San Francisco. Investing time and effort into the next generation of female leaders, Girls Garage provides in-depth training in 10 skill areas to over 200 girls a year. Founded by Emily Pilloton, the program is a sister program to the original Project H which leads youth in hands-on building and design in order to transform and improve their local community. Both programs teach design thinking, applied arts and sciences, and building skills in order to give them the tools necessary to succeed within their communities and beyond.

Site Analysis
- Program adapted to space, suggesting flexibility for other possible sites, not specific to this one
- Tools and equipment clearly organized and displayed for organization and clarity
- Flex classroom space with non-fixed furniture
- Durable and low maintenance materials throughout the space, ease of cleaning
- Color used as visual accents and to suggest programming
COLOR FACTORY

The brainchild of lifestyle and party company “Oh Happy Day!” opened in August of 2017 in the Union Square area of San Francisco. Advertised as an immersive pop-up color experience, it is a 2-story interactive exhibition celebrating color and material featuring work by a number of artists and collaborators. The space features 10,000 colored ribbons, a giant yellow ball pit, and a spectrum of treats from the creative team’s favorite spots in San Francisco. The use of color is immersive and informative - featuring a wayfinding system and a color map of the city to explore afterwards.

Site Analysis
- Program adapted to space, suggesting flexibility for other possible sites, non-specific to this one
- Full spectrum of color in transition spaces are present, transitioning to single colors within rooms
- Full sensory experiences are present with scratch and snuff walls, local food & beverage sampling coordinated to room color, ball pit swimming, & sound immersion.

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FIAT FACTORY

The former automobile factory in Turin, Italy was opened in 1923 and had a revolutionary design for the model of car production. The architect, Matteo Trucco, designed the building with five floors, each housing a different stage of the car construction, beginning with raw materials on the first floor and continuing upward until the car was completed and emerged on the rooftop level on a test track. At the time, it was the largest automobile factory in the world and was touted as “one of the most impressive sights in industry” by Le Corbusier. (Modern Architecture)

Site Analysis

- Production line informed design of the building, starting at the bottom floor, proceeding upwards until emerging on a test track on the roof.
- Rethought the manner of mass producing a commodity as ubiquitous as the automobile and made it a journey through the site.
- Minimal material palette, focusing on construction, durability, and uniform appearance from one floor to the next.
inspiration from **GIRLS GARAGE**, **COLOR FACTORY**, & the **FIAT FACTORY**, the following is an analysis of the themes identified in each precedent. These projects offered insight into how to best combine themes in a way that would inform and compliment the final product. The most influential elements drawn from these precedents were:

- Color & Material Palette
- Spacial Transitions
- Program Elements
- Establishing Production Flow
- Community Mission
- Site Involvement
- Storytelling

**KEY**

- Length of Line indicates importance of theme to thesis
- Size of blob indicates how much the project addresses theme
- Placement of blob on line indicates amount of inspiration drawn

**DRAWING**

**COLOR & MATERIAL PALETTE.** The visual blast of color in the Color Factory and integration of function and aesthetics. The clean and utilitarian forms exhibited in the concrete levels in the Fiat Factory.

**SPACIAL TRANSITIONS.** The way in which a user is moved from one space to another and what indications of the change are provided. A purposeful and understandable use of color and consistency to help a user understand this.

**WAYFINDING.** The use of a continuous line in the Fiat Factory to guide the car through the production line. The use of color in the rooms as well as the community map to inform the user of an intended path.

**PROGRAM.** The projects and building-centric program that Girls Garage employ. The nod to a production line in creating project spaces for the user.

**ESTABLISHING PRODUCTION FLOW.** The literal influence of the start to finish process of gathering parts, creating, and testing a product.

**COMMUNITY MISSION.** The intended impact the program has on the community surrounding it. The mission to create projects that directly benefit those living near the program and to involve the community in program-run events.

**SITE INVOLVEMENT.** The use of the building site to produce, test, and then display the product.

**STORYTELLING.** The story that is told to the onlooker without necessarily reading it word for word.
<table>
<thead>
<tr>
<th>Program</th>
<th>Occ. Class</th>
<th>Degree of Privacy</th>
<th>Visual Privacy</th>
<th>Acoustic Privacy</th>
<th>Physical Privacy</th>
<th># of Occupants</th>
<th>FF&amp;E</th>
<th>Sensory Experience</th>
<th>Highest Material Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASSROOM</td>
<td>B</td>
<td>some privacy</td>
<td>no privacy</td>
<td>most privacy</td>
<td>30+ (lectures)</td>
<td>seating, whiteboard - avoid traditional setup</td>
<td>focused</td>
<td>floor, chair, table surface</td>
<td></td>
</tr>
<tr>
<td>KITCHEN</td>
<td>B</td>
<td>no privacy</td>
<td>no privacy</td>
<td>some privacy</td>
<td>15</td>
<td>microwave, sink, seating, work surface</td>
<td>clean</td>
<td>countertop, chair, table</td>
<td></td>
</tr>
<tr>
<td>WELDING SHOP</td>
<td>F-1</td>
<td>some privacy</td>
<td>welding ppe</td>
<td>contain sound</td>
<td>15</td>
<td>MIG, stick, plasma cutter, work table, sink, exhaust</td>
<td>intense</td>
<td>work surface, floor</td>
<td></td>
</tr>
<tr>
<td>WOOD WORKSHOP</td>
<td>F-1</td>
<td>some privacy</td>
<td>no privacy</td>
<td>contain sound</td>
<td>15</td>
<td>cnc, worktable, bandsaw, band, belt sander, exhaust</td>
<td>intense</td>
<td>work surface, floor</td>
<td></td>
</tr>
<tr>
<td>COMMON AREA</td>
<td>A-3</td>
<td>most privacy</td>
<td>most privacy</td>
<td>some privacy</td>
<td>15</td>
<td>furniture to facilitate relax/interact, various setups</td>
<td>warm</td>
<td>seating, floor</td>
<td></td>
</tr>
<tr>
<td>OUTDOOR</td>
<td>no privacy</td>
<td>no privacy</td>
<td>no privacy</td>
<td>some (fence)</td>
<td>15</td>
<td>display lighting</td>
<td>curious</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECEPTION/ENTRY</td>
<td>most privacy</td>
<td>some privacy</td>
<td>some privacy</td>
<td>most privacy (locked)</td>
<td>15</td>
<td>reception desk/area, ADA access</td>
<td>approachable</td>
<td>floor</td>
<td></td>
</tr>
<tr>
<td>RESTROOMS</td>
<td>most privacy</td>
<td>most privacy</td>
<td>some privacy</td>
<td>most privacy, lockable</td>
<td>1</td>
<td>ADA stall, toilet, sink, grab rails, paper, trash</td>
<td>fresh</td>
<td>floor</td>
<td></td>
</tr>
<tr>
<td>SHOP</td>
<td>M</td>
<td>no privacy</td>
<td>no privacy</td>
<td>some privacy, money</td>
<td>20</td>
<td>display “case” or other method, cash register/rdr</td>
<td>happy</td>
<td>floor</td>
<td></td>
</tr>
<tr>
<td>GALLERY/DISPLAY</td>
<td>A-3</td>
<td>no privacy</td>
<td>no privacy</td>
<td>some privacy</td>
<td>30</td>
<td>display methods, lighting</td>
<td>bright</td>
<td>floor, shelving</td>
<td></td>
</tr>
<tr>
<td>LECTURE HALL</td>
<td>A-3</td>
<td>no privacy</td>
<td>no privacy</td>
<td>some privacy</td>
<td>50</td>
<td>seating, sound system, visual aid/projector</td>
<td>expansive</td>
<td>floor, seating</td>
<td></td>
</tr>
<tr>
<td>ADMIN OFFICE</td>
<td>B</td>
<td>some privacy</td>
<td>no privacy</td>
<td>some privacy</td>
<td>10</td>
<td>seating, desk, storage, computer, printer, phone</td>
<td>welcoming</td>
<td>desk, chair</td>
<td></td>
</tr>
<tr>
<td>LOADING/STORAGE</td>
<td>S-1</td>
<td>no privacy</td>
<td>no privacy</td>
<td>no privacy</td>
<td>1</td>
<td>shelving, bins/containers</td>
<td>organized</td>
<td>floor, shelving</td>
<td></td>
</tr>
</tbody>
</table>
program square footage

2.5 floors
14,000 gross sq/ft
8,400 net sq/ft

lecture hall
classrooms (2)
kitchen
critique area
common area
wood shop
admin
material storage
gallery/display
shop
restrooms (3)
reception

39
In these fifteen days, develop 15 conceptual studies

- 30 minutes: minimum time investment in each
- 30 square inches: minimum footprint for the smallest plane
- 10: minimum number of three-dimensional studies
- 5: must integrate at least 15 words of text
- 5: minimum number of solely manual/analog works
- 5: maximum number of solely computer generated/digital works
- 5: minimum number of digital/analog hybrid works
- 5: minimum number of different media to be used
FAIL EARLY
AND OFTEN.

Between January 2 and the first day of IDES 699, there are fifteen days. In these fifteen days, develop 15 conceptual studies in preparation for your thesis.

30 minutes: minimum time investment in each
30 square inches: minimum footprint for the smallest plane
10: minimum number of three-dimensional studies
5: must integrate at least 15 words of text
5: minimum number of solely manual/analog works
5: maximum number of solely computer generated/digital works
5: minimum number of digital/analog hybrid works
5: minimum number of different media to be used
15: minimum number of scans/model photos bundled as a PDF & uploaded to 17-0117-15
8:30 on January 17: pin up all studies in the fourth floor Pollak west corridor
ORGANIZATION & SPACE DIVISION

wooden block model exploring changeable space, massing & furniture
demonstrating CMYK color interaction through separate transparent image panels
THE PROGRAM

seeks to introduce young women to the design & fabrication process through active problem solving and prototyping.

A former Presbyterian Church in the six points region of Richmond, VA will house the program. The 13,000 square foot space is comprised of 3 connected structures, a chapel, a narthex, and a parish function hall. Constructed in 1924, the church has no additions and has remained vacant for nearly two decades.

The program introduces students to elementary hand and problem solving skills early on, to foster a sense of confidence and curiosity in the built world. Elements include design thinking and problem solving, wood and metal shop instruction, thoughtful reflection, and the incorporation of these experiences as life skills.

A three pronged approach to organizing the space through “design, prototyping, and reflection” helped to divide function while also bridging the gap between design and fabrication.

While variable in function, all spaces encourage confidence, suggest intended actions, and inform the user of the process along the way. The rooms balance an active workshop environment with a showroom atmosphere, depending on the audience and time of day.

The design intent is to acknowledge the act of making, the process that this entails, the participant as a maker, and the reflection over the final product through a series of relationships:

- A working shop environment is inherently noisy and dirty but a traditional studio environment is quiet and clean.
- The tension between safety under instruction & confidence and independence.
- The overlaps between spaces for young women and spaces for all people.
- To balance the interior environment between order, discipline, values and data & spontaneity and play.

Exploring these relationships through the lens of making and gender will inform decisions such as the scale of object to user, material connotations and values, & organizing the space between “design, prototyping, and reflection”.

Each floor has been specified for a phase within the design process:
Preparation > Action > Observation

Each section of the building has been similarly specified:
Activity > Transition > Reflection

Combining the two provides a distinct function to each space
A three pronged approach to organizing the space through “design, prototyping, and reflection” helped to divide function while also bridging the gap between design and fabrication. While variable in function, all spaces encourage confidence, suggest intended actions, and inform the user of the process along the way. The rooms balance an active workshop environment with a showroom atmosphere, depending on the audience and time of day.

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THE PRINCIPLES

- Change Perspective
- Use Transparency
- Employ Color Purposefully
- Infuse Fun
- Wayfinding
- Inspire Curiosity
- Emphasize Building Systems
- Play with Scale
- Craftsmanship
- Clarity and Direction
- Confidence Through Experience
- Detailed, Delicate, Durable
5 minutes. 2 media. create a rule of interaction that is responsive to one another. One should be a structured line or grid, the other more free form.

FIRST.

5 minutes. 2 media. represent the first exercise in 3 dimensional form, referencing the lines and rules in order to suggest how they may occupy the built environment.

SECOND.
5 minutes. 2 media. create a rule of interaction that is responsive to one another. One should be a structured line or grid, the other more free form.

FIRST.

SECOND.
site model
Elements have been selected based on durability, visual impact, color, connotation, & sensory experience. In order to create a space for young girls, but not make them feel alienated when they are in more traditional spaces, scale and color will be two highly utilized factors. Ever present are the questions - is it delicate? is it detailed? is it durable?
Interior Design Educators Council
Student Poster Finalist
IDEC Travel Grant Award Recipient
March 8 2018
Boston, MA

MFA Interior Environments
Final Oral Defense
May 3 2018
Pollack Building
Richmond, VA
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