

Thesis Project Portfolio

Guiding the Design of an Inclusive Playground through Needs Assessment and Materials Selection

(Technical Report)

A Survey of The Universal Design Framework and Application of Alternative Frameworks regarding the Topic of Inclusivity

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Department of Engineering Systems and Environment

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Sociotechnical Synthesis

Designing for inclusion is a growing space within the design realm. Many methods and frameworks can be applied in order to better define a space as inclusive and diversify the pool of end users. The technical portion of this project was to help guide the design of an inclusive playground through conducting a user needs assessment and a surface material recommendation. The stakeholder analyses consisted of a targeted demographic in order to fill the gaps of an understudied group of people within inclusive park designs. Further, materials research was conducted in order to better understand the appropriate materials to be used for the playground surfacing. Both aspects of this project were aimed to increase accessibility and inclusion for the community of people with disabilities. The results helped guide the design by showing multiple wanted themes by the community as well as a push for unitary, or non-loose fill material, for the playground surfacing.

My STS research dove further into what it means to define a space as inclusive. Throughout the work of the capstone project, I began to notice that there were still gaps within designing for inclusion of a diverse community. In order to define a space as inclusive, I felt there needed to be a more extensive analysis of the users and community of this urban public space. There was an evident gap in this design approach surrounding inclusion of people with varying identities and backgrounds. This research ultimately became a survey of different frameworks that could be applied to a playground design and how each method can cultivate inclusivity with a focus on racial inclusion. The three frameworks analyzed were Universal Design, Value Sensitive Design and Placemaking. An analysis and application of each framework showed how different approaches can both enhance and detract from designing around the value of inclusivity.

Through working with an external client, the team was introduced to incorporating values, such as inclusion, and executing related research to be considered in the planning process. It opened up our approaches within design by driving the research through a new perspective. Further, it taught me to question whether or not we are designing for the extents beyond the average users.

I'd like to thank Kara McClurken, Julie Basic and, the team behind Bennett's Village for opening space for discussion and allowing our capstone team to help guide the design of an inclusive play space. I would like to thank Dr. Valdez for mentoring the capstone team and providing research guidance throughout the year. I would also like to thank Dr. Ferguson for provided incredible feedback by challenging my thoughts and guiding the writing of my thesis. Lastly, I would like to thank Professor Klotz for challenging my ideas, adding new perspectives and teaching me to analyze wicked problems from a more holistic approach.

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Abstract—Playgrounds can serve as an influential site in children’s lives, but their designs and features often exclude those with disabilities and their social, emotional, and physical needs. This study was conducted in collaboration with Bennett’s Village, a Charlottesville-based nonprofit seeking to build an inclusive playground. The purpose of the study was to investigate the needs of adolescents and young adults in the disability space and to create a materials recommendation for playground surfacing. The parameters of these analyses were established and prioritized alongside Bennett’s Village. For the qualitative needs assessment, the team recruited members from organizations focused on the disability community and had 6 participants in the semi-structured interviews and 77 participants in the survey. Through qualitative content analysis of interview and open-ended survey responses and descriptive statistics analysis of close-ended survey responses, we found that, among other trends, participants viewed playgrounds as a site for community and socialization, wanted open spaces that could serve a variety of purposes, and emphasized the importance of nature. For the materials recommendation, the team created a life cycle assessment and cost-benefit analysis and found that poured-in-place (PIP) rubber was the optimal surfacing material with regard to factors such as permeability, local weather factors, and traffic/usage. These findings will be passed on to Bennett’s Village to use in their design of their playground and will also contribute to future inclusive playground design broadly.

Keywords—*inclusive playground, disability, adolescents, young adults, needs assessment, playground materials, ground surfacing material*

I. INTRODUCTION

Community playgrounds provide opportunities that positively guide childhood development, but the needs of those with disabilities are not typically considered in existing design standards.

For example, the 2010 Americans with Disabilities Act (ADA) guidelines require accessibility in terms of entry or access to the play features, but they do not regulate accessibility of the equipment itself [1]. Although some playgrounds may be ADA compliant, the materials used for the playground surfaces are not conducive to people with varying degrees of ability and/or mobility impairments [2]. The 2010 ADA guidelines address accessibility rather than inclusivity, and if disability is considered, it largely focuses on users who require wheelchair assistance and neglects other types of disabilities. Very few parks incorporate inclusive features such as parking accommodations, accessible play spaces and components, and park paths or routes [3]. This exclusion is detrimental to adolescents' growth, so it is imperative that playgrounds not only meet but exceed technical guidelines for accessibility and account for the emotional and social needs of all guests.

In addition to playground design in terms of play features and layout, playground surface material selection is a key component in exclusion of users. Surface materials typically used for playgrounds including, pea gravel, sand, wood chips (mulch), and shredded rubber, can hinder users from entering or navigating the playground. These loose fill surface materials are difficult to traverse for people with varying modes of mobility and are therefore not recognized as ADA-approved materials [4]. Unitary or fixed-form surface materials, on the other hand, would better ensure inclusion of playground users. Existing literature on playground surfacing materials does not include quantitative values such as life-time costs, so this can be expanded upon through further research [5].

Exclusion extends to the adolescent and young adult demographic, particularly those with disabilities, in how they are not typically given agency or power in the decisions that concern them [6]. They are forced to acclimate to a society that does not accommodate them because their

experiences are not accounted for in the design of their environment [7]. In the playground setting, there is more focus on allowing those with disabilities to be present rather than creating opportunities for them to engage in social play [7]. Although existing research has explored the needs of playground users, much of it focuses on young children; an additional needs assessment can be conducted to holistically understand adolescents and young adults, especially in the disability community [8].

Bennett's Village, a nonprofit in Charlottesville, Virginia, is seeking to meet this need by designing and constructing an all-abilities, multi-generational playground [9]. In collaboration with the organization, the team aims to fill the demographic research gap of adolescents and young adult playground users ages 12 through 26 and playground accessibility gap through analysis of surface materials.

II. METHODS

1. Overview

Based on dialogue with Bennett's Village and the existing gaps in the literature, the team identified the objectives of the study: conducting a needs assessment on playground visitors' needs and determining an optimal surfacing material for the playground. The team used a mixed methods approach for the study. For the needs assessment, the team used qualitative approaches to analyze semi-structured interviews and open-ended survey responses and descriptive statistics to analyze close-ended survey responses. Recruitment was completed through outreach to organizations in the disability space. We received approval from the UVA Social and Behavioral Sciences Institutional Review Board in March of 2021 to conduct this portion of our study. For the materials recommendation, we analyzed unitary materials using a life cycle assessment for quantitative cost data and cost-benefit analysis for qualitative data.

B. Sample

The research team used a combination of convenience sampling and snowball sampling to recruit participants for the online interviews and survey for the needs assessment. Eligible participants were individuals between the ages of 12 and 26 who were involved in the disability space and had playground experience. This could mean that they themselves self-identified as having a disability and/or they care for or are a companion to someone with disabilities. These participants were grouped into two categories: adolescents, 12-17 years old, and young adults, 18-26 years old. This demographic was chosen to fill the gap in existing general research and research conducted by Bennett's Village.

C. Recruitment

The needs assessment involved the distribution of outreach messages to local, regional, and national organizations to call on their members to participate in an online survey and/or virtual interview. The recruitment message included the purpose of the study and instructions on how to schedule an interview and access the survey. These messages were sent out in March and April of 2021. Interested interview participants reached out through self-selection to one of two researchers organizing the interviews, and survey participants were given access to the survey link through initial outreach messages. Interview participants were compensated with \$20 Visa gift cards, and survey participants were entered into a drawing for a \$40 Visa gift card.

D. Data Collection

The interviews were semi-structured, consisting of 47 questions and lasting approximately 40 minutes. There were seven objectives focused on:

- 1. General inquiry*
- 2. Current playground experiences*

3. *Previous playground experiences*
4. *Knowledge of inclusive play*
5. *Ideal park design*
6. *Feature and space preferences*
7. *Demographics*

Verbal consent was provided at the beginning of the interviews. Audio recordings and transcriptions were stored on UVA Box, a secure cloud storage platform that only the researchers on the team can access. Upon completion of each interview, the researchers ensured that the interview data were de-identified to maintain confidentiality.

Surveys were conducted through Qualtrics and included 41 closed-ended questions and 3 open-ended questions. These were broken up into categories relating to playground experiences, park elements, and playground preferences. Once the survey period concluded, the data were downloaded and securely stored on UVA Box.

Research data regarding material selection were collected during February and March of 2021. To form materials recommendations, the team first narrowed down candidate materials to those that were unitary, ADA compliant, and deemed viable by Charlottesville Parks and Recreation. These materials included PIP rubber, rubber mats/tiles, artificial/synthetic grass, and bonded rubber mulch. Data were then tabulated over several iterations to include information such as notes on costs, specifications, choice variety, and source citations.

E. Data Analysis

The interviews were recorded, transcribed, and analyzed using conventional content analysis through Dedoose Version 8.3.47b [10]. The team examined the interviews for overall trends before determining codes to define themes and draw example quotes. Conventional content analysis was

used for both interview and open-ended survey responses while descriptive statistics was used specifically for the close-ended survey responses [10]. Directed content analysis was used to group the categories of ideal park features and unfavorable park features. Conventional content analysis was then used to determine themes across participant responses within each category [10].

To obtain a comprehensive understanding for materials recommendation, the team elected to complete a life cycle assessment to better understand the longevity, cost, and qualitative components [11]. This assessment was conducted across a 10-year period for a playground area of 4,000 square feet. To simplify analysis, the team also worked under the assumption that the candidate materials would have equal monetary and labor maintenance costs since further research showed that maintenance was similar across candidate materials. The candidate materials were all compliant with ASTM and ADA standards, and costs were found to account for a critical fall height of ten feet to increase safety and limit potential injuries. Qualitative aspects including permeability, usage/traffic, and weather factors were also compared. The researched materials, which are all unitary, included:

1. *Poured-in-place rubber*
2. *Rubber mats/tiles*
3. *Bonded mulch*
4. *Artificial/synthetic grass*

III. RESULTS

1. Needs Assessment

1. Sample Characteristics

Six individuals self-selected to participate in online interviews based on specified criteria. All of these participants were in the young adult age group. Sixty-seven percent identified as white with the remaining 33% identifying as Asian. Sixty-seven percent identified as having a chronic health condition. Fifty percent identified clearly as having a disability while 33% gave conditional positive responses, such as not fully identifying with the term personally but considering themselves disabled medically. A total of 77 survey participant responses were recorded. Over 130 surveys were submitted, but only 77 responses met the eligibility required for age and 50% completion. Of the 77 qualified participants, about 94% were young adults, about 64% considered themselves as having either a long-term or temporary health condition, and about 94% had experience with playgrounds. These survey demographics can be seen in Table 1.

TABLE I. DEMOGRAPHIC INFORMATION OF SURVEY PARTICIPANTS

	Demographic Information		
	<i>Demographic Category</i>	<i>Demographic subcategory</i>	<i>n(%)</i>
Demographics	Age Division	Adolescents (12-17)	5(93.5)
		Young Adults (18-26)	72(6.5)
	Gender	Female	53(72)
		Male	14(19)
		Genderqueer/gender non-conforming	6(8)
		Other	1(1)
	Long-term or Temporary Disability (self-reported)	Yes	43(60.5)
		No	20(28)
		Prefer Not to Say	5(7)
		Other	3(4)
	Has Experience with Playgrounds	Yes	72(95)
		No	4(5)
	Race	Asian	14(18)
		Black or African American	3(4)
		Hispanic or Latino	4(5)

		Native Hawaiian or Pacific Islander	2(2.5)
		White	50(64)
		Prefer not to answer	2(2.5)
		Other	3(4)

b. Themes

The following themes were drawn from both the interviews and survey. The quotes and reference counts were pulled from the interviews and the open-ended survey questions, and the quantitative data were pulled from the survey responses.

THEME 1: MOTIVATIONS

Participants identified sense of community and relaxation as motivations for visiting playgrounds.

- Community: Playgrounds were identified as being a site conducive to community building and bonding. Some participants went to socialize with new people: “... *A chance to grow their social networks.*” Other participants went to playgrounds to bond and connect with their existing network: “*Sometimes I love walking around my neighborhood and those parks when I have the time with my friends and grow everlasting friendships.*” Participants also expressed the desire for multi-generational interactions, which would require equipment that could be flexible with various body type, sizes, and accommodations: “*Even though she’s small... people her age don’t still go to the park... so probably younger children she has interaction with at the park.*” Ninety-one percent of survey respondents indicated that they visited playgrounds with one or more individuals or in a group, which further supports the socialization motive. Survey participants made 19 references to how this socialization or community could be facilitated through entertainment spaces, like

amphitheaters, or event spaces for large gatherings, like pavilions: *“I really liked the idea of the amphitheater/entertainment center - type of addition. I don't think I have ever seen that in a park/playground before, but I would very much enjoy that.”*

- Relaxation: Playgrounds were identified as offering a source of relaxation from stressful situations because of their atmosphere: *“It's definitely, like, more carefree at a playground.”* From the survey, 19% of responses indicated that leisure or relaxation served as a motivation for playground visits. They also serve as a site for breaks or decompression from everyday routines: *“Just as a way to, you know, obviously, promote coming home from, like, a long school day and just a wave of relaxation.”* About 21% of survey respondents indicated a desire for relaxation spaces. This theme lends to the desire for quiet spaces and natural spaces, which will be further detailed in Theme 3: *“If I'm, like, really stressed out, like, being around nature kind of really relaxes me.”*

THEME 2: LAYOUT

Participants expressed a desire for the general layout of the playground to be open for versatile usage and offer ample space for various activities.

- Open, versatile spaces: There was an expressed preference from both interview and survey participants for open areas that could be used by a wide variety of audiences, *“like a good mix of a lot of things that you, like, would cater to a lot of people.”* This aligns with Bennett's Village's goal of creating a playground for all abilities and all ages to create community-building opportunities. Meeting this goal would allow playground visitors to accommodate the space to their own activities and *“switch between different activities”* as needed.

- Spread out spaces: There was also an expressed preference for the playground features to be spread out: *“It might get overcrowded and ... people may not properly be able to enjoy their space.”* This is especially important for children who require more space to accommodate their physical needs and to make them feel like they have room to play independently: *“Sometimes you’ll have limited space and someone’s trying to plan the equipment in such a tight spot that the kids don’t have the luxury to spread their wings.”* From the survey, over 63% preferred spaced-out layouts instead of centralized layouts. Survey respondents also made 19 references to a desire for space to enjoy the playground without encroaching on the space of others.

THEME 3: DESIRABLE FEATURES

In order to provide a sense of independence and connection to playground visitors, participants identified ground surfacing materials, handrails, seating, shaded areas, natural features, and swings as important features to consider.

- Ground surfacing materials: Participants expressed a preference for PIP rubber: *“If it could maybe be rubberized... the spongey type of, it was rubber, like, rubber flooring.”* Over 20% of survey respondents preferred rubber tiles, and 23% preferred solid rubber surfacing.
- Handrails: For a greater sense of safety and stability while moving throughout the playground and its features, participants wanted handrails and handles: *“Kids with Down syndrome have typically flat arches and low muscle tone so it’s hard to control sometimes... so to have the railing is just an added precaution for them for stability.”* This also provides a greater sense of independence for visitors to navigate the playground on their own: *“I think you also like the handrails to be sure of yourself. They matter to her in regards to that independence.”*

- Seating: Interview participants expressed a desire for seating for physical rest and relaxation. Benches would allow participants to take a necessary break from physical activity: *“It definitely makes things really difficult just physical activity wise... Having a place to sit down, it’s just such a huge deal for me now.”* Seating can also be used as a playground feature for stress relief: *“For me, it’s having... a place where I can sit in peace and quiet sometimes... Moments of clarity and moments of stress free.”* Survey participants made 24 references to the importance of the availability of diverse seating in terms of size and design at various locations within the park. Over 75% of survey responses indicated interest in large seating areas, and more than 76% of survey respondents expressed desire for private seating spaces at playgrounds.
- Shaded areas: With regard to weather concerns, there was a widespread desire for shade across both interviews and surveys: *“I think we’d like if it was more shady. Some type of canvas protection.”* This served to be especially important with blocking out direct sunlight in hot weather: *“Just having shade or something if there’s really bad, like, heat or something to prevent the overheating and things like that.”* There were 11 references made in the surveys with regard to this need for shade.
- Natural features: There was a trend across interview participant preferences for playgrounds to emphasize surrounding nature or other natural features: *“I guess it, like, highlights, like, the natural environment so, like, I’d like to see, like, grass, and, like, I guess nothing that looks, like, too artificial.”* Over 28% of survey respondents noted that they enjoyed the natural environment in playgrounds. These natural features were also connected to the stress relief motivation for visiting an outdoor space. There were 36 survey references to nature, including flowers, birds, butterflies, grass, forests, and trees, the most of any park element.

They described nature as an essential environmental factor for parks and playgrounds. Tracks or trails throughout the park, which were referenced 22 times, can also accommodate this desire.

- Swings: Swings were the most frequently mentioned traditional playground feature with 20 references in the survey. Further, participants specifically referred to the importance of a variety of swing designs, including those for people of all ages and abilities, and its importance in their playground experiences: *“She gets a lot of sensory input from it, um, in regards to swinging.”*

THEME 4: UNDESIRABLE FEATURES

In order to provide accessibility and inclusivity in the playground setting, metal structures, loose playground surfacing materials, and loud or unmaintained settings were indicated as features that should be avoided at playgrounds.

- Metal structures: Participants made 6 references to metal structures, especially metal slides, as features to avoid. Participants noted that metal features are vulnerable to weather conditions, particularly when it is hot and sunny: *“No metal slides—gets too hot.”*
- Loose playground surfacing materials: Loose fill ground surface was referenced 23 times in the survey as a hazard, irritant, or a generally undesirable material. Examples of these materials, which could serve as barriers in playground participation, included sand, pea gravel, and wood chips/mulch: *“No pea gravel because if you have kids in wheelchairs, they’re not gonna be able to maneuver in that stuff.”* When asked about which ground surface materials they did not prefer, survey participants indicated 26% sand, 25% pea gravel, and 19% mulch/wood chips.

- Loud or unmaintained setting: Survey participants referenced their dislike for loud, noisy, or distracting playground surroundings. This aligns with playgrounds being seen as a site for stress relief or relaxation: “*A park without any sort of way to really escape lots of noise and distractions would not be ideal.*” With regard to maintenance, there was a remarked emphasis placed on all playground features being in order for operation and general cleanliness across the space: “*I wouldn’t feel comfortable going to a park that isn’t, like, kept clean, or, like, making sure, like, everything is working, because, I guess, then it gives me the sense that it was kind of, like, abandoned or not, like, taken care of, so I wouldn’t feel quite as safe going there.*”

B. Materials recommendation

Table 2 displays the results of the life cycle assessment for the four candidate materials.

TABLE II. LIFE CYCLE ASSESSMENT OF CANDIDATE MATERIALS FOR PLAYGROUND SURFACING OVER A TEN-YEAR PERIOD

Aspect		<i>PIP Rubber</i>	<i>Rubber Mats/ Tiles</i>	<i>Artificial/ Synthetic Grass</i>	<i>Bonded Rubber Mulch</i>
<i>Section</i>	<i>Category</i>	<i>Cost</i>	<i>Cost</i>	<i>Cost</i>	<i>Cost</i>
<i>Installation Cost</i>	<i>Site Preparation</i>	\$16,000	\$15,000	\$14,000	\$8,000
	<i>Materials, Labor</i>	\$80,000	\$60,000	\$92,000	\$48,000
<i>Maintenance</i>	<i>Monthly</i>	\$20	\$20	-	\$20
	<i>Annually</i>	\$430	\$9,600	\$2,740	\$5,000
<i>Longevity</i>		15 years	10 years (max)	8-10 years	10 years
<i>Total</i>		\$102,700	\$84,620	\$108,740	\$73,400

Artificial/synthetic grass was the most expensive, costing an estimated \$108,740 whereas bonded rubber mulch was the least expensive, costing an estimated \$73,400. Qualitative elements of the playgrounds were then analyzed through a pros and cons list.

- **Permeability:** PIP rubber, rubber mats/tiles, artificial/synthetic grass, and bonded rubber mulch are all porous surfaces that aid in efficient drainage and limit runoff. PIP rubber requires the installation of an additional drainage system beneath the surface to ensure proper drainage. If soil and under layering expand due to excess water build up, the rubber mats/tiles could become unlevel in certain areas.
- **Weather Factors:** PIP rubber has a high ultraviolet resistance, meaning the material resists temperature change so the material will not generate significant amounts of heat on sunny days. Artificial/synthetic grass and bonded rubber mulch are vulnerable to the sun and typically generate surface heat on sunny days. Rubber mats/tiles are likely to warp or curl around the edges and corners, creating mobility hazards due to weather conditions that cause the expansion and contraction of the underlying ground.
- **Usage/Traffic:** PIP rubber is designed for heavy foot traffic areas and can withstand light vehicular traffic. Artificial/synthetic grass is also designed for high foot traffic settings. Rubber mats/tiles are durable, but if the mats/tiles warp or curl around the edges, high traffic settings will further worsen the state of the tiles. Bonded rubber mulch is not a durable surface and is designed for landscaping or low traffic areas. Bonded rubber mulch is 50 times less durable than PIP rubber and quickly diminishes in quality when used in high traffic environments.

IV. DISCUSSION

1. Summary of Key Findings

Four key themes emerged from the qualitative data from interviews and surveys: motivations, layout, desirable features, and undesirable features. Participants were motivated to visit these

spaces in order to experience a sense of community and relaxation. There was an expressed desire for open, flexible-use spaces. Specific desirable features included handrails, seating, shaded areas, natural features, and swings. Specific undesirable features included metal structures, loose surfacing materials, and loud or unmaintained settings.

PIP rubber was determined to be the optimal material for playground surfacing across several parameters through both the needs and life cycle assessments. PIP rubber surfacing is especially durable to heavy foot traffic and is UV resistant, which both play a key role in ensuring longevity. It also requires minimal maintenance and has high permeability, which will aid in providing a playground space that is safe and can be used more frequently. Additionally, while costly upfront, PIP rubber has the longest life expectancy and significantly lower long-term costs.

B. Comparison to Previous Research

The needs assessment findings with adolescents and young adults with disabilities included preferences for open and private spaces, natural settings, and large community events, which align with research conducted by the program, Growing Up Boulder, which examined the needs of teens without disabilities [12]. Additional research that aligns with our assessment suggests that public programs like comprehensive education, training, and coaching programs would enhance participation of play for people with disabilities as well [13].

There has been an emphasis in existing research on features regarding athletic activities in creating multi-generational spaces. The conducted research highlighted needs of creating a sense of community and relaxation. Features including amphitheaters, event spaces, and nature spaces could cultivate multi-generational relationships in addition to athletic features.

From the research results, it was clear that many participants raised concerns about loose fill material surfacing for the playground. Many existing playgrounds are composed of loose fill

material options, which introduce potential accessibility issues. Our materials assessment emphasized the importance of unitary materials by purposely excluding loose fill materials to meet the goal of inclusivity within playgrounds.

While previous research emphasizes ideas that adolescents and young adults have regarding features that they would like to see implemented, the team's research extends findings by inquiring users' thoughts on features, both positive and negative, beyond surfacing materials [12]. Existing research highlighted playground components that users would like to see such as accessible surfacing, safety and light features, and nature features [12]. The conducted research takes a step further into assessing what factors users do not prefer in terms of maintenance, metal structures, and distracting surroundings.

C. Implications

In terms of design, the team's findings indicate clear desires and needs of users and present a more vivid understanding as to how these users conceptualize playground spaces. Our findings could be used to modify or extend existing ASTM and ADA standards to meet the playground surfacing needs expressed in the interviews and surveys. This research can also be disseminated to parks and recreation departments to implement these inclusive features or throughout communities to educate and build greater awareness of these needs.

D. Limitations

Within the scope of this project and its research, there are several limitations that should be noted. One limitation is the amount of research the team procured in terms of materials. While compiling information, there could be variability in reported costs depending on materials sourcing and characteristics. A sensitivity analysis is needed to account for this. Within the scope of the needs assessment, the team's understanding of users' experiences is reliant on limited narratives

due to a relatively small sample size. The demographics of the research participants may not reflect local communities, so further research should be conducted to consider this aspect. These factors would have an impact in terms of comprehensively portraying the experiences of playground users but could over time be improved by obtaining more survey respondents and interviewees.

E. Future Research

In designing inclusive playground spaces, more research can be conducted surrounding what inclusion truly means. It would also be advantageous to conduct additional interviews with the study demographic to gain more insight in terms of age diversity, especially with the adolescent population. Additionally, it could be beneficial to investigate not only standardized surfacing materials for the playground, but also emerging prototype materials which may not traditionally be used as surfacing but could be considered.

V. CONCLUSION

In order to create a playground that is inclusive across the spectrums of age and ability, a needs assessment was conducted to learn about the lived experiences of adolescents and young adults in the disability community. Through interviews and survey responses, factors emerged such as the importance of open and versatile use areas and spaces that highlight surrounding nature. These elements, including access to seating or shade, can increase inclusivity and facilitate the sense of community and relaxation in playgrounds for adolescents and young adults in the disability community. Through the materials analysis, poured-in-place rubber was identified to be the best option in terms of factors such as high permeability, durability in various weather conditions, and high usage/traffic. This information can be employed by Bennett's Village and other playground designers in future all-abilities, multi-generational playgrounds.

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REFERENCES

- [1] Department of Justice. (2010, Sept. 15). *2010 ADA standards for accessible design*.
[Online]. Available:
<https://www.ada.gov/regs2010/2010ADASTandards/2010ADAstandards.htm>
- [2] C. L. Fernelius, "Evidence-based practices for the design of inclusive playgrounds that support peer interactions among children with all abilities," M.L.A. thesis, Dept. Landscape Architecture and Environmental Planning, Utah State Univ., Logan, UT, USA, 2017.
- [3] M. Reiman, et al., "Spatial audit of Charlottesville parks," Dept. Architecture, Univ. of Virginia, Charlottesville, VA, USA, 2018.
- [4] United States Consumer Product Safety Commission. (2018, Jan.) *Summary of playground surfacing focus groups*. [Online]. Available: https://www.cpsc.gov/s3fs-public/Playground_Surfacing_Focus_Group_Report_2018.pdf
- [5] "Playground surfaces: Cost comparison & prices." TotTurf.
<https://www.totturf.com/resources/comparing-surface-types/> (accessed Mar. 4, 2021)
- [6] G. Kembhavi and S. Wirz, "Engaging adolescents with disabilities in research," *Alter*, vol. 3, no. 3, pp. 286-296, May 2009, doi:10.1016/j.alter.2009.05.004
- [7] J. Burke, "Just for the fun of it: Making playgrounds accessible to all children. *World*

Leisure Journal, vol. 55, no. 1, pp. 83-95, Mar.

2013, doi:10.1080/04419057.2012.759144

- [8] C. L. Fernelius and K. M. Christensen, “Systematic review of evidence-based practices for inclusive playground design,” *Children, Youth and Environments*, vol. 27, no. 3, pp. 78-102, Jan. 2017, doi:10.7721/chilyoutenvi.27.3.0078
- [9] “About.” Bennett’s Village. <https://bennettsvillage.org/about/> (accessed Jan. 25, 2021).
- [10] H. F. Hsieh, and S. E. Shannon, “Three approaches to qualitative content analysis,” *Qualitative Health Research*, vol. 15, no. 9, pp. 1277–1288. Nov. 2005, doi:10.1177/1049732305276687
- [11] G. Finnveden, et al. “Recent developments in life cycle assessment,” *Journal of Environmental Management*, vol. 91, no. 1, pp. 1-21, June 2009, doi:10.1016/j.jenvman.2009.06.018
- [12] Derr, V, “Parks for teens: 10 features teens want to see.” *Child in the City*. <https://www.childinthecity.org/2015/12/02/parks-for-teens-10-features-teens-want-to-see/?gdpr=accept&gdpr=accept> (accessed Mar. 18, 2021)
- [13] “Promoting the participation of people with disabilities in physical activity and sport in Ireland.” National Disability Authority. <http://nda.ie/Publications/Health/Health-Publications/Promoting-the-Participation-of-People-with-Disabilities-in-Physical-Activity-and-Sport-in-Ireland1.html> (accessed Apr. 8, 2021).

**A SURVEY OF THE UNIVERSAL DESIGN FRAMEWORK AND APPLICATION OF
ALTERNATIVE FRAMEWORKS REGARDING THE TOPIC OF INCLUSIVITY**

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In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

Chloe Isabella Brannock

Spring, 2021

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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A SURVEY OF THE UNIVERSAL DESIGN FRAMEWORK AND APPLICATION OF ALTERNATIVE FRAMEWORKS REGARDING THE TOPIC OF INCLUSIVITY

Introduction

The Universal Design framework is an established method defined by the Disability Act of 2005 that incorporates a two-level approach creating both a user aware design and a customizable design (National Disability Authority, 2020). There is a seven-step principal guide that builds this design framework and the principles are as follows: equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort and size and space for approach and use. The Universal Design Framework can be applied to a diverse range of products, services and environments and provides a standard that allows for fluid, progressive changes in design. Within Universal Design, there has been strong reliance upon its elements to create spaces society deems as inclusive. However, I am arguing that this is inadequate framing of what makes a space inclusive. This paper will include the emergence of Bennett's Village, a proposed all-inclusive play space, that has incorporated principles of Universal Design methods in their project. I will then shift to analyzing how Universal Design methods lie heavily in the realm of enhancing design for people with disabilities and are not inclusive in integrating cultural and racial diversity.

Inclusive Design for Bennett's Village

In analyzing the emergence of Bennett's Village, it is important to understand the story behind its inspiration. The design of Bennett's Village was inspired by the passing of a boy named Bennett who had spinal muscular atrophy and a love for play (McClurken, Personal Communication, 2020). His love for play encouraged the development of a space where all can

play together and learn and grow from each other. This space is proposed to be an all-accessible, all-inclusive multigenerational play space located in Charlottesville, Virginia.

Throughout my experience of helping guide the design of Bennett's Village, a stakeholder analysis portion has been conducted in order to understand the needs of 12-17- and 18-26-year-old demographic in an inclusive play space. Within this stakeholder analysis, there is a targeted audience for people with disabilities. Most of the questions are centered around accessibility and navigation of entering and utilizing the park, personal experience of exclusion for people with disabilities, and what is needed in the park to enhance the user participation of people with disabilities. In speaking to the Vice President of a regional inclusive park, SOAR365, Kim Watson elaborated on some of the crucial features in the park including sensory walls, interconnected and accessible pathways, athletic space, establishing a theme, and surfaces providing safety and mobility for varying disabilities (Watson, Personal Communication, 2020). Interconnected pathways and appropriate surfacing promote safe and intuitive use of the space. Additionally, sensory walls enhance intellectual growth, athletic space promotes physical growth and themed areas cultivate social environments. Bennett's Village does have the value of inclusivity in mind, however the meaning of inclusive is not as exhaustive as it could be. The inspiration for Bennett's Village is moving forward toward inclusivity, however there may be personal experience and bias intertwined within its motives. The imaginary of this community has the potential to open engagement for a plethora of identities to be included within this process. My question for this community space is are we truly designing an inclusive space to its utmost potential?

Inclusion in Universal Design

In further analyzing Bennett's Village creating an inclusive play space and community, it is important to identify what inclusive means. In designing for inclusivity, the area of accessibility will be addressed. However, if design is inspired around enhancing accessibility, inclusivity will not be completely addressed. As the World Health Organization states, "It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives" (Khazanchi, A. 2018). The process of designing for inclusion creates a relationship between all stakeholders involved. In targeting a group of people to design a space for, we are leaving out the opportunity to enhance creation of inclusive diversity and community. The stakeholder analysis is providing a solution for one type/group of people. Inclusive design works toward one size fits one; it is designing a diversity of things so everyone has an opportunity to participate (Khazanchi, A. 2018). Addressing cultural identity and its preservation within the design process could complement the imaginary of inclusivity within Bennett's Village. The process of a stakeholder analysis can pave the way for potential users of a space to speak about how a design can both benefit and retract from their experiences and emotions. Inclusive design is more procedural, more ongoing, and more iterative of a process than Universal Design. There are still many components of inclusive design that show gaps that need to be filled in order to properly create spaces that create opportunities in designing for the extents beyond average. I am going to hone in to one of these areas, racial exclusion.

Racial Exclusivity in Design

The United States population is becoming more racially and ethnically diverse than ever seen before (Colby et al., 2015). However, people of color are less likely to use public parks compared to Whites due to having less park areas, fewer recreation opportunities or an inferior

quality of parks facilities (Lee et al., 2020). It has been argued that traditional models of public leisure survive have not been effective in catering to needs of disenfranchised groups due to workforces that do not resemble diverse constituents and the belief that recreation is fairly distributed to all constituents (Scott, 2000).

A sector of the problem in the design of public space is zoning. Zoning is more often than not a local-level decision in design. Essentially, local authorities decide what can and cannot be built depending on what they choose to be the identity of a particular area. It has been observed that zoning has intentionally created barriers for directing the atmosphere and population of an area. As an example, for many people a bridge is just a bridge that one travels over. However, throughout history bridges have been built in ways to direct specific groups to and away from areas such as directing traffic to be released in a poor rather than rich neighborhood (Lagoutte et al, 2017). As zoning itself is a large barrier, there is a deeper issue of civic engagement in the process of planning and designing what can and cannot be built. Stakeholder engagement in the design process is an existing problem for all peoples, however people of color have to fight even harder to be able to have any voice heard. Questions such as who does this space serve, what solutions should it help create, whose needs does it meet, are all necessary in the design process. Depending on whether or not these questions are posed in design, designers will be intentionally including and excluding certain peoples from a space. Further, we set a precedent of the values and relationships that arise in these environments ultimately altering the social and political community (Shiffman, R. 2012).

In aims to enhance inclusivity, the adoption of Universal Design has without question opened doors of moving into all-embracing technologies and spaces. However, Universal Design through many of its principles is tailored to physical and intellectual accessibility enhancement

and permitting safety, ultimately identifying it as a limiting framework. For Bennett's Village, Universal Design is working to make sure that people with walking aids and wheelchairs have seamless transitions throughout the playscape by using wide, flat surfacing. It is providing visual sensory through colored and patterned surfaces and features. There are physical sensory walls with aims to increase participation of play. There are themes throughout the playground to help cultivate a common understanding and open the imagination of people at play. However, Universal Design for Bennett's Village is not addressing accessibility for people of different neighborhoods throughout the community. It is not working to understand the diverse cultures that reside within the demographic and engage them as a cohesive community. More specifically, the planning and proposed design of Bennett's Village is not working to address disparities of racial or cultural inclusion. There is no evident intent to fill gaps within the community surrounding racial exclusion.

Examining Universal Design, Value Sensitive Design and Placemaking and Their Applications to Bennett's Village

Universal Design: Designing Solutions for All to Use

In theory, Universal Design is a wonderful framework in contemplation. It's 7 principles of design, there seems to be space for interpretation of how these goals can enhance a space or technology. What we do know is that Universal Design is working to standardize designs so that *all* peoples can use the features. It promotes design through long range planning by municipalities and revisions to building codes and zoning (Chester County Planning Commission, 2021). However, as stated earlier, The Universal Design approach is working to create a solution of one size fits all, but it is limiting the opportunity to enhance participation and engagement of different characteristics of diversity. In thinking about Universal Design's goals

in aims to better cultural, racial, ethnic, and gender identities, a one size fits all approach is not possible to design without bias. In order to create equitable spaces for all peoples, all stakeholders must be a part of the planning, designing and revising process. To design for inclusivity, we must work to seek out more than one point of exclusion, we must identify personal biases within the design processes, and we must provide equivalent experiences by offering different ways to engage (Xiao, L. 2018). Looking further into inclusive design, I believe that Universal Design should be coupled with other frameworks or methods in order to truly define a space as inclusive. I will now explore two different options to better enhance the experiences of racially diverse peoples within a space; Value Sensitive Design and Placemaking.

Value Sensitive Design: Collective Behavior and Engagement

Value Sensitive Design (VSD) is an approach that emerged in the 1990s and since then has been applied to various technologies and industries as a tool to engage both technical and socio-structural design spaces (Shonhiwa, M. 2020). This framework aims to push for more of an iterative, systems approach as it helps avoid solving problems from either a solely technical or socio-technical perspective. One of the biggest components of VSD is its focus on human values as it works to form a relationship between design and ethics. What are human values? Human values are what is important to people in their lives, with a focus on ethics and morality (B. Friedman et al., 2017). The articulate relationship between stakeholders and design paves way for a more deep-seated interconnection strengthening aspects of collective behavior and engagement. VSD as an iterative process presents a fluid relationship between conceptual, empirical and technical investigations of design. The empirical framework for VSD is broken into a pyramid from top to bottom of values, norms, and designs. Understanding the values of the community, the norms of user behavior, and the norms of existing design methods can help

cultivate a collective understanding between both sides. A critical component of VSD is that human values are integrated into every step of the design process, ultimately making it continual. Collective human values can range over multiple lifespans ultimately designing for more than just the current user. This multi-lifespan design reaches to the end users of a technology allowing for preservation of knowledge, support of social processes, and envisioning infrastructure to support inclusivity and access (B. Friedman et al., 2017).

The Bennett's Village stakeholder engagement portion is evidently enhancing inclusivity. However, when we look at enhancing inclusivity within a community, it is easy to put a focal point on one demographic at a time. Throughout history, we can see that this is a norm in which we have designed that results in including or excluding certain people from a space. This lens is too narrow if the goal is to design for inclusion. It seems that in working to strengthen inclusivity for Bennett's Village by targeting the disabled community, it has almost intensified exclusivity in other areas. In redesigning the stakeholder analysis, Bennett's Village would benefit from a more zoomed out lens analyzing all of the systems that use and are related to parks. Means of analysis, design charrettes or interviews for example, should be more open ended and human value oriented to avoid targeting the needs of one or few demographics. Some questions to consider: "How does one characterize the wide-ranging and deeply held values of diverse stakeholders, both present and future? Moreover, how does one prioritize the values implicated in the decisions? (B. Friedman et al., 2004). Through focusing on the impacts and implications of design through different value lenses, there is opportunity to create a space that is inclusive not just of people with disabilities, but rather connect the community through identifying commonalities, differences, and areas of growth surrounding values. In doing so we can use these results to study trends, fill existing gaps and create new ways to connect people.

Placemaking: Engaging Culture in The Community

“Placemaking” emerged in the 1960s in planning and design fields with aims to encourage community participation in neighborhood revitalization efforts (Arroyo, 2017). The idea of placemaking enhances design by creating experiences that connect people to place. It aims to use materiality, form and content to express a place and inspire, engage and connect users (*What Is Placemaking and Identity?*, 2014). Creating identity through placemaking permits opportunity to bridge gaps between multiple disciplines including urban planners, landscape architects, developers, clients and users. In the fall of 2020, Charlottesville removed a Confederate soldier statue located in a park in the heart of downtown. Communal pushes for a different identity within the Charlottesville community allowed for the statue to be removed. Here, Charlottesville is experiencing a form of placemaking as the presence of this statue was communicating an identity that the community did not find to be encompassing of who they are. Further, the community is working to disenfranchise this identity and create a more welcoming park and city space. Placemaking raises the awareness and importance of cultural diversity. It has the opportunity to be a platform for inclusive and transformative dialogue thus disrupting exclusive narratives in design of public space (Toolis, 2017).

A potential inspiration for Bennett’s Village of exemplary placemaking in Charlottesville is The IX Art Park. This park from an outside perspective may look disorganized and be seen as an attempt of careless design. However, IX has created a diverse inclusive space by providing a plethora of artistic engagement for the community. This park, formerly an abandoned warehouse, has become a center in Charlottesville for creative expression through means of colorful murals, life-size sculptures that invite people of all ages to engage with arts, and a stage space for performances (IX Art Park, n.d). Here, people of the community can engage in art practices,

watch a myriad of performances, take part in annual programs or simply gaze at all of it happening. Through using the broad ideas of art and creativity as its core, IX has invited a diverse group of people to utilize this space as they desire.

In applying placemaking as a means to enhance racial and cultural inclusivity in Bennett's Village, it is going to be crucial to understand the users, designers and policymakers. First, it is necessary to assess stakeholders who have experienced racial exclusivity in public urban spaces. Engaging with stakeholders about these experiences will help identify cultural aspects that may need to be preserved within design. It involves listening to stakeholders, asking them questions about their needs and aspirations in a space and successfully implementing them. "Community involvement is key to decision making around how to best use a place.

Placemaking flips the top-down planning approach and embraces a participatory process that, although it may take longer, can be more rewarding (Burrows, 2019). Second, one will need to understand the processes of the planners and designers who contribute to a space as well as the standards and codes of design they are required to follow. Through conducting civic engagement of both direct users and people affected by a proposed space, the community can push for rezoning of a plot of land to be better fit to their needs. There is opportunity to remove barriers of exclusion by allowing for design of space in a more demographically centered and accessible location. As of now, Bennett's Village is proposed to be built in an existing space in Charlottesville known as Pen Park (McClurken, Personal Communication, 2020). This location is currently surrounded by growing semi-affluent neighborhoods ultimately providing ease of access to a select group of people. Within the park space itself, Bennett's Village would benefit by having more engaging opportunities for people of different racial identities. Through including aspects such as local art exhibits that tell a communal story, spaces for cultural

participation and appreciation, and collaborative programs to showcase and educate about niche expertise, Bennett's Village can create an inviting atmosphere for a breadth of identities.

Conclusion

Addressing design projects with a scope such as inclusivity is vital in fulfilling a sustainable vision for the built environment. Universal Design has set in motion the idea of enhancing what may be called an inclusive space or design. It has created a framework to better understand and design for the needs of people with varying disabilities through incorporating them within the greater community. As of now, this design framework is not creating an inclusive space to its utmost potential. Through this paper's analysis, we can see there is still a prominent gap in designing for extents beyond people with disabilities. Areas of racial, cultural, gender, education, socioeconomic status, as well as numerous other identities have been excluded within the use of The Universal Design approach. In planning the design for inclusion, new frameworks need to be applied and potentially even coupled together. There cannot be one solution in hopes of designing for inclusivity; there needs to be various solutions for the diverse makeup of communities that we are and are going to continue to become if we hope to create equitable experiences for all.

References

- Arroyo, K. (2017). Creative Policymaking: Taking the Lessons of Creative Placemaking to Scale. *Artivate*, 6(2), 58-72. doi:10.34053/artivate.6.2.058
- Burrowes, K. (2019, July 15). *Detroit Shows How Placemaking Can Undo Neighborhood Segregation*. Urban Institute. <https://www.urban.org/urban-wire/detroit-shows-how-placemaking-can-undo-neighborhood-segregation>
- Chester County Planning Commission. (2021). *eTools: Universal Design for Public Spaces*. <https://www.chescoplanning.org/MuniCorner/eTools/18-UniversalPublic.cfm#:~:text=Universal%20design%20is%20a%20design,ease%20of%20common%20daily%20tasks>
- Colby, S. L., & Ortman, J. M. (2015). Projections of the Size and Composition of the U.S. Population: 2014 to 2060. *Current Population Reports P25-1143*. Washington, DC: U.S. Census Bureau
- B. Friedman, D. G. Hendry and A. Borning. A Survey of Value Sensitive Design Methods. *Foundations and Trends in Human-Computer Interaction*, vol. 11, no. 23, pp. 63–125, 2017
- B. Friedman, P. Khan and A. Borning. (2004, July 14). Value Sensitive Design and Information Systems. <https://cseweb.ucsd.edu/~goguen/courses/271/friedman04.pdf>

Ginsburg, K. (2006). *The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds*.

<https://pediatrics.aappublications.org/content/119/1/182>

Khazanchi, A. (2018, August 21). *What does it actually mean to create 'inclusive solutions?'*

Medium. <https://uxdesign.cc/inclusion-in-design-843f99b5d1c8>

Lagoutte, J., & Schindler, S. (2017, November 20). *Architectural Exclusion: Race and Class in the City*. Green European Journal. <https://www.greeneuropeanjournal.eu/architectural-exclusion-race-and-class-in-the-city/>

Lee, K. J., Casper, J., & Floyd, M. (2020, March 1). Racial and Ethnic Diversity and Inclusion Efforts of Public Park and Recreation Agencies. *Journal of Park & Recreation Administration*, 38(1), 88 - 105.

Maisel, J., & Ranahan, M. (2017). *Beyond Accessibility to Universal Design | WBDG - Whole Building Design Guide*. Whole Building Design Guide. <https://www.wbdg.org/design-objectives/accessible/beyond-accessibility-universal-design>

National Disability Authority. (2020). *The 7 Principles*. Centre for Excellence in Universal Design. <http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/#:%7E:text=The%207%20Principles%20of%20Universal,the%20North%20Carolina%20State%20University>

Shiffman, R. (2012). *Racialized Public Space | Reimagine!* Reimagine Journal.

<https://www.reimaginepe.org/19-2/wiley-shiffman>

Shonhiwa, M. (2020, September 3). Human values matter: why value-sensitive design should be part of every UX designer's toolkit. Medium. <https://uxdesign.cc/human-values-matter-why-value-sensitive-design-should-be-part-of-every-ux-designers-toolkit-e53ffe7ec436>

Scott, D. (2000, March). Tic, Toe, the Game is Locked and Nobody Else Can Play! Retrieved 2020, from https://www.researchgate.net/publication/280158242_Tic_Toe_the_Game_is_Locked_and_Nobody_Else_Can_Play

Toolis, E. E. (2017, March 1). Theorizing Critical Placemaking as a Tool for Reclaiming Public Space. *AMERICAN JOURNAL OF COMMUNITY PSYCHOLOGY*, 59(1-2), 184 - 199.

What is Placemaking and Identity? (2014). Society for Experiential Graphic Design. <https://segd.org/tags/what-placemaking-and-identity>

Xiao, L. (2018, September 10). *6 Principles for Inclusive Design - UX Planet*. Medium. <https://uxplanet.org/6-principles-for-inclusive-design-3e9867f7f63e>

Prospectus

Guiding the design of an inclusive playground in Charlottesville

(Technical Topic)

Placemaking: A Tool for Enhancing Racial Inclusivity in Urban Public Space

(STS Topic)

By

Chloe Brannock

November, 5, 2020

Technical Project Team Members:

Reid Auchterlonie

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: Chloe Brannock

Technical Advisor: Rupa Valdez

STS Advisor: Sean Ferguson

Introduction

In 1990, the United States established The American's with Disabilities Act (ADA) (ADA National Network, 2010). Since the 1950's, there has been an international evolution of inclusive design working to remove the barriers for people with disabilities. In 1997, The 7 Principles of Universal Design were created permitting a framework to be established for design processes (National Disability Authority, 2020). More recently, there has been a stronger shift in cultural attitudes to adopt more encompassing means of inclusivity within the design process. Many spaces are now going beyond the ADA standards to enhance and better define what it means to be inclusive and accessible in public space.

The technical research of this project is centered around the concepts of accessibility and inclusivity within the design process of Bennett's Village, a playground in Charlottesville, VA. Our team is working to conduct research and provide surface material recommendations, conduct stakeholder analysis on an adolescent group and assist in the project's publicity within the Charlottesville community. In transitioning to the STS portion, I will be looking into the ways in which we define inclusivity within the design process. The technical portion of this project emphasizes designs to accommodate people with disabilities. I would like to challenge this by examining ways in which the scope of the technical work may be blinded to designing an all-inclusive space. Further, I will be exploring how we can design for the extents beyond the average of the Universal Design Framework. The Universal Design framework holds as a great tool for developing accessibility standards within the design process, but coupling it with other design frameworks and/or components may strengthen the definition of inclusivity in both the process of design and the final product.

Technical Topic

Public open space is defined as one essential type of land use that provides and promotes all community members the opportunity to engage with one another, participate in recreation and be in contact with the environment (YiJianac et al., 2020). Charlottesville is home to twenty-six parks that offer a variety of outdoor activities for the community throughout the year. Many of these locations host camps, schools and programs in order to provide facility to local organizations and activities. After the ADA law was established, these parks became more accessible to people with disabilities with hopes to increase human integration in these spaces. However, much of the infrastructure and playscapes in these vicinities are not designed to provide accessibility to people with varying mobility challenges nor do they encourage inclusive play of people with all-abilities. In 2010, the American Disability Act established a new standard for accessibility within design of playgrounds (Department of Justice, 2010). ADA compliant playgrounds have excelled in the movement of enhancing accessibility and inclusivity within playscapes, however there are still gaps of mobility and encouragement of play for all. Play is critical to a child's development and it has an established role in cognitive, physical, emotional and social components of growth (Ginsburg, 2006). Bennett's Village hopes to harness a space that allows children of all-abilities to experience opportunities of both social and individual growth (McClurken, Personal Communication, 2020).

The development of Bennett's Village was inspired by the passing of Bennett as a way to honor the love for play. Bennett's Village is also acting as a tool that is underlining the gaps in design of existing spaces in the Charlottesville community (McClurken, Personal Communication, 2020). In this project, our Capstone team is working to help Bennett's Village fill gaps of research and knowledge with regards to the development of an inclusive and all-

access playground. We are focusing on three subcomponents of scope including stakeholder analysis, research and recommendation of materials, and assistance in marketing and publicity.

The stakeholder analysis component will help ensure Bennett's Village is creating space for a multi-generational facility. Our team has selected an understudied adolescent age range of 12-26-years old in order to find ways they hope to access the park. For this part of the project, we are conducting meetings with local resources, completing an IRB application and providing survey and interview platforms to stakeholders of our demographic. The results of our analysis will help tailor the design of Bennett's Village to bridge the generational gap between the young children demographic and adult/caretaker demographic in this space.

Our material research and recommendation heavily rely on literature review. Playgrounds have been around for centuries and have standardized appropriate materials such as shredded rubber, sand, concrete, asphalt and mulch (U.S. Consumer Product Safety Commission, 2015). The understood risk, costs and maintenance of these standard materials have provided ease to playground designers and have become default guidelines for many spaces. However, many of these parks lack playground inclusion for people with disabilities due to uneven surfacing, narrow openings and some completely inaccessible spaces without the company of a caretaker/adult (Skär, 2002). Our goal in playground material research and recommendations is to find an option that goes beyond ADA compliance standards by analyzing characteristics including usability for many modes of mobility, impact and safety ratings, durability, maintenance and cost.

Publicity of Bennett's Village is aimed to educate the Charlottesville community about the importance of having inclusive and accessible public outdoor spaces. We will mainly be

working toward establishing connections within the community for publicity of Bennett's Village. We plan on reaching out to The Cavalier Daily and a local news platform.

For this project, our team has broken down and delegated tasks within each of our three sub scopes. Over the course of the semester, I have conducted literature reviews on materials, planned and conducted meetings with local contacts, helped prepare an IRB research application and created the schedule for our work.

STS Topic

The Universal Design framework is an established method defined by the Disability Act of 2005 that incorporates a two-level approach creating both a user aware design and a customizable design (National Disability Authority, 2020). There is a seven-step principal guide that builds this design framework and the principles are as follows: equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort and size and space for approach and use. The Universal Design Framework can be applied to a diverse range of products, services and environments and provides a standard that allows for fluid, progressive changes in design. Within Universal Design, there has been strong reliance upon its elements to create spaces society deems as inclusive. However, I am arguing that this is inadequate framing of what makes a space inclusive. This paper will include an overview of playgrounds that have incorporated principles of Universal Design methods in their projects. I will then shift to analyzing how Universal Design methods lie heavily in the realm of enhancing design for people with disabilities and are not inclusive in integrating cultural and racial diversity.

Universal Design in Play Space

Universal Design works to place diversity at the core of design. This framework covers persons regardless of age, size, and all-abilities in order to create inclusive, responsive, and sustainable cities and communities (“Planning and Policy,” 2017). The use of The Universal Design Framework in urban public spaces is vital to helping increase integration of users by providing ease of access. Bennett’s Village has adopted Universal Design principles in order to provide ease of access and inclusion for people with disabilities. Approaches to achieving this goal include education on the needs of the user through a stakeholder analysis and reference to successfully implemented playgrounds. The Vice President of SOAR365, Kim Watson, elaborated on some of the crucial features in the park including sensory walls, interconnected and accessible pathways, athletic space, establishing a theme and surfaces providing safety and mobility for varying disabilities (Watson, Personal Communication, 2020). Interconnected pathways and appropriate surfacing promote safe and intuitive use of the space. Additionally, sensory walls enhance intellectual growth, athletic space promotes physical growth and themed areas cultivate social environments. Another space, Chase Palm park in Santa Barbara, California, created a play area that would serve as a focal point for the community. Universal Design played a large role in the development of this park through combining accessibility components with the ocean theme for the community (Goltsman, 2007). For example, the blue ocean rubberized safe surfacing serves as a context for the whale sculptures, provided by local artists, and creates accessible pathing for people with mobility aids. Chase Palm park used the ocean theme to enhance mobility features, include local businesses and promote a community bond through an identifying characteristic of this location.

Racial Inclusion and Design of Urban Public Space

In analyzing the measures taken to establish inclusive playscapes through Universal Design, it is evident that there is a gap in designing for beyond disabilities. Universal Design, through many of its principles, is tailored to physical and intellectual accessibility enhancement and permitting safety, however there are limitations in this framework that need to be filled regarding racial and cultural inclusivity.

The United States population is becoming more racially and ethnically diverse than ever seen before (Colby et al., 2015). However, people of color are less likely to use public parks compared to Whites due to having less park areas, fewer recreation opportunities or an inferior quality of parks facilities (Lee et al., 2020). It has been argued that traditional models of public leisure survive have not been effective in catering to needs of disenfranchised groups due to workforces that do not resemble diverse constituents and the belief that recreation is fairly distributed to all constituents (Scott, 2000). Applying Universal Design to spaces may be able to start creating a more holistic society, but it lacks needs to address cultural values (Maisel & Ranahan, 2017). Universal Design principles coupled with placemaking methods may provide the opportunity for enhancement of cultural diversity in addition to accessibility within urban built spaces.

Placemaking

“Placemaking” emerged in the 1960s in planning and design fields with aims to encourage community participation in neighborhood revitalization efforts (Arroyo, 2017). The idea of placemaking enhances design by creating experiences that connect people to place. It aims to use materiality, form and content to express a place and inspire, engage and connect

users (*What Is Placemaking and Identity?*, 2014). Creating identity through placemaking permits opportunity to bridge gaps between multiple disciplines including urban planners, landscape architects, developers, clients and users. In the fall of 2020, Charlottesville removed a Confederate soldier statue located in a park in the heart of downtown. Communal pushes for a different identity within the Charlottesville community allowed for the statue to be removed. Here, Charlottesville is experiencing a form of placemaking as the presence of this statue was communicating an identity that the community did not find to be encompassing of who they are. Further, the community is working to disenfranchise this identity and create a more welcoming park and city space. Placemaking raises the awareness and importance of cultural diversity. It has the opportunity to be a platform for inclusive and transformative dialogue thus disrupting exclusive narratives in design of public space (Toolis, 2017).

In further research of placemaking as a means to enhance racial and cultural inclusivity, it is going to be crucial to understand both sides of developed urban spaces. First, it is necessary to assess stakeholders who have experienced racial exclusivity in public urban spaces. Second, I will need to understand the processes of the planners and designers who contribute to a space as well as the standards and codes of design they are required to follow. Methods of gathering information include continued literature review as well as potential interviews with stakeholders. Questions I have moving forward: What is the source of racial exclusivity in urban space? What practices in design are directly working to eliminate racial injustice? How might other aspects of identity, such as class and education, be intertwined with race and culture? Under what circumstances is placemaking considered as an option for design? Why has Universal Design not been successful in addressing cultural identity?

Addressing design projects with a scope such as inclusivity is vital in fulfilling a vision for the built environment. Universal Design through Bennett's Village and Placemaking to remove racial and cultural barriers in the City of Charlottesville are currently two separate projects regarding enhancing inclusivity in urban public space. However, defining inclusivity for a community may benefit from the coupling of Universal Design Principles and Placemaking.

Next Steps

- Refine Prospectus
- Continue literature review of applications of The Universal Design Framework
- Begin literature review of socio-political controversies within The Universal Design Framework
- Begin literature review of racial injustice and cultural exclusion in design
- Potentially conduct interviews with stakeholders in Charlottesville
- Analyze ways Universal Design could adopt placemaking in its framework

References

- ADA National Network. (2010). *ADA - Findings, Purpose, and History | ADA Anniversary Tool Kit*. ADA 30 Years Americans with Disabilities Act. https://www.adaanniversary.org/findings_purpose#:~:text=ADA%20and%20the%20ADA%20Amendments,law%20on%20July%2026%2C%201990.
- Arroyo, K. (2017). Creative Policymaking: Taking the Lessons of Creative Placemaking to Scale. *Artivate*, 6(2), 58-72. doi:10.34053/artivate.6.2.058
- Colby, S. L., & Ortman, J. M. (2015). Projections of the Size and Composition of the U.S. Population: 2014 to 2060. *Current Population Reports P25-1143*. Washington, DC: U.S. Census Bureau
- Department of Justice. (2010). *2010 ADA Standards for Accessible Design*. https://www.ada.gov/reg2010/2010ADASTandards/2010ADASTandards_prt.pdf
- Ginsburg, K. (2006). *The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds*. <https://doi.org/10.1542/peds.2006-2697>
- Goltsman, S. M., & Iacofano, D. S. (2007). ADOPTING A NEW HEART. In *The inclusive city: Design solutions for buildings, neighborhoods and urban spaces* (pp. 155-173). Berkeley, CA: MIG Communications.

Lee, K. J., Casper, J., & Floyd, M. (2020, March 1). Racial and Ethnic Diversity and Inclusion Efforts of Public Park and Recreation Agencies. *Journal of Park & Recreation Administration*, 38(1), 88 - 105.

Maisel, J., & Ranahan, M. (2017). *Beyond Accessibility to Universal Design | WBDG - Whole Building Design Guide*. Whole Building Design Guide.
<https://www.wbdg.org/design-objectives/accessible/beyond-accessibility-universal-design>

National Disability Authority. (2020). *The 7 Principles*. Centre for Excellence in Universal Design. <http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/#:%7E:text=The%207%20Principles%20of%20Universal,the%20North%20Carolina%20State%20University>

Planning and policy. (2017). In *Building for Everyone: A Universal Design Approach*. Centre for Excellence in Universal Design. <http://universaldesign.ie/Built-Environment/Building-for-Everyone/9-Planning.pdf>

Scott, D. (2000, March). Tic, Toe, the Game is Locked and Nobody Else Can Play! Retrieved 2020, from
https://www.researchgate.net/publication/280158242_Tic_Toe_the_Game_is_Locked_and_Nobody_Else_Can_Play

Skär, L. (2002, March 1). Disabled children's perceptions of technical aids, assistance and peers in play situations. *Scandinavian Journal of Caring Sciences*, 16(1), 27 - 33.

Toolis, E. E. (2017, March 1). Theorizing Critical Placemaking as a Tool for Reclaiming Public Space. *AMERICAN JOURNAL OF COMMUNITY PSYCHOLOGY*, 59(1-2), 184 - 199.

U.S. Consumer Product Safety Commission. (2015). *PublicPlayground Safety Handbook*.
<https://www.cpsc.gov/s3fs-public/325.pdf>

What is Placemaking and Identity? (2014). Society for Experiential Graphic Design.
<https://segd.org/what-placemaking-and-identity#:~:text=Placemaking%20is%20the%20design%20activity,%2C%20pattern%2C%20video%20and%20motion>

YiJianac, I., Luo, J., & Chan, E. H. W. (2020). *Spatial justice in public open space planning: Accessibility and inclusivity*. ScienceDirect.
<https://login.proxy01.its.virginia.edu/login?url=https://www.sciencedirect.com/science/article/pii/S0197397519309993>