

Building blocks of inclusion: Minecraft as a tool for youth engagement

by

Abigail Loraine Danner

B.A., Monmouth College, 2019

A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture and Regional & Community Planning
College of Architecture, Planning, and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2023

Approved by:

Major Professor
Dr. Sara Hadavi

Copyright

© Abigail Danner 2023.

Abstract

Land-use planning tends to be adult-oriented, leaving young people's ideas and concerns frequently dismissed. In addition, attempts to involve youth in planning are often resisted due to societal views of young people as lacking the capacity to participate meaningfully in the design process (Frank, 2006). Despite this tendency to dismiss youth in the planning process, youth are still impacted by land-use decisions and should be considered an important stakeholder group. Encouraging youth to participate in decisions that will impact them enables them to take active roles in their personal and community development (United Nations, n.d.). Participatory design is a democratic approach to the design process that encourages community members to take part in design decision-making; including youth in participatory design is gaining traction as a priority issue (Sanders & Stappers, 2008). Video games are an emerging way to include young people in design decision-making. With more than 480 million copies sold as of 2019, Minecraft seems to be the most successful video game of all time. Due to its cultural ubiquity and relative ease of learning compared to traditional CAD software, Minecraft is becoming an increasingly popular way to engage youth in participatory design (Delaney, 2022; Cheshire, 2012). Minecraft has been applied by nonprofits and professional organizations, including Block by Block (a collaboration with UN Habitat) and ASLA to gather youth input in the design process. However, there is a lack of research evaluating Minecraft's effectiveness in building youth understanding and contribution to the design process as compared to traditional participatory design approaches. My study aims to address this issue by comparing youth responses to traditional and video-gaming engagement practices. In this study, 10 students aged 16-19 from an urban high school in Kansas City, Missouri were randomly selected and assigned to one of two community engagement workshops: a traditional paper-based design charrette and a video-game workshop

using Minecraft. In both workshops, students created designs for a stretch of greenspace near their school. Surveys issued before and after the workshops evaluated the effectiveness of each approach by assessing the strengths and shortcomings of each tool, students' sense of involvement, and the meaning of their involvement. Minecraft was found to be a promising method for youth engagement: students in the Minecraft group reported a significantly better understanding of the design process after the activity than their counterparts in the traditional group. Students in the Minecraft group also reported themselves as more willing to participate in an actual public project. While the findings may not be generalizable due to the small sample size, this study offers a useful method to be utilized in similar studies. Further investigation with a larger sample size is needed to explore the potential of Minecraft as a tool for participatory design.

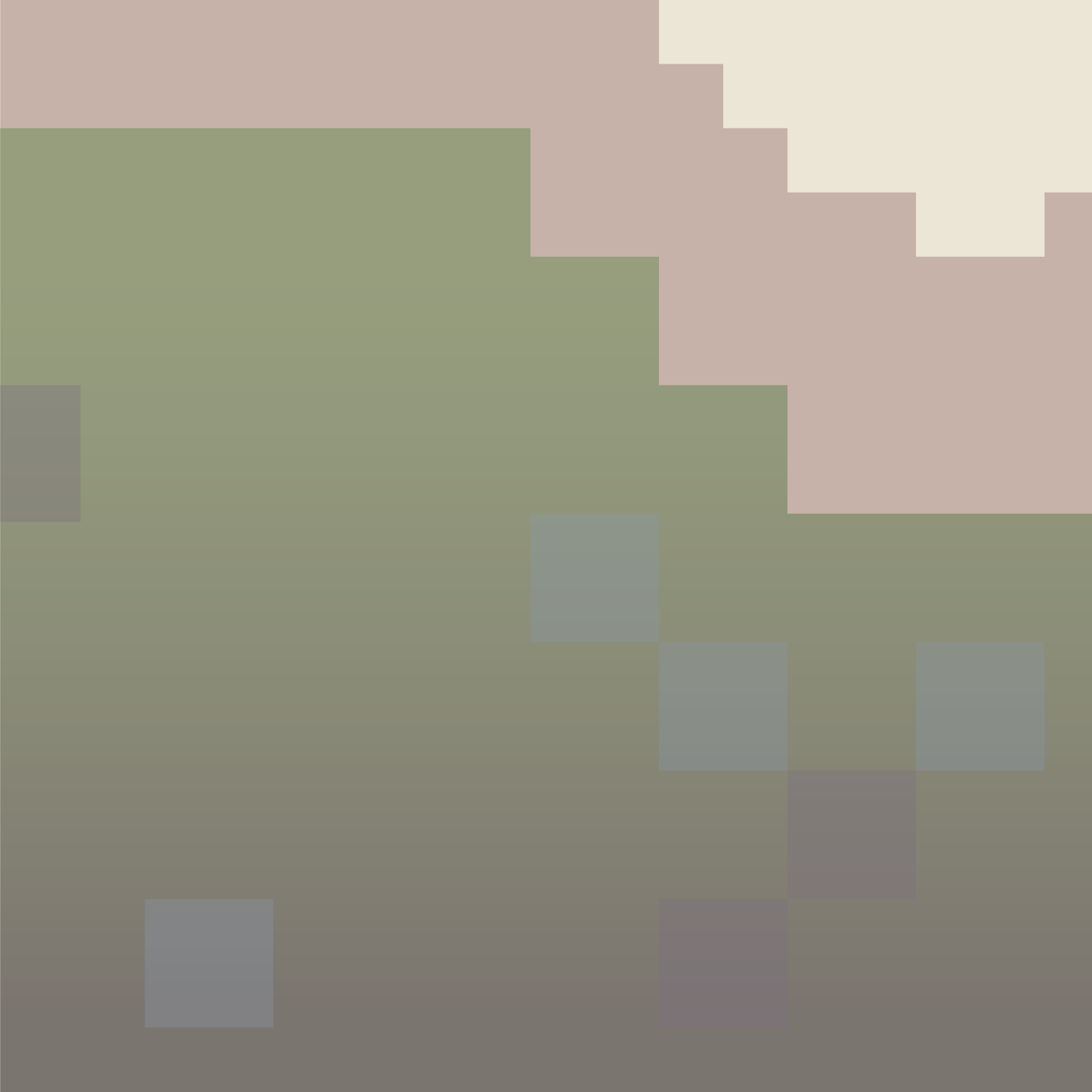


building blocks of inclusion

Minecraft as a Tool for
Youth Engagement

Abigail Danner





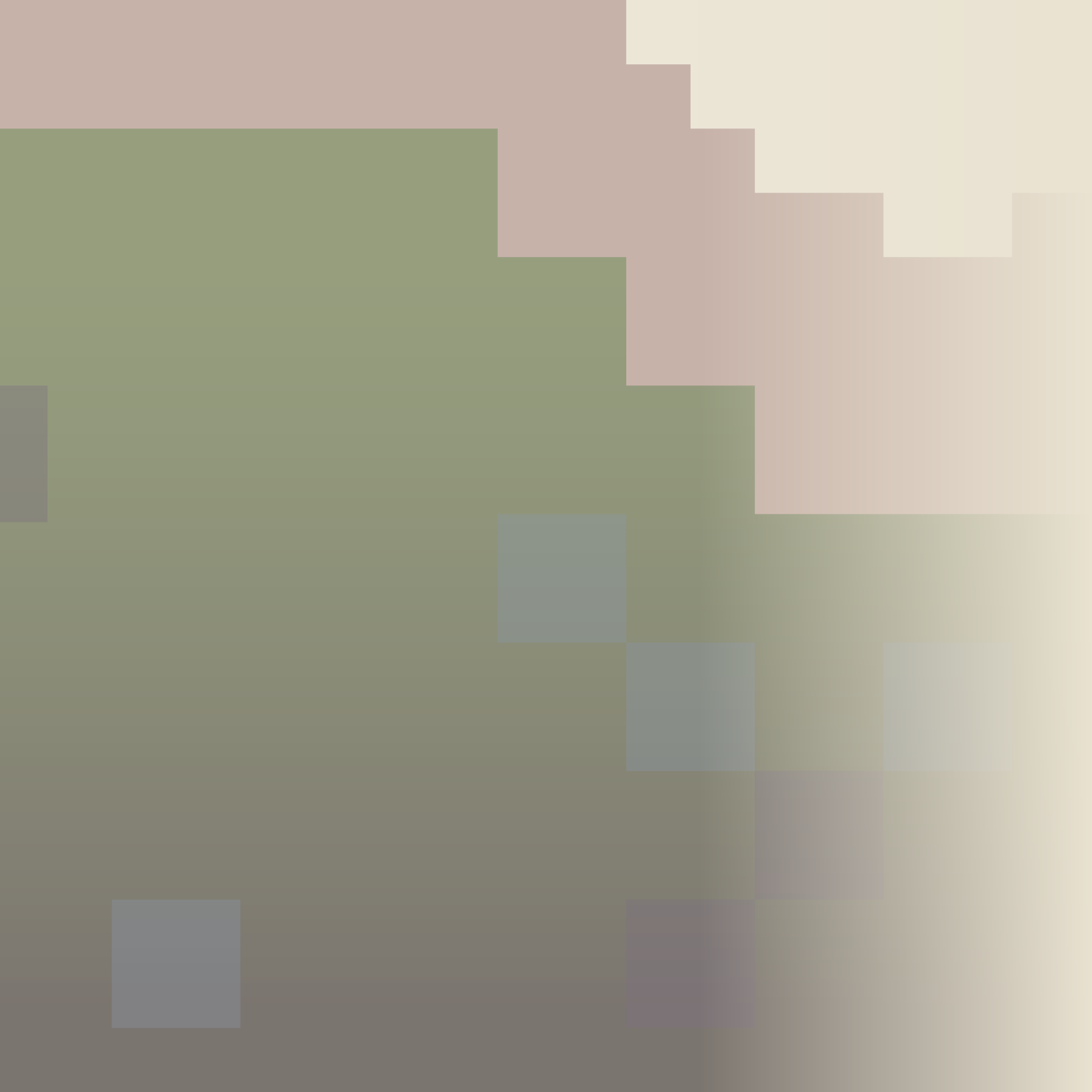


table of contents

Acknowledgments	.....	vii
Abstract	.....	ix
List of Figures	.....	xii
Chapter 1: Introduction	.....	1
Chapter 2: Literature Review	.....	6
Chapter 3: Methodology	.....	21
Chapter 4: Results	.....	45
Chapter 5: Discussion	.....	81
Chapter 6: Conclusion	.....	101
Chapter 7: Appendices	.....	111



acknowledgments

To my major professor, Dr. Sara Hadavi, and my committee members, Kirby Barrett and Katie Loughmiller: Thank you for your invaluable support, insight, and advice throughout this research project. Your guidance has shaped my project from start to finish.

To the hardworking and dedicated teachers at Guadalupe Centers High School, especially Andrew Heimbürger, Keith Schoen, and Ashlyn Welch: Thank you for your patience and your magnificent efforts to coordinate students and workshop dates. I really appreciate your work and your care for your students.

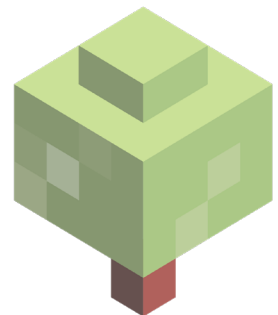
To my four Student Assistants, Pedro Velazquez, Joel Holguin, Sofia Esquivel, and Amy Angulo: Thank you for your time, effort, and patience. This project would not have been possible without the four of you, and I enjoyed working with and learning from you.

To my parents, Mike and Julie Danner: Thank you for your extensive support and Friday check-ins. Your care and commitment to my education has made me the person I am today, and I'm extremely grateful to have come this far.

To Beth, Amelia, and Christine: Thank you for the quality time, study outings, jokes, and encouragement. The three of you have been wonderful to live, work, and cook with.

To Jamie, Jon, Kate, Charling, Liv, Tooba, and Aman: Thank you for your senses of humor and astute listening as I finished my “degree in Minecraft.”

To Cosmin and Calcifer, who provided needed motivation and excellent (though often cryptic) advice.





abstract

Land-use planning tends to be adult-oriented, leaving young people's ideas and concerns frequently dismissed. In addition, attempts to involve youth in planning are often resisted due to societal views of young people as lacking the capacity to participate meaningfully in the design process (Frank, 2006). Despite this tendency to dismiss youth in the planning process, youth are still impacted by land-use decisions and should be considered an important stakeholder group. Encouraging youth to participate in decisions that will impact them enables them to take active roles in their personal and community development (United Nations, n.d.). Participatory design is a democratic approach to the design process that encourages community members to take part in design decision-making; including youth in participatory design is gaining traction as a priority issue (Sanders & Stappers, 2008). Video games are an emerging way to include young people in design decision-making. With more than 480 million copies sold as of 2019, Minecraft seems to be the most successful video game of all time. Due to its cultural ubiquity and relative ease of learning compared to traditional CAD software, Minecraft is becoming an increasingly popular way to engage youth in participatory design (Delaney, 2022; Cheshire, 2012). Minecraft has been applied by nonprofits and professional organizations, including Block by Block (a collaboration with UN Habitat) and ASLA to gather youth input in the design process. However, there is a lack of research evaluating Minecraft's effectiveness in building youth understanding and contribution to the design

process as compared to traditional participatory design approaches. My study aims to address this issue by comparing youth responses to traditional and video-gaming engagement practices. In this study, 10 students aged 16-19 from an urban high school in Kansas City, Missouri were randomly selected and assigned to one of two community engagement workshops: a traditional paper-based design charette and a video-game workshop using Minecraft. In both workshops, students created designs for a stretch of greenspace near their school. Surveys issued before and after the workshops evaluated the effectiveness of each approach by assessing the strengths and shortcomings of each tool, students' sense of involvement, and the meaning of their involvement. Minecraft was found to be a promising method for youth engagement: students in the Minecraft group reported a significantly better understanding of the design process after the activity than their counterparts in the traditional group. Students in the Minecraft group also reported themselves as more willing to participate in an actual public project. While due to small sample size, the findings may not be generalizable, this study offers a useful method to be utilized in similar studies. Further investigation with a larger sample size is needed to explore the potential of Minecraft as a tool for participatory design.



list of figures

Figure 1.1. Map of the research process.

Figure 2.1 Design charette held in Jackson, MS (Carry, 2019).

Figure 2.2 City street designed and built by MattuFIN in Minecraft (Landin, 2018).

Figure 2.3 Skyline of a Minecraft city designed and built by MattuFIN (Landin, 2018)

Figure 2.4 Park in Lima, Peru reconstructed in Minecraft (UN Habitat, 2015).

Figure 2.5 Minecraft workshop with Block by Block (UN Habitat, 2017).

Figure 2.6 Literature map of this study.

Figure 3.1 Structure of the design workshop conducted at the high school.

Figure 3.2 Location of GCHS on the east side of Kansas City.

Figure 3.3 Memorial plaza.

Figure 3.4 View across the greenspace from the south.

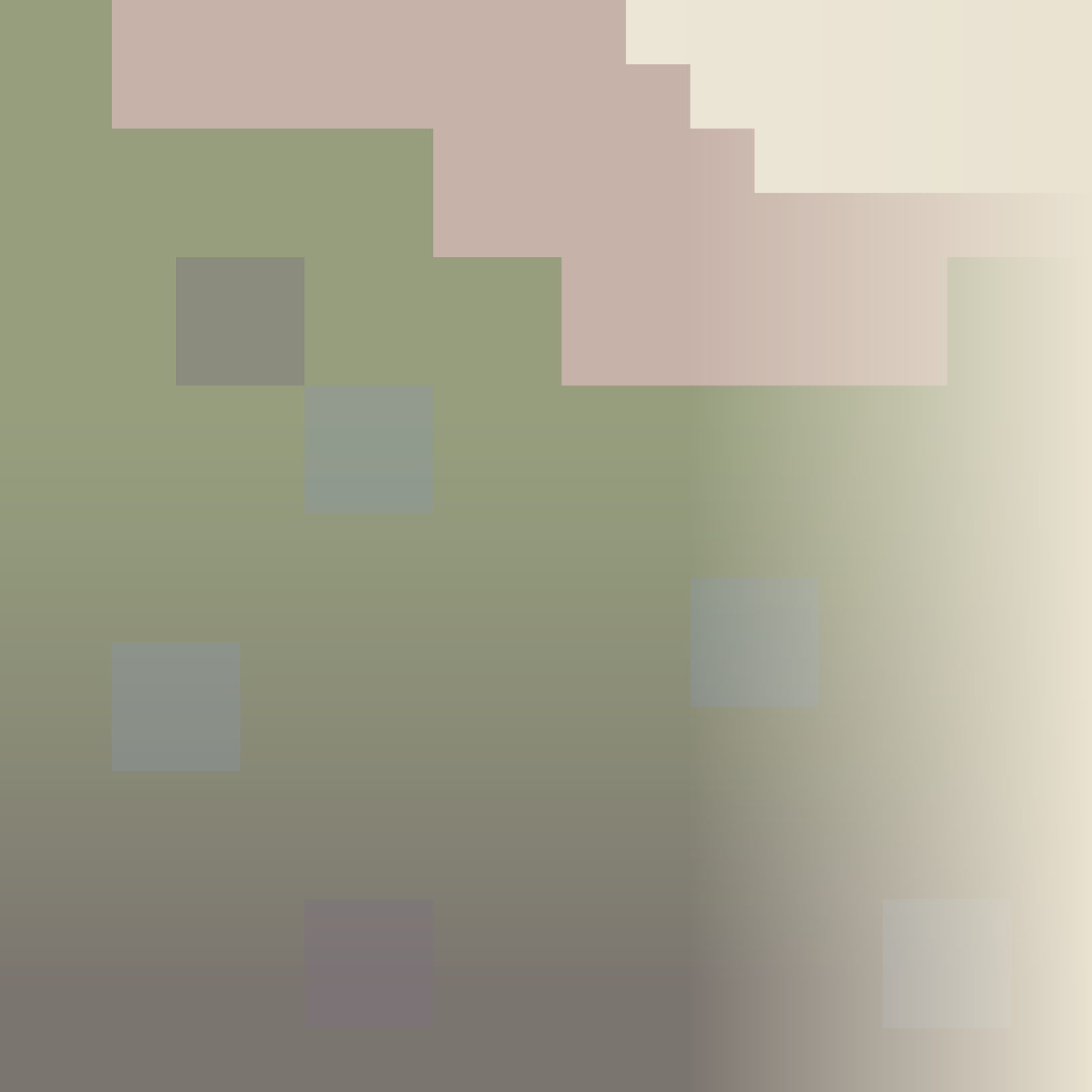
Figure 3.5 Crosswalk at The Paseo.

Figure 3.6 Aerial map of the site and immediate context.

Figure 3.7 Perspective view of the reconstructed site in Minecraft.

Figure 3.8 Aerial view of the reconstructed site in Minecraft.

- Figure 4.1** Mean student scores for tool effectiveness (within-group).
- Figure 4.2** Mean student scores for sense of involvement (within-group).
- Figure 4.3** Mean student scores for meaningfulness of involvement (within-group).
- Figure 4.4** Mean student scores for tool effectiveness (between-group).
- Figure 4.5** Mean student scores for sense of involvement (between-group).
- Figure 4.6** Mean student scores for meaningfulness of involvement (between-group).
- Figure 4.7** Aerial view of Minecraft design.
- Figure 4.8** Water feature built by Minecraft group.
- Figure 4.9** Picnic shelter built by Minecraft group.
- Figure 4.10** Sign placed by Minecraft group.
- Figure 4.11** Soccer field built by Minecraft group.
- Figure 4.12** Villager goalie in soccer field.
- Figure 4.13** Shaded seating area in soccer field.
- Figure 4.14** Traditional group design 1.
- Figure 4.15** Traditional group design 2.
-
- Figure 5.1** Diagram of within-group comparisons.
- Figure 5.2** Diagram of between-group comparisons.



01

introduction

1.1 Background

Traditional user-centered approaches to design view design professionals as the experts, while end user groups are considered largely passive recipients of the design. In the 1970s, participatory design emerged as an approach to counter the perspective of the end user as passive. Participatory design sees the end user as an active partner, rather than a subject, in the design's creation (Sanders & Stappen, 2008; Spinuzzi, 2005; Sanoff, 2000).

Since its inception, the participatory design process typically involves design workshops where community members propose ideas for a site. Participants use markers, scissors, and construction paper over bases of maps, sketches, and physical models to visualize their ideas for a space, and designers use these ideas as the foundation of their work (Sanoff, 2000).

Ideally, participatory design should represent as many stakeholder groups as possible in the design process. However, young people are underrepresented despite the benefits of youth engagement (Frank, 2006; Sanoff, 2000; United Nations, n.d.). Barriers to youth participation include adult beliefs that youth lack the experience to contribute meaningfully to the process, as well as youth feelings that their ideas and concerns won't be listened to by adult "experts" (Frank, 2006; Sanoff, 2000; Mullahey et al.,1999).

Owing to their tremendous popularity with young people, video games have emerged as a way to overcome these barriers and involve youth in participatory design. The sandbox video game Minecraft, developed by Mojang Studios in 2009, is a popular choice for youth engagement due to its ease of learning, popularity, and possibilities for creativity. However, there is a shortage of research addressing the effectiveness

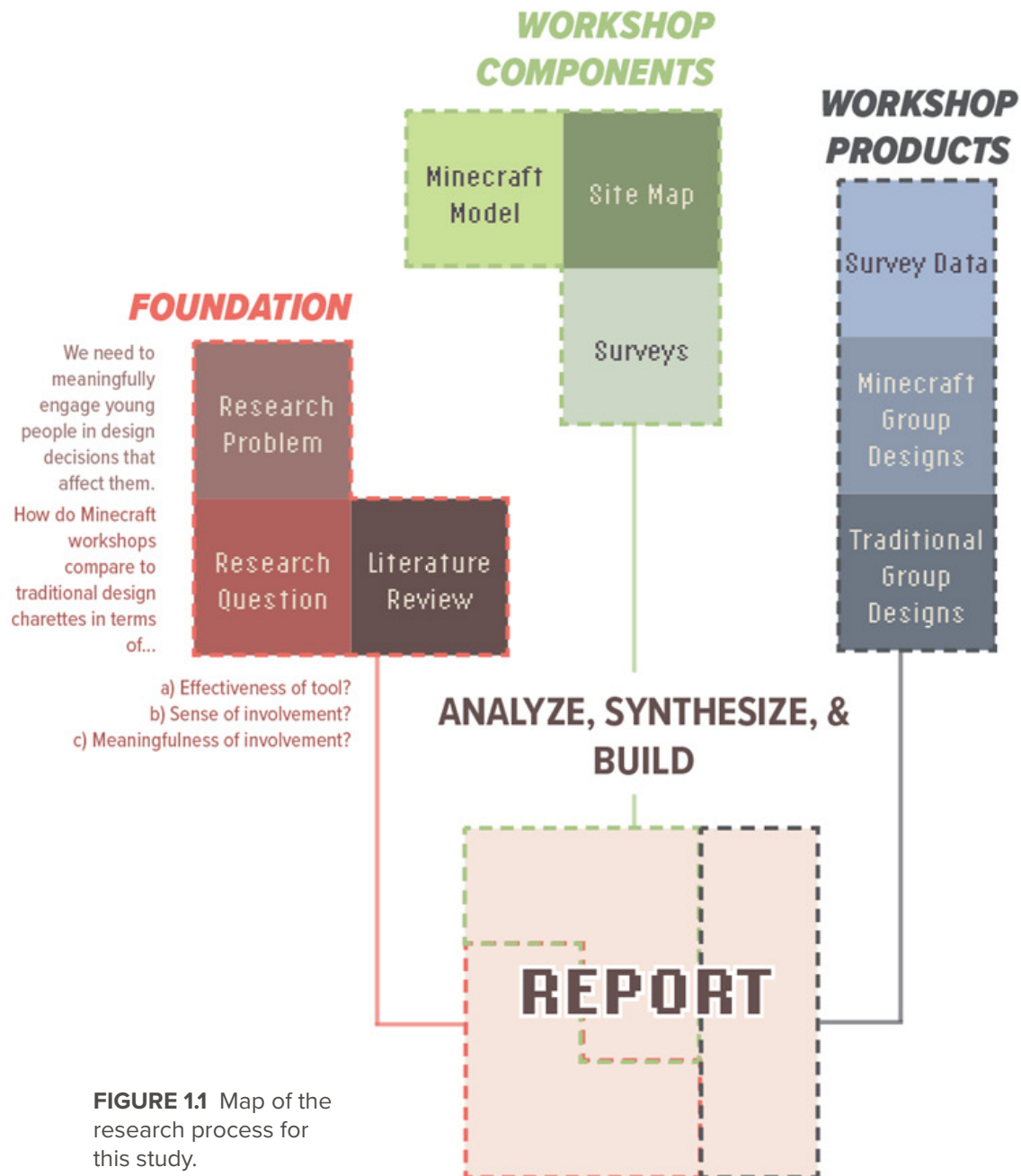


FIGURE 1.1 Map of the research process for this study.

of Minecraft as a design tool compared to traditional design workshops. My study addresses this shortage by examining three factors: a) the effectiveness of each tool; b) students' sense of involvement; and c) how meaningful students found their involvement. The comparison of the two workshop approaches with regard to these factors is intended to shed light on whether Minecraft is an effective tool to address the shortage of youth representation in the participatory design process.

The outcomes of this study are expected to encourage youth participation through effective methods and provide insights to better ways of involvement of young people in design decision-making. This study aims to address the lack of research comparing traditional and video-game means of engagement.

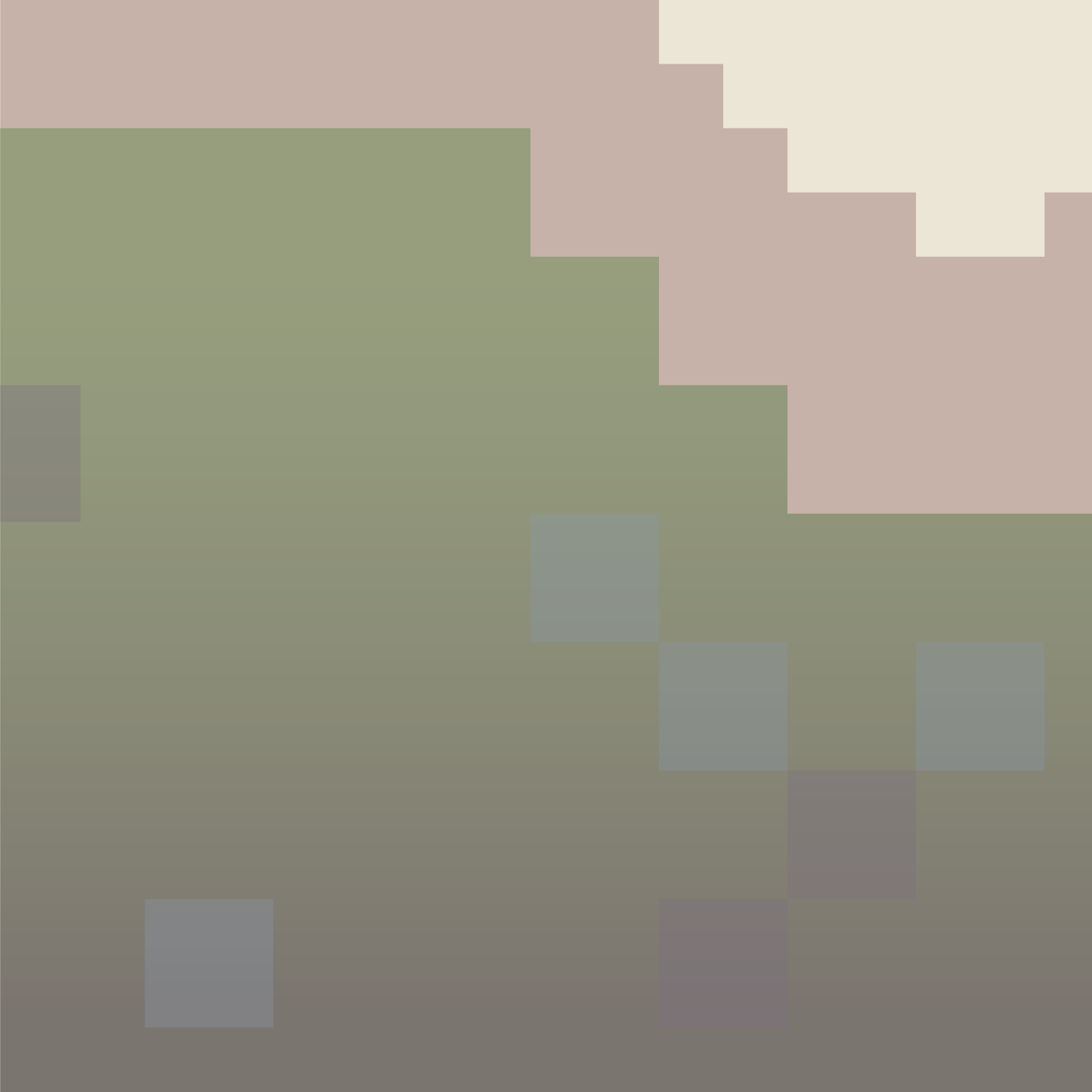
The broader aim of this study is figuring out a good way to increase the representation of youth in participatory design. Since youth are an underrepresented group in participatory design, it's crucial to find methods of participation that are accessible and meaningful to them.

1.2 Research Objective and Goal

Research Objective: Develop workshops and surveys to measure high school students' engagement with Minecraft vs. traditional design charettes.

Research Goal: Identify the benefits of video-gaming to involve youth in design decisions that affect them.





02

literature review

2.1 An Overview of Participatory Design

Participatory design is both a design approach and a method of research (Spinuzzi, 2005). It is characterized by user involvement and views the end user as an active partner in the creation of the design. Participatory design emerged as an alternative to the traditional user-centered approach to design, which sees the user as a subject rather than a partner. Participatory design considers the *tacit knowledge* of the participant – the unwritten, often-invisible knowledge gained from a person's lived experience – and melds it with the more analytical, abstract knowledge of the researcher (Sanders & Stappers, 2008; Spinuzzi, 2005; Luck, 2003). When designers and researchers engage in participatory design, they recognize that design is a social process and that the impact of the design extends beyond the designer (Luck, 2003; Sanoff, 2000).

The idea of participatory design has its roots in labor research in the early 1970s, when researchers in Norway, Sweden, and Denmark pioneered the Collective Resource Approach. This approach partnered computer system designers with industrial metal workers, combining the expertise of both groups to develop more effective computer systems for industrial workplaces (Sanders & Stappers, 2008; Bannon & Ehn, 2012). Instead of implementing a new system without any input from those who would be using it, the Collective Resource Approach provided workers with the ability to influence the scope of the new technologies they would be using. The experiment was advocated by labor unions, who sought to provide a more democratic, worker-focused approach to workplace research (Spinuzzi, 2005; Bannon & Ehn, 2012; Sanders & Stappers, 2008).

Around the same time, in 1972, a conference called *Design Participation* was held in Manchester, England by the Design Research Society. The conference featured educators and practitioners in the fields of planning, economics, architecture, design research, and mechanical engineering (Sanders & Stappers, 2008). Nigel Cross, editor of the conference proceedings, noted a pattern: one major shortcoming of design professions at the time was the failure of designers to consider the negative effects of their designs to users. According to Cross, user participation in design was crucial to avoiding further failures (Cross, 1972). In the decades since its emergence, participatory design has become increasingly recognized as an effective – and necessary – approach to design.

Participatory design has advantages for both the end user group and the professional facilitating the process. In landscape architecture, these end user groups are community members and other stakeholders who will be impacted by the implementation of the design. Encouraging end user groups to collaborate in the design process enables them to contribute to decision-making processes that will affect them (Sanoff, 2000; Ferguson & Candy, 2014; Simonsen & Robertson, 2012). For professionals, involving community members in the design process improves the sense of trust between designer and community, and increases the likelihood that a designed landscape will be successful in the eyes of the people who will be using it. Involving people in bringing about designs for their communities serves to improve public spirit, creates a sense of ownership and pride, and can lead to significant financial savings (Sanoff, 2000).

In architecture and design professions, methods for participatory design are commonly design workshops, charettes, and games (Luck, 2007; Sanoff, 2000; Sanoff, 1979; Wisner et al., 1991). Traditionally, community members use materials such as construction paper, markers, and blank maps to show designers what they want to see on a particular site (Arciniegas & Janssen, 2012; Mitchell & Norgaard, 2011; Todd & Lindsey, 2016; Hautopp & Ørngreen, 2018). Figure 2 shows residents using some of these tools in a community design charette in Jackson, Mississippi.

FIGURE 2.1 Design charette held in Jackson, MS (Carry, 2019).



2.2 Youth Inclusion in Participatory Design

It is indisputable that the decisions made by design and planning professionals have an impact on young people's lives: from parks and playgrounds to community gardens and zoos, young people live and play in the spaces we design. However, they are seldom included in the design process. One shortcoming of participatory design is that it is still largely oriented towards adults. Adults, including design professionals and other stakeholders taking part in participatory design exercises, are inclined to be unaware of – or actively dismiss – young people's ideas and concerns (Mullahey et al., 1999). In addition, further internal and external obstacles exist that make it more difficult for youth to take part in decision-making processes for their communities.

Frank (2006) and Mullahey et al. (1999) note several potential barriers to youth participation. Adults are often hesitant to involve youth in the planning process due to societal views of young people as lacking the capacity to participate meaningfully in the design process, even though young people will be affected by land use decisions. Barriers to participation can also be internal: young people often do not view themselves as a group with the ability to enact change (Frank, 2006). Alternatively, young people may feel they have good ideas but are unsure how to implement them (Mullahey et al., 1999). This exclusion leaves youth marginalized and frustrated (UN Habitat, 2015).

If the barriers to youth participation are overcome, there are numerous benefits to youth engagement. Encouraging young people to participate in decisions that will impact them empowers them to take active roles in their personal and community development (United Nations, n.d.; Checkoway et al., 1995; Derr et al., 2018).

Sanoff (2000) argues that community development and youth development are inextricably linked: encouraging youth to participate in the design process gives them a sense of ownership in their communities and provides them with an opportunity to be socially productive. The benefits of youth involvement in participatory design are evident, but it is unclear how different approaches to participatory design differ in their effectiveness at producing these benefits.

2.3 Games and Video Games

From an early age, we learn from games and play. Play is an integral part of mental development, and playful activities are vital to creative acts (Flanagan, 2009; Bodrova & Leong, 2005; Glenn et al., 2012). Video games are an increasingly common mode of play for young people, who spend up to 10,000 hours playing video games by the age of 21. 70% of parents say that video games are a positive part of their children's lives (Shliakhovchuk, 2018; ESA, 2019).

For many people, video games are a source of relaxation, diversion, and entertainment. Video games offer players an escape from reality, allowing them a “not-work” outlet to further new narratives and complete tasks. Games provide players with the opportunity to fail safely and exercise their free will in a low-stakes virtual environment (Marlow, 2012; Flanagan, 2009).

However, as Flanagan (2009) argues, some games have become something more than a source of entertainment. Games are usually

reflections of the larger social systems within which they operate. Schoolyard games such as hopscotch or tag can be used to enforce or establish social relations; there are rules, hierarchies, and an underlying logic to them (Flanagan, 2009).

In her book *Critical Play*, Flanagan examines the potential of video games to interrogate these social relations, or to act as a means of creative expression. The genre of video games that provide a learning experience for players is commonly referred to as “serious” games or “activist” games (Shliakhovchuk, 2018; Flanagan, 2009). In some cases, serious games deliver a message by directly addressing complex social issues, including poverty, inequity, homelessness, prejudice, and war; in others, learning is more of a side effect of players having fun (Shliakhoyhcuk, 2018).

One use of video games that can synthesize creative expression and social relations is as a tool for participatory design. Video games offer the potential for interactivity with proposed designs, but technical difficulties can obscure the experience of a designed environment (O’Coill & Doughty, 2004). However, if these technical difficulties are overcome, computer games can be a useful tool for participatory design and landscape architecture education (Örnek & Özer, 2016; Örnek, 2013; Marlow, 2012).

2.4 Minecraft as an Educational Game

With more than 480 million copies sold as of 2019, Minecraft seems to be the most successful video game of all time (Delaney, 2022). Since 2016, the game's educational version has made it an increasingly popular tool in classrooms to teach students the basics of urban design and planning. In addition, many of Minecraft's built-in features make it an ideal tool for engaging youth in participatory design.

One of these features is Minecraft's "creative mode," which allows players to customize their game world by placing colorful blocks, analogous to a digital Lego. The game features over 150 different blocks, encompassing a variety of materials. The face of each standard block measures 16x16 pixels, and blocks are proportionately 1 cubic meter (Minecraft Wiki, n.d.). Blocks can be opaque (including cobblestone, wood, and dirt) or semi-transparent (such as glass and leaves), and some blocks emit light. These blocks can be arranged creatively to suggest different natural and manmade materials.

Minecraft can be played as a single-player game or with multiple players on an online server, and its high potential for collaboration is another of its greatest assets (Örnek & Özer, 2016). Working in a multiplayer game in creative mode, players can collaboratively create complex buildings and cities. Figures 2.2 and 2.3 show a Minecraft city built over the course of six years by a player who goes by MattuFIN (Landin, 2018). Minecraft provides an interactive, simplified approach to 3D modeling.

Due to its cultural ubiquity and relative ease of learning, Minecraft has become an increasingly popular way to engage youth in design



FIGURE 2.2. Closeup of a city street designed and built by MattuFIN in Minecraft (Landin, 2018). The game's 150+ materials can be creatively arranged to create complex, visually interesting buildings and cities.



FIGURE 2.3. Skyline of a Minecraft city designed and built by MattuFIN. The city includes landmarks (including an observatory inspired by Seattle's Space Needle) and a series of residential, commercial, and arts districts (Landin, 2018).

(Delaney, 2022). Minecraft has been applied by nonprofits and professional organizations, the best known of which is Block by Block (a collaboration between Minecraft developer Mojang and UN Habitat), to gather community input in the design process (UN Habitat, 2015). Block by Block has developed Minecraft workshops for projects in countries including Nigeria, Somalia, Kosovo, Mexico, and the Philippines.

Block by Block first recreates a real-world location in Minecraft, as shown in Figure 2.4, and then invites community members into the virtual space to build and develop design proposals for the location. Participants in Block by Block projects claim that the medium of Minecraft made it easy to communicate their ideas and interests; Figure 2.5 shows a young woman presenting her proposed design.

In addition to the higher-profile Block by Block projects, Minecraft has been the subject of a growing number of exploratory studies. Existing research primarily focuses on Minecraft's capabilities as a tool to educate youth about urban design (de Andrade et al., 2020; Karsenti et al., 2017; Magnussen & Elming, 2017; Edwards et al., 2021). However, there is a lack of research comparing the effectiveness of digital engagement in Minecraft to traditional participatory design charrettes.

Rahman & Day (2006) performed a study comparing the use of digital modeling vs. pen-and-paper charrettes for participatory design. The researchers used SketchUp as their digital modeling software; however, SketchUp has a steep learning curve and participants complained it was difficult to use for beginners (Rahman & Day, 2006). This study makes a similar comparison between traditional tools and Minecraft workshops, given that Minecraft is designed to be substantially more beginner-friendly.



FIGURE 2.4. A park in Lima, Peru reconstructed in Minecraft (UN Habitat, 2015).

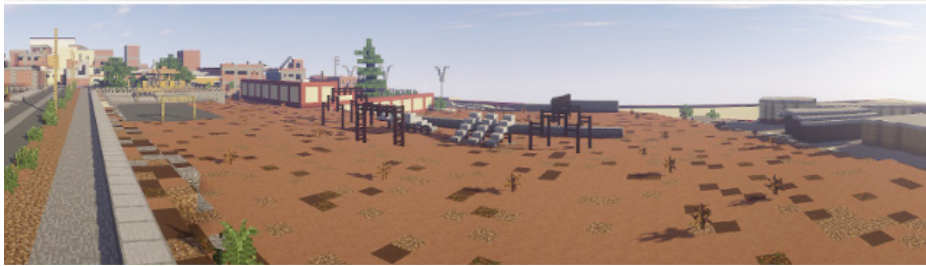
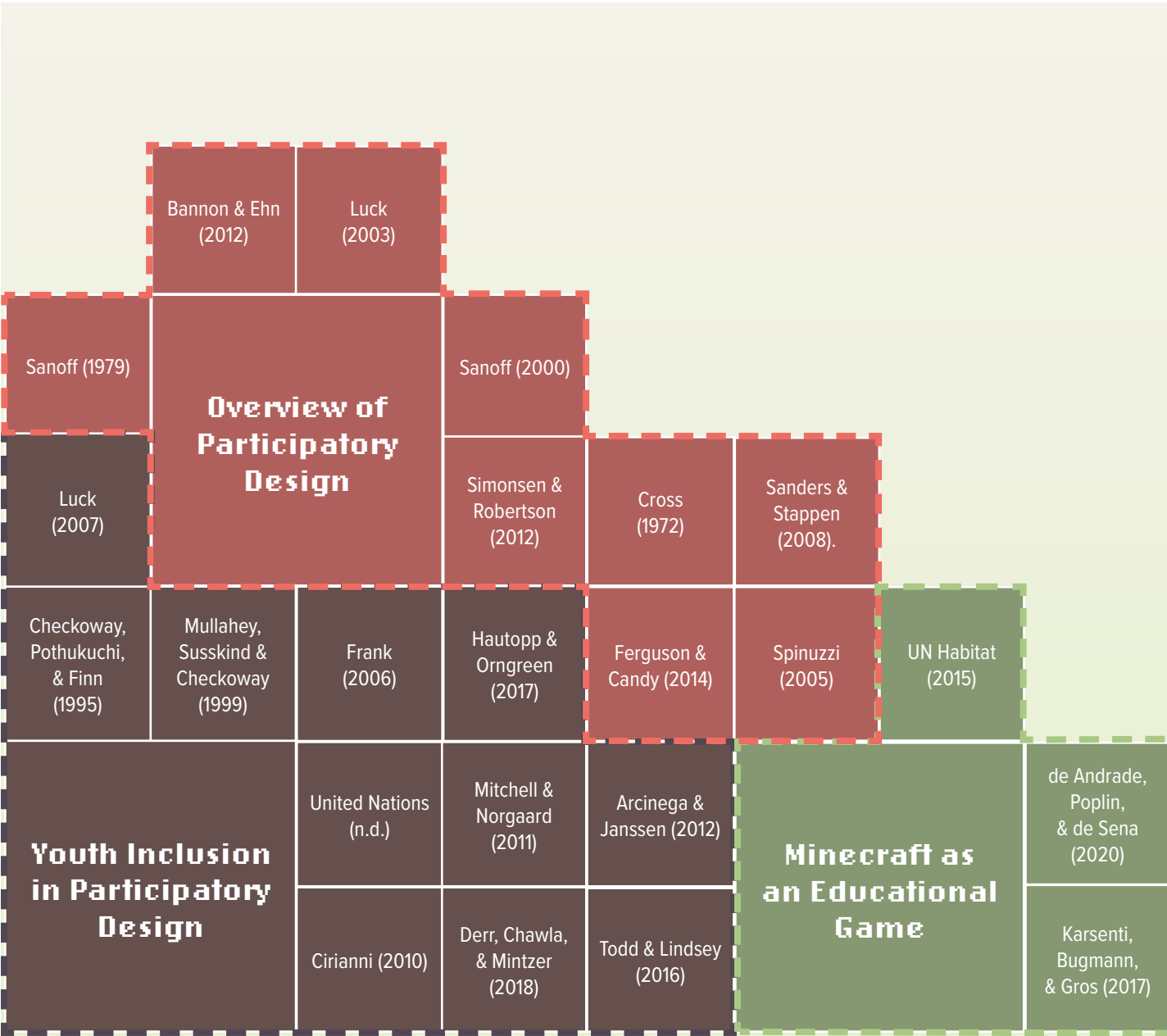


FIGURE 2.5. A young woman presents her Minecraft proposal for a waterfront in Addis Ababa, Ethiopia as part of a Minecraft workshop with Block by Block (UN Habitat, 2017).

literature review building blocks



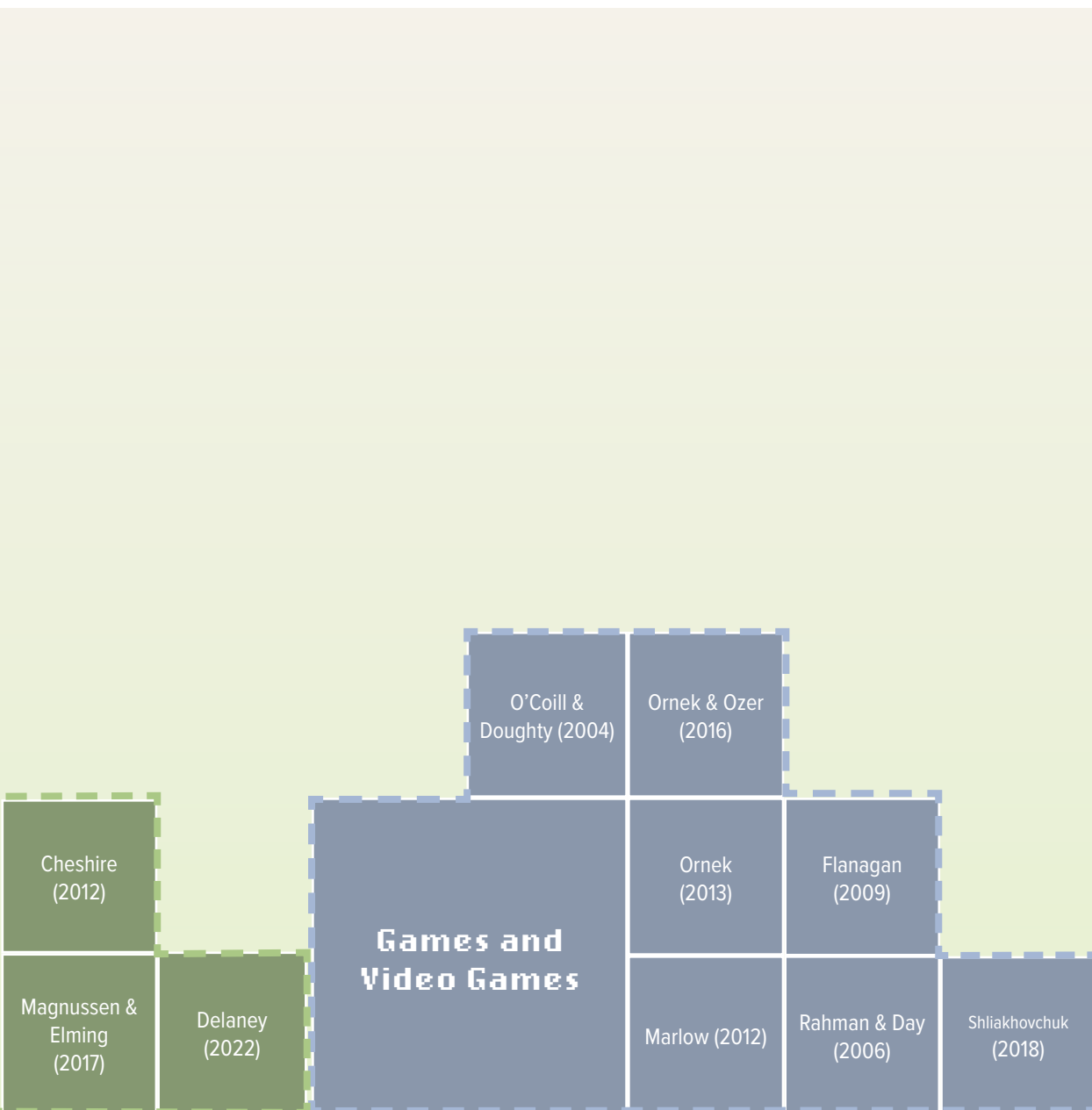
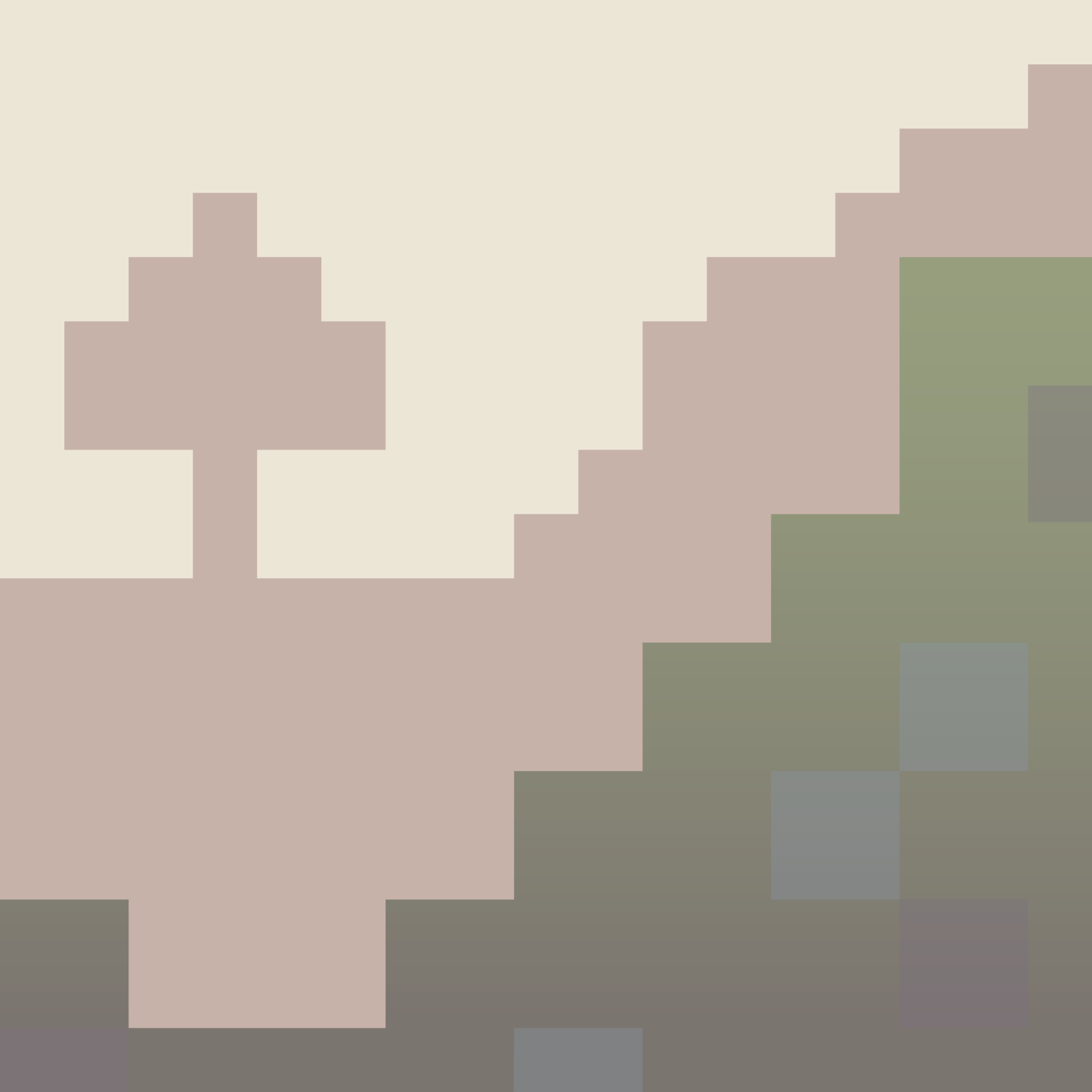
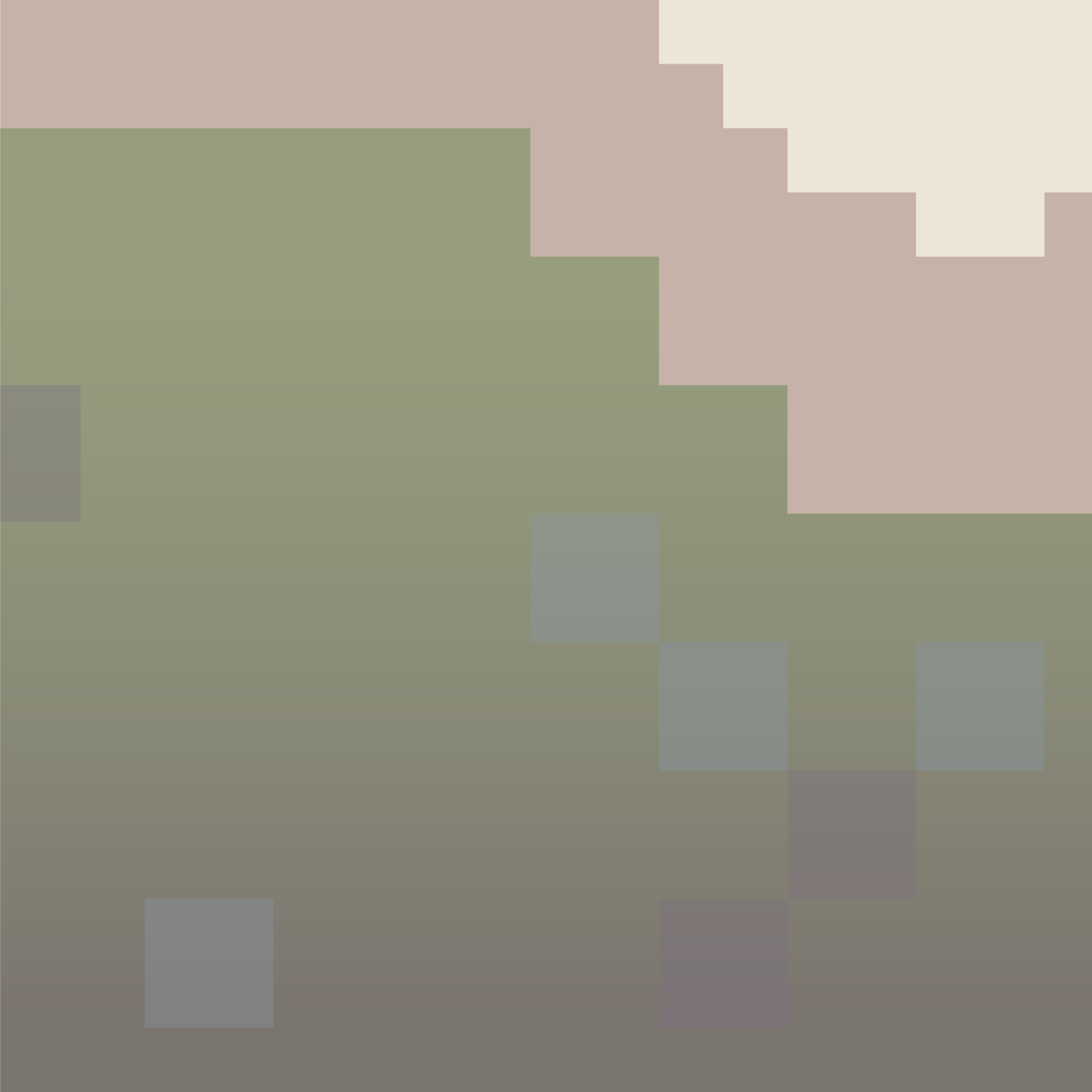
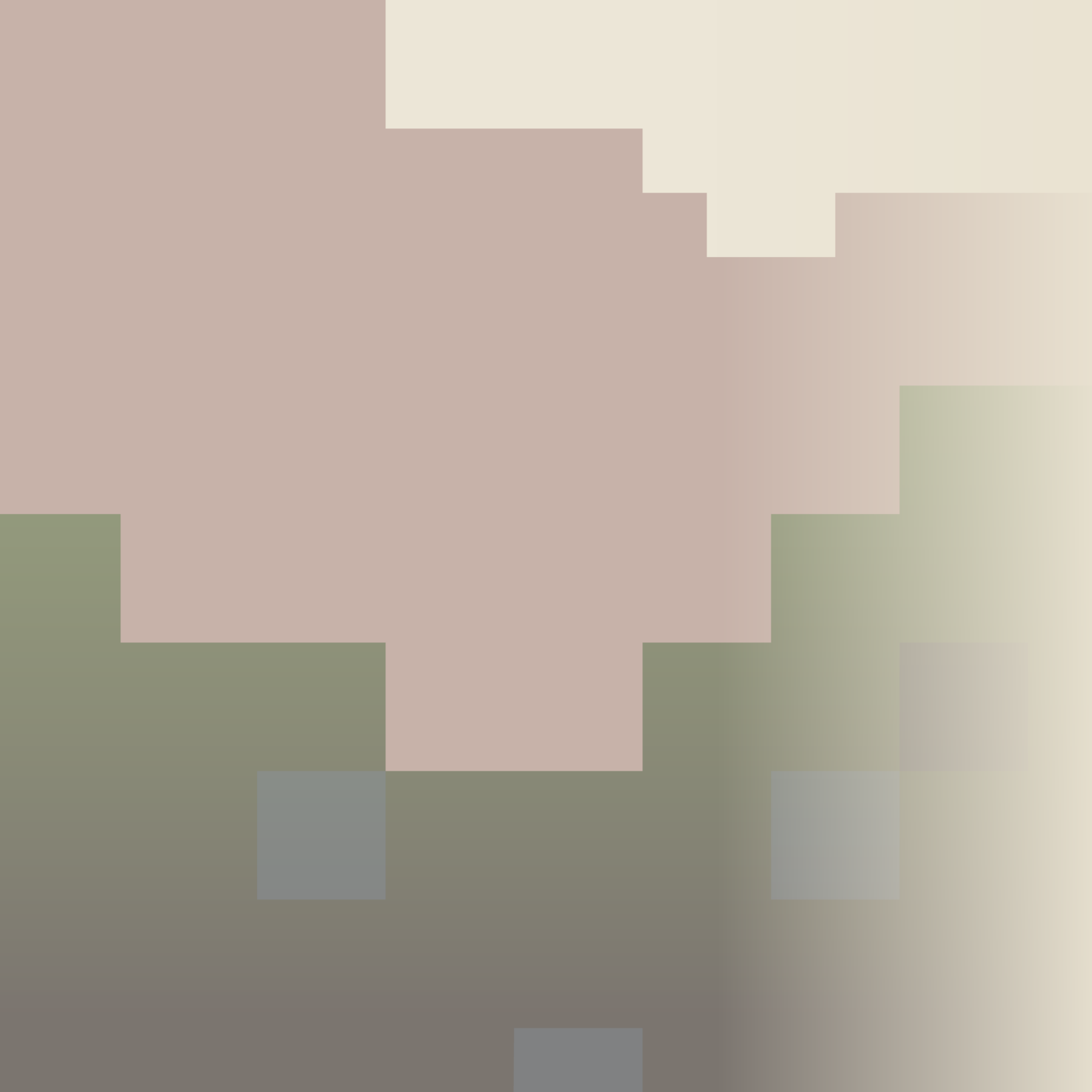


FIGURE 2.6.
Literature diagram
for this study.







03

methodology

3.1 Research Strategy

10 students aged 16-19 from an urban high school in Eastside Kansas City were assigned to one of two community engagement workshops: a traditional paper-based design charette and a video-game workshop using Minecraft.

In both workshops, students created designs for a greenspace near their school. Surveys issued before and after the workshop evaluated the benefits and shortcomings of each approach by asking three types of questions. These three types of questions were intended to evaluate: a) the effectiveness of each tool; b) students' sense of involvement; and c) how meaningful students found their involvement.

These three types of questions are designed to address three research needs. Evaluating the effectiveness of the traditional and Minecraft tools will help determine whether Minecraft is an effective mode of youth participation. Assessing students' sense of involvement addresses the low youth participation in participatory design, and determining how meaningful students found their involvement addresses youths' view of themselves as a group unable to enact change (Frank, 2006).

This research is a collaboration with Guadalupe Centers High School (GCHS). GCHS students are given the option to participate in Real World Learning (RWL) opportunities during their junior and senior year. RWL opportunities provide students with a chance to gain research and/or job skills experience while still in high school. The RWL coordinator and two instructors at GCHS assisted with recruiting student participants for this research.

Four Student Assistants from GCHS assisted with facilitating the two in-person workshops in this study. Two were assigned to the “traditional” workshop and two were assigned to the Minecraft workshop. Student Assistants helped recruit students, administer the workshops, and answer questions from student participants. Student Assistants also collaboratively created a design of their own for the greenspace in Minecraft.

This collaboration was meant to be a mutually beneficial exercise for Student Assistants and the graduate researcher. Participating in this collaboration gave Student Assistants the chance to act in a leadership role on a graduate-level research project. Furthermore, they assisted with recruitment and data collection and analysis, helping them hone real-world research skills. All students involved with the project learned about the importance of youth participation in design, which could encourage them to participate in their own communities.

To conduct this study, one orientation session for Student Assistants and two experimental sessions for participants were held on separate dates. Figure 3.1 shows the structure of the workshop conducted at the high school.

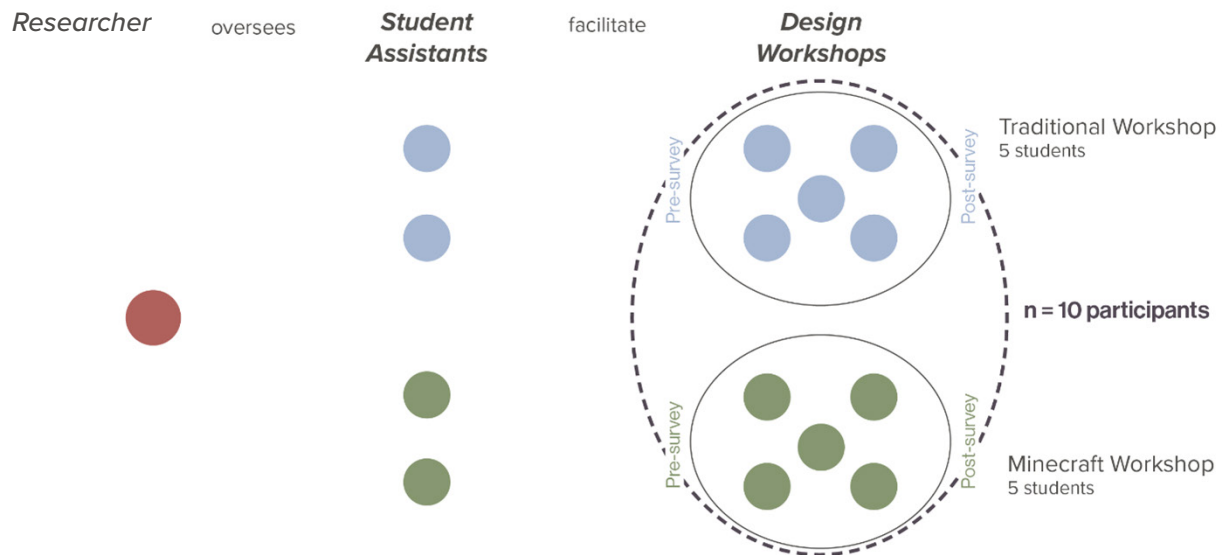


FIGURE 3.1. Structure of the design workshop conducted at the high school.

3.2 Recruitment

Workshop participants were recruited by the four Student Assistants, who gathered a list of fellow students interested in participating in a design activity. To avoid bias, Student Assistants were instructed not to inform potential participants that the study compared traditional design charettes with Minecraft; instead, potential participants were asked if they were interested in participating in a design activity for high school students.

10 students in total were recruited. The students who volunteered were then randomly assigned to either the traditional or the Minecraft group to avoid selection bias. Each participating student received a copy of the pre-activity survey upon entering the room for the workshop; surveys were marked with “T” for traditional or “M” for Minecraft.

All participating students were high school juniors or seniors involved in the Real World Learning program at GCHS. No other demographic information was collected.

Students were asked to create designs for a small greenspace located across the street from their high school. This site was selected based on insights from the Real World Learning coordinator at GCHS, who suggested a suitable real-world location commonly used by students.

3.3 Site Selection

GCHS is located east of Troost Avenue, which has historically been a racial dividing line in Kansas City. Areas east of Troost have been impacted by racially discriminatory “redlining” housing policies

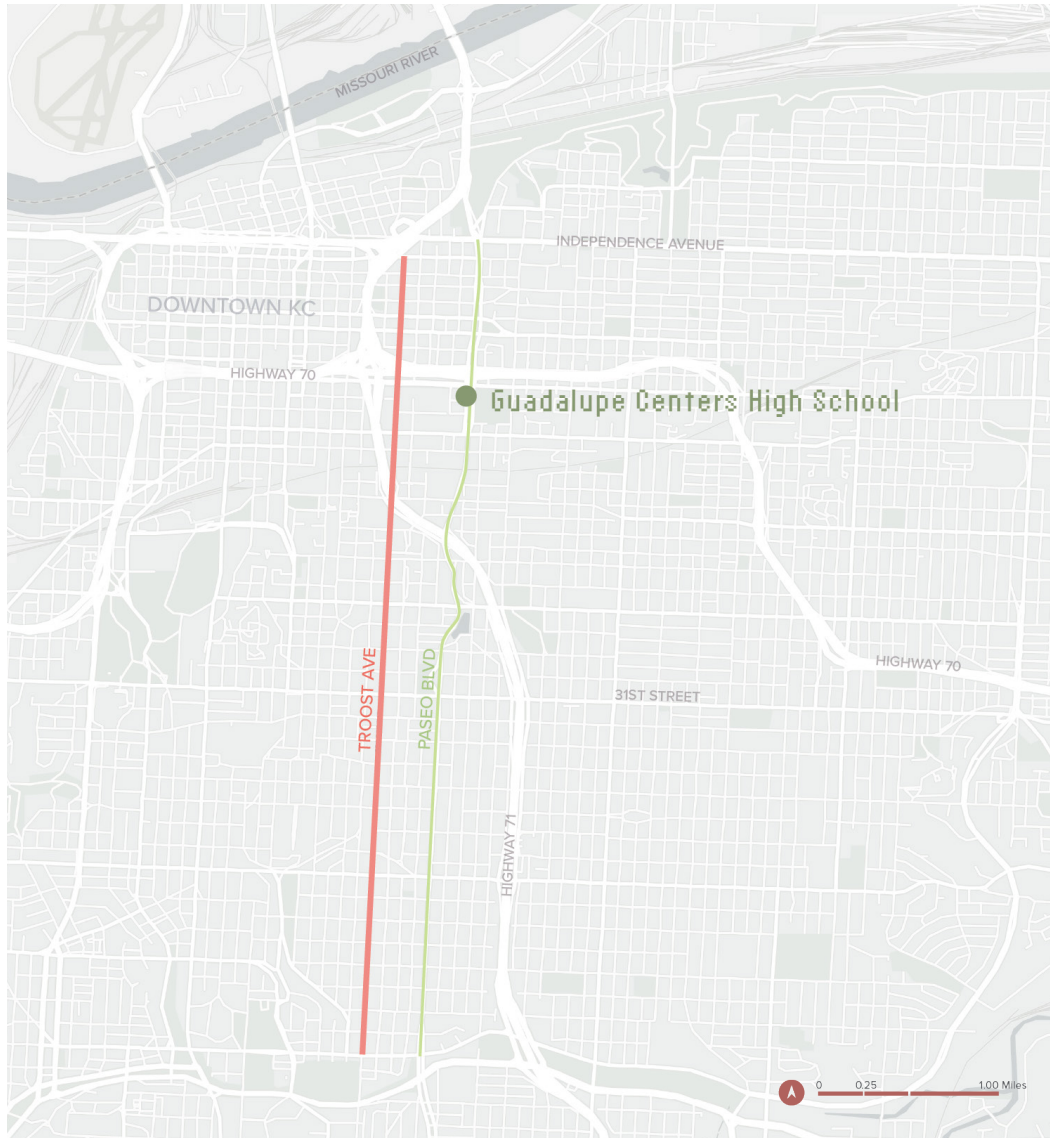


FIGURE 3.2. Location of GCHS on the east side of Kansas City.

FIGURE 3.3. A memorial plaza constructed in 1968 sits at the southern end of the study site. The plaza contains a few benches and a small planted area of roses.





FIGURE 3.4. View of the site looking north from the memorial plaza. Busy traffic surrounds the greenspace on the north, east, and west sides.



FIGURE 3.5. Crosswalk departing the memorial plaza, facing one of the baseball fields at the KC MLB Urban Youth Academy.

enacted in the early twentieth century, the effects of which are still felt across many American cities today (Howell, 2006). Figure 3.2 shows the school's location within the broader context of Kansas City.

The greenspace, which measures 1.12 acres in area, is part of the Paseo Boulevard, a north-south parkway in Kansas City, Missouri. The greenspace is bordered to the north by East Truman Road, to the east by southbound traffic on the Paseo, and to the west by northbound traffic on the Paseo. Figure 3.4 shows some of the bustling traffic at the site. The southern end of the site is home to a small memorial plaza honoring Salvatore Grisafe, a 17-year-old who was shot and killed while defending two women from robbery and assault. The 12.5' commemorative sculpture (shown in Figure 3.3) is meant to symbolize "youth striving for greater goals" (KC Parks n.d.). A concrete sidewalk crosses the memorial plaza, with crosswalks across both lanes of traffic on the Paseo (as shown in Figure 3.5).

Additional site context includes Guadalupe Centers High School and a BP gas station (both located across the northbound traffic lane of the Paseo Blvd), St. Stephen's Baptist Church (located to the north across E Truman Rd), and the Kansas City MLB (Major League Baseball) Urban Youth Academy, a non-profit sports organization for youth (located across the southbound traffic lane of the Paseo Blvd). Figure 3.6 shows the site and these surrounding features.



FIGURE 3.6. Aerial map of the site featuring street names and context. Project space outlined in magenta.

A 3-D model of the site was constructed in Minecraft to allow students to interact with and build in the site. This is similar to the process used by UN Habitat's Block by Block projects (refer to Figure 2.4 in the Literature Review chapter). Figures 3.7 and 3.8 show an perspective and an aerial view of the reconstructed site in Minecraft.

For a more detailed description of the process used to reconstruct the site, see Appendix C.



FIGURE 3.7. Perspective view of the Paseo crosswalk in the Minecraft model. GCHS is on the left.



FIGURE 3.8. 3-D Minecraft model of the site showing the greenspace and some surrounding context.

3.4 Workshop Schedules & Descriptions

An orientation workshop was held on January 4, 2023 to introduce Student Assistants to the traditional and Minecraft workshops. Subsequently, the design workshop was held at Guadalupe Centers Impact Academy on February 3rd, 2023.

See Tables 3.1 through 3.3 for detailed workshop schedules. See Section 4.3, Workshop Observations and Student Designs, for more detailed descriptions of workshop procedures.

Workshop 1: Orientation

Date: Jan 4th, 2023; 9-10:45 AM (105 min)

Purpose: Teach GCHS Student Assistants to administer Traditional and Minecraft Workshops

Table 3.1. Orientation Workshop Schedule

Time	Activity
10 mins	Welcome
30 mins	AD Presentation <ul style="list-style-type: none">Research Objectives and PurposeRole of Student AssistantsOverview of Tools (Traditional and Minecraft)IRB Requirements
10 mins	Virtual Site Walk and Analysis <ul style="list-style-type: none">Students viewed site maps and photosIntroduction to questions designers ask when they look at a site
15 mins	Design Objectives <ul style="list-style-type: none">Students discuss site opportunities/constraintsWhat should be built on the site?Think about surrounding context – what does neighborhood need?
10 mins	Individual Minecraft Projects <ul style="list-style-type: none">Student Assistants received a copy of the Minecraft world to build a design of their own (optional)
10 mins	Survey Discussion <ul style="list-style-type: none">Administering pre- and post-activity surveysHow will the data be used/analyzed? What can it tell us?

Workshop 2: Design Workshop

Date: February 3rd, 2023; 9 AM – 10:45 AM (1 hr, 45 minutes).

Purpose: Students develop designs for a neighboring green space using traditional (paper) and digital (Minecraft) methods. Student Assistants and AD administer.

10 total students participated in the research activity (for a visual diagram, see Figure 3.1 at the beginning of the chapter). The Traditional and Minecraft groups received the Welcome and Virtual Site Walk presentations in the same room (see Appendix 4 for the complete slide deck). Both groups of students completed the pre- and post-activity surveys in the same room at the same time.

Table 3.2. Traditional Group Schedule

Time	Activity
15 mins	Welcome (large group) <i>Introductions</i> <i>Informed Consent Statement</i>
10 mins	Pre-Activity Surveys
20 mins	Virtual Site Walk and Analysis (large group) <i>Students shown photos of the site</i> <i>Students provided with three possible programs (playground, sports field, outdoor classroom)</i> <i>What questions should we ask when we look at the site?</i>
65 mins	Design Activity (small groups) <i>Split students into 2 groups of 5</i> <i>Collaborative design exercise - provide students with site maps and tools for drawing and coloring. Each group creates designs based on the opportunities/ constraints they identified using hand drawing.</i>
10 mins	Post-Activity Surveys
10 mins	Closing Discussion (large group) <i>Students received debriefing statement as per IRB requirements</i>

Table 3.3. Minecraft Group Schedule

Time	Activity
15 mins	Welcome (large group) <i>Introductions</i> <i>Informed Consent Statement</i>
10 mins	Pre-Activity Surveys
20 mins	Virtual Site Walk and Analysis (large group) <i>Students shown photos of the site</i> <i>Students provided with three possible programs (playground, sports field, outdoor classroom)</i> <i>What questions should we ask when we look at the site?</i>
65 mins	Design Activity (small groups) <i>Split students into 2 groups of 5</i> <i>Collaborative design exercise in Minecraft – provide students with model of site and have each group create a design based on the opportunities/constraints they identified</i>
10 mins	Post-Activity Surveys
10 mins	Closing Discussion (large group) <i>Students received debriefing statement as per IRB requirements</i>

When the 10 student participants arrived at the classroom, they were first read the verbal assent statement and given some brief background on the study. Students were informed that they would be participating in a design activity for a green space outside their school as part of a research study. They were informed that the purpose of the research study is to explore the best ways to engage young people in design decisions that affect them.

Following this introduction, students were given the pre-activity surveys. Each student received a survey based on their random assignment to either the traditional or Minecraft group. Each student also received a “participant ID” to ensure that the pre- and post- activity surveys were paired correctly. Questions were grouped into four categories to evaluate the following factors: students’ familiarity with their assigned tool (hand drawing or Minecraft); their predicted effectiveness of their assigned tool; their current knowledge and sense of involvement in the design process; and their perceived meaningfulness of their involvement.

While “effectiveness” was not formally defined in the survey, the effectiveness questions asked students to rank how easy or difficult their assigned tool was to use, how effective the tool was in achieving their goals for the design, and how limiting they found their assigned tool to be in creating their design. Due to the lack of an explicit definition, it’s possible that the high-school-aged participants may have had a different understanding of the term “effectiveness” than the researcher.

The “design process” question asked students to rate their understanding of the process that design professionals (architects, landscape architects, etc) use to solve problems. Since the students are unlikely to have had any formal design education prior to taking the surveys, their understanding of the term “design process” may have differed from the researcher’s.

Students were given 10 minutes to answer the pre-workshop surveys on paper. Following the surveys, students received a 20-minute introduction to the design process in the form of a PowerPoint presentation. For the complete presentation slide deck, see Appendix 4.

This presentation showed an overhead map of the site, as well as several perspective images taken from Google Street View. Students were given a basic overview of the types of questions designers usually ask in site analysis. They were asked to consider areas of sun and shade, areas prone to flooding, areas of high traffic or noise, site circulation, and possible activities the site could support. Students were provided with three potential programs for the site: an outdoor classroom, a sports field, and a playground/park. In addition, they were encouraged to explore other ideas for the site based on their interpretation of the school’s and the community’s needs.

Students were seated together as one large group during the presentation. Following the presentation, students were broken up into two groups of five based on their random assignment to either the traditional or Minecraft workshop. Both groups were given 65 minutes to create designs for the site. Two Student Assistants were assigned

to each group to “host” the workshop. They helped each group generate ideas and field questions. In the Minecraft group, the Student Assistants hosted a copy of the 3-D Minecraft model of the site.

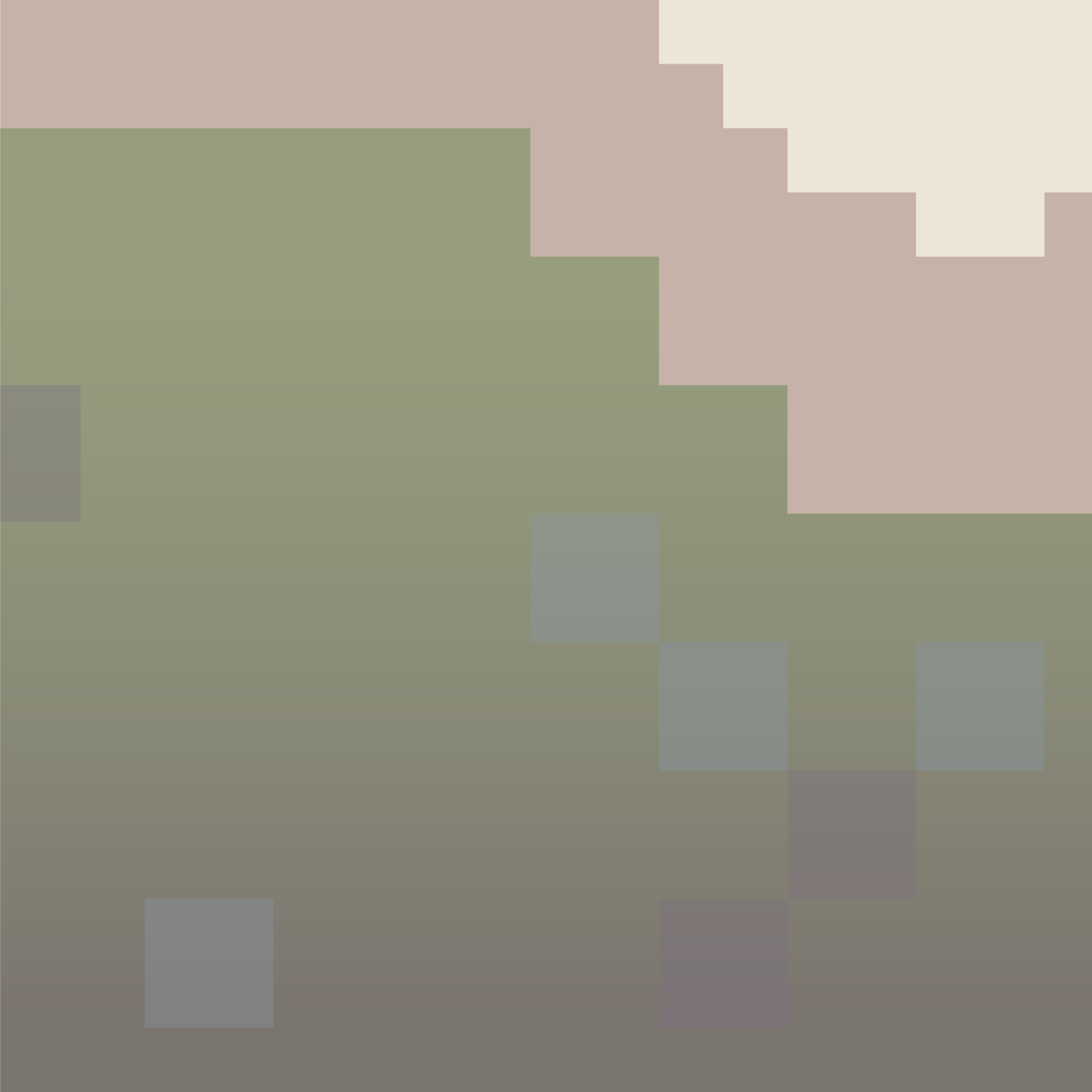
Students in the traditional workshop were equipped with pencils, pens, colored pencils, markers, Post-Its, scissors, and trace paper. Students were also given two color-printed 18”x24” maps of the site, a 36” ruler, and an engineering scale.

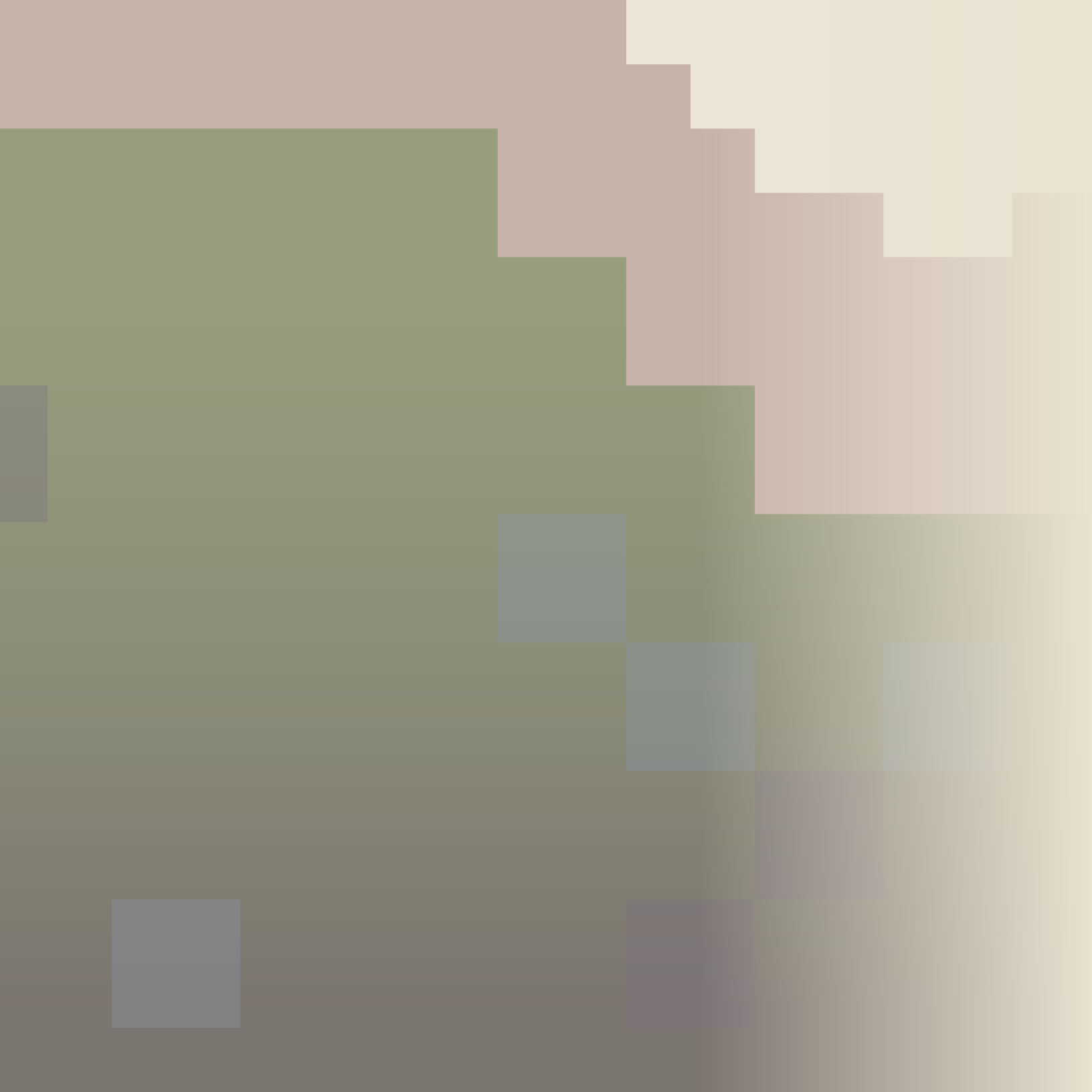
Participants in the Minecraft workshop used their school-assigned MacBook laptops and Minecraft Education Edition. Students were able to work collaboratively in the 3-D Minecraft model of the site to create their designs.

Following their completion of the design activity, students were given 10 minutes to complete a post-activity survey on paper. The post-activity surveys asked students to evaluate the actual effectiveness of their assigned tool, their post-activity knowledge of and sense of involvement in the design process, and the meaningfulness of their involvement.









04

results

4.1 Differences Within Groups

Since the sample size is small ($n = 9$), the strength of the statistical analysis is limited. Descriptive statistics were calculated for each question based on the students' answers on a 5-point Likert scale. A paired-sample t-test was used to examine differences between the pre- and post-survey results for each group. Effect size was also calculated for each test and reported wherever the t-test results indicate a statistically significant difference.

Familiarity with Tools

The first group of pre-survey questions assessed students' familiarity with their assigned tools.

Five students participated in the Minecraft design activity. Of these five, two participants (40%) indicated they had experience in either physical or digital model-building (one physical, one digital). Students were also asked to rank their level of experience with Minecraft on a five-point Likert scale, with 1 representing a "very poor" and 5 representing a "very good" level of experience. Four of the students indicated at least an intermediate level of experience with the game by choosing answers of 3 or higher on the scale; only one student of the five identified their level of experience as "very poor". The mean level of familiarity with the game was found to be 3.4 out of 5.

Five students participated in the "traditional" design charette activity, but only four responded to the surveys. Students in this group were

similarly asked whether they had experience drawing on 2-D maps or plans of a real-world location, as well as their level of experience with hand drawing. 2 students (50%) reported they had experience drawing on 2-D maps, while the other 2 had no experience. Participants' level of experience with hand-drawing resulted in a mean score of 1.5 out of 5, with 1 representing a "very poor" and 5 representing a "very good" level of experience. Of the 4 respondents, 2 (50%) reported a score of 1, corresponding to a "very poor" level of experience.

Effectiveness of Tools

In this group of questions, students were asked whether they perceived their assigned tool as easy or difficult to use. Students were then asked to predict whether using their assigned tool might limit their decisions in the design activity, and whether their assigned tool would be effective for achieving their goals in the design activity. Post-activity surveys asked participants to rate the same factors upon their completion of the design workshop.

Pre-activity responses indicated students in the Minecraft group perceived their assigned tool as somewhat easy to use. The mean score for the "ease of use" question was 2.6 out of 5, with a score of 1 being "very easy" and a score of 5 being "very difficult." No students scored Minecraft as "very difficult" to use. Post-activity surveys showed a mean score of 2.4 on the "ease of use" question (where a score of 1 indicated "very easy" and 5 indicated "very difficult"), a 7.7% decrease from the pre-activity value of 2.6.

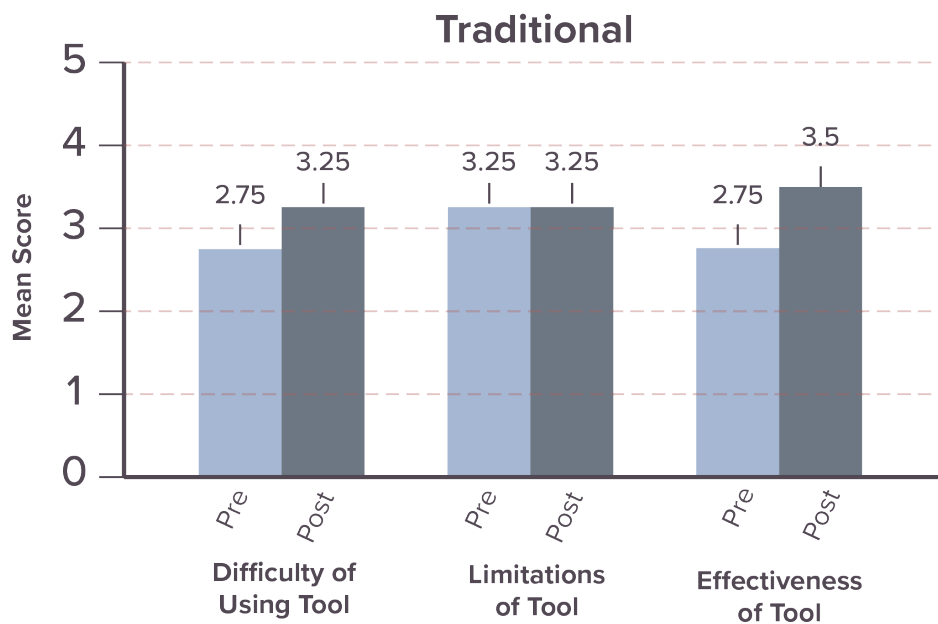
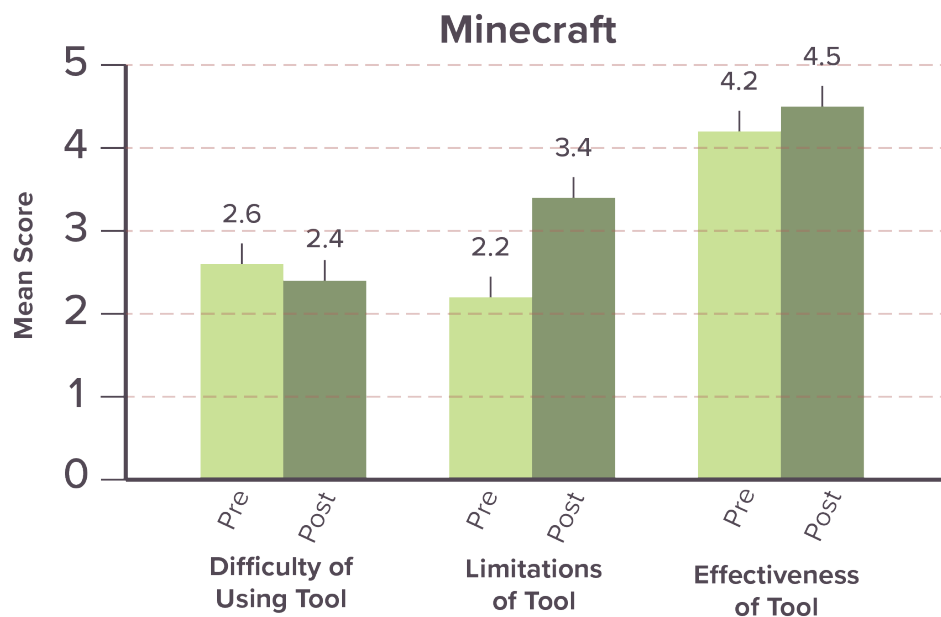


FIGURE 4.1. Graph showing mean student scores for questions that evaluated the effectiveness of the students' assigned tool.

Students in the traditional group provided a similar response to the Minecraft group prior to the design activity. Their mean pre-activity score for the “ease of use” question was 2.75 out of 5, with 1 being “very easy” and 5 being “very difficult.” However, after the activity, students reported that hand-drawing had been more difficult than they had anticipated. Though no student rated the difficulty of the tool as “very difficult,” the mean score of the students’ responses increased to 3.25 out of 5, an 18.2% increase.

When asked to predict how much their assigned tool might limit the decisions their group made, students in the Minecraft group scored between 1 (“not at all”) and 5 (“very much”). The mean score for this question was 2.2, indicating students did not anticipate Minecraft being a particularly limiting tool. In the post-activity surveys, students found Minecraft to be more limiting for their design choices than they had thought prior to the activity. They reported a score of 3.4 on the “limitation” question, marking a 54.5% increase from the pre-activity value of 2.2.

Students in the traditional group reported a score of 3.25 out of 5 on the “limitation” question, indicating that they predicted the medium of hand drawing would somewhat limit them in achieving their goals. In the post-activity surveys, students again scored the perceived limitation of their assigned tool as a 3.25 out of 5, marking no change.

Finally, students were tasked with predicting how effective their assigned tool would be to achieve their goals in the design activity, with a score of 1 being “not at all” effective and 5 being “very much” effective. The Minecraft group reported a mean score of 4.2 for this question, indicating students believed Minecraft would be an effective

tool for accomplishing their goals. No student answered below a 3 on this question. Despite the limitations perceived by the students, students still found Minecraft to be an effective tool for achieving their goals during the design activity. Their view of Minecraft's effectiveness as a tool for reaching their goals increased from 4.2 pre-activity to 4.5 post-activity, an increase of 7.1%.

Prior to the design activity, the traditional group predicted a mean effectiveness of 2.75 out of 5 for their assigned tool. The maximum score reported was 3, with no students scoring either 1 ("not at all" effective) or 5 ("very much" effective). Following the activity, the reported level of effectiveness increased by 27.3% to 3.50. One student rated the effectiveness of hand drawing with a score of 5 after the workshop, indicating they believed the tool to be "very much" effective.

The mean scores for this group of questions are shown graphically in Figure 4.1.

Sense of Involvement

This group of questions assessed how involved the students felt in their communities and their awareness of community engagement in design. In the pre-activity survey, students were asked to rank their level of engagement in community decision-making (with a score of 1 indicating "not at all" and 5 indicating "very much").

Students in the Minecraft group reported a mean score of 3.6 for this question, indicating that they generally felt involved in making decisions for their communities. Zero students indicated feeling "not

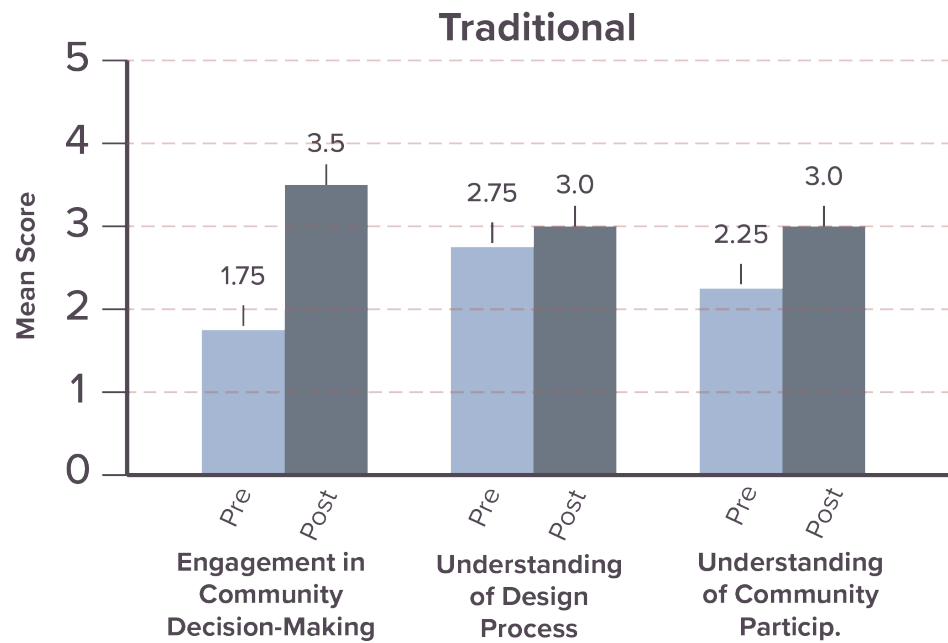
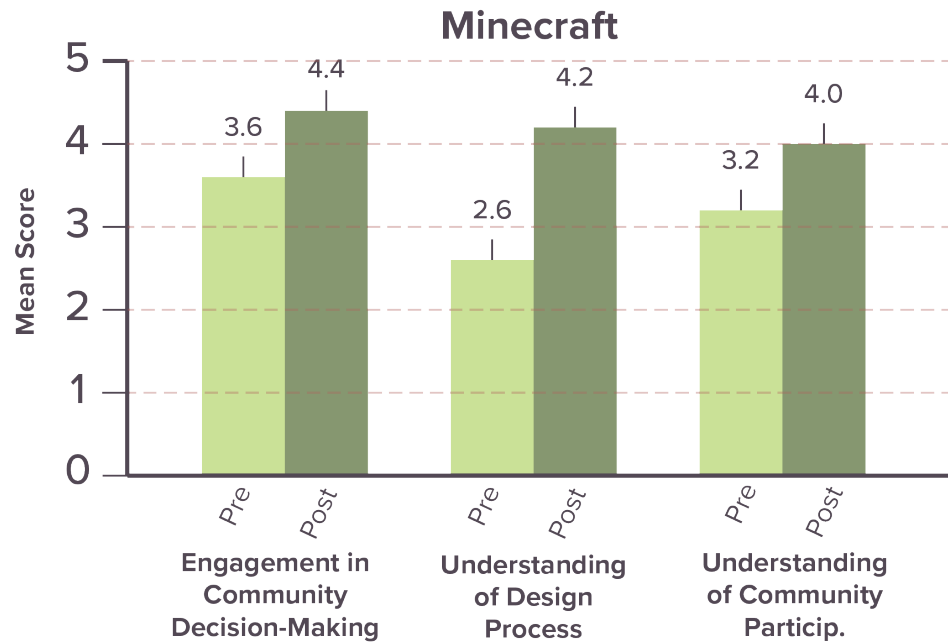


FIGURE 4.2. Graphs showing mean student scores for questions that evaluated students' sense of involvement within their communities and understanding of the design process.

at all” engaged in community decision-making. Post-activity surveys found a mean score of 4.4 for this question, a 22.2% increase from the pre-activity value, but this difference was not statistically significant ($p = 0.099$). The effect size for this variable was calculated to be high (Cohen’s $d = 0.837$).

Prior to the design workshop, students in the traditional group reported a mean score of 1.75 out of 5 for their level of engagement in community decision-making. 2 students (50%) answered with a score of 1, meaning they felt “not at all” engaged. In the post-activity surveys, this value doubled (100% increase) to 3.5 out of 5. However, this difference was not found to be statistically significant ($p = 0.102$). In addition, zero students reported feeling “not at all” engaged after the activity.

The second and third questions in this group focused on the design process and the role of community participation. Prior to the design activity, students were asked to rank their level of familiarity with the process design professionals (architects, landscape architects, etc) use to solve problems, with a score of 1 indicating “very poor” understanding and 5 indicating “very good” understanding. The mean score for the Minecraft students was 2.6 before the activity, suggesting students had a moderate understanding of the design process. After the design workshop, students reported a mean score of 4.2 out of 5, a 61.5% increase from the pre-workshop value. This difference was determined by a paired-samples t-test to be statistically significant ($p = 0.003$). Effect size was found to be medium (Cohen’s $d = 0.548$).

Students in the traditional group reported their understanding of the process designers use to solve problems on the same scale, resulting in a mean score of 2.75 out of 5 before the activity. After the workshop,

participants' mean score had increased by 9.1% to 3.0.

When asked to rate their understanding of community participation in design, students in the Minecraft group responded with a mean score of 3.2, with a score of 1 indicating “very poor” understanding and 5 indicating “very good” understanding. The mean score increased to 4.0 after the workshop, marking a percent increase of 25.0%.

In the traditional group, participants reported a mean score of 2.25 prior to the workshop and 3.0 after the workshop. This marks an increase of 33.3%. These results appear to show that for both groups, the students' understanding of community participation grew stronger after the workshop.

Results for the second group of questions are shown graphically in Figure 4.2.

Meaningfulness of Involvement

The third group of questions assessed how meaningful students perceived their involvement in the exercise to be. The first question in this group asked students to rate their willingness to participate in a design workshop for youth as part of an actual public project, with a score of 1 being “not at all” willing and a score of 5 indicating “very much” willing. In the Minecraft group, the mean score for student responses in the pre-activity survey was 3.4, with one student answering “not at all”

and one student answering “very” willing. After the design workshop, the mean score increased to 4.0 out of 5, an increase of 17.6%. This time, three of the five participants answered they would be “very” willing to participate.

Before the workshop, the mean score for students in the traditional group was 2.25 out of 5, with one student of the four answering that they would be “not at all” willing to participate in a youth design workshop. Following the design activity, the mean score for students in the traditional group showed no change: it remained 2.25 out of 5.

The second question assessed how much students felt their participation in a design workshop for an actual public project would make a difference in their community. Students were asked to rate their perceived impact, with a score of 1 indicating they saw their participation as “not at all” making a difference and 5 indicating “very much.” Prior to the design workshop, students in the Minecraft group answered a mean score of 3.0 to this question. After the activity, students responded with a mean score of 3.6, a 20% increase from the earlier value.

Students in the traditional group reported a decrease in their ability to make a difference. Prior to the design workshop, the mean score for this question was 3.5 out of 5; after the workshop, the mean score decreased by 14.3% to 3.0.

The third question asked how meaningful students found collaboration with their peers. This question was intended to evaluate the collaborative aspect of the activity, since students worked in a team of five to create their designs in Minecraft or on paper. With a score of

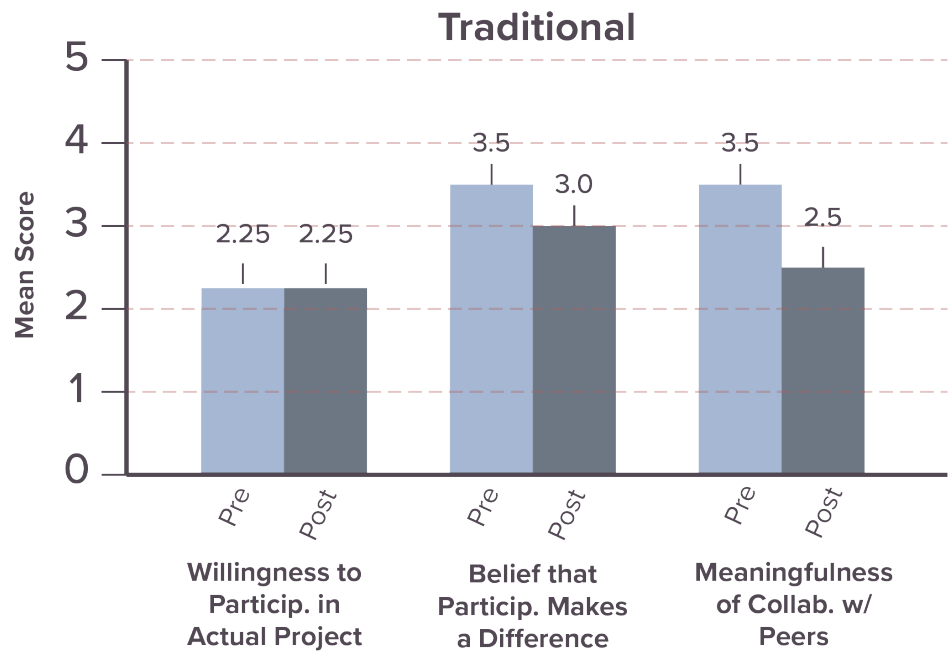
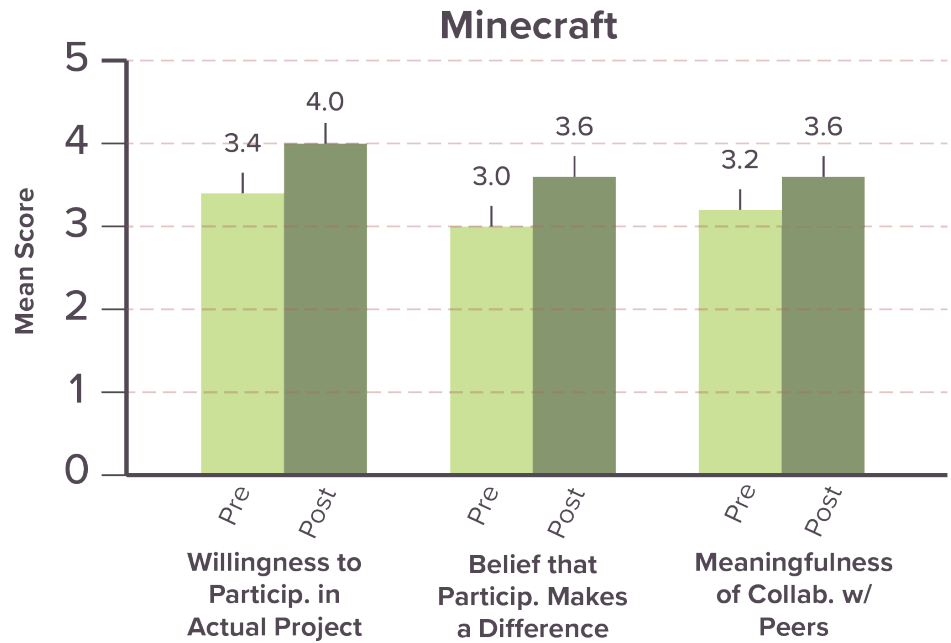


FIGURE 4.3. Graphs showing mean student scores for questions that evaluated how meaningful students found their involvement in the design activity.

1 indicating students found collaboration “not at all” meaningful and 5 indicating “very much” meaningful, the Minecraft group’s responses resulted in a mean score of 3.2. This value increased slightly after the workshop to 3.6, marking a percent increase of 12.5%.

The traditional group again experienced a decrease. Students reported a mean score of 3.5 before the design workshop and a score of 2.5 after, a decrease of 28.6%.

Results are shown graphically in Figure 4.3.

4.2 Differences Between Groups

After reviewing the differences between the pre- and post-activity responses within the groups, independent-samples t-tests were performed to determine any differences between the traditional and Minecraft groups. Two variables (post-activity level of enjoyment and pre-activity tool effectiveness) were found to have statistically significant differences between the traditional and Minecraft groups. In addition, the difference between the two groups in post-activity understanding of the design process was found to be approaching statistical significance.

Enjoyment

In the post-activity survey, students in both groups were asked to rate how much they enjoyed being part of the design exercise, with a score of 1 being “not at all” and a score of 5 being “very much.” Students in the Minecraft group reported a mean enjoyment level of 4.8, with 4 of the 5 participants indicating they enjoyed the activity “very much.” Students in the traditional group rated their enjoyment as 32.3% lower, with a mean score of 3.25 out of 5. Performing an independent sample t-test revealed the difference in enjoyment between the two groups was statistically significant ($p = 0.036$). Despite the low sample size ($n = 9$), the effect size for enjoyment was found to be large (Cohen’s $d = 0.89$), indicating that these results have practical significance.

Tool Effectiveness

When students were asked to predict the effectiveness of their assigned tool in the pre-activity surveys, there was a statistically significant difference ($p = 0.019$) between the traditional and Minecraft groups. The mean score for the traditional group was 2.75, compared to 4.2 for the Minecraft group. However, this difference was no longer significant in the post-activity survey. When students were asked to rate the actual effectiveness of their assigned tool to achieve their goals, the difference between the traditional and the Minecraft group was statistically insignificant ($p = 0.134$). Effect size for this variable was found to be moderate (Cohen’s $d = 0.712$) for the pre-activity survey and high (Cohen’s $d = 0.816$) for the post-activity survey. Comparisons between the groups for the first set of questions are shown in Figure 4.4.

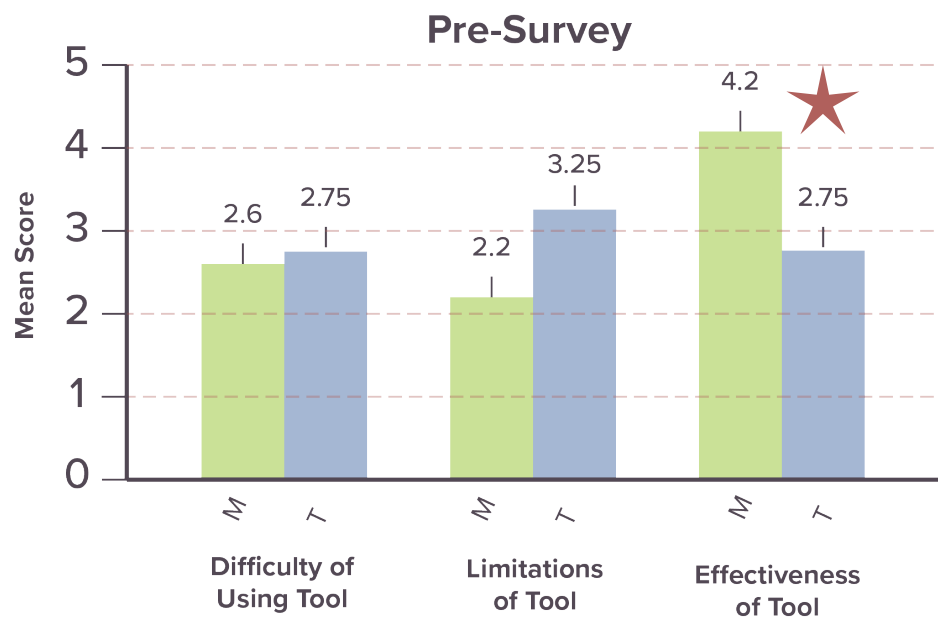



FIGURE 4.4. Graphs comparing the means across the traditional and Minecraft groups for questions about the effectiveness of tools.

 Statistically significant finding ($p < 0.05$)

Understanding of the Design Process

In the pre-activity surveys, there was not a statistically significant difference ($p = .815$) between the Minecraft and traditional groups when they were asked to evaluate their understanding of the process design professionals use to solve problems. However, post-activity surveys indicated a difference between the two groups that is approaching statistical significance ($p = 0.068$). Effect size was found to be high for both the pre-activity survey (Cohen's $d = 0.922$) and the post-activity survey (Cohen's $d = 0.828$). Figure 4.5 shows the between-group differences for the second set of questions, and Figure 4.6 shows the between-group differences for the third set.

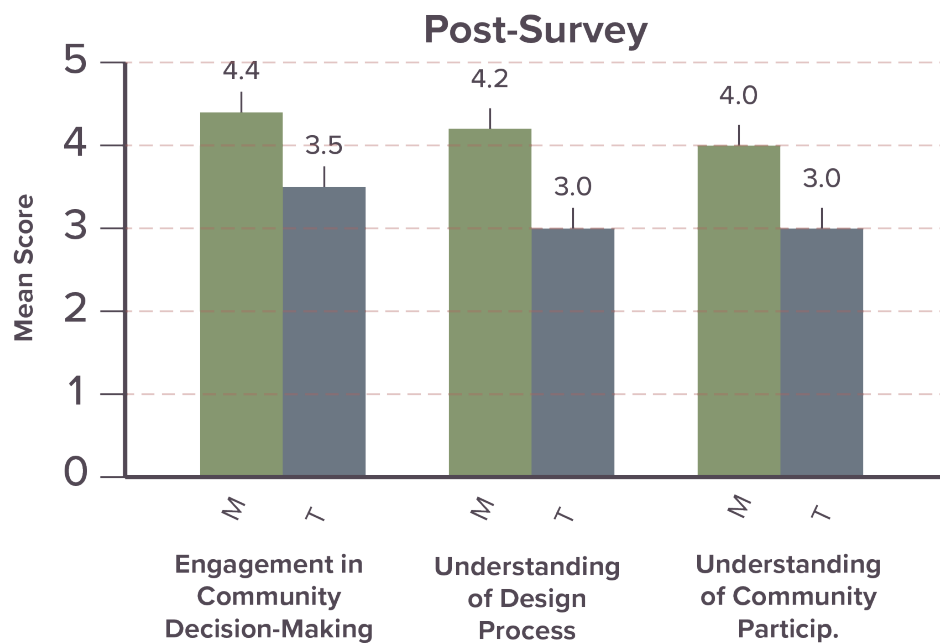
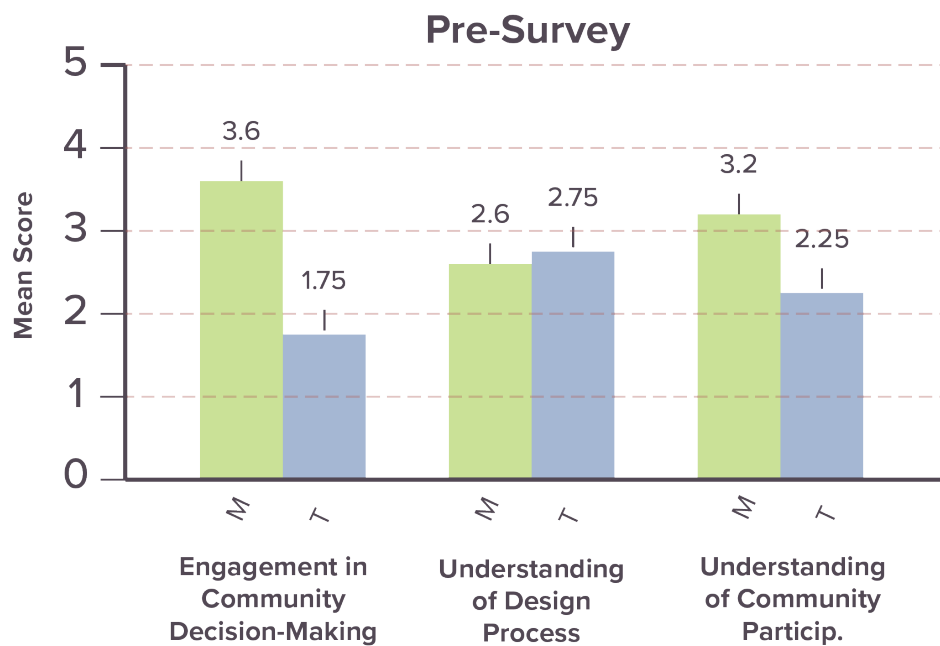


FIGURE 4.5. Graphs comparing the means across the two groups for the questions measuring students' involvement in their communities and understanding of the design process.

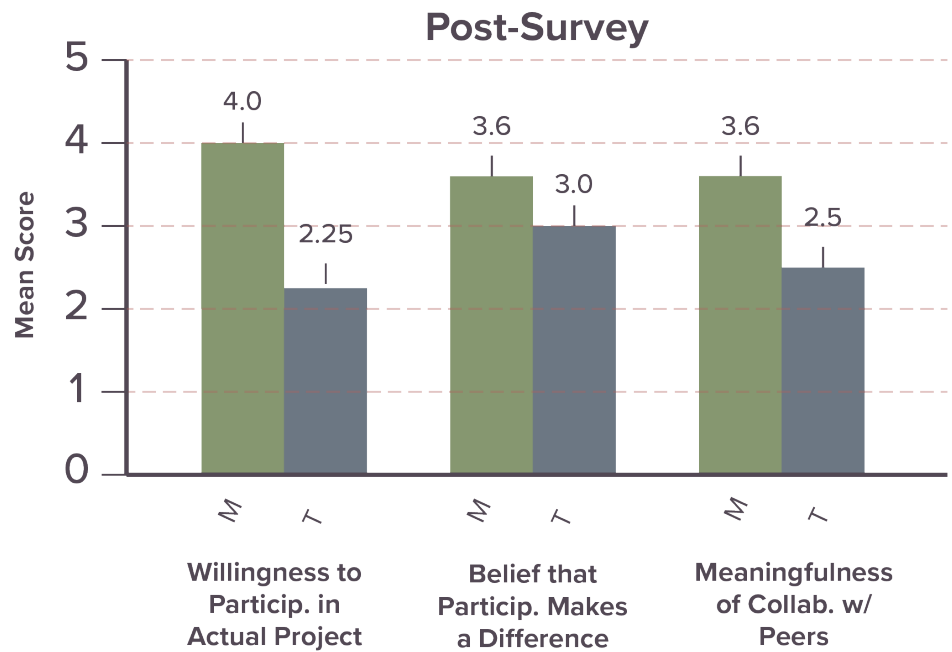
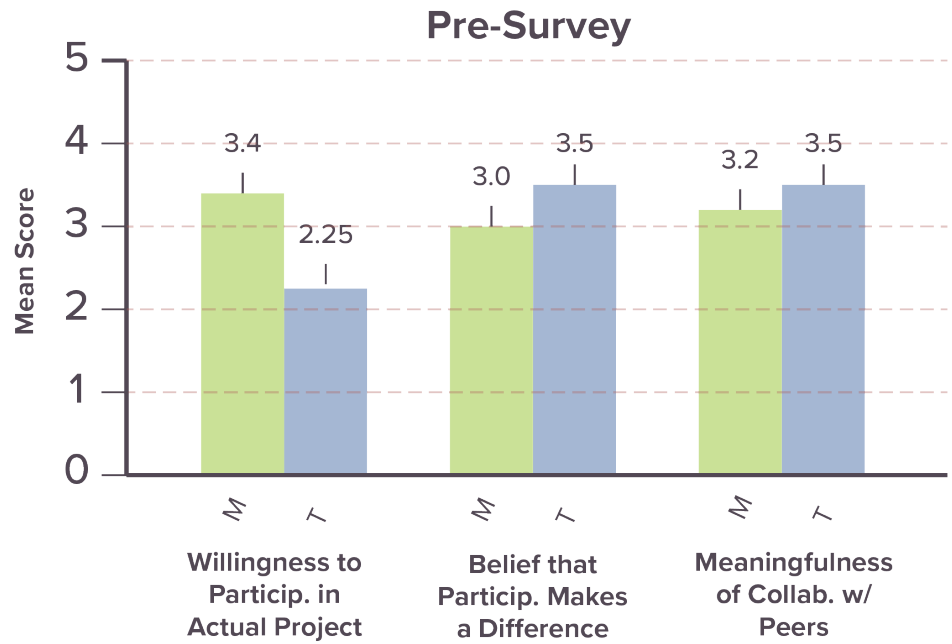


FIGURE 4.6. Graphs comparing the means across the traditional and Minecraft groups for the questions measuring meaningfulness of student involvement.

4.3 Workshop Observations and Student Designs

In addition to the quantitative survey data, the maps produced by students on trace paper and in Minecraft were examined. Figure 4.7 shows an overhead view of the design created by the Minecraft group. Figures 4.14 and 4.15 show the two plan-view sketches created by the traditional group.

Minecraft Group

Overview of Design

Students in the Minecraft group included a fence around the perimeter of the site, as shown in Figure 4.7. The two central features of their design are a centrally located sports field and a picnic shelter near the memorial plaza. In addition, the Minecraft group chose to build outside the perimeter of the site, where they constructed a large water feature. Interestingly, the Minecraft group chose not to add additional trees to their design, opting instead to include flower plantings in the sunny area to the southeast of the site. The Minecraft group also chose to include lighting throughout their design.

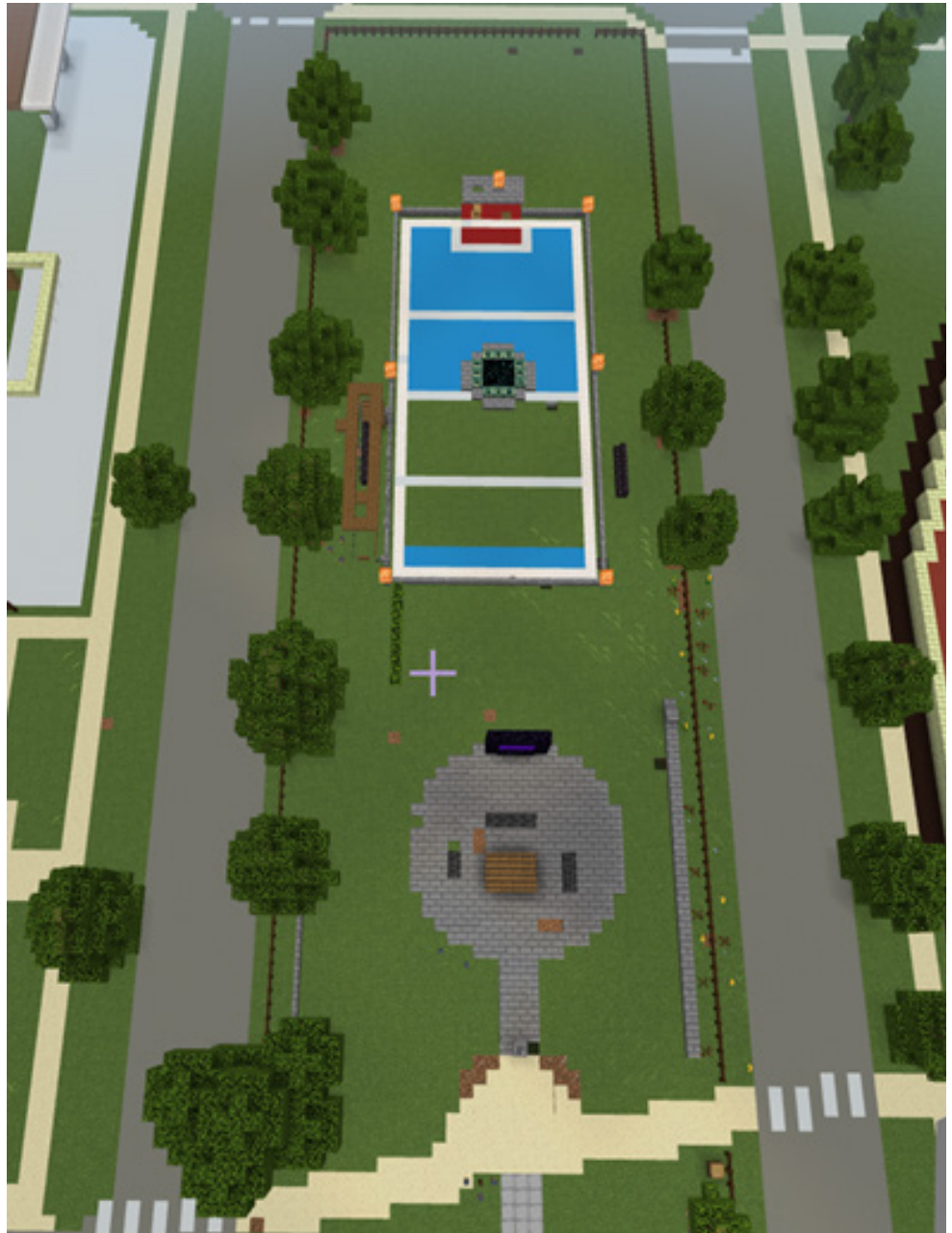


FIGURE 4.7. The Minecraft group's design for the site, featuring a sports field and a picnic shelter.

Workshop Procedures

Before the Minecraft group began to build, they spent 5-10 minutes exploring the site context. They used the features of the game's Creative Mode to fly around and explore the 3D model of their school. Students pointed out the limitations of my model, asking questions like “Where are the stairs?” (referring to the stairs in front of their school, which I had to condense in order to work within the constraints of Minecraft).

After this initial period of exploration, the students quickly set to work at the design activity. The students used an adjacent greenspace south of the study site to construct a water feature, shown in Figure 4.8. They identified this area as being overrun by geese in real life and avoided building other activities on the southern end of the map due to “poop everywhere [from] the geese.”



FIGURE 4.8. The water feature constructed by the Minecraft group was built slightly outside of the study area, in an adjacent greenspace to the south.

While the students in the group began building the water feature all together, they soon began to split up into other focus areas. The group was much more action- than discussion-oriented; without much debate about what to build next, students would simply begin work on new areas throughout the model.

The second prominent feature the students opted to build was a picnic shelter, as shown in Figure 4.9. The students chose to construct a base for the shelter and set up a picnic table, but they did not build the roof. Instead, they left a sign containing further instructions with their intent for the space (see Figure 4.10). While I had not instructed them to leave signs or labels in the design, their decision to do so made their design decisions much easier to understand and interpret.

The picnic shelter can be considered a more diagrammatic construction than the other features students built: the picnic table they constructed was not to scale and more to indicate where picnic tables should go. While they constructed the picnic shelter, students made comments that the base was “uneven”; the blockiness of the game limited the shapes the students could choose to build.

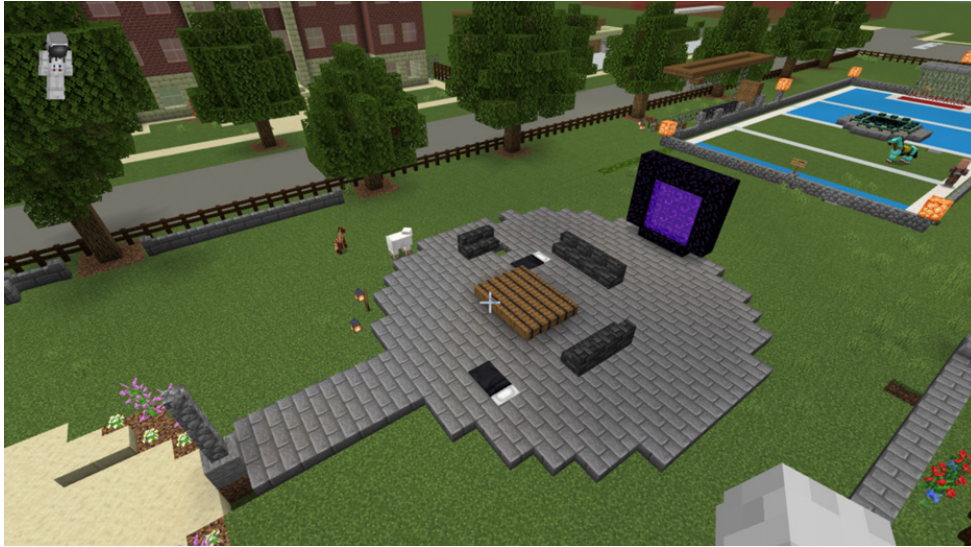


FIGURE 4.9. Picnic shelter base constructed by the Minecraft group. The black-and-purple object at one end of the base is a Nether portal, a Minecraft feature irrelevant to the design activity.



FIGURE 4.10. Students did not build a roof for their picnic shelter, but left a sign to communicate their intent.

The third major element students constructed was a soccer field at the northern end of the study site, as shown in Figure 4.11. As students built the field, they populated it with Villager and horse mobs, including a Villager goalie at one end (shown in Figure 4.12).

As part of the soccer field, students also built a shaded area for players to rest and spectators to watch. The shaded area includes equipment storage. Students left the shaded seating area incomplete but included more instructional signage to indicate their ideas for the space (see Figure 4.13).



FIGURE 4.11. Soccer field constructed by the Minecraft group. The object in the center of the field is an End Portal, another Minecraft feature irrelevant to the design activity.



FIGURE 4.12. “Golli” [sic] placed by the Minecraft group.



FIGURE 4.13. Shaded seating area by soccer field.

Degree of Participation

For most students, there was a high degree of participation throughout. Students were actively constructing or delegating tasks for themselves and others for the duration of the workshop. There was one student who helped in the construction of the water feature at the beginning, but soon “checked out” of the activity to use their cell phone.

Distractions

There were many aspects of Minecraft that provided the opportunity for distraction. These included:

- 1) Students throwing blocks at one another.
- 2) Students using mob eggs to spawn animals in the water feature.
- 3) Students pranking one another (one student broke blocks directly underneath a second student, causing the second student to fall out of the world).
- 4) Students created portals to the Nether and the End (two “alternate dimensions” in Minecraft; I didn’t know these were enabled in Minecraft Education) and traveled through them, leaving the model behind.

Traditional Group

Overview of Designs

The first design created by the traditional group, shown in Figure 4.14, features a circular playground space at the north end of the site, surrounded by benches. Students added additional trees to complete the rows of trees on the perimeter of the greenspace. In this version of the design, the small garden at the memorial plaza is expanded to encompass most of the southernmost portion of the site. A sidewalk connects the memorial plaza to the playground. Picnic tables are placed alongside the central sidewalk.

The second plan created by the traditional group, shown in Figure 4.15, includes a more detailed playground, with different types of equipment labeled. An “outside gym area” including all-ages exercise equipment is found at the north of the site. This design also includes a fence around the entire perimeter of the site. At the southeastern end of the site, students recommended more trees to encircle the bench seating around a flower garden.

FIGURE 4.14. The traditional group's first design for the greenspace, overlaid on a color map of the site.

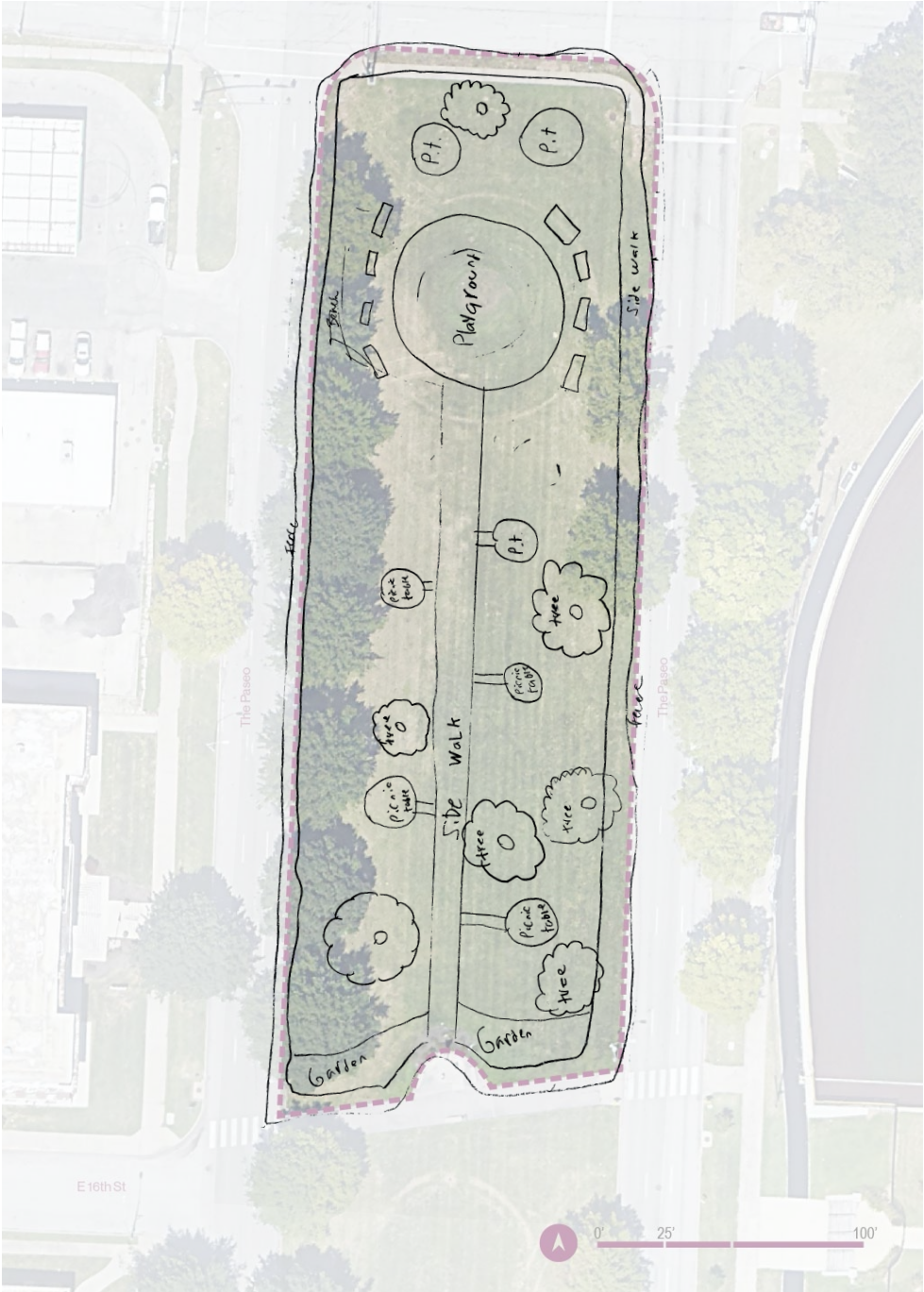




FIGURE 4.15. The traditional group's second design for the site, overlaid over the same map.

Workshop Procedures

At the start of the workshop, several students in the group expressed nervousness or discomfort about drawing. “I don’t know how to draw,” complained one participant. Students were hesitant to start, and the group was more focused on discussion than action. Students debated ahead of time before beginning their designs.

Students were provided with pencils, erasers, pens, colored pencils, markers, Post-Its, and scissors. Despite the variety of tools provided, the traditional group completed their designs using only pencil. Students were provided with trace paper and drafting dots to visualize their designs.

Working at scale was new to most of the students. One student was familiar with using a scale and used the provided engineering scale to take simple measurements and teach the other students how to draw at scale.

Degree of Participation

The degree of participation was high in the traditional group. Two students had to leave class before the activity was finished, which was one limitation faced by this group. However, all group members were active participants in the exercise.

Distractions

This group did not face as much of a problem with distractions as the Minecraft group did. There were fewer distracting features for them to handle and the group remained on task throughout the duration of the activity.

4.4 Groups' Approaches

Students in the Minecraft group were more focused on materiality than their counterparts in the traditional group. They tried to choose Minecraft blocks that approximated the materials they wanted to use and would check with their groupmates to make sure their choice had the desired effect or appearance.

The traditional group's designs were much more diagrammatic. Rather than including specific materials or details, they indicated where program elements should go and their approximate size. The exception to this is the playground in their second design, which they populated with specific equipment types (including the somewhat amusingly named "twirly things" shown in Figure 4.15).

Students in the Minecraft group were more attentive to lighting throughout the site. They installed lanterns and glowstone blocks around the soccer field, picnic shelter, and water feature. Students in the traditional group did not include lighting.

Students did not place any additional trees in the site. Instead, they chose to implement built shade structures for the picnic shelter and sports seating area. On the other hand, students in the Traditional group added new trees in both their designs.

The traditional group chose to design entirely within the outlined study area, while the Minecraft group included space south of the specified area to build their water feature. Both groups chose to build a fence around the greenspace, citing concerns about bustling traffic in the nearby streets.

















Students in the traditional group were able to coordinate their designs more than their Minecraft counterparts. All members of the traditional group had access to the entire overhead map of the site and could see what each person was doing, whereas Minecraft group members could be working on separate ends of the model and unaware of what the others were doing. There was much more dialogue and debate in the traditional group.

Both groups chose to build fences around their designs. In addition, both groups opted to locate activities (a sports field for the Minecraft group and a playground/all-ages recreation area for the traditional group) in the northern portion of the site.

Finally, students in the traditional group had much more flexibility to start over if they chose to do so. Beginning a new design was as simple as tearing off a new sheet of trace and starting to work, whereas the Minecraft group would have had to redistribute an empty copy of the world or clear their progress manually.

The following table summarizes the features each group chose to include in their design. The table also details whether each design feature was part of the short list of suggested programs provided by the student researcher during the introductory presentation (see Appendix 4 for the full presentation). The three suggested programs were an outdoor classroom, a sports field, and a playground/park.

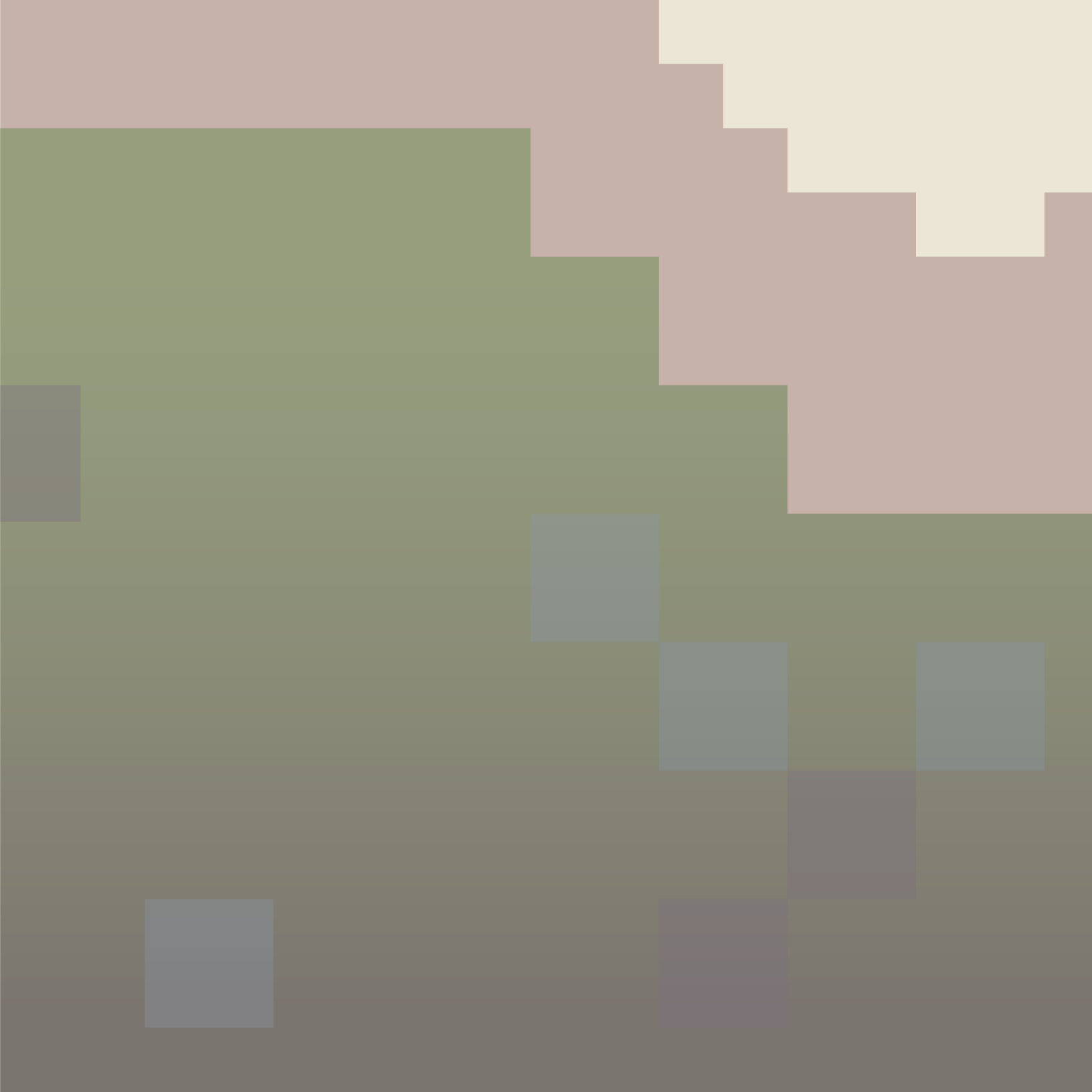
Table 4.1. Design Features

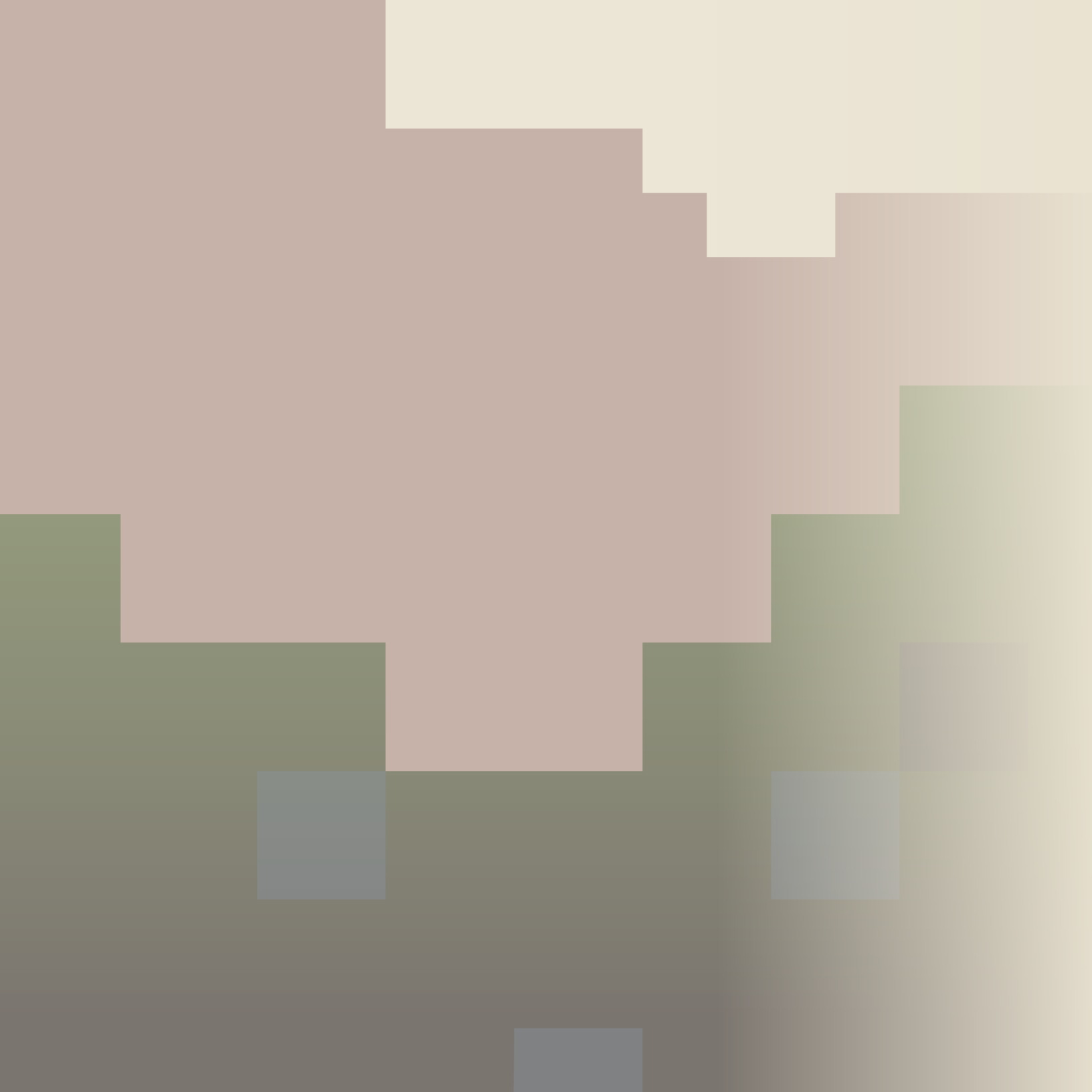
Design Feature	Group		Suggested Program?
	Traditional	Minecraft	
Flower garden			N
Sports field			Y
Playground			Y
All-ages recreation			Y
Picnic shelter			N
Water feature			N
Benches/seating			N
Additional trees			N
Fence			N
Sidewalks/paths			N
Lighting			N
Entourage*			N

* Entourage refers to the placement of people (and sometimes animals) into a design visualization to convey what the space looks like when being used or inhabited. Students in the Minecraft group populated their model, especially their sports field, with Villagers and horses.









05

discussion

5.1 Survey Results

Within-Group Comparisons

Results of within-group comparison allow us to compare students' survey responses to the pre- and post- activity questions. These statistical comparisons help us make inferences about how the design activity could have changed the students' answers before and after the activity. Figure 5.1 shows a diagram of within-group comparisons.

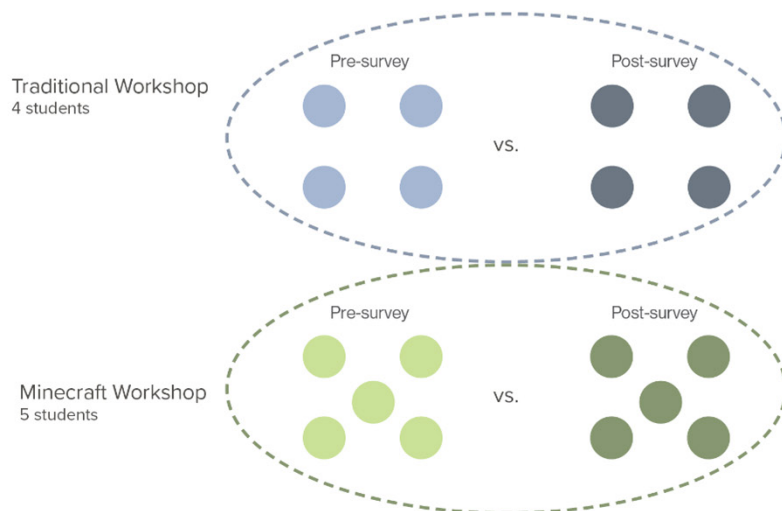


FIGURE 5.1. Visualizing comparisons within the two groups.

Effectiveness of Tools

Survey results indicate that the Minecraft group found their assigned tool easier to use, but more limiting, than they had expected. This corresponds with student commentary throughout the design activity, when students remarked that their built features looked “uneven” or “blocky.” Since Minecraft blocks generally measure 1 cubic meter in volume, it was sometimes difficult for students to build more detailed objects or curved geometries. The picnic table shown in Figure 4.9 is one example; the table’s actual size is 5x4 meters (approx. 16’ x 13’, much larger than a picnic table would be in real life). The benches students constructed are also inaccurately sized.

However, the “blockiness” of Minecraft is part of what makes it a comparatively quick and easy tool for 3-D modeling. A more sophisticated tool for 3-D modeling, such as SketchUp, could be used to create curves and objects more accurately, but such a tool would likely be difficult for students to use unless they have previous experience in 3-D modeling.

The traditional group found the tool more difficult to use, but more effective than they had expected. Their perception of the tool’s limitations stayed the same before and after the activity.

The higher-than-anticipated difficulty might have been due to the students’ unfamiliarity with working at scale. I included an engineering scale in the traditional group’s materials with the expectation that students could use it as a straight edge if they were unfamiliar with

working at scale. However, one student in the traditional group was already familiar with using a scale and taught other group members how to do so. This new tool resulted in some confusion and might have impacted students' perception of the activity's difficulty.

The increase in difficulty also might have been as more general unfamiliarity with the type of design work. Students in this group indicated a low level of familiarity (1.5 out of 5) with drawing on 2-D maps or plans, and it's possible that they found this unfamiliar activity more difficult than they had anticipated.

Sense of Involvement

Both groups experienced increases across the board for all three of the questions which evaluated students' sense of involvement in their communities and knowledge of the process design professionals use to solve problems. The steepest increase was seen in students' level of understanding with the design process: students in the Minecraft group reported a significantly higher understanding of the design process after participating in the activity.

While the statistical results from this study may not be generalizable due to its small sample size, this difference is nevertheless an interesting one and invites further exploration. Students in both

groups watched the same presentation prior to the design activity, but students in the traditional group saw a smaller increase that was not statistically significant. It's possible that students in the Minecraft group felt more connected to the design process due to their higher enjoyment of their activity compared to the traditional group. Future studies are encouraged to include more open-ended survey questions to investigate which aspects of the design process the students felt they understood better.

Meaningfulness of Involvement

The third group of questions focused on students' perception of the meaningfulness of their involvement in the activity. Since the purpose of this study was to determine Minecraft's effectiveness as a tool for youth engagement, this set of questions was intended to focus on the broader real-world implications or larger meaning of the design exercise.

The Minecraft group's responses indicated they would be more willing to participate in an actual public project after participating in the design workshop. This could be due to the Minecraft group's higher enjoyment of their activity. It's also possible that the Minecraft group would be willing to participate in a Minecraft workshop for an actual public project, but that they would be less willing to take part

in a more traditional design workshop. Future studies should consider asking students further about which type of workshop would be more appealing to them in a real project.

The traditional group described collaboration with their peers as less meaningful after the exercise. The same group was unchanged in their willingness to participate in an actual public project, and their belief that their participation made a difference even decreased. The Minecraft group saw an increase in the meaningfulness of collaboration with their peers, and their responses to the other two questions increased as well.

Both groups reported a change in how meaningful they found collaboration with their peers, suggesting that group dynamics may have influenced their responses somewhat. Attaining a larger sample size of groups would make it easier to see how group dynamics impact answers to the other two questions.

Between-Group Comparisons

Results of between-group comparisons allow us to compare students' survey responses based on which design activity (traditional or Minecraft) they received. These statistical comparisons can help us infer how the assigned tool affected student responses. Figure 5.2 shows a diagram of between-group comparisons.



FIGURE 5.2. Visualizing comparisons between the two groups.

Effectiveness of Tools

The Minecraft group found their assigned tool more limiting, but also more effective than the traditional group. There was also a significant difference in the perceived effectiveness of the two tools pre-survey (with the Minecraft group predicting that their tool would be more effective). This significant difference disappeared in the post-activity survey, suggesting the limitations students found with Minecraft might have evened out their perceived effectiveness of the tool.

Sense of Involvement

For the second question group, which assessed students' familiarity with the design process and sense of involvement in their communities, there were no statistically significant differences between the traditional and Minecraft groups. However, the difference in post-activity understanding of the design process was approaching statistical significance ($p = 0.068$). This seems to indicate that the Minecraft group reported a better understanding of the design process following the design activity than the traditional group.

Meaningfulness of Involvement

The third set of questions, which investigated the meaningfulness of student involvement, again found no statistically significant differences. However, the Minecraft group was found to be 56% more willing than the traditional group to participate in an actual public project.

When the traditional and Minecraft methods are compared, Minecraft certainly appears to be a worthwhile method for engaging youth in the design process. Despite students in both groups receiving the same presentation at the same time to introduce them to the design process, students in the Minecraft group described their understanding of the design process as significantly higher than students in the traditional group. Students in the Minecraft group also reported themselves as more likely to participate in an actual public project, suggesting Minecraft has the potential to spark student interest in design projects in their communities. However, the findings of this study are limited by its small sample size, and further investigation is needed.

5.2 Design Evaluations

In addition to the survey results, the designs created by the two groups of students are important products of this study. Though students were limited by time, evaluating their final products can shed more light on the benefits and limitations of each tool.

The three designs produced by students are shown in Figures 4.7, 4.14, and 4.15. For a comparative summary of the features of both groups' designs, see Table 4.1.

Minecraft Group

The three main features produced by the Minecraft group were a water feature, a picnic shelter, and a sports field. Of these three, only the sports field was suggested in the presentation (see Appendix 4) as a possible program for the site; the rest were come up with by the students. All features of the students' design were located centrally in the site, potentially to mitigate danger and noise resulting from traffic on the Paseo Boulevard.

The water feature and picnic shelter are both well placed to mitigate challenges posed by the environment. The picnic shelter is in the southern part of the site, which receives the most sunlight (both due to sunlight direction and lack of tree cover). Placing a covered picnic shelter here gives visitors to the space a restful place to get out of the sun.

The students also provided a path connecting the existing sidewalk to their proposed picnic shelter. This path begins right behind the existing memorial; it would be difficult to access if built as the students designed it in Minecraft. With the exception of this path, students did not build any circulation throughout the site.

The water feature was placed in a location where geese gather, according to the students. Based on the comments students made while constructing their fountain, they hoped to collect the geese to the water feature rather than having them roam throughout the site.

The water feature itself is roughly rectangular in shape, partially surrounded by a stone fence. Though the feature is surrounded by lights, these appear to have been placed at random (see Figure 4.8). Students began placing a path leading to the water feature, but this path was left incomplete. Students did not consider seating, shade, or other elements for human comfort around the water feature.

Lighting appeared to be more intentionally placed around the sports field, where the students placed lights around the perimeter of the field (see Figure 4.11). Students also included seating around the field; on the western side of the field, which receives the least shade from trees, they included an overhead shade structure.

Students were likely limited in their choice of geometry by the blocky design of Minecraft. Most of the features they designed are linear or rectangular in shape, with the exception of the circular picnic shelter.

Students in the Minecraft group also produced design elements of uncertain purpose. These include the stone slabs placed on the southeastern ends of the site (visible in the overhead view of the Minecraft's design) and the red-and-white checkered area north of the water feature (visible in Figure 4.8). While students left signs elsewhere around the site to communicate their intent (see Figure 4.10 for an example), there are no such signs to tell the viewer what these two elements are. Without input from the students, it is impossible to determine if these features were placed with a purpose in mind, or if they were the result of students experimenting as they explored the gameplay and materials.

This is one further shortcoming of using Minecraft as a tool for design workshops: unless the participants leave signs for every feature, it may be difficult to decipher their desires or intentions for the space.

Future studies should consider additional follow-ups with students (potentially through structured interviews) to get a better grasp on design elements whose purpose isn't immediately apparent. Follow-up interviews would also be helpful to uncover the reasoning behind students' placement of features in both traditional and Minecraft groups (e.g. "We put trees here because they would look pretty along the boulevard," vs. "We put trees here to keep people out of the sun").

As the study currently stands, the researcher is limited to interpreting the design products and the observations collected during the design workshop. While these products and observations are helpful, crucial pieces could be missing; anyone continuing this research would be strongly advised to conduct follow-up interviews.

Traditional Group

First Design

The traditional group chose to construct a playground, install a central sidewalk (with alternating picnic tables), and expand the existing memorial garden in their first design. They also placed additional trees along the southeastern end of the site (which receives the most direct sunlight) and near picnic tables to provide shade for users.

Though the traditional workshop wasn't as limited by their assigned tool, they also used simple linear and circular geometries throughout the site.

A sidewalk passes around the perimeter of the site, enclosed by a fence. While a sidewalk would make it easier to get around the site, the sidewalk drawn by the students would leave no buffer room between pedestrians and traffic. The position of the fence on the immediate outside of the sidewalk would also pose safety concerns for people crossing. A professional design for the site might move this sidewalk to the other side of the trees to make it more comfortable for users, and reposition the fence.

Students determined they wanted a playground to occupy the northern central portion of the site. This choice is interesting, since both groups opted to put major programming elements there. This could be due to the level ground at the northern end of the site, or a response to the presence/absence of geese.

The group included seating for users of the playground, which they placed around the playground's perimeter.

Second Design

The traditional group's second design includes three central elements: a flower garden, a playground, and an all-ages "outside gym area."

The second design omits the sidewalk around the perimeter of the site, choosing instead to include a sidewalk around the playground they designed. While this resolves the problem of the sidewalk being adjacent to traffic, there is still no connection between the three different elements of the site (similar to the Minecraft group's design). This might make the designed features difficult for users to access.

Students considered human comfort by installing benches around the flower garden, and trees to provide shade for the benches. However, flowers planted in this garden might have trouble growing in the shade in such a small area.

Again, students included seating around the playground. The playground in the traditional group's second design is much more specific, which students identifying particular pieces of playground equipment they wanted to include. In some cases, it's difficult to identify what some of the elements actually are (follow-up interviews would again be helpful in determining this).

Follow-up interviews would also be helpful in determining the students' intentions for the rectangular "outside gym area." I have been interpreting it as a multigenerational exercise space with equipment, but the students might have had something different in mind for it.

Overall, students in both groups were thoughtful in creating their designs. In most cases, they responded very well to the environmental and safety concerns present on the site. Their work is especially impressive given the short amount of time provided to think through and execute their designs. Future research could include more sessions/iterations and further design development from students.

5.3 Recommendations for Future Minecraft Workshops

Mobs

Students opted to spawn mobs throughout the model. By the end of the workshop, the study area was populated with an array of sheep, horses, Villagers, and cats, as well as a small army of axolotls in the water feature. There is a setting in Minecraft Education to prevent students from spawning mobs; it might be advisable for whoever is hosting the world to turn this setting on. While the students' choice to generate Villagers as players in their soccer field was appealing, the mobs created far more distraction than benefit for the students in the design activity.

Portals

I have been unable to find a setting in Minecraft to disable portals to the Nether or End dimensions. There is a possibility that at least one student in the group will know how to build a portal and will take their groupmates on an impromptu trip to another dimension. It may be difficult for students to find their way back to the design activity, and the portals are visually unappealing and distracting from the students' other constructions.

To accommodate students who want to travel to the Nether or the End, it might be advisable to put aside 10-15 minutes at the beginning of the activity to let students play with Minecraft in a separate world if time allows. Letting students get out their “zoomies” before the activity could help with introducing students to the game mechanics and keeping mischief in check.

Weather and Day/Night Cycles

While the in-game weather and day/night cycles can be distracting, it was interesting to see how the students responded to these changes. Students in the Minecraft group included lighting because they saw how the greenspace looked in the dark, whereas students in the traditional group did not add lighting. I would recommend leaving both weather and day/night cycles enabled.

Outlining the Study Area

I considered outlining the study area in my Minecraft model with a different material but opted not to (I found it to be too distracting). This led students in the Minecraft group to work outside the study area, which would be unproductive in an actual project. Rather than an outline, I would recommend using grass within the study area and another similar-but-distinct block (such as green or lime-green wool) for the ground outside the study area. This would help students differentiate between the study area and the surrounding context.

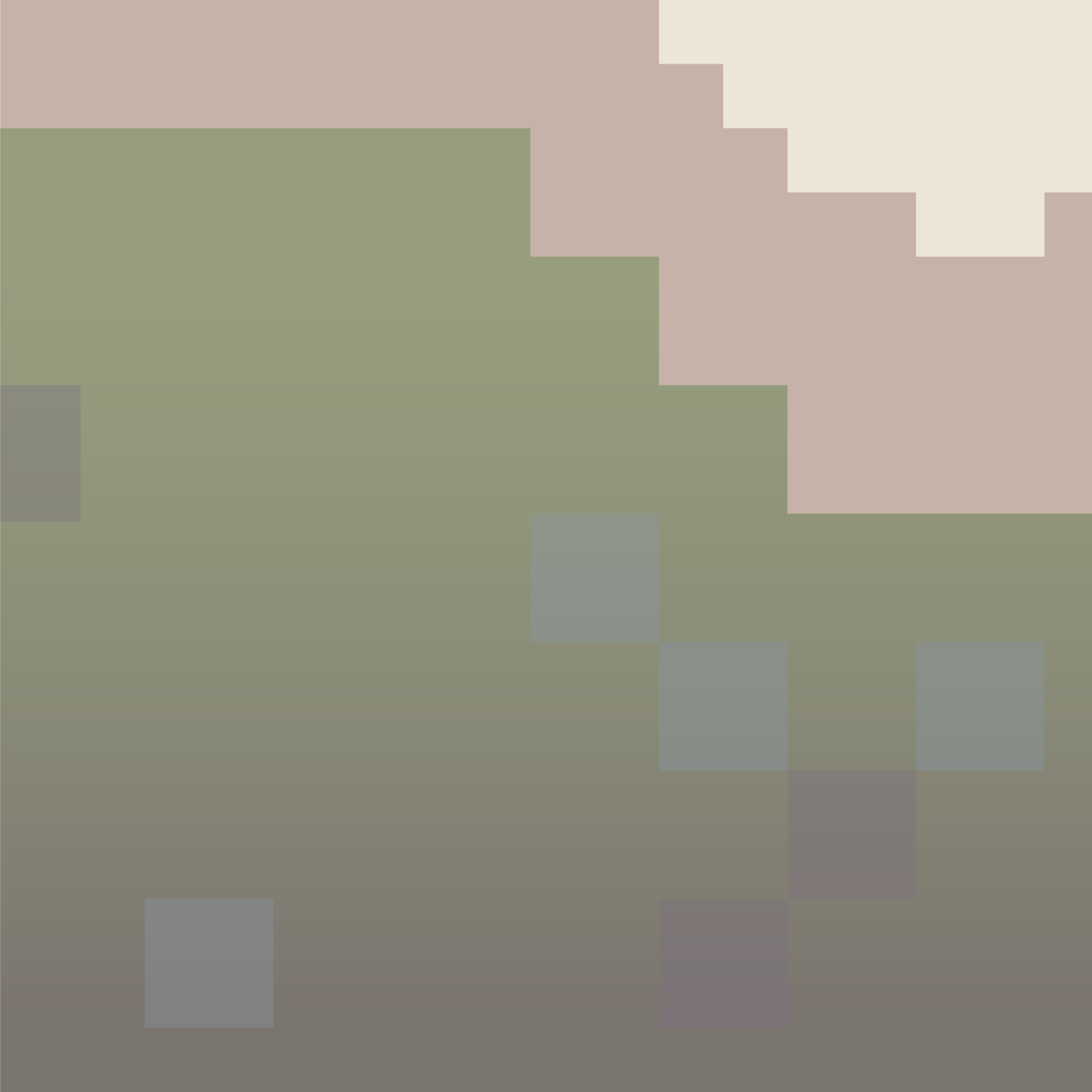
Labeling/Signs

Further research would benefit from requiring students to add labels or signs to the different elements of their design. While I did not specifically instruct students to do so, it would have been very difficult to ascertain what some elements of the design were had they not included signs to tell me. The traditional-group students were able to quickly and easily label their design elements; signs can serve the same purpose for the Minecraft group.

5.4 Limitations

The Minecraft group began with some technical difficulties. GCHS had purchased student licenses for Minecraft Education Edition ahead of time, and most of the group was able to access Minecraft without issue. However, two students had difficulty signing in or accessing their license, and one participant had to switch over to the Traditional group after they were completely unable to sign into Minecraft. Any technical issues were resolved within the first 5 to 10 minutes of the workshop. The most significant limitation of this study is the small sample size. Two participants in the traditional group had to leave early for a different class. Several students were absent from class or the workshop, and one student opted not to participate after the activity had already started. Unbeknownst to me until I had begun entering data, one student in the traditional group filled out the pre-activity survey but not the post-activity survey. Future studies should aim for more robust recruitment and a larger sample size.







06

conclusion

The aim of this study was to examine effectiveness of Minecraft as an engagement tool, and the sense of involvement and meaningfulness it brings to youth as compared to traditional participatory design approaches. The outcomes of this study encourage youth participation through effective methods and provide insights to better ways of involvement of young people in design decision-making. This study aimed to address the lack of research comparing traditional and video-game means of engagement.

The broader implication of this study is figuring out a good way to increase the representation of youth in participatory design. Since youth are an underrepresented group in participatory design, it is crucial to find methods of participation that are accessible and meaningful to them.

Results of the study indicate that Minecraft has high potential for engaging young people in public projects. When compared to students who took part in a traditional design charette, students who participated in a Minecraft activity reported themselves as having a significantly better understanding of the design process. Students in the Minecraft group also described themselves as much more willing to participate in an actual public project, suggesting Minecraft may be a good tool for piquing student interest in design. These findings are promising and warrant more investigation to further encourage youth participation in participatory design for public projects.

This study should be considered as a pilot study for future research. Future studies should further address Minecraft's limitations and potential distractions. If distractions can be minimized, Minecraft shows excellent promise as a tool for youth engagement.

6.1

references

Arciniegas, G., & Janssen, R. (2012). Spatial decision support for collaborative land use planning workshops. *Landscape and Urban Planning* 107(3), pp. 332-342.

Bannon, L. J., & Ehn, P. (2012). Design Matters in Participatory Design. In J. Simonsen, & T. Robertson, *Routledge International Handbook of Participatory Design* (pp. 37-63). London: Routledge.

Block by Block. (2018). Building an Accessible, Sustainable Waterfront in Addis Ababa. UN Habitat. <https://www.blockbyblock.org/projects/addisababa>.

Bodrova, E., & Leong, D. J. (2005). Why Children Need Play. *Early Childhood Today*, 20(1), 6.

Cheshire, T. (2012, November 22). Want to learn computer-aided design (CAD)? Play Minecraft. *Wired*. <https://www.wired.co.uk/article/minecrafted>.

Checkoway, B., Pothukuchi, K., & Finn, J. (1995). Youth Participation in Community Planning: What are the Benefits? *Journal of Planning Education and Research* 14(2).

Cross, N. (eds.) (1972) *Design Participation - Proceedings of the Design Research Society Conference, 1971*, London, Design Research Society. <https://dl.designresearchsociety.org/conference-volumes/1>.

de Andrade, B., Poplin, A., & Sousa de Sena, Í. (2020). Minecraft as a Tool for Engaging Children in Urban Planning: A Case Study in Tirol Town, Brazil. *ISPRS International Journal of Geo-Information*, 9(3), 170. <https://doi.org/10.3390/ijgi9030170>.

Delaney, J. (2022). Minecraft and Playful Public Participation in Urban Design. *Urban Planning* 7(2), pp. 330-342.

Derr, V., Chawla, L., & Mintzer, M. (2018.). *Placemaking with Children and Youth Participatory Practices for Planning Sustainable Communities*. New Village Press, New York.

Edwards, B., Edwards, B. B., Griffiths, S., Reynolds, F. F., Stanford, A., Woods, M. (2021). The Bryn Celli Ddu Minecraft Experience: A Workflow and Problem-Solving Case Study in the Creation of an Archaeological Reconstruction in Minecraft for Cultural Heritage Education. *Journal on Computing and Cultural Heritage* 14(2), pp. 1-16. <https://doi.org/10.1145/3427913>.

Entertainment Software Association (ESA). (2019). 2019 Essential Facts About the Computer and Video Game Industry. ESA. <https://www.theesa.com/wp-content/uploads/2019/05/2019-Essential-Facts-About-the-Computer-and-Video-Game-Industry.pdf>.

Flanagan, M. (2009). *Critical Play: Radical Game Design*. MIT Press.

Frank, K. I. (2006). The Potential of Youth Participation in Planning. *Journal of Planning Literature*, pp. 351-371.

Glenn, N. M., Knight, C. J., Holt, N. L., Spence, J.C. (2012). Meanings of play among children. *Childhood* 20(2), pp. 185-199. DOI: 10.1177/0907568212454751.

Hautopp, H., & Ørngreen, R. (2018). A Review of Graphic Facilitation in Organizational and Educational Contexts. *Designs for Learning*, 10(1), 53–62. DOI: <http://doi.org/10.16993/dfl.97>

Karsenti, T., Bugmann, J., and Gros, P. P. (2017) Transforming Education with Minecraft? Results of an exploratory study conducted with 118 elementary-school students. Montréal: CRIFPE.

Landin, Per. (2018, April 28). Big City Life: MattuFIN's Minecraft mega-city makes us marvel. Minecraft. <https://www.minecraft.net/sv-se/article/big-city-life>.

Luck, R. (2003). Dialogue in participatory design. *Design Studies* 24(6), pp. 523-535.

Luck, R. (2007). Learning to talk to users in participatory design situations. *Design Studies* 28(3), pp. 217-242.

Marlow, C. (2012). Making Games and Environmental Design: Revealing Landscape Architecture. Academic Conferences International Limited.

Magnussen, R., & Elming, A. (2017). Student Re-Design of Deprived Neighbourhoods in Minecraft: Community-Driven Urban Development. 12th International Conference on Computer Supported Collaborative Learning.

Minecraft Wiki. (n.d.). Blocks. <https://minecraft-archive.fandom.com/wiki/Blocks>.

Mitchell, R., & Nørgaard, M. (2011). Using DIY cartoon storyboards, live sketching and co-sketching to involve young and older users in participatory design. *Proc. of World Conference on Design Research IASDR*.

Mullahey, R., Susskind, Y., & Checkoway, B. (1999). Youth Participation in Community Planning. American Planning Association.

O’Coill, M. & Doughty, M. (2004). Computer Game Technology as a Tool for Participatory Design. *Virtual Environment and Participatory Design*, pp. 12-23.

Örnek, M. A. (2013). Exploring the potential uses of computer games in landscape architecture education. *ITU Journal of Faculty of Architecture* 10(2), pp. 161-177.

Örnek, M. A., & Özer, E. (2016). Classifying and Evaluating Computer Games to Explore their Potential Use in Landscape Architecture Education. *Edinburgh Architectural Research Journal* 34., pp. 107-124.

Spinuzzi, C. (2005). The Methodology of Participatory Design. *Technical Communication*, pp. 163-174.

Sanders, E. B., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*.

Sanoff, H. (2000). *Community Participation Methods in Design and Planning*. Hoboken, NJ: Wiley.

Sanoff, H. (1979). *Design Games*. Los Altos, CA: W. Kaufmann.

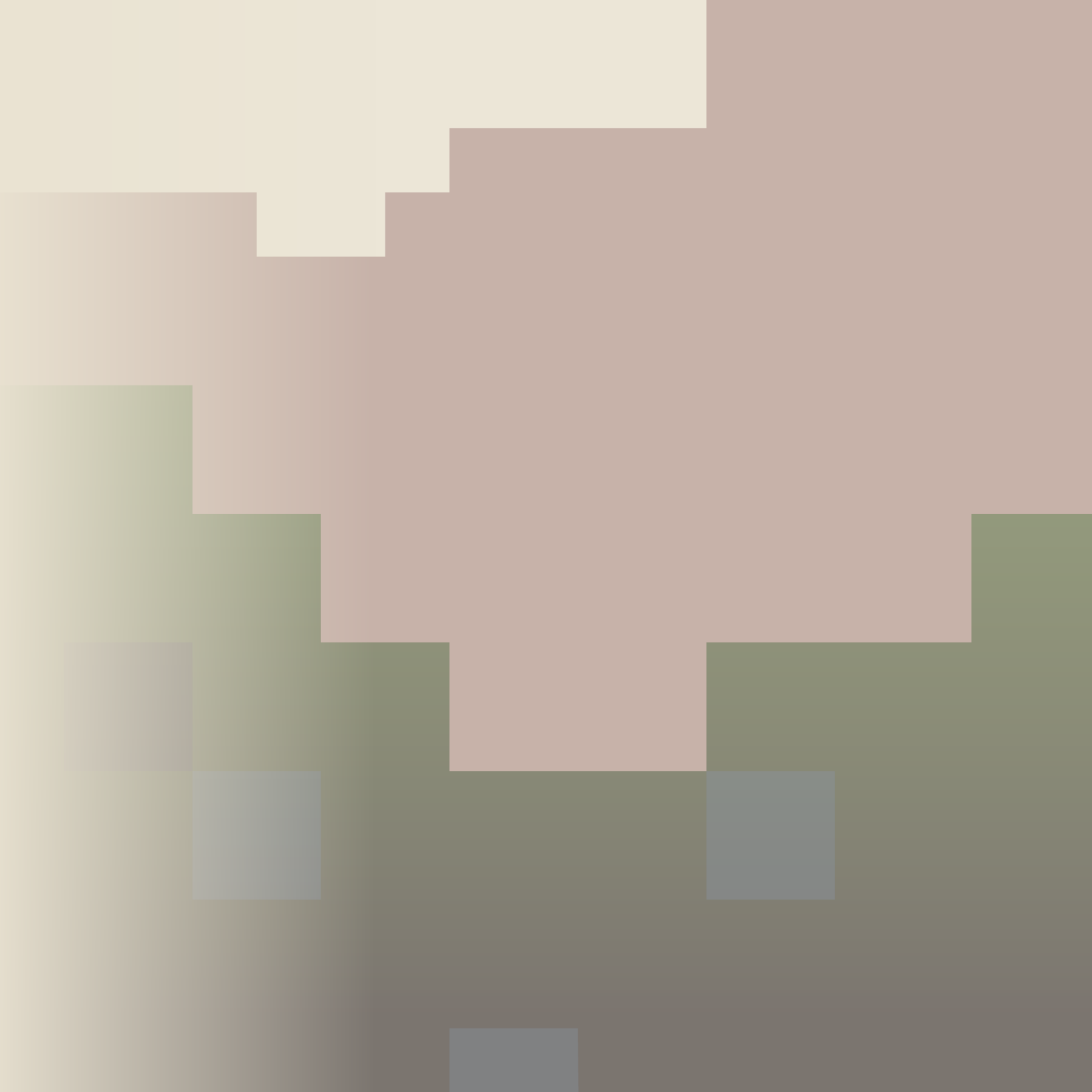
Shliakhovchuk, E. (2018). Using Video Games in Intercultural, Diversity and Inclusive Education. 11th Annual International Conference of Education, Research and Innovation. Seville, Spain. 12–14 November 2018, pp. 10326–10336.

Todd, J. A., & Lindsey, G. (2016). Planning and Conducting Integrated Design (ID) Charettes. *Whole Building Design Guide*. <https://www.wbdg.org/resources/planning-and-conducting-integrated-design-id-charrettes>.

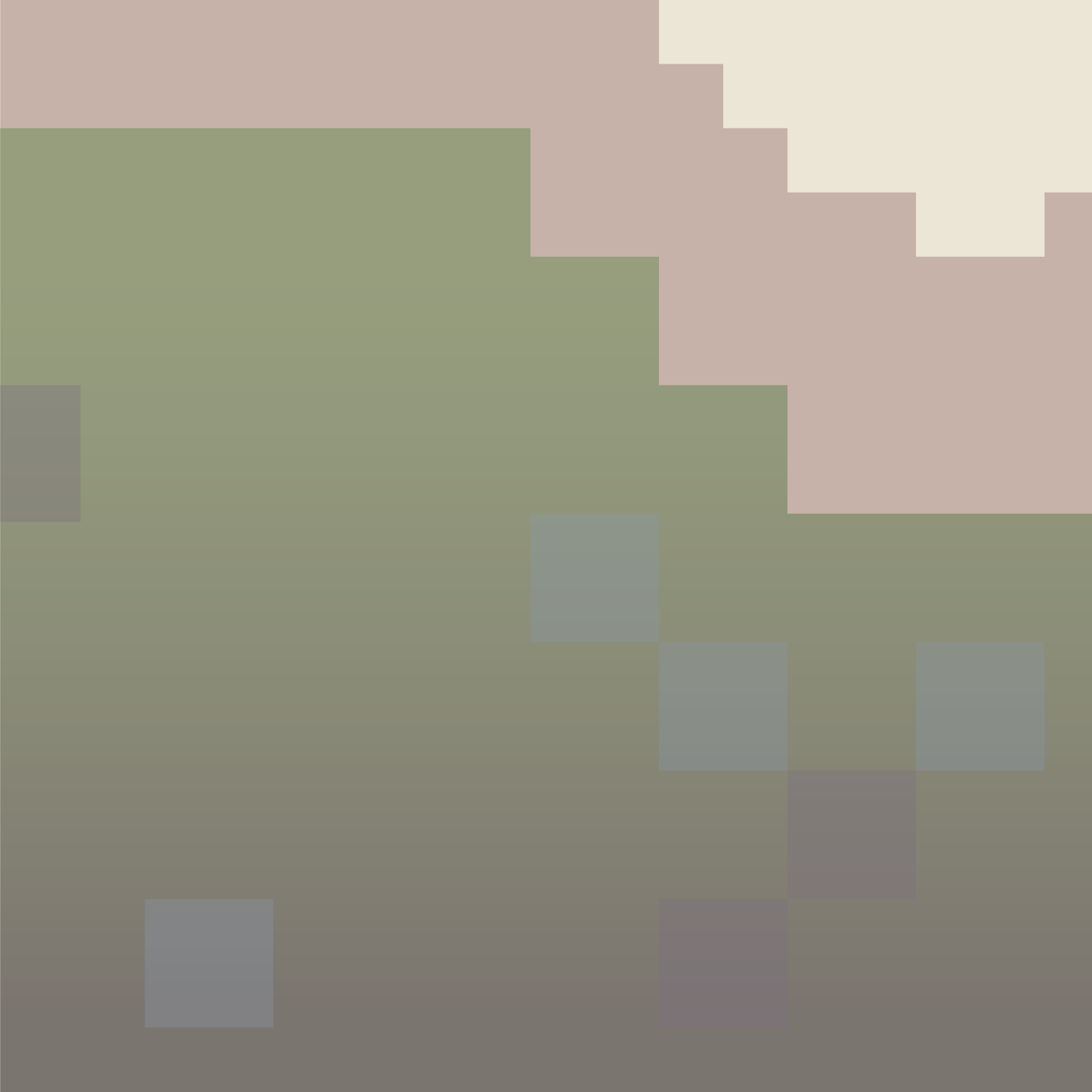
United Nations. (n.d.) Youth Participation. United Nations Youth. <https://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-participation.pdf>.

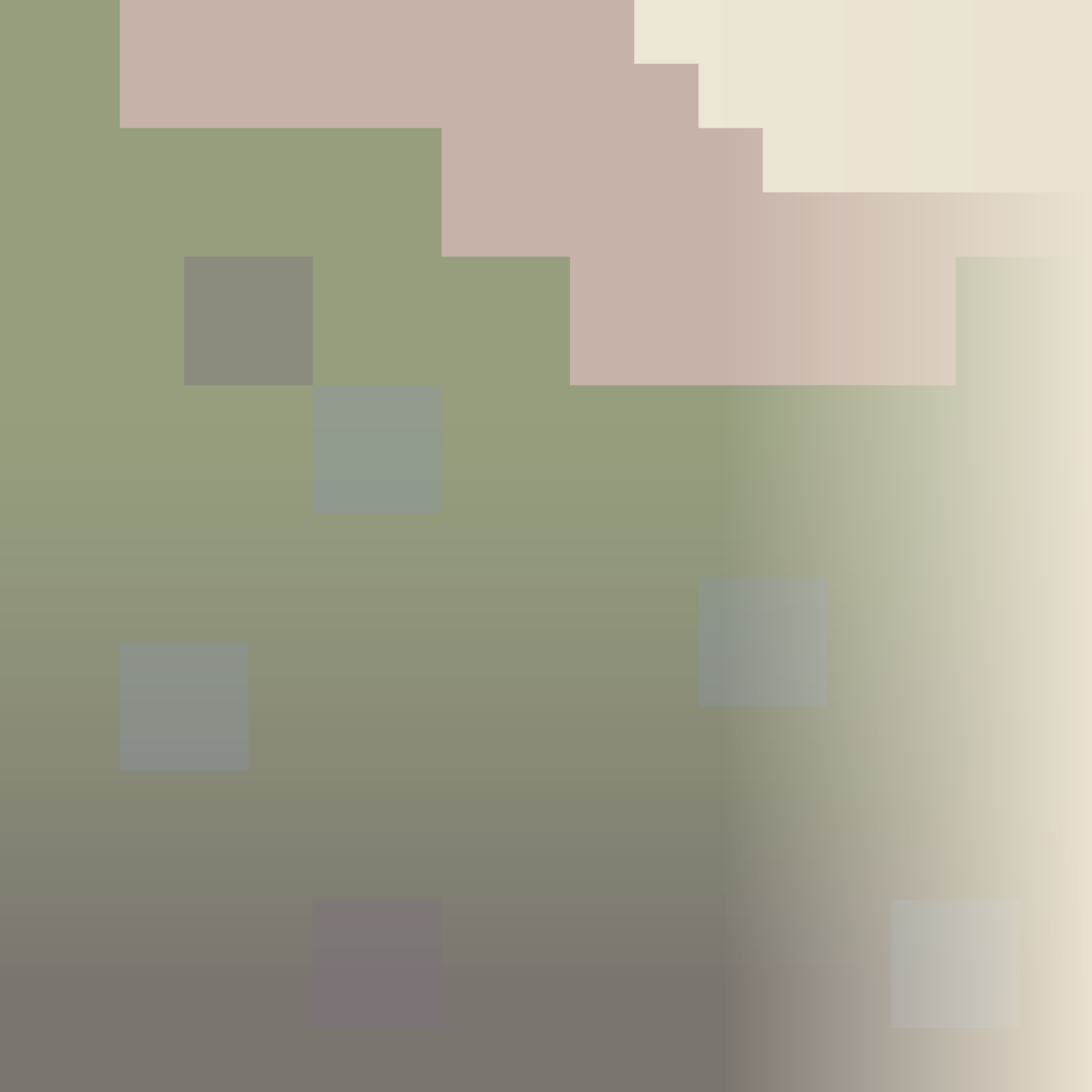
UN Habitat. (2015.) Using Minecraft for Youth Participation in Urban Design and Governance. United Nations Human Settlements Programme (UN-HABITAT). <https://unhabitat.org/sites/default/files/download-manager-files/Using%20Minecraft%20for%20Youth%20Participation%20in%20Urban%20Design%20and%20Governance.pdf>.

Wisner, B., Stea, D., Kruks, S. (1991). Participatory and Action Research Methods. In: Zube, E.H., Moore, G.T. (eds) *Advances in Environment, Behavior, and Design*. *Advances in Environment, Behavior, and Design*, vol 3. Springer, Boston, MA. https://doi.org/10.1007/978-1-4684-5814-5_8.









07

appendices

Appendix 1: IRB Approval

Appendix 2: Survey Questions

Appendix 3: Timeline

Appendix 4: Instructions for Building a Minecraft Model

Appendix 5: Presentation for GCHS Students

7.1

IRB approval



University Research
Compliance Office

TO: Sara Hadavi
Landscape Archit & Comm Plan

Proposal Number IRB-11461

FROM: Lisa Rubin, Chair
Committee on Research Involving Human Subjects

DATE: 01/27/2023

RE: Approval of Proposal Entitled, "Building Blocks of Inclusion: Minecraft as a Tool for Youth Engagement."

The Committee on Research Involving Human Subjects has reviewed your proposal and has granted full approval. This proposal is **approved for three years from the date of this correspondence.**

APPROVAL DATE: 01/27/2023

EXPIRATION DATE: 01/26/2026

In giving its approval, the Committee has determined that:

No more than minimal risk to subjects

This approval applies only to the proposal currently on file as written. Any change or modification affecting human subjects must be approved by the IRB prior to implementation. All approved proposals are subject to continuing review, which may include the examination of records connected with the project. Announced post-approval monitoring may be performed during the course of this approval period by URCO staff. Injuries, unanticipated problems or adverse events involving risk to subjects or to others must be reported immediately to the Chair of the IRB and / or the URCO.

Electronically signed by Lisa Rubin on 01/27/2023 7:54 PM ET

7.2

survey questions

Pre-Survey Questions (Minecraft)

Familiarity with Tools

Do you have previous experience with building 3-D models?

Yes – physical model-building Yes - digital model-building No

How would you currently rate your level of knowledge/experience with Minecraft?

1 – Very Poor 2 3 4 5 – Very Good

Additional comments:

Effectiveness of Tools

How easy or difficult do you perceive Minecraft as a tool to use?

1 – Very Easy 2 3 4 5 – Very Difficult

How much do you predict your assigned tool might limit the decisions you and your group make in the design activity?

1 – Not At All 2 3 4 5 – Very Much

To what degree do you predict your assigned tool will be effective in achieving your goal?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Sense of Involvement

How much do you currently feel engaged in decision-making for your community?

1 – Not At All 2 3 4 5 – Very Much

How would you currently rate your understanding of the process that design professionals (architects, landscape architects, etc) use to solve problems?

1 – Very Poor 2 3 4 5 – Very Good

How would you rate your understanding of community participation in design?

1 – Very Poor 2 3 4 5 – Very Good

Additional comments:

Meaningfulness of Involvement

Would you be willing to participate in a design workshop for youth as part of an actual public project?

1 – Not At All 2 3 4 5 – Very Much

How much do you believe your participation in a design workshop for an actual public project would make a difference in your community?

1 – Not At All 2 3 4 5 – Very Much

To what degree do you find collaboration with your peers meaningful?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Post-Survey Questions (Minecraft)

Effectiveness of Tools

How easy or difficult did you find this tool to use?

1 – Very Easy 2 3 4 5 – Very Difficult

How much did the tool you used limit the choices you and your group made to achieve your goals?

1 – Not At All 2 3 4 5 – Very Much

How much was the tool you used effective in achieving your goal?

1 – Not At All 2 3 4 5 – Very Much

To what extent did your group dynamics impact your design choices, regardless of which tool you used?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Sense of Involvement

Did you enjoy being part of this exercise?

1 – Not At All 2 3 4 5 – Very Much

How much did you feel engaged in decision-making in this exercise?

1 – Not At All 2 3 4 5 – Very Much

How would you currently rate your understanding of the process that design professionals (architects, landscape architects, etc) use to solve problems?

1 – Very Poor 2 3 4 5 – Very Good

How would you rate your understanding of community participation in design after this exercise?

1 – Very Poor 2 3 4 5 – Very Good

Additional comments

Meaningfulness of Involvement

Would you be willing to participate in a design workshop for youth as part of an actual public project?

1 – Not At All 2 3 4 5 – Very Much

How much do you believe your participation in a design workshop for an actual public project would make a difference in your community?

1 – Not At All 2 3 4 5 – Very Much

To what degree did the collaborative aspect of the activity make your participation meaningful?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Pre-Survey Questions (Hand Drawing)

Familiarity with Tools

Do you have previous experience drawing on 2-D maps or plans of a real-world location?

Yes

No

How would you currently rate your level of knowledge/experience with hand drawing?

1 – Very Poor 2 3 4 5 – Very Good

Additional comments:

Effectiveness of Tools

How easy or difficult do you perceive hand drawing as a tool to use?

1 – Very Easy 2 3 4 5 – Very Difficult

How much do you predict your assigned tool might limit the decisions you and your group make in the design activity?

1 – Not At All 2 3 4 5 – Very Much

To what degree do you predict your assigned tool will be effective in achieving your goal?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Sense of Involvement

How much do you currently feel engaged in decision-making for your community?

1 – Not At All 2 3 4 5 – Very Much

How would you currently rate your understanding of the process that design professionals (architects, landscape architects, etc) use to solve problems?

1 – Very Poor 2 3 4 5 – Very Good

How would you rate your understanding of community participation in design?

1 – Very Poor 2 3 4 5 – Very Good

Additional comments:

Meaningfulness of Involvement

Would you be willing to participate in a design workshop for youth as part of an actual public project?

1 – Not At All 2 3 4 5 – Very Much

How much do you believe your participation in a design workshop for an actual public project would make a difference in your community?

1 – Not At All 2 3 4 5 – Very Much

To what degree do you find collaboration with your peers meaningful?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Post-Survey Questions (Hand Drawing)

Effectiveness of Tools

How easy or difficult did you find this tool to use?

1 – Very Easy 2 3 4 5 – Very Difficult

How much did the tool you used limit the choices you and your group made to achieve your goals?

1 – Not At All 2 3 4 5 – Very Much

How much was the tool you used effective in achieving your goal?

1 – Not At All 2 3 4 5 – Very Much

To what extent did your group dynamics impact your design choices, regardless of which tool you used?

1 – Not At All 2 3 4 5 – Very Much

Additional comments:

Sense of Involvement

Did you enjoy being part of this exercise?

1 – Not At All 2 3 4 5 – Very Much

How much did you feel engaged in decision-making in this exercise?

1 – Not At All 2 3 4 5 – Very Much

How would you currently rate your understanding of the process that design professionals (architects, landscape architects, etc) use to solve problems?

1 – Very Poor 2 3 4 5 – Very Good

How would you rate your understanding of community participation in design after this exercise?

1 – Very Poor 2 3 4 5 – Very Good

Additional comments:

Meaningfulness of Involvement

Would you be willing to participate in a design workshop for youth as part of an actual public project?

1 – Not At All 2 3 4 5 – Very Much

How much do you believe your participation in a design workshop for an actual public project would make a difference in your community?

1 – Not At All 2 3 4 5 – Very Much

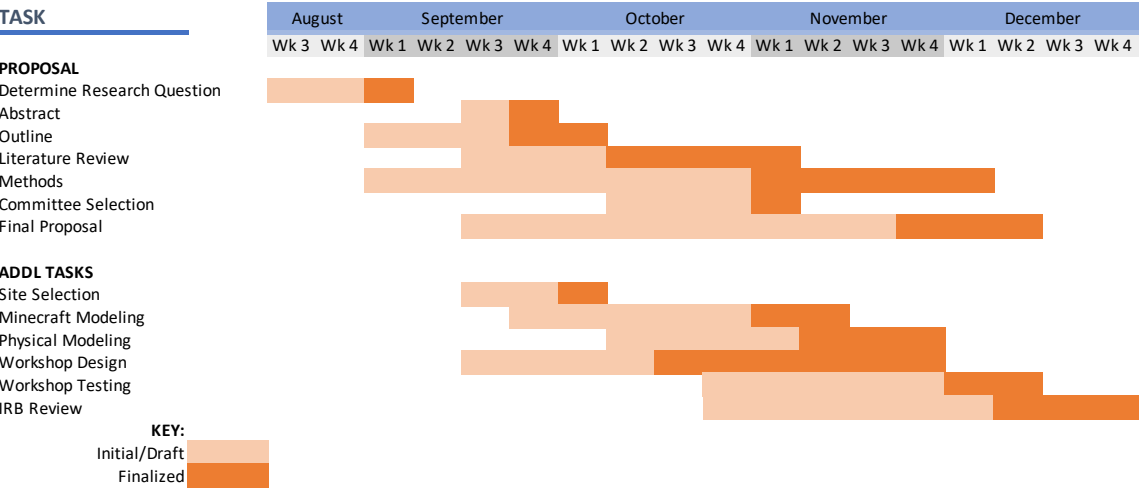
To what degree did the collaborative aspect of the activity make your participation meaningful?

1 – Not At All 2 3 4 5 – Very Much

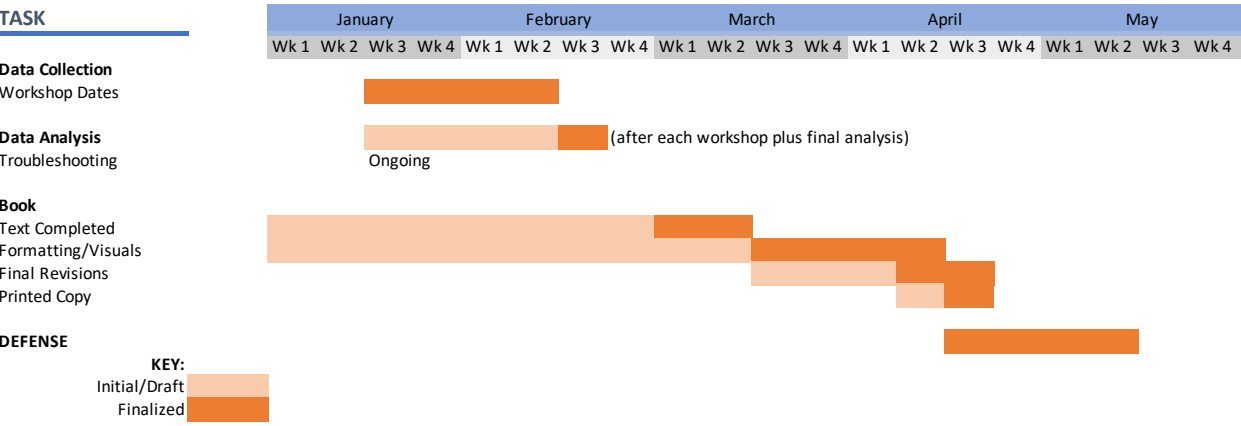
Additional comments

7.3 project timeline

RESEARCH TIMELINE: FALL SEMESTER



RESEARCH TIMELINE: SPRING SEMESTER



7.4

constructing your Minecraft world

This guidebook was originally created in November 2022 as part of LAR705, Master's Project Studio 1. The objective of the studio was to create a comprehensive plan and an individual project for eight neighborhoods east of Troost in Kansas City, MO. Much of the foundational work for my MPR was completed as part of this project. The following pages provide detailed instructions and process photos of the Minecraft template I built for GCHS.

guidebook:

Minecraft in the Historic Eight

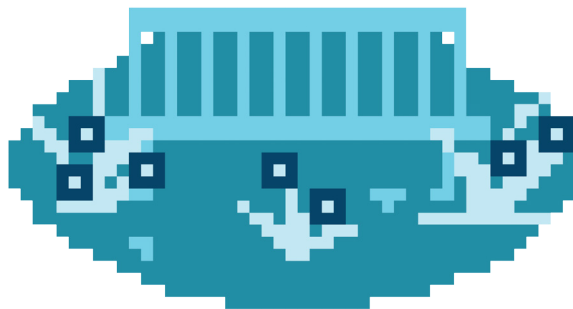


Figure 7.1

256

part 1:

introduction



Figure 7.2

From parks and playgrounds to community gardens and zoos, young people live and play in the spaces designers create. However, they are seldom included in the design process. Though participatory design aims to be inclusive, it is still largely oriented towards adults. Since youth are an underrepresented group in participatory design, it's crucial to find methods of participation that are accessible, meaningful, and even fun to them.

Owing to their tremendous popularity with young people, video games have emerged as a way to overcome these barriers and involve youth in participatory design. The sandbox video game Minecraft, developed by Mojang Studios in 2009, is a popular choice for youth engagement due to its ease of learning, popularity, and possibilities for creative collaboration.

This guidebook is intended to provide a simple guide to using Minecraft to involve young people in the design process. It is aimed at three potential audiences:

1. Designers working on public projects within the Historic Eight neighborhoods;
2. Young people interested in using Minecraft to create designs for locations in their neighborhood;
3. Educators or neighborhood leaders wanting to familiarize students with community involvement and participation in design.

community engagement 257

project goals



All-Ages Collaboration

Encourage participation by youth and collaboration between people of all ages. If young people don't feel welcome to present their ideas, neighborhood leaders risk missing out on their valuable perspective.



Community Engagement

Communication and collaboration between neighborhood residents, community leaders, and design professionals is essential to ensuring the success of a project.



Minecraft Guidebook

Develop a guidebook for holding Minecraft workshops throughout the Historic Eight. Engaging digitally with youth can allow their ideas to be heard for improving vacant lots and beautification.

Figure 7.3

strategies



Recreating
Locations



Community
Workshops

Figure 7.4

process timeline

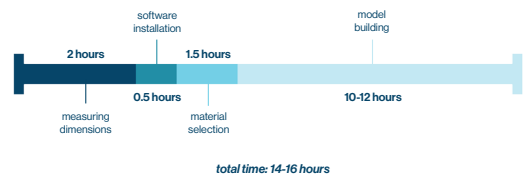


Figure 7.5

strategic plan connections



Figure 7.6. All three of the strategies will require some form of community engagement.

part 2:

preparation



Figure 7.7

This approach to using Minecraft in design involves recreating a real-world location using Minecraft and sharing it with workshop participants. With some careful measurement, you can replicate your chosen location as close as possible to its actual size, essentially creating an interactive 3-D model. Participants can walk around the model freely in the game and use your model as a "canvas" to quickly generate ideas for the site using Minecraft's colorful blocks and features. This guidebook will walk you through the process of recreating a real-world location in Minecraft and sharing it with workshop participants.

Before getting started in Minecraft, it's necessary to carry out some groundwork. Walk around the site if you're able, taking photos of the site and noting potential problems and opportunities. If you are unable to physically travel to the site, Google Street View is a good way to obtain images.

After your site walk, you can begin measuring distances using Google Earth's 3D buildings feature and Measure tool. This helps you ensure your model will feel true to size for players.

steps

1. measure dimensions
2. record dimensions

tools



Google Earth Pro (free)



Adobe Acrobat
or similar pdf editor

Figure 7.8

estimated time needed

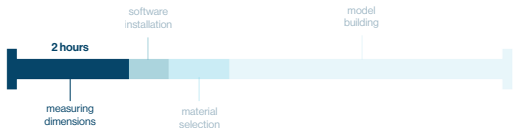


Figure 7.9

site

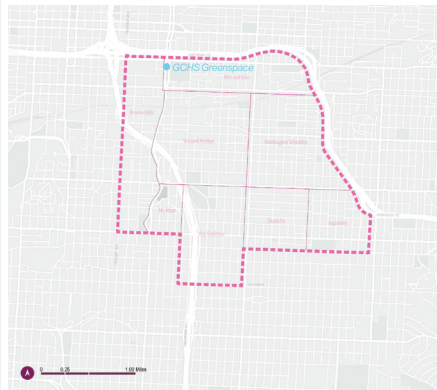


Figure 710. Location of the GCHS Greenspace within the Historic Eight Neighborhoods.

The site we will be using for this guidebook is a greenspace outside of Guadalupe Centers High School (GCHS), located between the Beacon Hills and 18th & Vine neighborhoods. This site, which is the project site for my Master's Project research, was chosen based on insights from the Real-World Learning Coordinator at GCHS. The greenspace is commonly used by students and teachers for learning and recreation.



Figure 711. GCHS Greenspace and surrounding context.

262

community engagement 263

step one: measure dimensions

tool: Google Earth Pro

window

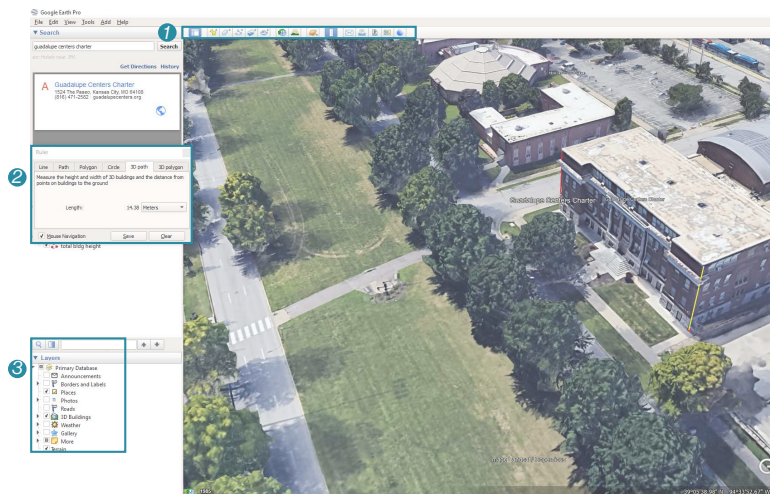


Figure 712.

parameters

1. Use ruler tool to measure distances in meters.
2. Use "3D path" for buildings and "line" for ground distances.
3. Make sure 3D Buildings, Places, and Terrain are set to ON.

264

community engagement 265

step two: record dimensions

sample dimension sheet

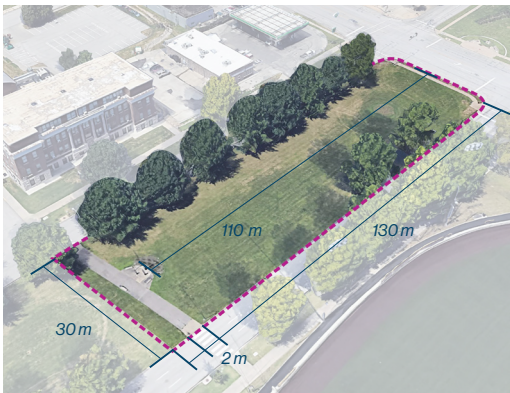


Figure 713. Sample dimension sheet (simplified for readability)

Using your Google Earth screenshot as a base, record the measurements in a pdf editor as you take them in Google Earth. Record dimensions of notable structures (buildings, roads, etc) and how they relate to one another.

tool: pdf editor



TIP: 1 Minecraft block = 1m³

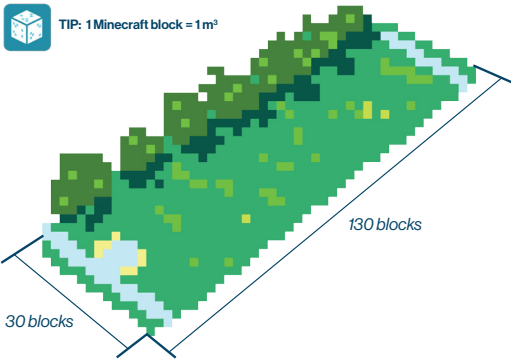


Figure 714

Taking the time to carefully and accurately measure dimensions will ensure that your Minecraft model is as close to scale as possible. This will help it feel more immersive and “real” for players.

part 3:

recreating your site



Figure 715

After you have finished measuring and recording the dimensions of your chosen site, you are ready to begin recreating it in Minecraft.

While it's possible to build large structures by placing blocks individually in Minecraft's Creative Mode, using a modified version of the game ("mod") can make construction much easier and faster. This chapter describes how to install WorldEdit, a mod that allows you to quickly edit your world, and provides a list of some useful commands.

All of the operations described in this chapter were performed on a PC running Windows 10. If you are using a different operating system, the steps to creating your Minecraft model will be slightly different.

steps

1. install software
2. create your Minecraft world
3. build your model

tools



Minecraft Java Edition 1.18



Forge (free)
add-on for Minecraft enabling mods



WorldEdit (free)
modified version of Minecraft that makes construction faster

Figure 716

estimated time needed

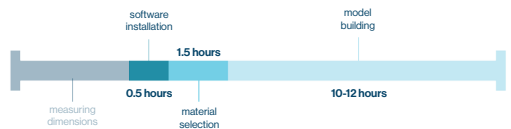


Figure 717

step one: install software

steps

1. Download the plugin Forge from <https://files.minecraftforge.net/net/minecraftforge/forge/>. On the left side of the page, navigate to the version of Minecraft you will be using with the plugin. In this workshop, we will be using **Minecraft Version 1.18.1** to ensure your world will be easier to share with workshop participants later.

Downloading Forge will allow you to enable mods in Minecraft Java Edition.

2. Download the WorldEdit mod from <https://www.curseforge.com/minecraft/mc-mods/worldedit/files>. Once again, make sure to download the mod for the correct version of Minecraft (1.18.1).

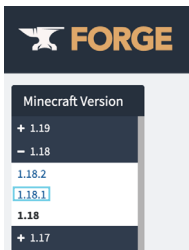


Figure 718

File Details

WorldEdit 7.2.8 (Forge/Fabric for MC 1.18.1)						
Filename	Uploaded by	Uploaded	Game Version	Size	Downloads	MD5
worldedit-mod-7.2.8.jar	me4502	Dec 11, 2021	1.18.1 - 1.18.2	5.23 MB	417,879	910673a00713a4830905c423c4d3d3
Supported Modloader VersionsSupported Java VersionsSupported Minecraft 1.18 Versions						
Forge	Fabric	Java 18	Java 17	1.18.1		

Figure 719

4. Follow the instructions on the WorldEdit download page to enable Forge and WorldEdit on your copy of Minecraft.

tools: Minecraft Java Edition 1.18, Forge, WorldEdit

5. Once you've enabled both Forge and WorldEdit, you are ready to create your world in Minecraft. Below is a table containing some of the most useful WorldEdit commands for recreating a real-world location.

Command	Purpose
//wand	Used for selecting a region. The player inputs 2 coordinates that act as the start and end of the selection.
//expand	Used to expand a selection.
//replace	Replaces an existing material with a material specified by the user. This allows you to quickly change a large area to a specific material at once.
//move	Allows the user to move all objects within a selected area.
//flora	Quickly generates flowers and grasses at a density specified by the user.
//descl	Deselects a previously selected area.
//green	Adds grass to nearby dirt blocks.
//walls	Builds walls around the outline of a selected area.

Table 1. Useful commands in the WorldEdit mod.

step two: create your Minecraft world

parameters

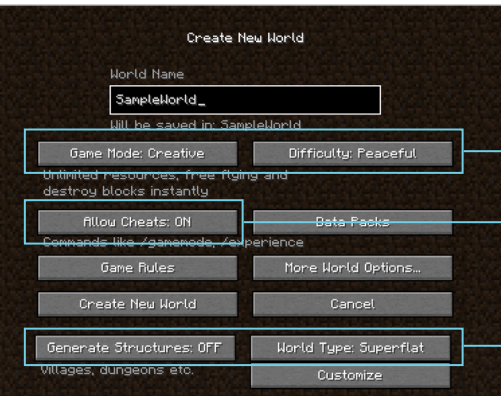


Figure 720.

Using these parameters ensures you will be able to quickly replicate the dimensions you measured using Google Earth in your Minecraft world.



TIP: The WorldEdit mod works **ONLY** in Minecraft Java Edition, **NOT** Bedrock or Educational Editions.

Allows player to fly and instantly place/destroy blocks; prevents monsters from spawning

Must be set to ON to enable WorldEdit commands

Creates a flat world (terrain may be modified in WorldEdit); prevents in-game structures from generating

step three: build your model

steps

1. Locate (0,0) on coordinate grid.
2. Outline first building footprint using the dimensions you gathered in Google Earth Pro; create corner of first building at (0,0).
3. Determine other building footprints using coordinates in Minecraft/dimensions in Google Earth, remembering that one Minecraft block=1 cubic meter.
4. Locate roadways and create them in your Minecraft world using the //replace tool in WorldEdit.



Figure 7.21. Progress shot of building facades in Minecraft (GCHS Greenspace highlighted in time).

tools: Minecraft Java Edition, WorldEdit



Figure 7.22. Using photos of the site, either taken in person or Google Streetview, is a good way to ensure you are capturing the "feel" of the site.

274

community engagement 275



Figure 7.23. Once you have constructed the building facades, you can save time by using a semi-transparent block such as Red Stained Glass to show the form of the buildings.



Figure 7.24. Add flowers and grass to create some texture and variation in your Minecraft model.

steps

5. Using the //walls tool, create building walls using a Minecraft material that best approximates the appearance of the real-world material (texture, color, etc.). The next pages suggest potential materials.
6. Once you've finished the building facade, use a semi-transparent block such as Red Stained Glass to give you an idea of the size and orientation of the buildings around your site.
7. Place trees. If necessary, add more leaves to create a fuller appearance.



Figure 7.25. Project site and its recreation in Minecraft.

276

community engagement 277

material selection










<i>real-world material</i>		<i>minecraft equivalent</i>		<i>real-world material</i>		<i>minecraft equivalent</i>
limestone	→		End Stone Bricks	glass	→	 White Stained Glass Pane
brick	→		Bricks	deciduous tree	→	 Oak Tree
concrete sidewalks	→		Cut Sandstone	building massing	→	 Red Stained Glass
roadways	→		Light Gray Concrete	doors	→	 Iron Door
parking areas, crosswalks	→		White Concrete			

Figure 7.26.

278

community engagement 279

part 4: collaboration

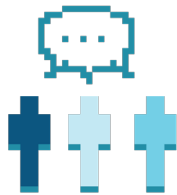


Figure 7.27

Now that you've built your model, it's time to prepare it to share with workshop participants. The easiest way to share your world and invite participants to collaborate is through Minecraft Educational Edition. Since Forge and WorldEdit use Java, we have been using Minecraft Java Edition up to this point, but Educational Edition does not recognize worlds created in Java. Thus, you will need to convert your world from Java Edition to Bedrock Edition. The conversion process is covered in the first part of this chapter.

When your model is accessible in Minecraft Educational Edition, you will be able to quickly and easily share it with participants using a link. This chapter covers how to share your model and provides potential locations and structures for Minecraft workshops within the Historic Eight neighborhoods.

280

steps

1. *convert your model*
2. *plan your workshop*
3. *host your workshop*

tools

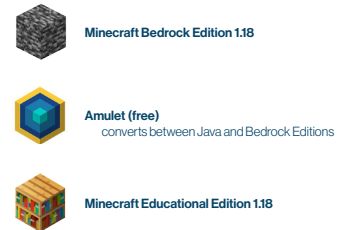


Figure 7.28



community engagement 281

step one: convert your model

overview

Minecraft Java Edition is currently the best way to enable WorldEdit. Unfortunately, Java Edition worlds cannot be imported into Educational Edition, which is the edition of Minecraft we will use for our workshops. Instead, the Java world must be converted into Bedrock Edition using a third-party converter (in this case, Amulet). From Bedrock Edition, it's possible to export your world into a format compatible with Educational Edition.

steps

1. Download Amulet, which enables you to convert worlds between different editions of Minecraft, at <https://www.amuletmc.com/>.



Figure 7.29

Use this option to open your Java world.

2. Open Bedrock Edition and create a new world. This will be your "output world" - when your world is converted from Java, it will live here. Ensure that your new Bedrock world is in Creative Mode.

3. With your Java world open in Amulet, select the "Convert" tab in the top left corner of the page.

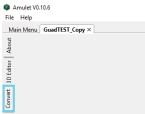


Figure 7.30

4. Click "Select Output World" and choose the Bedrock world you created, then click "Convert." This will overwrite your Bedrock world with the world you built in Java.

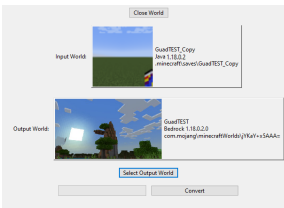


Figure 7.31

steps

5. Open your world in Bedrock. It should now contain the model you built in Java. From the "Edit" tab in your Bedrock world, scroll to the bottom of the page to find the "Export World" option. Export your Bedrock world to a .moworld file, which allows the file to be read by Educational Edition (don't worry about the game settings for now)

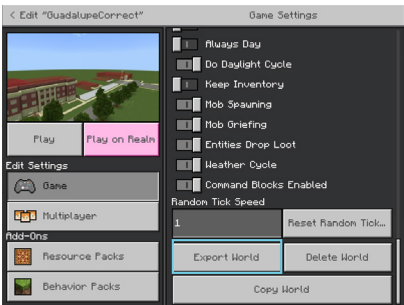


Figure 7.32

6. Open Minecraft Educational Edition and select "Play" on the home screen. From there, locate your .moworld file and import it into Educational Edition. You will get a confirmation message when the model is finished importing.

Your world is now ready to share!

step two: plan your workshop

Potential Sites for Minecraft Workshops

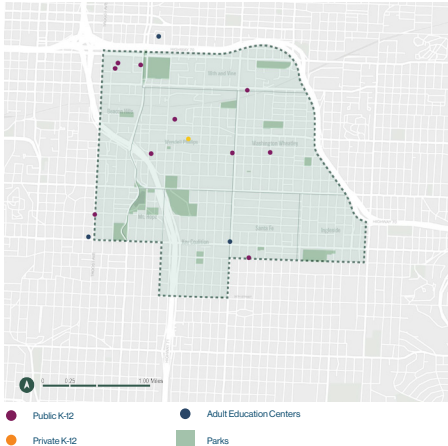


Figure 7.33

Ideal sites for hosting your Minecraft workshop include K-12 schools and sites for all-ages collaboration. These could be libraries, literacy centers, community centers, and any other sites for all-ages learning with access to technology.

Potential sites to target in your workshops include parks and vacant lots.

7.4

GCHS presentation

The following presentation was given to students at GCHS. Both the traditional and Minecraft group received the same presentation at the same time.

GCHS Design Workshop

Abigail Danner | Kansas State University Dept. of Landscape
Architecture | 02/03/2023

Welcome!

Overview

- Introduction/Informed Consent (5 mins)
- Pre-Activity Surveys (10 mins)
- Virtual Site Walk and Analysis (20 mins)
- Group Design Activity (65 mins)
- Post-Activity Surveys (10 mins)
- Debriefing (2 mins)

Introduction/Informed Consent

5 mins

Pre-Activity Survey

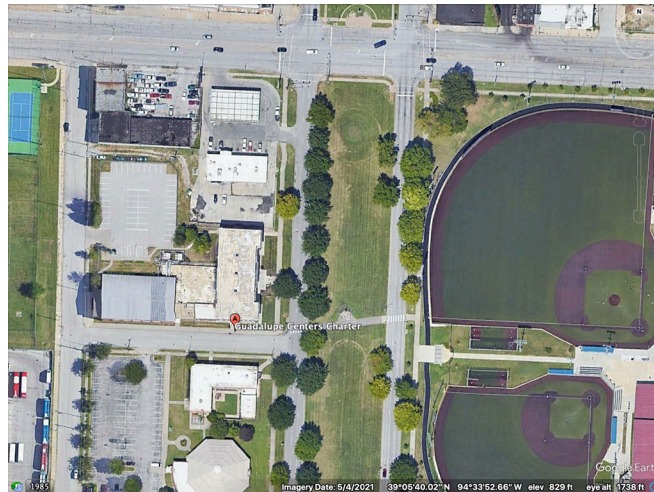
10 mins

Virtual Site Walk

20 mins



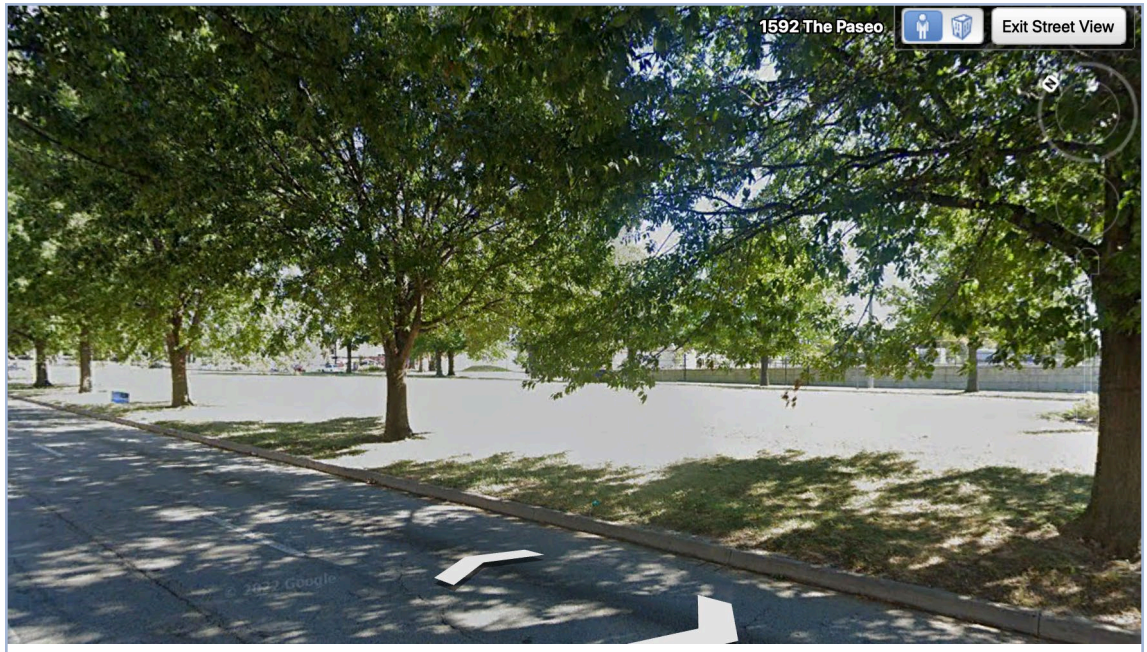
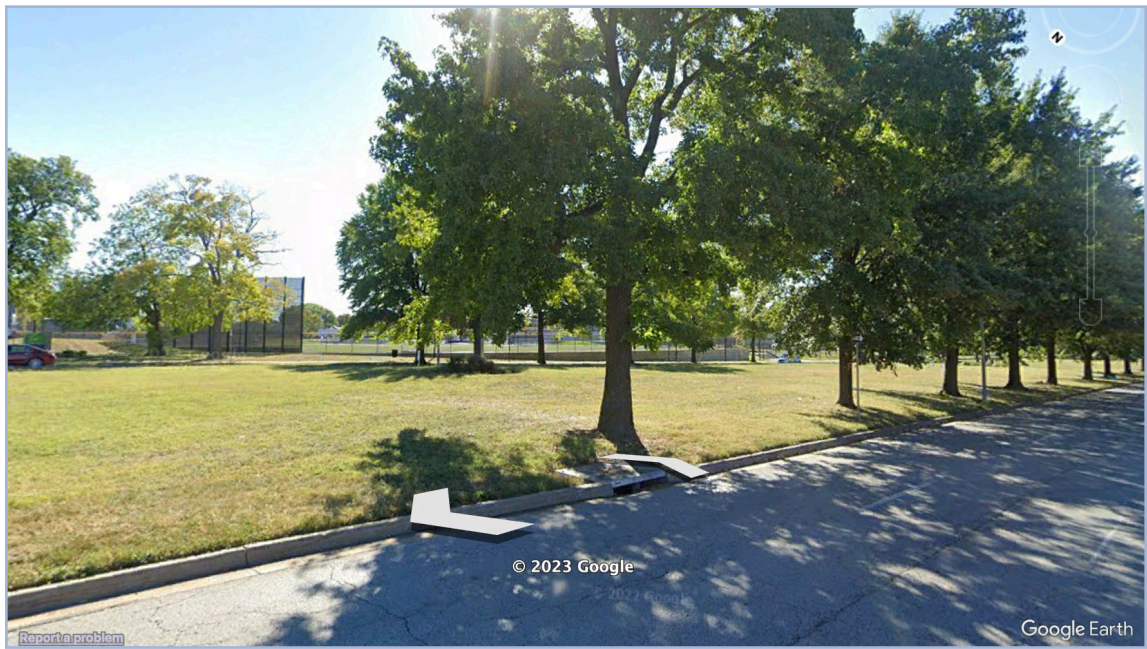
Site Overview



Questions Designers Ask

- Identify areas of sun or shade.
- Are any areas of the site prone to flooding?
- Where are areas of loud noise? How can we buffer that noise?
- How do people move through the site? Where do they tend to enter and leave?
- What types of activities could the space support?







Potential Programs

- Outdoor classroom
- Sports field
- Playground/Park
- Consider:
 - What are the school's needs?
 - What is the neighborhood/community's needs?

Design Activity

65 mins

Post-Activity Survey

10 mins

Debriefing

