

Playing with Fire:

The Value of Play in a Climate Crisis

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“The most widely shared picture of a sustainable world is one of tight and probably centralized control, low material standard of living, and no fun... Whatever the reason, hardly anyone envisions a sustainable world as one that would be wonderful to live in.”

–Donella Meadows, 1994

Introduction

The COVID-19 pandemic we are facing now is an example of a global crisis that requires governments, communities, and individuals to listen to advice from scientists because we are able to see the undeniable, tragic effects of inaction. It is affecting everyone, albeit disproportionately, and average people have a responsibility to change their behavior to help the most vulnerable. In these ways, this pandemic is very similar to the climate crisis. However, while our response to COVID-19 has entailed social distancing practices that keep us away from our communities, we do not have to view our response to climate change as a sacrifice. As designers, we can use the fact that we are nearing the end of many finite resources as an opportunity to think differently. We can decide what is important to create for the next generation of children who will inevitably live in a very different world than we do because of our inaction towards climate change.

We need global action to mitigate climate change, but designers have the power to collaborate with other disciplines to foster change. One of the many ways we can prepare the next generation is to instill in them an appreciation for nature and a knowledge of their local environments. Even in a crisis, kids will not stop playing and having fun, so we can find ways to integrate environmental knowledge into their everyday experiences as children. *Playing with Fire* is a proposal for a playground space in the Nichols Arboretum that fosters exploration and connection to the natural environment for children through play. I fabricated the proposal in the form of a scale model, a video, and a log swing; they act as a proposal for a playground norm that can be adapted to various sites. This system design is site-specific but can be taken and adapted to other sites. It contributes to the field of nature play, which is an accessible form of sustainable design; psychological and environmental health studies further support a focus on nature play over standard plastic playgrounds. This integration of environmental science, sociology, psychology, and design acknowledges the need for interdisciplinary work in a time when it is crucial for children to feel connected to nature.

Contextual Discussion

The idea of approaching play creatively led me to research the psychology of play and how design can cater to the developmental needs of children. There is a plethora of research to support my initial hunch that kids who spend more time playing in nature are much more likely to demonstrate pro-environmental behavior as adults. A seminal psychological research paper argues that “environmental sensitivity,” quality time spent outdoors with close family and friends, is a major “entry-level variable” to behavior change.¹ As an “entry-level variable,” it is crucial alongside formal education, although it is not given as much focus in most curricula. In their *American Psychologist* article, Susan Clayton et al. agree that connection to nature provides many benefits to individuals, including tools for resilience against climate change.² These arguments for outdoor play as a way to foster environmental stewardship add to the other known benefits of physical and mental health that come from spending time in nature.

¹ Hungerford, Harold R., and Trudi L. Volk. “Changing Learner Behavior through Environmental Education.” *Journal of Environmental Education*, 1990.

² Clayton, Susan. “Expanding the Role for Psychology in Addressing Environmental Challenges.” *American Psychologist* 71, no. 3 (2015).

³ Papanek, Victor. *Design for the Real World*. Second Edition. Pantheon Books, 1971.

⁴ *Abstract: The Art of Design. Season 2 Episode 4: Cas Holman: Design for Play*. Directed by Billy Sorrentino and Sarina Roma. Netflix, 2019.

Right: Fig. 1, Cas Holman’s *Rigamajig* building toy.

Designers can take this research and apply it to systems, products, or environments that affect kids’ everyday lives. In *Design for the Real World*, Victor Papanek discusses the danger of advertising and industrial design at a time when we know that we have limited resources to make things people do not need.³ He posits that the designers can apply the creative problem-solving skills taught in art and design schools to focus on bettering society instead of on adding to the mass consumer market that is contributing to climate change.

In toy designer Cas Holman’s episode of Netflix’s *Abstract: The Art of Design*, Holman argues that kids do not need more plastic toys with bright colors and faces loudly vying for their attention.⁴ Her toy *Rigamajig* shows that when we give kids toys made from materials that look and feel similar to tools that adults would use, they approach their play methodically and creatively (Fig. 1). Toys are great ways to influence children’s education and behavior because designs that create durable behavior change require repeated usage over a significant period of time. However, in terms of environmental sustainability, playgrounds have the opportunity to be less wasteful and contribute less to a highly detrimental consumer market.



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A Google Image search of “playground” leads to a collection of plastic and steel structures with bright colors that include slides, swings, and monkey bars (Fig. 2). These playgrounds, known as “fixed equipment playgrounds,” are mainly prevalent in the United States, possibly because they do not cause much worry about safety and liability, and they require little installation and maintenance effort. In contrast, “adventure playground” is a general term given to the types of playgrounds which are more commonly found in the rest of the world but which are starting to appear in the U.S. as well (Fig. 3). Adventure playgrounds are generally characterized by the upcycled materials used to construct them, including tires, metal, and wood pieces. One of the major defining features is the level of controlled risk presented in these playgrounds.

Left: Fig. 2, Google search for “playground.”

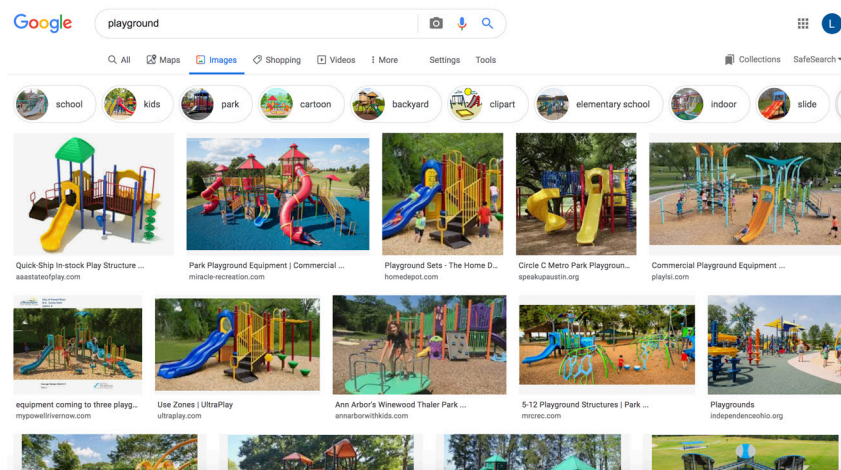
Right Top: Fig. 3, example of adventure playground in St. Kilda.

Right Bottom: Fig. 4, example of modular playground.

⁵ Shrier, Carrie. “The Value of Open-Ended Play.” MSU Extension. December 2, 2016. https://www.canr.msu.edu/news/the_value_of_open_ended_play.

⁶ Leichter-Saxby, Morgan and Wood, Jill. “Comparing Injury Rates on a Fixed Equipment Playground and an Adventure Playground.” (2018).

Open play, as opposed to adult-organized activities like sports, is important because kids tend to be more creative when there is less structure.⁵ In the current technological climate, parents and kids must actively seek boredom and open play because it is rare to be in a situation without a device that can stimulate the brain. Although the idea of risk may worry parents, in Morgan Leichter-Saxby and Jill Wood’s study of fixed equipment versus adventure playgrounds, they found that more injuries tend to occur on fixed equipment playgrounds.⁶ When fixed equipment playgrounds have very fixed instructions (i.e. slide down the slide, swing on the swings), kids get bored and search for new ways to use the equipment (i.e. climbing up the slide, swinging from the top bar of the swing set), which can be dangerous. When adventure playgrounds present more obvious risk, kids may approach play more carefully, thoughtfully, and creatively. Additionally, a current trend in modular playgrounds incorporates building, teamwork, and imagination into play (Fig. 4).



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Some projects have co-benefits that reach far beyond play. A park that I saw in Gladsaxe, Denmark shows how a climate change project could be marketed to politicians as community-building and urban regeneration (Fig. 5). Gladsaxe was having climate change-enhanced flooding issues, and it avoided the cost of widening all the underground pipes by integrating play structures into water retention basins. However, most of the structures rely on finite materials, such as steel and metal. I decided that in the context of my project, “sustainability” means maintaining a low carbon footprint and using a design process that can be sustained into the future when finite materials will be ever more scarce. There are many examples of play structures that meet this standard of sustainability; one in Parque Ibirapuera in Brazil exemplifies the use of natural materials by elevating a fallen tree on wooden stakes and attaching nets between the branches (Fig. 6). There is no instruction, but it invites climbing and open play.

Left Top: Fig. 5, a playground piece from flooding adaptation playground in Gladsaxe, Denmark.

Right: Fig. 6, a play structure in Parque Ibirapuera in Brazil.

Left Bottom: Fig. 7, a photo from Lisa Molomot’s *School’s Out: Lessons from a Forest Playground*.

⁷ Moore, Robin C. *Nature Play and Learning Places: Creating and Managing Places Where Children Engage with Nature*. 1.6 ed. Raleigh, NC: National Wildlife Federation and Natural Learning Initiative, 2014.

⁸ *School’s Out: Lessons from a Forest Kindergarten*. Directed by Lisa Molomot. 2013.

Through my research about adventure playgrounds and eco-friendly design, I stumbled upon the field of nature play. Nature play essentially refers to the benefits of the aforementioned research about how playgrounds made from natural materials support a combination of open play and environmental sustainability.⁷ Nature play can manifest itself in backyards or parks, but it is oftentimes connected to schools. In *School’s Out: Lessons from a Forest Kindergarten*, director Lisa Molomot explores the lives of kindergarteners in Switzerland who spend their entire school day outdoors.⁸ They engage in open play, interact with animals, and navigate many instances of controlled risk (Fig. 7). Anecdotally, this environment led the kids to develop a strong sense of agency, among many other healthy social skills.



Methodology

An important part of my process was firsthand observation and talking to design, environmental, and childcare experts connected to the University of Michigan. In my conversations with experts, professors, and teachers who were interested in nature play, I was glad to see that they all strongly believed in the necessity of interdisciplinary work (in this case, psychology, sociology, environmental science, and art/design) to combat the climate crisis. Early on when I was still unsure about the direction my project was going to take, I talked to my design professors who do not necessarily do this kind of work but whose advice I valued. Besides my professors and graduate student who directly advised this project (Bruce Tharp, Andy Kirshner, and Gowri Balasubramaniam), I also talked to Sophia Brueckner, Franc Nunoo-Quarcoo, Joe Trumpey, and Nick Tobier. When I met Roland Graf, a professor whose design research centers around play, he encouraged my nature play direction since the ideas I was proposing reminded him of the playgrounds he saw more commonly in Europe where he grew up. When I decided to make the Nichols Arboretum my playground setting, I met with Lee Bravender, who runs a children's garden in the Matthai Botanical Gardens. I also met with the director of the Arboretum and landscape architecture professor in the School for Environment and Sustainability, Bob Grese, who lent me books containing research on the field of nature play. He also connected me to Christian Boyer, a teacher at the Towsley Children's Center in Ann Arbor, who runs a classroom of 4 and 5-year-olds who spend many of their school days learning outside in the Nichols Arboretum.

With my new connection to Christian, another major piece of my methodology became ethnographic research through playing with the Towsley children. The group of preschoolers who experience the Arboretum outdoor classroom is called the Maple Classroom. During our first meeting, I met with the center director, Beth Blanchard, and the Maple teachers: Christian, Kacie, and Kamaria. We discussed how they integrate nature play into their classroom and the psychological benefits they see, from imagination and creativity to enhanced social skills. They were excited about my project and invited me to spend time with the kids in the Arboretum. I met the Maple classroom at Towsley at 9AM on a 25-degree day, and we walked to the Arboretum and played outside until almost noon. I had not interacted with kids that young for a long time, and I had forgotten how innately creative they are. Throughout the three hours outside, I was involved in

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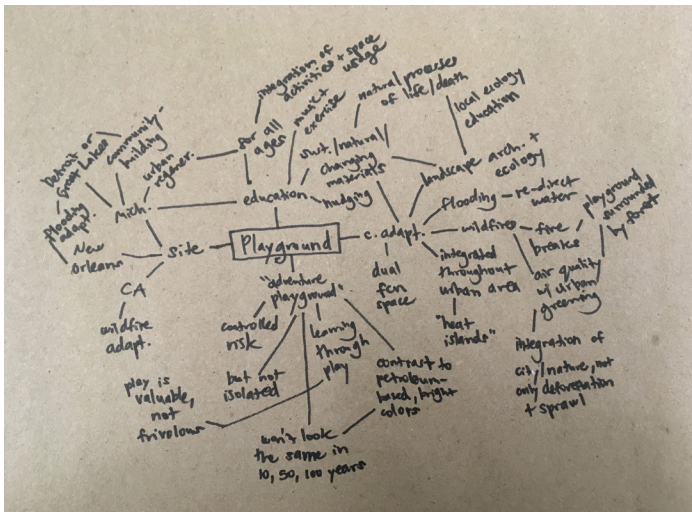
Above: Fig. 8, my photos of kids from the Towsley Children's Center in their nature play classroom in the Nichols Arboretum.

approximately fifteen different imaginative scenarios and games. I was a guest to a dinner party in a stick-and-rock fort where Caroline and Anna served me snow pies, and a minute later I was helping Enzo and Hugo steer their fallen tree airplane (Fig. 8). I observed that the kids exemplified all the psychological research I had found that argued that kids are more creative without instruction, whether by adults or by physical space; in the Maple classroom, the adults played along with the games that the kids initiated. There were many instances where the kids had to solve conflicts amongst themselves or learned how to interact with their surroundings by trying, failing, and trying something new. The outdoor classroom allowed them to directly observe and draw animal tracks, which they proudly showed me. And they experienced this full day of learning by only interacting with natural materials that are not harmful to the environment.

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An integral part of the design process is iteration and revision. For this project that relies so heavily on research, I integrated the iteration process within the research process. I used 2D and 3D sketches as a way to efficiently explain my ideas to the experts I consulted. Having those physical drawings or models to refer to was necessary because they often reminded the experts of something they had seen, which facilitated deeper discussions (Fig. 9). After these conversations, I reflected, re-sketched, or re-arranged. While I usually plan as much as possible before I start making, I brought my first drafts of ideas to people before I felt completely comfortable with them because I knew that the more time I had to iterate, the better.

Below: Fig. 9, some of my ideation sketches and my studio floor filled with found branches for the scale model.



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Above: Fig. 10, a photo and a map of the Nichols Arboretum, and an aerial photo of my playground proposal site, which is marked by a white outline.

I went through the process of designing for a local site to emphasize the importance of catering to the needs of a specific place. This approach is different than how a community would choose a fixed equipment playground that requires little to no installation, maintenance, or site-specificity. I used the Nichols Arboretum that is connected to the University of Michigan to conduct this process because it is accessible to me in terms of distance and resources available, but the overall playground design is adaptable to other areas (Fig. 10). A localized design approach is especially important for catering to the environmental needs of a specific site. The rain garden and its accompanying sign in the scale model exemplify an aspect of the park that can only be designed site-specifically; rain gardens beautify an area while also controlling flooding, so local flora and fauna need to be considered.

Creative Work

Due to the COVID-19 pandemic, the final exhibition of my work was changed to an online gallery, similar to how the work will live afterwards on my personal design website. After reading my artists' statement in the online exhibition, there is a video showcasing the Arboretum site, my scale model, and the log swing. I also added some pieces of research into the video, including a few quotations and one-sentence summaries of my psychology/environmental/playground research, along with photos of the Towsley kids in the Arboretum.

Moving through the online gallery, the viewer sees photos of my scale model (Fig. 11, Fig. 12). Layered, laser cut cardboard represents the topography of the Arboretum site; I derived the contour lines from a topographic map using ArcGIS with the help of a UofM librarian. Green, blue, and brown paper from Hollander's in Ann Arbor stands in for grass, water, and soil; the paper is handmade with banana and mango leaves, keeping with the theme of natural materials. Placed throughout the topography are pieces of the playground: a log swing, tree tunnel, observation log, water xylophone, stick pile, fallen trees and logs, climbing nets, stump seating, stump and rock jumping, balance board, and a rain garden. Each piece represents a different aspect of play, and most of the pieces have an adjacent sign that prompts optional further engagement by asking questions such as "Do you climb more like a chipmunk or a frog?" or by explaining how the water xylophone can mimic the water cycle.

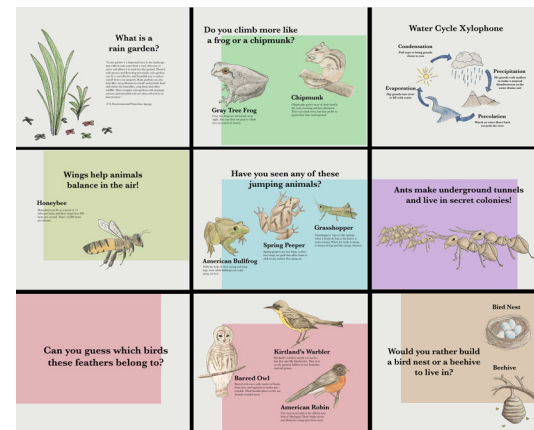
I used the opportunity of designing the scale model to show that I could conduct an eco-friendly design process in addition to the eco-friendly playground that the model represents. Since iteration and revision are so important, using unsustainable materials like foam and plastic can compile into a very wasteful process. I used found sticks and rocks, organic kitchen twine, and recycled cardboard in my scale model. For initial iterations in the rapid prototyping stage, I used recycled chipboard, paper, and sticks. These real pieces of nature add a whimsical element to the model, even though viewers will know that the found sticks and rocks do not precisely match the shape and size of the exact trees and branches found in the Arboretum. The base of the model is also abstracted by layering laser cut cardboard, but I made it topographically accurate by translating GIS data of the Arboretum into contour lines. After the exhibition, I can break down the entire model by recycling, composting, and returning the found sticks and rocks to nature.

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Above: Fig. 11, scale model of playground.

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Above: Fig. 12, close-ups of scale model. Read more about each structure at lianasmale.com.

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As an additional part of my project (along with the precedence research) to exemplify my idea beyond the conceptual model, I created a full-size log swing. I chose the log swing because it was the most logistically viable for me to make by myself while following the Arboretum's regulations; additionally, it seemed like it would be a good addition to Towsley's existing nature play area in the Arboretum. However, to be cautious about COVID-19, I installed the swing in my backyard (Fig. 13). My professor's friend, Kendall Babl, helped me choose and split the log. I then drilled 3/4" holes in the four corners in the woodshop and used figure eight knots to secure the 1/2" manila rope. Kendall helped me hang it on the tree branch, and my housemates and I played with it and took photographs.

Below: Fig. 13, log swing I fabricated and installed in my backyard because due to COVID-19, I could not give it to the Towsley children.



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Conclusion

With this project, I wanted to conduct interdisciplinary research and apply insights from it throughout my design process. The main reason I chose to attend the University of Michigan was to be able to pursue multiple interests, which I have achieved with my dual degree in art/design and environmental science. The process of working on this project for eight months has allowed time for introspection of connecting my personal life to my fields of study. As a kid, I loved nature. If I told you that I spent my childhood exploring lush forests and playing with animals, you would not think that I grew up in one of the largest and most unsustainable cities in the world. My imagination would turn a cluster of trees on UCLA's campus into a jungle, and the rare rainy days always prompted me to run outside to watch all the snails and worms come out of hiding. I was lucky to have spent so much time in my little pockets of nature, and I did not think that preferring worms to dolls was at all unusual. As a young teenager, I began to realize the toll that drought was taking on my city. As a high school student, I was confused to learn that many governments, corporations, and individuals placed the natural environment at the bottoms of their lists of valued assets. In college, I have transformed my love for nature into a desire to take action and the beginnings of a career.

Climate change is a unique issue in that it is affecting and will continue to affect everyone, albeit disproportionately. This disproportionality means that the crisis encompasses many social issues and questions of human rights. As designers, we have to give the environment the attention that living in a climate crisis warrants. I want to help show that nature playgrounds are supported by scientific research and that the low-cost implementation does not mean that they should only be for communities that cannot afford a plastic and steel structure. On the contrary, the affordability aspect makes it a very accessible form of sustainable design, and the psychological benefits further justify their implementation. This project can be a contribution to the movement of raising a generation of children who will need to understand and feel connected to nature in order to adapt to the damage we have done to the environment. Their world will be different than ours, but it does not have to be worse.

Left: Fig. 14, redwood trees and a river in my elementary school: UCLA Lab School in Los Angeles, CA.

Right: Fig. 15, me, my younger sister, and my father in a tree in my grandmother's backyard.

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