BRIDGING DIGITAL UX DESIGN METHODICS AND NON-DIGITAL

USER NEEDS FOR A BETTER URBAN FISHING EXPERIENCE

by

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## DEDICATION

To my dearest Mathilda, education is the one thing that can't be taken from you once you have it. Seize it, and you'll always have what you need wherever life takes you.

To my wife, Jennifer, you've kept the home fire burning while my studies had me burning the candle at both ends. For twenty-six years, you've accepted that restless unnamed force that drives me, and for that, I am eternally grateful.

You are the most important people in my life. You fuel a flame, a distant point on the horizon, which marks my true North. You keep me focused and determined as I try to improve myself every day.

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**ABSTRACT**

This study investigates the impact of digital design methodics on non-digital fishing experience user problems in an urban public park. Data on angler needs and urban park features were collected with primary research and secondary research methods over two years. As prescribed by digital user experience design practices, convergent and divergent thinking processes were used to analyze and identify design opportunities in public parks. The British Design Council's four-phase Double Diamond framework for design thinking was used to encourage innovation, discover insights, define user needs, develop solutions, and deliver testable prototypes. IDEO's Human-centered Design Methods Kit was used to promote user empathy. Lean UX was applied to streamline the ideation process. Material culture and placemaking strategies were applied to enhance human-to-prototype connections. Communication design tactics were applied to facilitate user navigation, promote endearment, and encourage learning. Generative ideation methods were used to explore concepts informed by digital experience design methods across multiple prototyping formats.

The resulting medium-fidelity prototype resolved core Urban Angler needs related to stewardship, safety, kinship, and success. It received a 91% user rating for usability and an 89% user rating for delightfulness, demonstrating that digital user experience design methodics can successfully deliver a non-digital park experience.

## I. INTRODUCTION

Designers need to make things that satisfy people's needs, in terms of function, in

terms of being understandable and usable, and in terms of their ability to deliver

emotional satisfaction, pride, and delight.

—Don Norman, *The Design of Everyday Things*

Digital user experiences define how we engage with the immaterial world of

the internet. However, they can also shape our relationship with the tangible experiences

of outdoor recreation. Activities such as biking, hiking, or fishing can now be enhanced

by digital apps on our electronic mobile devices. Runs are mapped to push runners

farther, fishing trips are calculated to help anglers catch more, and personal bests are

tracked to maximize users' sense of accomplishment.

Over the last fifteen years, an entire user experience (UX) design industry has

grown alongside a rapid rise in personal digital technology. Enjoyable usability, or

the positive quality of an interaction with a design, has become the essential factor in

bonding users to their digital companions. As UX designers seek to improve outdoor

experiences through human-to-machine interactions, tangible experiences are becoming

less non-digital. Thus, how well users interact with the real outdoors is not only

measured by the sweat on their brow or the bounty they bring home; it also depends

on the delightfulness of their app's user experience (Norman 2013, 54).

Alongside the rise in demand for apps in recent years is the equally dramatic rise

in interest for outdoor adventures. Participation in non-digital activities such as fishing

has exhibited a thirteen-year upward trend since 2008, and park design has paralleled the

movement by offering more engaging activities (RBFF 2019, 1; Jones and Sutton 2019).

Imagine non-digital outdoor experiences as fine-tuned as the apps designed to track them. Several existing design methods can be used to address and improve user-focused design problems in tangible environments. However, digital user experience design's intimacy with human interactivity offers a unique opportunity for discovery to address the user challenges in outdoor urban park experiences. Of course, fundamental questions would arise and must be answered during such an application: What is the nature of an urban park? Whom does it serve? How is it used? Can digital experience design improve park usability in the absence of a digital experience?

### The Value of Urban Park Experiences

Over the last 30 years, the findings in multiple studies have demonstrated that good tangible experience design and exposure to more natural environments benefit communities. These qualities make our neighborhoods more attractive places to live. They also provide measurable economic and environmental benefits that positively impact physical and psychological health within our communities (Sherer 2016, 23).

In 2005, a landmark study conducted by the California State Parks presented data showing outdoor recreation as a critical factor in reducing preventable chronic illness within urban populations (CSP 2005, 9). The data also showed a decline in depression and stress-related mental illness when correlated with physical activity (CSP 2005, 10).

A 2016 study by the Trust for Public Land found that home values in California's urban areas were estimated to rise by as much as 1.5% when located within 500 feet of a public park (Sherer 2016, 16). The study also found that parks improve the environment as trees and their nearby soil absorb byproducts of human activity that would otherwise pollute waterways, such as nitrogen, potassium, phosphorous (Sherer 2016, 19).

Neighbors who shared common green spaces were also shown to enjoy stronger social ties than their counterparts who shared common concrete-covered spaces; shared green spaces promoted "co-mingling," by fostering tolerance and caring which reduced polarization and established common ground (Woltz 2016, 246).

The 2005 California State Parks study also found that the citizens of Los Angeles listed urban parks and recreational facility improvements as "absolutely critical" to "restoring their community" after riots ravaged their neighborhoods in 1992 (CSP 2005, 23). The report noted that 80% of the state's mayors believed that urban recreational parks and programs were influencing factors in reducing crime and juvenile delinquency in their communities (CSP 2005, 22). Plus, the 2016 study showed that physical play was proved in the research as a critical component in improving a child's social success.

With knowledge and insights gained from three-decades of studies, more and more communities throughout the U.S. and abroad are committing vast resources to provide better and more expansive urban park experiences.

## Community-centered Experience of Urban Park Design

### Early Urban Park Design in the U.S.

Historical data suggests that today's urban park experience design can be traced back to 1857 when Frederick Law Olmsted presented his plans for New York's Central Park, birthing the American Urban Park movement (Freitas 2014). As a believer in the "restorative powers of the landscape for ordinary people," Olmsted formulated principles for planning large-scale natural spaces to improve how they served cities and their communities (Freitas 2014). Like urban park design in London during the 1800s, Olmsted's approach aimed to alleviate social issues by applying specific Victorian

ideals: community parks should remain municipally funded natural spaces free from development; public parks should be free from industry, agriculture, or commerce; and, parks should reflect inclusivity, serving everyone regardless of social status (Freitas 2014; Barker et al. 2019, 2457).

*Contemporary Urban Experience Design Methods*

Olmsted's approach and London's Victorian ideals democratized urban space planning; an idea still promoted by contemporary American public space design (Freitas 2014). For instance, *placemaking* is a multi-disciplinary process that encourages meaningful connections between people and underutilized public spaces in urban areas. (Barker et al. 2019, 2457). *Material culture* is a cross-disciplinary social science that studies the meaning of objects in society and has been used by designers to shape culturally relevant human experiences in urban places (Freitas 2014; Berger 2014, 16). *Tactical Urbanism*, a more recent public space design method, has been used to test small-scale temporary public space improvements to promote gatherings while staging opportunities for more substantial future investment (Lydon 2012, 1).

*Public Parks are a Format for Group Experiences*

Park planners seem to define the *urban park* as a shared collection of broadly related activities that cater to group events rather than individual experiences. For instance, in 2012, winners of a design competition to revitalize the National Mall in Washington D.C. were announced. The selections exhibited vast gathering spaces for hosting national-scale events that could accommodate thousands of visitors at one time (Holmes 2012). The new park design featured an amphitheater, viewing terraces, pedestrian walkways, and public gardens that resembled natural areas (Holmes 2012).

The juried selection demonstrated a trending community-scale focus for urban park design: they are designed for communities. Equally, in the 2005 California State Parks report, "community" was mentioned forty-three times, "neighborhood" was mentioned twelve times, and "user" was mentioned only three times (CSP 2005, 23).

In a 2019 article about urban park needs by Anna Barker, she wrote that future park experiences must offer social diversity opportunities and host various types of users rather than plan for a single shared experience (Barker et al. 2019, 2468). However, despite the revelation, her call to action still appeared to present user needs as a vague abstraction within the context of a descriptive "greater societal benefit."

*Activities Dedicated to Tangible and Real Experiences*

With the increasing density of real estate development in cities and an excess of "digital distractions," tangible park experiences such as community fishing programs offer urban users a relief and escape toward a slower-paced and natural outdoor activity (Clarke 2017, 12). For example, the Texas Parks & Wildlife Department (TPWD), in response to a population shift from rural to urban areas, partnered with the state's municipalities in 2003 to prompt interest in outdoor recreation and to encourage physical activity ("TPWD: Neighborhood Fishin'" n.d.). The TPWD created the ongoing Neighborhood Fishin' (NFn') program to promote family-focused fishing activities by regularly stocking fourteen lakes and ponds with thousands of catfish and trout each year in city parks across the state. The TPWD, when reporting the popularity of the program in 2012, announced that it had served over 81,000 unique anglers that spent 275,000 hours fishing that year, with forty-five percent of them being "new anglers."

## User Experience Needs of Urban Park Activities

When considering park users, planners of the NFn' program and its host parks appear to approach the outdoor experience using Olmsted's "subordinate the details to the whole" principle (Freitas 2014). The program is more of an unstructured group activity than an individualized experience. According to Robert J. Mauk, who wrote a 2015 report about the NFn' program, the host parks typically offer basic amenities "such as bathrooms, seating, and shade" (TPWD-IFD 2015). However, these general park features are not dedicated to the fishing activity, nor do they meet angler-specific needs.

The primary community-based angling feature that Texas municipal parks offer consists of a lake or pond stocked with game-size fish. Some locations have a kiosk containing general program or fishing information, but it has minimal educational value (TPWD-IFD 2015). Instead, the TWPD relies on an online digital experience to relay important program details such as stocking dates, fundamental angler education, and rules for harvesting (Texas Parks & Wildlife Department n.d). A digital format leaves anglers who prefer a non-digital experience to rely heavily on their fishing expertise upon arrival to the park. Otherwise, personal digital devices seem like the only valuable educational amenity at these parks for novice users who must search for instructional support at angling websites, dedicated Facebook pages, or commercial fishing apps.

Consequently, there are substantial opportunities to better the user experience for anglers at these parks. Angling can be an environmentally destructive activity, and it appears that the NFn' program planners made untested assumptions regarding users' capabilities regarding urban fishing (Hay 2016). A park's overall usability can be negatively impacted if thousands of urban anglers descend around small lakes every

week only to find a lack of dedicated amenities to offer seating, support safety, manage waste, and promote responsible angling or environmental stewardship.

## Building Better User Experiences

Improving the user experience (UX) has become a marching order for designers today, and expediency is a primary principle driving digital design (Krug 2014, 11). In twenty-first-century America, the design industry, fueled by technological trends, has almost universally steered innovation toward perfecting digital experiences; and turning the focus away from designing tangible artifacts (Interaction-design.org n.d). Leading companies such as IDEO, NN/g, IBM, and Google have defined professional practice standards since the early 2000s and inspired the revolution in digital UX design (Nessler 2016). Designers of all disciplines have migrated to higher-paying digital-only design roles at a record pace, with a thirteen percent increase between 2010 to 2020.

### *The Benefits of UX Design*

The UX design (UXD) difference is that deliverables are not based on subjectivity informed by familiarity or designer-driven assumptions. Instead, *user needs* define the product. Digital UXD relies on user data to frame and deliver solutions that are imagined in collaborative sessions. In UXD, data is synthesized, user needs are identified, and design opportunities are prioritized. Solutions are tested and validated throughout, appearing more like a scientific process than a creative endeavor (Interaction-design.org n.d.). Since digital UX designers champion user needs that may shift due to outside forces, the process is versatile to keep pace with ever-changing technological conditions. Therefore, it stands to reason that a critical benefit to the UXD process is that it can improve a user experience regardless of the technological format that delivers it.

## II. STATEMENT OF THE PROBLEM

Urban park designers have focused on community-scale experiences since the 1800s, and the proven benefits of public parks make them essential to the urban living experience. However, contemporary park design methods do not address critical user needs. TPWD's NFn' program is a prime example. It is considered a successful program by park planners and serves the community in measurable ways, but unaddressed user needs plague it. Urban fishing is a time-intensive, technically involved, ecologically impactful, angler-driven activity, and the program offers no real amenity to support users in a meaningful way.

Therefore, urban fishing programs such as NFn' demonstrate how outdoor activities within public parks are not user-friendly. They offer very little on-site information for novice anglers on how to fish safely or interact with the natural environment responsibly. The lack of fundamental instruction can lead to unlawful or irresponsible fishing practices, personal injury, and harmful long-term environmental impact. The unfortunate experience also relies on digital devices for full engagement, which can frustrate anglers looking to escape from daily life's digital demands in the otherwise non-digital outdoor activity (Clarke 2017, 12). The popularity of community fishing programs in poorly equipped parks across Texas, coupled with an urban population not well-versed in responsible fishing or environmental stewardship, has led to an inhospitable condition for park users and wildlife in these areas.

An empathetic discipline such as digital UXD exists primarily to solve experience problems by identifying critical user needs and utilizing frameworks to guide data-driven innovation along an iterative process. Unfortunately, digital UXD methodics is native to

an industry exclusively dedicated to solving on-screen user problems. Human-centered design, on which UXD's user-focus is based, does provide a precedent for addressing user problems in non-digital environments. However, applying digital methods to analog problems may seem counter-intuitive to a UX designer looking to expand digital impact. Plus, applying a relentlessly iterative process to concepts that require physical assembly may be perceived by designers as an economic challenge.

Since examples of digital UXD methodics solving tangible user needs in urban parks were not available for review, this research study will analyze the positive impact such an approach can have on non-digital experience problems.

## Thesis Statement

This thesis aims to prove that digital UXD methodics can improve non-digital urban fishing experiences in public parks while delivering practical and functional amenities that can address user needs, promote environmental stewardship, and present a meaningful sense of place.

### III. PRELIMINARY RESEARCH

### Digital User Experience Design

The power of digital UXD to improve experiences for individual users within complex platforms that serve millions originates from two approaches: design thinking and Human-centered Design (HCD). Design thinking, promoted by Stanford's d.School, is a collaborative, iterative, cross-disciplinary, and multi-phase approach applied by designers who pursue the understanding of users and their needs to innovate products and solutions (Interaction-design.org n.d.). Although several user-focused digital UX design approaches exist, such as Sprint, Lean UX, and the Loop, they all share the same basic design thinking framework; used by UX designers to "know" and solve the "correct" user problems (Norman 2013, 218). HCD, popularized by IDEO, is used by digital UX designers to solve the "right" problems for certain users within specified constraints. The process focuses on human needs and capabilities and helps users accomplish tasks within understandable, frictionless, affordable, and delightful experiences (Norman 2013, 219).

### Comparative Audit

The effort to improve a non-digital outdoor experience is not a novel concept. Many examples of conceptualized park amenities, urban experience tactics, and environmental techniques were discovered during the comparative research phase of this thesis. However, aside from a few digital examples, none of the solutions found mentioned using digital UXD processes in their development.

#### *Anglers' Seats*

Design Studio H2E's *Anglers' Seats*, as shown in figure 3.1, is a public outdoor seating concept unveiled in 2018 on the shores of Lake Aluksne (Starks 2019). The

installation contained permanent fixtures for a small group of people that resembled oversized plants and had fixed seating and several fishing rod holders, light fixtures for evening participation, and an informational sign to educate the novice angler. It was an apparent effort to impact a public space with placemaking strategies that encouraged social gathering. Material culture tactics were also used to reflect the community's heritage, and experiential graphic design methods were used to convey purpose. The installation received an "Honor Award" in 2019 by the SEGD (Makowski 2019).



Figure 3.1. *Anglers' Seats*, lakeside seating installation. Photographs by Ansis Starks.

Figure 3.2. *Canada Benches,* modified Vancouver bus stops and park benches. Photographs by Sidney Brownstone.

## *Canada Benches*

In 2013, Spring Advertising, a Canadian marketing firm, collaborated with the Vancouver homeless shelter and the Rain City Housing and Support Society to raise awareness of homelessness in the city and offer shelter to homeless individuals with their *Canada Benches* installation. Instead of discouraging the homeless from occupying public amenities, park benches were modified by attaching convertible awnings, as shown in figure 3.2, to shelter occupants from the weather. Promotional messaging was added to the retractable awning that read "This is a Bench" during the day. Glow-in-the-dark materials revealed "This is a Bedroom" during the evening. The concept was celebrated by industry-press such as Fast Company; and Bustle called it an "uplifting

alternative" to the anti-loitering policies targeting the homeless in other major cities

(Brownstone 2014; Lowenstein 2014).



Figure 3.3. "Chairbombing" in a Brooklyn neighborhood. Photography by Aurash Khawarzad.

## Chairbombing

DoTank, a creative collective in New York City, responded to the lack of public

seating in Brooklyn neighborhoods by upcycling discarded palettes and building portable

lounging chairs. By using "chairbombing," a Tactical Urbanism method of strategically

placing unauthorized seating fixtures in bustling areas (see figure 3.3), the designers

hoped to improve the sense of community within neighborhoods (Lydon 2012, 25). The

test proved successful as authorized permanent benches replaced the temporary chairs

where no seating existed before the placemaking intervention (Lydon 2012, 25).

## Flybrary Project

By appropriating unused spaces to create meaningful connections between places

and fly-fishing anglers, the *Flybrary Project* by Justin Forrest bridged outdoor angling

with an online experience. It was designed to promote the sharing of fly-fishing lures and

helpful area-specific angling tips (Flybrary Project n.d.). Anglers could purchase a prefabricated Flybrary kit consisting of promotional stickers and an eight-inch by five-inch magnetic card that read "Need one? Take one." and "Have one? Leave one." Once a Flybrary was installed outdoors for public use, participants could register its location on the project website so other anglers could find and engage with it (see figure 3.4). The popular project achieved international reach with dozens of Flybrary locations registered across the United States and Canada.
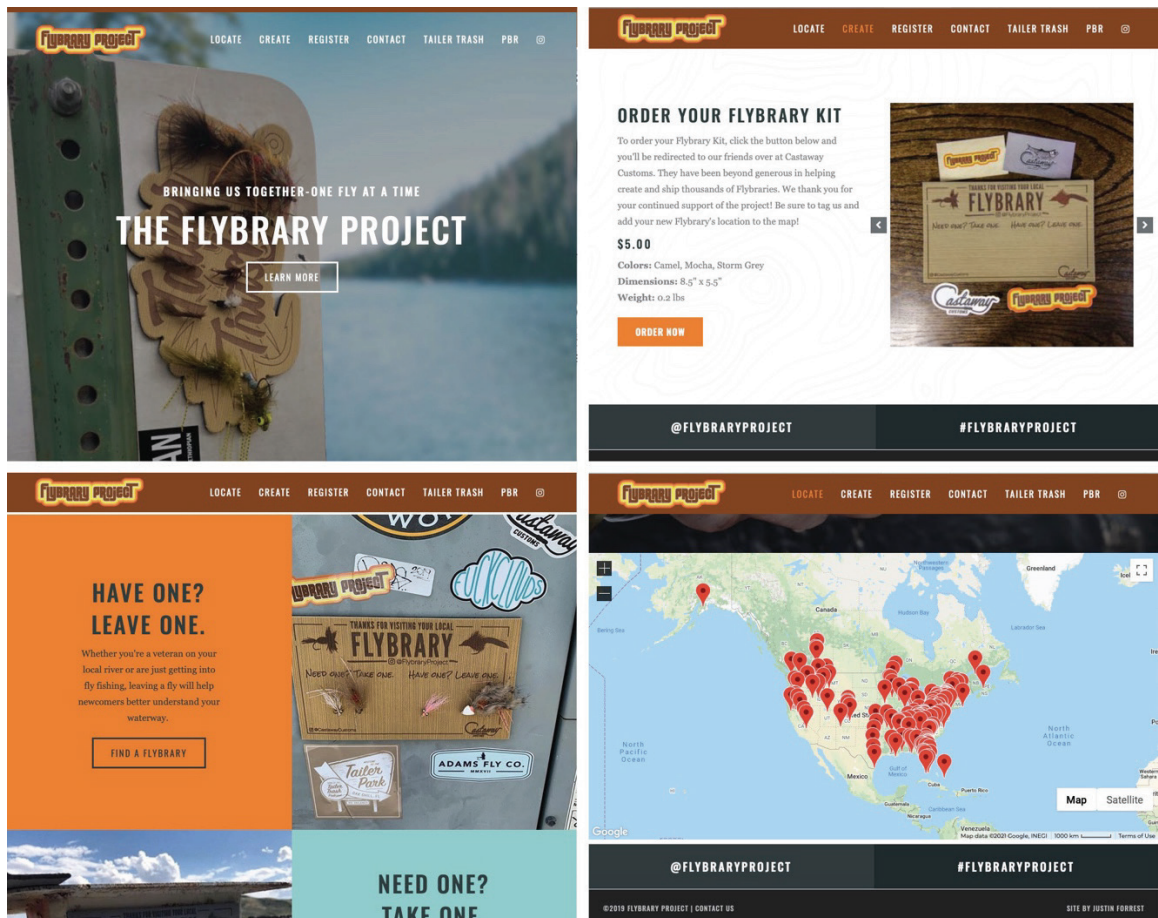


Figure 3.4. *Flybrary Project* website screens. Image source: www.flybraryproject.com.

Figure 3.5. AGFD *Community Fishing Water* program information kiosk. Image source: www.azgfd.com.

*Park Information Kiosks*

As shown in figure 3.5, informational kiosks are a standard utility with fishing programs in public parks. The *Community Fishing Water* program, sponsored by the Arizona Game and Fish Department (AGFD), placed information kiosks near public fishing spots in about fifty sites across ten Arizona cities. The kiosks were comprised of a permanent host structure built into the landscape holding printed panels that contained program details, park maps, and general fishing information (Fish AZ n.d.).

Figure 3.6. *Box Cycle Animal Face Recycling Bins*. Image source: www.wybone.com.

### Box Cycle Animal Face Recycling Bins

To promote environmental stewardship to children, a London-based street furniture designer called Wybone created the *Box Cycle Animal Face Recycling Bins* (see figure 3.6). The color-coded set was made to collect specific materials such as unrecyclable trash, aluminum cans, plastic bottles, and paper. The clear plastic boxes were designed in an animated style with colorful child-friendly bin tops that resembled animal heads with openings that looked like gaping mouths (Wybone n.d).

### Line Collection Bins

Fishing line collection bins, made of polyvinyl chloride (PVC) plumbing pipe, were placed near public fishing spots to help stave off the ecological harm caused by improperly discarded monofilament fishing line. With an estimated cost of $35, these

bins are popular with fishing programs and nature conservationists (Lagally 2017).

As shown in figure 3.7, the bin by coast4u.org was a low-cost method for the responsible

collection of non-biodegradable and durable fishing line material that would otherwise

end up in landfills and natural areas where animals could get entangled and harmed.



Figure 3.7. Fishing line collection bins made of PVC plumbing pipe. Photograph by Christie Lagally.

*Digital Apps*

There are many digital companions available to enhance fishing experiences.

As shown in figure 3.8, FishBrain was a subscription-based app for mobile devices that

boasted 10 million users and "10,527,617 catches logged" (Fishbrain n.d). The digital

angler experience provided many useful tools such as a fishing spot finder, a fishing

forecaster, a way to track catches, and a social media platform for sharing.
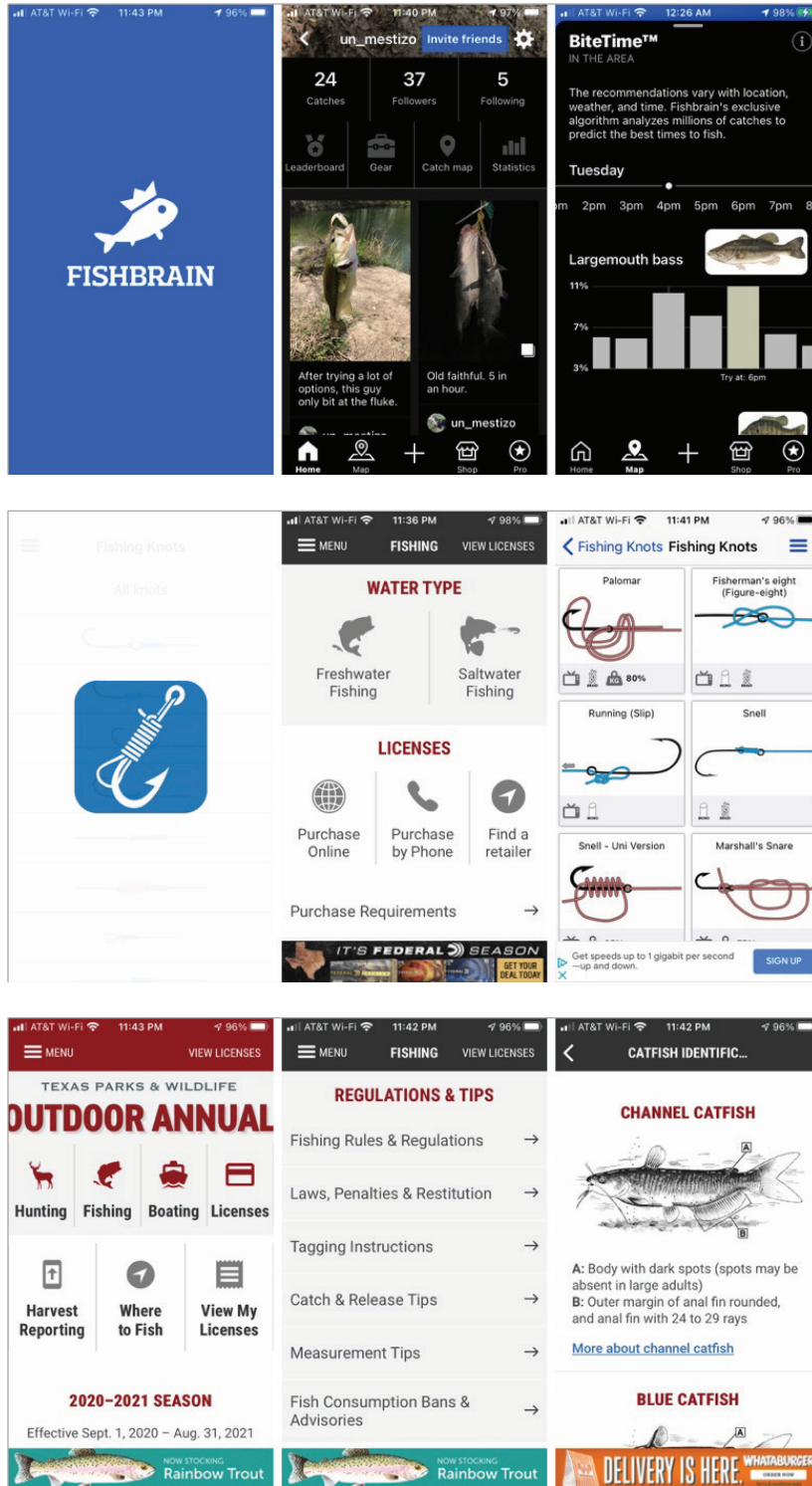
Figure 3.8. Fishing app screens – *top,* Fishbrain; *center,* Fishing Knots; *bottom,* Outdoor.

Fishing Knots was a free app for mobile devices that offered an encyclopedia

of fishing knots with detailed educational diagrams and how-to instructional videos. Its

apps.apple.com page mentioned a knowledge base of "the maximum number of knots

used by fishermen" and a rating of 4.7 out of 5 stars by users (Apple n.d.).

The Texas Parks & Wildlife Outdoor Annual app is the "official app of Texas

hunting, fishing, and boating" (Texas Parks & Wildlife n.d.). It was intended as a digital

companion for outdoor activities in Texas and an alternative to the printed book of the

same name. As a free resource, the Outdoor Annual offered the latest details on fishing

regulations, online license purchasing, safety rules, and game identification.

# IV. METHODS
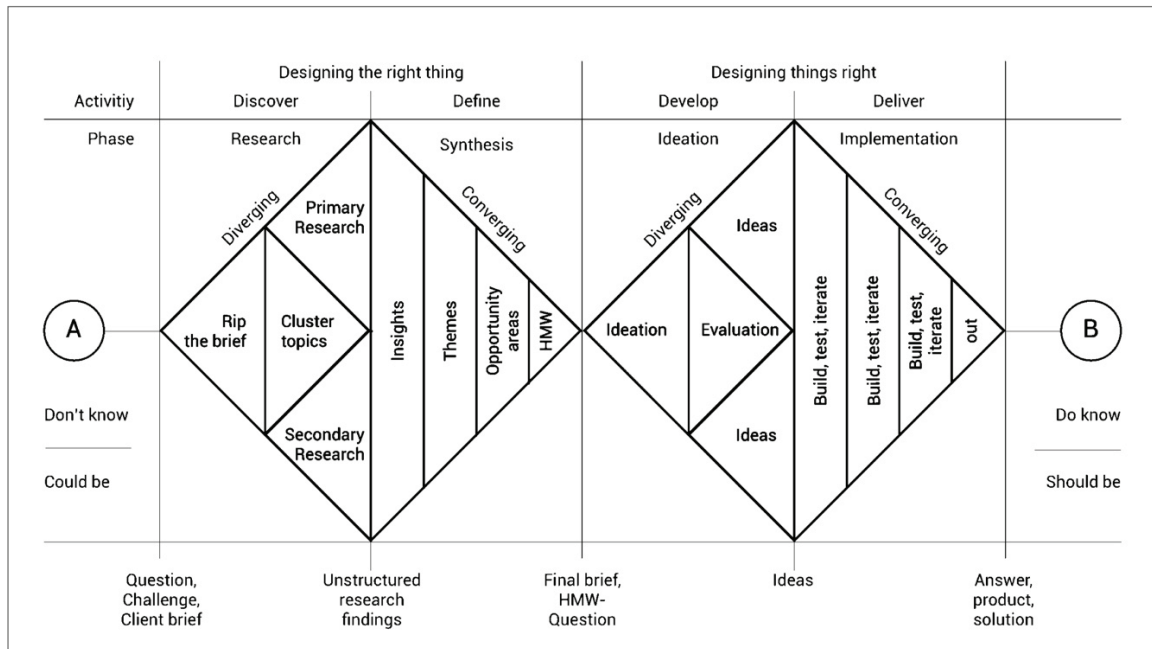


Figure 4.1. The British Design Council's Double Diamond framework. Diagram by Dan Nessler.

The methodics of digital UXD informed the methodology of this thesis. To better understand digital design methods in a novel context, for a comprehensive practical application, the research targeted various coexisting digital UXD approaches: Lean UX, Sprint, Loop, and Krug strategies. These parallel theories were studied, and their methods were applied to progress the design process in a manner that digital UX designers may not employ in a typical professional setting. However, the deeper exploration of digital UXD allowed an atypical number of design methods to be applied to the research hypothesis for a more holistic solution. Collaborative exercises were employed to satisfy specified project parameters while intentionally avoiding a full-on group-project scenario.

HCD methods devised and championed by Don Norman, IDEO, NN/g, and the Stanford d.School were applied throughout this research. Digital design platforms such as

Mural and Invision were used to test and improve the non-digital experience to the point of creating a testable medium-fidelity prototype. COVID-19 protocols informed the process whenever human health and safety were a concern.

This thesis's design thinking framework was informed by the British Design Council's Double Diamond, which guides designers' level of understanding around specific design challenges from "do not know" to "know" and "could be" to "should be" (Nessler 2016). This project's research was divided into four phases: Discover and Define formed the first half of the process and Develop and Deliver comprised the second half. As shown in figure 4.1, each diamond in the diagram represented a process of convergent and divergent thinking, starting with "first exploring" an issue in a broad context to gain deep understanding, then taking "focused action" to solve specific problems (Design Council n.d.). The Discover phase facilitated a clear understanding of the problem with design methods which minimized assumptions through involved surveys, observations, and interviews of people who "are affected by the issues" (Design Council n.d.). The Define phase allowed gained insights to identify, define, and reframe design challenges through synthesis methods that helped make sense of the data (Design Council n.d.). The Develop phase inspired collaboration that found solutions for a clearly defined problem (Design Council n.d.). The Deliver phase converged the possibilities by testing solutions, eliminating options, and cultivating improvement (Design Council n.d.).

Placemaking tactics were applied during ideation to establish parameters around a tangible experience platform, much like when a UX designer sets a standard screen size for a digital experience. Also, material culture methods were applied during the design development phase to address community-focused communication user needs.

**Discover: Observing Current Urban Fishing Experiences**

*Design Method: Framing the Scope*

An actionable UXD challenge was unclear early in the Discover phase as there were too many unknown variables to engage in meaningful problem-solving. The "How might we" method (HMW) was applied during the onset of the project as an "abductive tool" to promote innovative thinking around complex problems (Kolko n.d.). It defined the scope with enough specificity to target a research field and enough generality to allow for its meaningful exploration (Kolko n.d.). A fundamental question was initially posed to frame the design challenge: "How might we improve the fishing experience for the average angler at urban parks?" The HMW set the creative compass with a design challenge that could be further defined after deeper meaning was synthesized during the Define phase of this thesis (IDEO.org n.d.).

*Design Method: Secondary Research*

Secondary research was conducted to gain an understanding early in the Discover phase when project boundaries were still being set up. Books, online periodicals, design research websites, and academic dissertations were reviewed to extract knowledge about anglers, urban communities, public parks, fishing techniques, placemaking tactics, material culture theories, design thinking strategies, UXD methods, and the HCD approach. Sources written by subject matter experts in relevant areas provided valuable context to insights and data collected during the research phase of this thesis (Martin and Hanington 2012, 112). The acquired insights and knowledge were then used to prepare for more direct user and stakeholder engagement.

*Design Method: Primary Research and COVID-19*

Aside from conducting secondary research, users and experts were observed and directly engaged. Conducting this primary research allowed empathy-building data to be gathered first-hand (IDEO.org n.d.). Interviews, surveys, and user testing for this thesis were managed in South Central Texas during the COVID-19 pandemic caused by Coronavirus Disease 2019 (CDC n.d.). Even though digital UXD researchers typically prefer in-person engagement, research processes were adapted to state-mandated quarantine and social distancing protocols (Texas Governor 2020). Research surveys were conducted online using Qualtrics, a digital survey platform. Face-to-face interviews and in-person user testing were replaced by video conference sessions using Zoom, an online meeting platform. Field and observational research were completed on-site in 2019, before the COVID-19 outbreak.

*Design Method: Immersion, Observation and Participation*

Immersion methods, adopted from anthropology's applied ethnography approach, were conducted in early 2019 to study angler behaviors in an urban park setting (Norman 2013, 222). The collected data formed a deeper understanding of anglers' needs, goals, and impediments to success. They offered context to insights and first-hand observations within the design territory (Martin and Hanington 2012, 120).

Figure 4.2. Southside Lions Park amenities (2019). Photographs by IFliSkyhawks.

Observations were conducted at San Antonio's Southside Lions Park in 2019 (see figure 4.2). The 600-acre public park hosted a ten-acre lake stocked by the TPWD with almost 29,000 live game fish between 2018 and 2019 and was served by the NFn' program (SAPR n.d.). An estimated 30,000 anglers visited this urban lake during the same period (TPWD n.d.). At the time, the park was equipped with a large playground, 8 rentable pavilions, 17 picnic tables with grilling pits, a large restroom facility, a two-mile paved walk path, 8 paved parking lots, 3 shaded information kiosks, 6 water fountains, 17 trashcans, 34 recycling bins, and a full array of light fixturing. However, the waterfront was undeveloped with no permanent fixtures except for 18 trashcans and 16 recycling bins. Trees shaded make-shift fishing spots worn into the water's edge from regular angler use. Artificial lighting was present but inadequate to light the areas during

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the evening. There were retaining walls around the lake with a few boulders used by anglers for sitting near the water on the west end.

In a twelve-hour observational research study conducted to formulate survey and interview questions, over 19 anglers were observed from a distance for the sake of objectivity (Schuler and Namioka 1993, 62). Most of the observed anglers appeared to bring personal equipment to their selected fishing spots, such as fishing tackle, coolers, water, food, seating, umbrellas, and lanterns. The anglers each fished near the water's edge, with most of them sticking portable rod holders into the ground within inches of the water and placing portable seating on the edge of the lake.

Of the 19 anglers observed, 16 anglers socialized with apparent strangers. Of those anglers who did not catch a fish, 3 appeared to express frustration when they witnessed others catch a fish. Of the anglers who caught fish, 8 caught at least one fish throughout the day, and 3 caught up to five fish, and 5 anglers immediately released their fish. Of all the anglers, 9 left some trash behind or unwanted end-tackle near the area they fished, and 3 picked up someone else's litter when they arrived at a fishing spot.

In addition to the observed human activity, an abundance of animal activity was witnessed. Several native and migrating wild species were spotted near the lake or on the water. Multiple duck species swam on the water or roosted on the trees. Numerous geese mingled around the park visitors, and other bird species were observed, including cranes, fishers, mockingbirds, cardinals, sparrows, grackles, and doves. Several animals were seen swimming underwater near the bank, including water snakes, multiple turtles, and non-game fish such as bluegills and sunfish. Lizards and butterflies were also seen near the water's edge.

Figure 4.3. Discarded tackle litters the water's edge at Southside Lions Park (2019).

Joining the fishing activity as a participatory research method while conducting observational research allowed for a hands-on understanding of the observed angler challenges (Martin and Hanington 2012, 60). An eight-foot by ten-foot area near the lake's edge served as a fishing research station for six hours. Litter was observed around the area consisting of several snack bags, plastic bottles, beer cans, and disposable fountain drink cups. As seen in figure 4.3, discarded monofilament, braided fishing line, and rusted hooks were also seen littering the ground around the research area. Several hooks were found stuck into tree trunks about five feet above the ground, and lost fishing lures hung from nearby branches. Discarded fishing line submerged in the lake made newly-cast fishing lures a challenge to retrieve from the water; the attached hooks often snagged on stray line several feet underwater and caused entanglements resulting in the loss of fishing tackle and line into the water.

*Design Method: User Surveys*

A Qualtrics questionnaire was used to gather preliminary insights from 11 urban anglers. The "Responsibility, Respect, and Honesty guidelines" of ethical HCD research were applied to protect participant privacy during the survey (Martin and Hanington 2012, 172; Raider and Rabinelli 2019). Of those selected to participate based on having fished at an urban public park within the last five years, 7 were males, and 4 were females. Survey participation was solicited using social media posts across five separate Facebook groups dedicated to fishing: three private and two public. The survey collected qualitative and quantitative data about the urban fishing experience, such as the level of fishing activity friction, angler fishing skills, interest in environmental stewardship, and overall angler experience concerns (see appendix A).
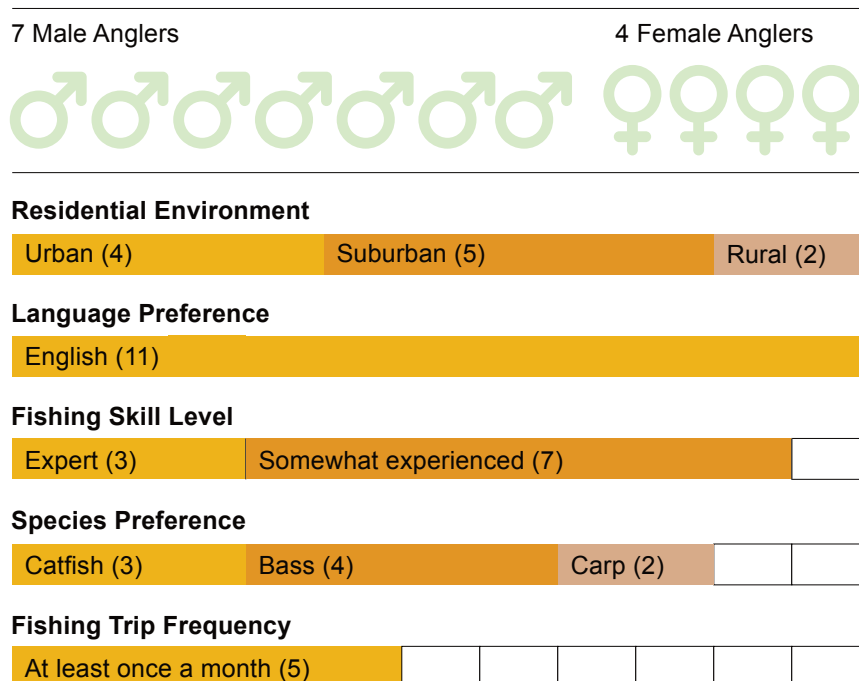


Figure 4.4. Primary research participant demographic summary.

**What I'd like to know more about.**

Fish in the water (11)

Sustainabilty & eco-friendly fishing (10)

Angling tips (10)

Wildlife & environment at the park (7)
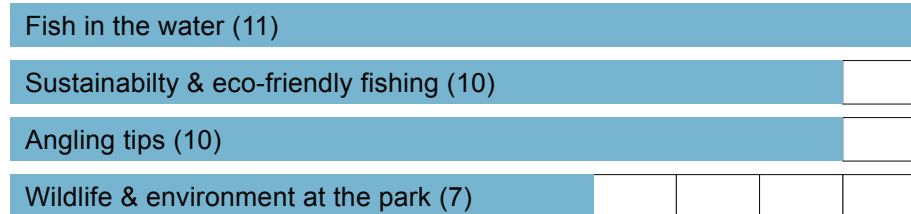
**What makes fishing enjoyable.**

Catch at least one fish (10)

Recreation & relaxation (6)

Improve angling skill (4)
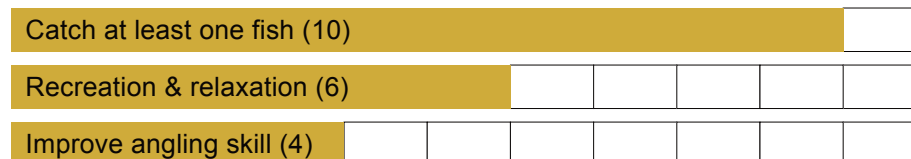
**How I socialize while fishing.**

| Small groups – less than 3 anglers (7) | Alone (3) |

Share fishing tips with strangers (8)

Share hooks with strangers (7)

With anglers of various skill levels (7)

With anglers i just met (7)

**How I feel about environmental stewardship.**

Dislike improperly discarded line (10)

Want pristine natural areas & dislike litter (10)

Dislike improperly discarded hooks (9)

Would keep discarded lures or hooks (8)

Prefer catch and release (7)

Would not keep discarded line (6)
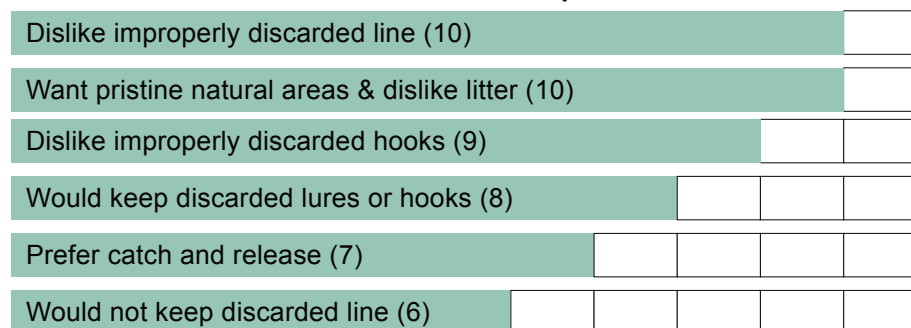
Figure 4.5. Primary research survey response summary (2020).

When asked about their fishing skill, 100% of the participants expressed some level of aptitude; 7 out of 11 participants rated themselves "somewhat experienced," 3 out of 11 participants rated themselves as "experts," and 3 out of 11 respondents claimed to participate "very often" in urban fishing by engaging in at least one fishing trip each month before the COVID-19 restrictions went into effect in the Spring of 2020.

All participants showed a degree of preference for the species they targeted: 23% of the participants preferred channel catfish, 38% preferred largemouth bass, and 33% preferred other freshwater species such as carp or sunfish (see figure 4.4).

As shown in figure 4.5, participants were asked what information would be most helpful during the activity. Of the participants, 8 out of 11 responded that details about the surrounding environment and wildlife would be "very helpful," 7 out of 11 participants responded that receiving information about sustainable or eco-friendly fishing would be "very helpful," and 10 out of 11 participants responded that fishing tips would be either "somewhat helpful" or "very helpful. All participants responded that information about the fish in the water would be "somewhat helpful" or "very helpful." One hundred percent of participants stated that they preferred the information in English.

When asked about essential factors that make fishing enjoyable, 9 out of 11 participants responded that catching a fish during the activity was either "important" or "very important." Of the participants, 58% answered that they fish for "outdoor recreation and relaxation, and 32% responded that they fish to "improve fishing skills."

When asked about fishing socially, 8 out of 11 participants responded that they fish with no more than two other people during a trip, 8 out of 11 participants answered that they like to fish with people of varying fishing experience, 7 out of 11 participants said that they would consider fishing with someone they just met, 8 out of 11 participants stated that they would share hooks with an angler they just met, and 10 out of 11 participants responded that they would share fishing tips with an angler they just met.

When asked about environmental stewardship and sustainability, 9 out of 11 participants responded that it was "very important" for their fishing spot to be free from

29

improperly discarded hooks, 10 out of 11 participants responded that a site free from any improperly discarded fishing line was "very important," 11 out of 11 participants answered that it was "very important" that the wildlife and natural areas at urban parks be "pristine and free from litter," 10 out of 11 participants responded that they were "very likely" to properly discard hooks or fishing line that someone else improperly discarded, 10 out of 11 participants stated they would keep any improperly discarded lures or hooks.

When asked about handling their catch, 63% of the participants said they preferred to practice catch-and-release. When surveyed about what the urban parks department could "do better" to improve the fishing experience, "more catch-and-release parks" was repeated most often by the participants.

*Design Method: Expert Interviews*

Several experts were interviewed for this thesis to gather specific insights about digital UXD, public parks, and urban fishing to improve understanding of the field of research (Martin and Hanington 2012, 102). These "key informants" were selected as professional subject-matter experts who could offer technical advice and share their informed perspectives about the latest innovations in their fields. (IDEO.org n.d.). A UXD research interview method was applied as experts were asked scripted questions presented conversationally, allowing for "flexible detours" in the exchange (Martin and Hanington 2012, 103) (see appendix B). These experts also served as the thesis *Project Stakeholders* and provided feedback throughout the research and ideation process.

Sarah Turfboer is a Principal UX Designer at H-E-B's Eastside Tech HUB. She offered insights into UXD methods used by current digital professionals. According to Turfboer, various methodics inform individual and organizational UXD processes in

professional digital design. The most common digital UXD processes are based on the pioneering work of organizations such as the Nielson Norman Group, IDEO, IBM, and Google. Although specific techniques may differ, underlying commonalities consist in their HCD approach and design thinking framework application to deliver a better human-to-technology interface. And a non-digital problem could conceivably benefit from a digital UXD within the proper context. Turfboer found that, because of "the complex research-heavy nature of the discipline," UX designers may consequently lose sight of project goals at times, and she advised that the solution is to "just push through and trust the process" to the end.

Oscar Castillo is the Executive Director and founder of the Fin-Addict Angler Foundation, a non-profit organization dedicated to youth mentorship, angler education, and environmental stewardship. According to Castillo, urban fishing is more popular than ever, but public park managers struggle to keep pace with angler needs. Few publicly funded angler education programs exist to promote environmental stewardship or support skill-building. Permanent fishing amenities at urban parks are rare or non-existent. The burden of keeping fishing spots litter-free and eco-friendly has fallen on individual anglers, community volunteers, or non-profit organizations.

Adam Comer is an aquatic education training specialist for the TPWD. In 2020, he coordinated the TPWD Angler Education Program by sponsoring angler classes and outreach events, which trained and supported community volunteers. In 2019, according to the Comer, the TPWD Angler Education program served 70,000 Texans of all ages and experience levels. Part of the curriculum targeted novice anglers and entailed learning about baitcasting, fishing rigs, lure selection, knot tying, aquatic species

identification, environmental ethics, and fishing safety. Comer mentioned that the ability

to identify fish species was vital in developing environmental stewardship in anglers; he

called it the "if you can name it, you will want to save it" approach. The TPWD recently

adopted micro-fishing programs that target tiny fish native to urban waters. Comer also

mentioned that improperly discarded fishing line was a significant ongoing problem at

public parks as the materials can take over 600 years to biodegrade. The TPWD advises

volunteers who serve as environmental stewards to collect and send unwanted fishing

to companies like Pure Fishing that, in turn, use the line to make tackle boxes for retail.

Mary Jane Verette is the President & CEO of the San Antonio Parks Foundation

(SAPF), a Texas-based non-profit organization with a mission to improve residents'

quality of life through the support and enhancement of public parks in the community.

Her position has allowed her to navigate the complexities of park management and strict

restrictions imposed by city parks departments for park improvement. According to

Verette, a proposal to add fishing amenities or visitor experiences to city parks can

involve a lengthy and demanding approval process. Any proposed tangible improvement

to an urban park experience should holistically represent special considerations to the

community, the site's historical context, the park maintenance budget, and the impact on

the overall natural aesthetic.

*Unstructured Data Summary*

Several UXD research methods were conducted to collect user and environmental

data during this thesis's Discover phase. Anglers were studied at Southside Lions Park,

yielding insights about their behaviors during fishing activities within an urban ecological

system. "Key informant" interviews provided insights on digital UXD, urban fishing

education, and park design. Anglers' responses to an online questionnaire provided valuable qualitative and quantitative data.
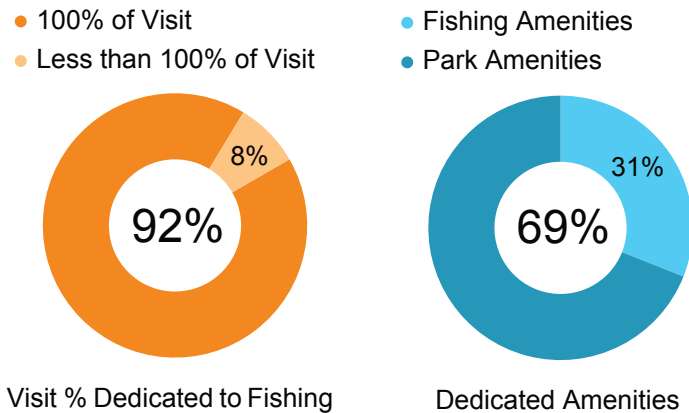


Figure 4.6. Park visits dedicated to fishing and dedicated fishing amenities.

According to the TPWD, 70,000 Texans took part in TPWD-sponsored fishing sites in 2019. Between 2018 and 2019, 30,000 new anglers visited the lake at Southside Lions Park to fish for over 29,000 stocked game fish. Of those surveyed, 92% of anglers claimed to dedicate 100% of their park visits to fishing, as shown in figure 4.6. In comparison, only 31% of amenities at the park were dedicated to the fishing experience in the form of disposal and recycling bins.

According to Turfboer, a digital UXD expert, design thinking, HCD methods, and UXD tools can solve user needs in real environments by delivering a more empathic experience. Based on insights shared by MaryJane Verette, any proposed improvements hindered by a complicated parks department approval process could gain essential support by the addition of a strategic format and a nature-themed aesthetic.
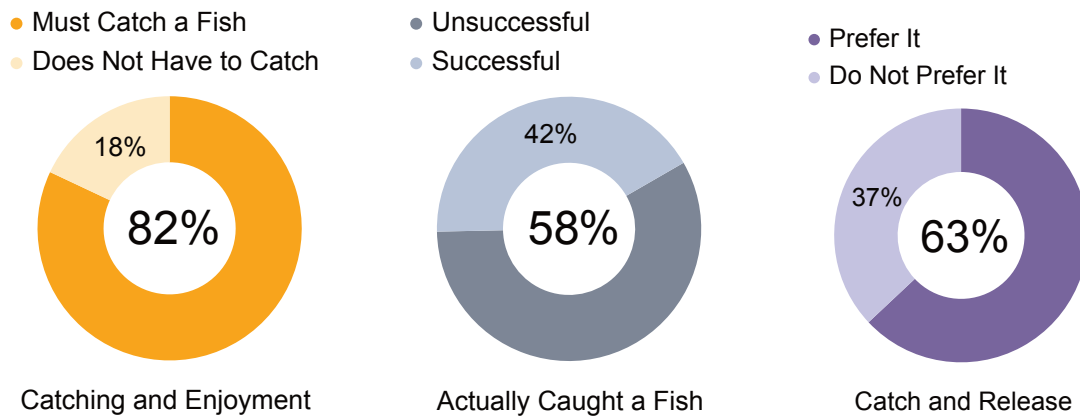
Figure 4.7. Summary of primary research survey responses – *left,* need to catch a fish; *center,* observed catching a fish; *right*, prefer catch-and-release.

As shown in figure 4.7, 82% of survey participants said catching a fish was very important to the enjoyment of the fishing experience, while only 42% of anglers observed at Southside Lions Park were successful. Out of the participants surveyed, 63% percent preferred to release their fish back into the water. As shown in figure 4.8, fewer than three people make up an ideal angler group, 7 of 11 participants said they would fish with people they just met, and 10 of 11 participants would share fishing tips with strangers.
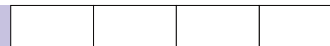


Figure 4.8. Summary of primary research survey responses – social fishing

Of the participants surveyed, 64% wanted to receive more information about Southside Lions Park's ecology, and 92% said it "was very important" to have a pristine

natural area free from litter and improperly discarded line. However, 47% of anglers were observed leaving some form of trash behind. Of those who responded to the survey, 82% said they wanted fishing spots to be free from discarded hooks, 92% of participants said they would clean up after others to maintain a pristine fishing spot, and 73% were willing to collect and recycle improperly discarded hooks and lures (see figure 4.9).
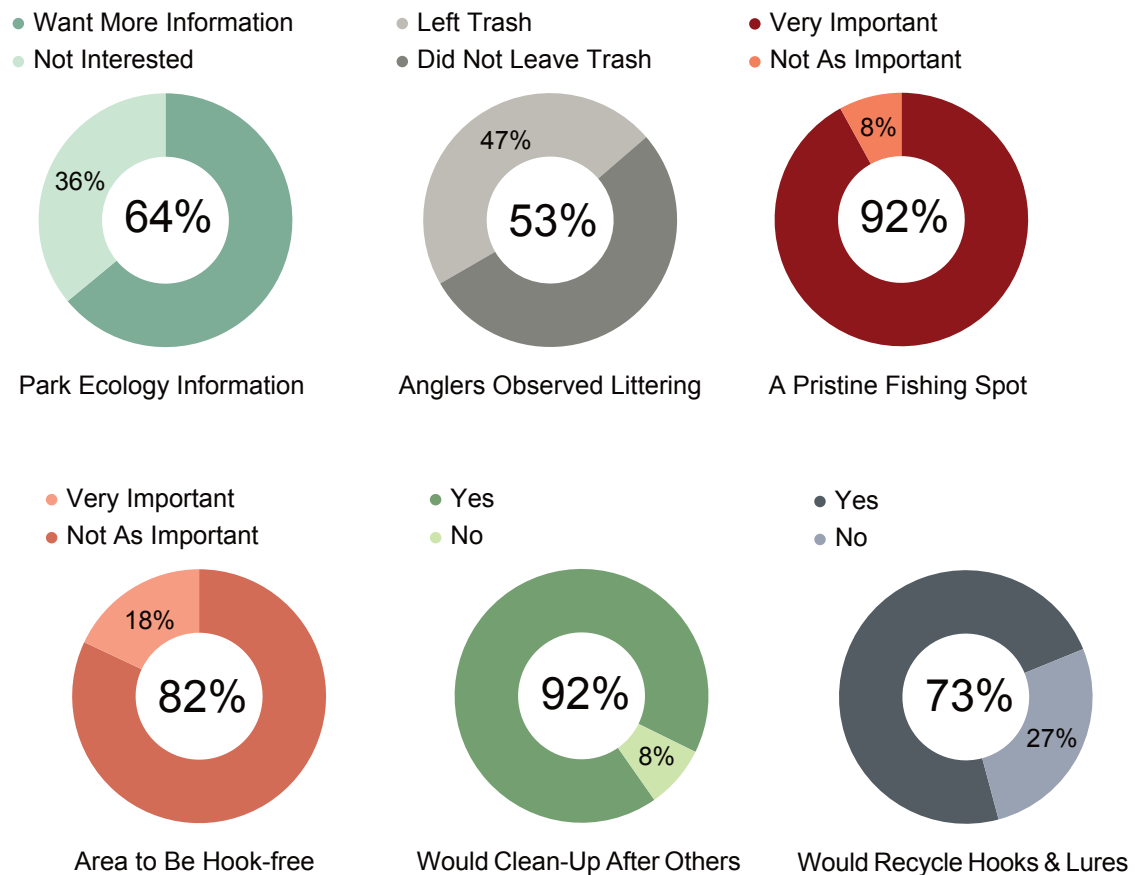


Figure 4.9. Summary of primary research survey responses – *top left*, more park ecology information; *top center,* observed littering; *top right,* a pristine fishing spot; *bottom left* a hook-free area; *bottom center*, clean-up after others; *bottom right,* recycle hooks and lures.

**Define: Data Synthesis**

*Design Method: Data Download*

Once the data from the online angler surveys, expert interviews, and observations at the Southside Lions Park were collected, the insights were recorded and organized in a method that offered graphical representation for synthesis (Kolko n.d.). Design thinking methods prescribe that all data points and insights be downloaded or written onto Post-it notes and adhered to walls for review (Post-it n.d.). According to IDEO methods, this is a rich and powerful way to build a collective knowledge base; however, simulating this technique using Mural, a collaborative digital UXD platform, was more helpful for this thesis (IDEO.org n.d.; Mural.co n.d.). Mural's digital card-sorting capabilities offered a quicker data download and improved shareability during remote presentations and discussions with the Project Stakeholders.

The online angler survey and expert interview responses were transcribed to 92 individual digital cards coded with twenty-four different colors, representing grouped responses to categorical inquiries for easy tracking. There were 42 notes recorded during observation and immersion at Southside Lions Park. Each note described specific conditions, amenities, and observed angler behaviors (see figures 4.10 – 4.11).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| I would definitely share my hooks with a stranger | Anglers share hooks often | I would fish with an angler I just met | I may fish with an angler I just met | I prefer to fish alone | I prefer to fish with no more than 1-2 people | I prefer to fish during the day | I prefer to start fishing during the day and end in the evening | Many anglers plan their fishing trip by target species |
| I may share my fishing lures with a stranger | I may share my fishing line With a stranger | public parks are a main source of fresh fish in urban communities | some signs exist that offer fishing tips | I prefer to fish with people of various levels of angling expertise | I fish for saltwater | I fish for Ciclids and Sunfish | I fish for Perch | I fish for bass |
| I am an expert angler | I am an experienced angler | I sometimes consume fish caught at an urban public park | I would definitely share fishing tips with a stranger | I keep the best catch and safely release the rest back into the water. | I fish for Carp | I fish for freshwater | I fish for catfish | Maintaining brush/debris in the water has made my experience better (2) |
| I prefer the signs to be in english | I fish once a month | I would less likely keep improperly discarded line | I would definitely keep improperly discarded lures | I only catch and release. | Easy access to the lake has made my experience better | Easy access to the lake has made my experience better | Plenty of trash cans has made my experience better | Regularly stocked lake with edible fish has made my experience better (3) |
| I only go to urban parks to fish | I fish vey often. More than once a month | I prefer to eat or drink after i fish | I would definitely keep improperly discarded hooks | Habitually fish at the same park | It is not uncommon for anglers to drive many miles to fish in an urban park | Accessible restrooms has made my experience better (2) | good lighting has made my experience better | kayak access has made my experience better |
| I spend half my time fishing at the park | I definitely want to know about the surrounding wildlife/natural environment | Fish for food | Fish for recreation and relaxation | Anglers live in suburbs | Anglers live in urban area | I cleaned my catch at the park on a table away from the water | I cleaned my catch away from the park | I do not clean my catch in the park water where I caught it |
| I want to know about the fish in the water | I very much want to know about sustainable or eco-friendly fishing | I Fish to become a better angler | I am paid to catch fish | It is somewhat important that I catch when I fish | It is very important that I catch when I fish | The parks department needs to offer better kayak access (2) | To feel safe, pick up the trash others leave behind. | To feel safe, I carry a firearm |
| I might want to know about tips on how to fish | The parks department needs to provide better access | The parks department needs to offer more shade | a fishing spot free from tossed hooks | a fishing spot free from tossed line | I would properly discard tackle that someone else has left behind | a fishing spot free from tossed lures | A pristine and litter-free parks is important to me. | To feel safe, I bring first aid supplies, fluid for hydration, and phone. |
| I always take first aid bag on my fishing trip | I always take camera equipment and hat on my fishing trip | The parks department needs to keep crazy people and litterers out | The parks department needs to provide more catch and release only parks (2) | The parks department needs to enforce the fishing laws and regulations | The parks department needs to install restrooms (2) | The parks department needs offer better parking | To feel safe, I choose the right spot | To feel safe, I clean up improperly discarded tackle |
| I always take sunglasses and hat on my fishing trip | I always take water on my fishing trip (8) | To feel safe, I stay a safe distance from other anglers | To feel safe, I am always aware of my surroundings | To feel safe, I monitor safety | To feel safe, I avoid people | To feel safe, I practice social distancing. | To feel safe, I stay a safe distance from other anglers | To feel safe, I practice finesse fishing |
| | | | | | | | | To feel safe, pick up the trash others leave behind. |

Figure 4.10. Data download – digital cards, survey responses (2020).

| | | | |
|---|---|---|---|
| Water fountains are far from the banks | Water fountains water recharge stations | Plenty of trash/recycle bins | Strangers talking to each other |
| Most parks are not strictly catch and release. Fishing regulatoins are posted onsite and online. | Fishing spots polluted with litter | No first aid stations or onsite resources | The parks departments regularly trim the surrounding area near the water's edge. |
| Plenty of trash/recycle bins | Signs exist with basic stweardship information. | Good hooks and lures littering the park | Park maps exist, but do not define specific fishing spots |
| Opportunitiy for environmentally-friendly | Open spaces, lighting | Community as a user | Bank fishing |
| The parks regulrly stock edible game fish. | Many trees in most parks. Some parks lack enough shade. Almost none have covered fishing spots. | The parks provide ada access, paved paths, kayak access, parking, railing, signs | Favorite fishing spots |
| Signs on-site provide basic infomormation, but most information has to be accessed online or through angler interactions | Smiling faces with tight lines | Educational signs exist to educate anglers on the type of fish are in the water and possible baite | Some users look isolated |
| A few long benches exist on the premises, but rarely near the water. | 600-Acre park | Few species of fish in the water | Natural recreational oasis |
| A small natural oasis in the city | Natural desitination | Picnic tables | A lot of wildlife and native plants |
| Shady characters sitting in cars in their parking lot | Plenty of opportunity for design intervention | Many trees and shady spots | Some spots are difficult to reach |
| No rescepticles to discard tackle. Trash cans are the only option | Many people fishing alone | The parks stock specific fish species by season or location. | Open spaces, lighting |
| A few benches exist for socializing, resting and recreation on the site, but rarely near the water. | | | |

Figure 4.11. Data download – digital cards, Southside Lions Park field research findings (2019).

# By the Angler

## Angler Safety

### Safe Gear
- I always take water on my fishing trip (8)
- I always take first aid bag on my fishing trip
- I always take sunglasses and hat on my fishing trip

### Safe Practice
- To feel safe, I choose the right spot
- I always take first aid bag on my fishing trip
- I prefer to eat or drink after I fish

## Stewardship & Sustainability

### Clean Up
- To feel safe, I clean up improperly discarded tackle
- To feel safe, pick up the trash others leave behind.

### Catch & Release
- I keep the best catch & safely release the rest back into the water.

### Recycle
- I would definitely keep improperly discarded lures

## Angler (user)
- I am an experienced angler
- I fish very often. More than once a month
- I fish once a month
- Anglers live in suburbs
- Habitually fish at the same park
- I always take Camera equipment and hat on my fishing trip
- I fish for carp
- I fish for freshwater
- I fish for catfish

## Angler Community

### Group
- I prefer to fish with no more than 1-2 people
- I prefer to fish with people of various levels of angling expertise
- I may fish with an angler I just met
- I would fish with an angler I just met

### Sharing
- I would definitely share my hooks with a stranger
- I may share my fishing lures with a stranger
- I would definitely share fishing tips with a stranger
- I may share my fishing line with a stranger

### Experience I want
- I prefer to fish during the day
- I prefer to start fishing during the day and end in the evening
- a fishing spot free from tossed hooks
- a fishing spot free from tossed lures
- a fishing spot free from tossed line
- A pristine and litter-free parks is important to me.
- I all of my time at urban parks fishing
- I spend half my time at the park fishing
- It is very important that I catch when I fish
- It is somewhat important that I catch when I fish

### Motivation (Why I fish)
- I Fish to become a better angler
- Fish for food
- I am paid to catch fish
- Fish for recreation and relaxation

# By the Park Planner

### A good experience
- Easy access to the lake has made my experience better
- Maintaining brush/debris in the water has made my experience better (2)
- Regularly stocked lake with baitfish has made my experience better
- Regularly stocked lake with edible fish has made my experience better (3)
- The parks department needs to enforce the fishing laws and regulations

### Trash Cans
- Plenty of trash cans has made my experience better

### Waterfront Access
- The parks department needs to offer better kayak access (2)
- The parks department needs to provide better access
- Kayak access has made my experience better ess
- Easy access to the lake has made my experience better

### Vehicle Access
- The parks department needs offer better parking

### Lighting
- Good lighting has made my experience better

### Restroom
- Accessible restrooms has made my experience better (2)
- The parks department needs to install restrooms (2)

### Shade
- The parks department needs to offer more shade

### Info
- I definitely want to know about the surrounding wildlife/natural environment
- I might want to know about tips on how to fish
- I very much want to know about sustainable or eco-friendly fishing
- I want to know about the fish in the water
- I prefer the signs to be in english

### Security
- The parks department needs to keep crazy people and litterers out

### Cleaning Station
- I cleaned my catch at the park on a table away from the water
- I do not clean my catch in the park water where i caught it
- I cleaned my catch away from the park

Figure 4.12. Space Saturate Group framework.

*Design Method: Space Saturate and Group*

The Space Saturate and Group method was conducted to unpack relevant survey data and insights recorded on 134 digital cards during the data download. Saturating the digital space with insights by spreading them across a viewable surface improved the opportunity for seeing connections (Both n.d.). The cards were consolidated into 82 unique responses. The data were explored for thematic commonalities and emerging patterns that identified meaningful angler needs or revealed key user insights (IBM n.d., 8; Kolko n.d.). As shown in figure 4.12, the sorting revealed two data groups that were labeled "By the Angler" and "By the Park Planner." The "By the Angler" group represented user actions, needs, or attributes and was subdivided into six subgroups: angler safety, stewardship, angler ability, motivation, needs, community. The "By the Park Planner" group represented the everyday user experience at Southside Lions Park and was subdivided into two subgroups: amenities and "A good experience." The amenities section was subdivided further into nine categories: trash cans, waterfront access, vehicle access, lighting, restroom, shade, info security, cleaning station.

*Design Method: Empathy Mapping*

An empathy map, shown in figure 4.13, is a "collaborative visualization" technique applied to prioritize user needs and articulate what is known about the *Urban Angler*, a distinct user type within the angler segment (Gibbons 2018a). In digital UXD, it is paramount for designers to understand the user. Still, it is also essential for others, such as researchers and subject matter experts, to empathize with the user to aid in ideation and decision-making (Gibbons 2018a).

**Says**

- I fish for food
- I prefer to fish with no more than 1-2 people
- I prefer to start fishing during the day and end in the evening
- I prefer to fish with people of various levels of angling expertise
- I fish for recreation and relaxation
- I prefer to fish during the day
- I spend a lot of my time fishing at urban parks
- I prefer to eat or drink after I fish
- I live in urban area
- I take sunglasses and hat on my fishing trip
- I fish to become a better angler

**Angler (User)**

**Feels**

- want more about the surrounding wildlife/natural environment, tips on fishing, sustainability and park info
- A pristine and litter-free parks is important to me.
- Plenty of trash cans has made my experience better
- It is important that I catch when I fish
- Easy access to the lake has made my experience better
- Regularly stocked lake with edible & bait fish has made my experience better (3)
- I prefer the signs to be in english (12)
- kayak access has made my experience better
- Easy access to the lake has made my experience better
- Maintaining brush/debris in the water has made my experience better (2)

**Thinks**

- I may fish with an angler I just met
- The parks department needs to keep crazy people and litterers out
- I would definitely share fishing tips, my line, lures and hooks with a stranger
- I would definitely keep improperly discarded hook & lures
- The parks department needs to offer more shade
- I am an experienced angler
- The parks department needs to provide better access
- The parks department needs to offer better kayak access (2)
- The parks department needs offer better parking
- The parks department needs to provide more catch and release only parks (2)
- The parks department needs to install restrooms (2)
- The parks department needs to enforce the fishing laws and regulations

**Does**

- To feel safe, i pick up the trash others leave behind.
- I sometimes take first aid bag on your fishing trip
- A fishing spot free from tossed hooks. Line and lures
- To feel safe, i am always aware of my surroundings
- I habitually fish at the same park
- To feel safe, i bring first aid supplies, fluid for hydration, and phone.
- I take camera equipment and hat on your fishing trip
- To feel safe, i choose the right spot
- To feel safe, i stay a safe distance from other anglers
- I keep the best catch and safely release the rest back into the water.
- I fish more than once a month
- I cleaned my catch away from the park
- To feel safe, i clean up improperly discarded tackle
- I fish for bass & catfish mostly.
- I cleaned my catch at the park on a table away from the water

**Pains**

- I bring my own water because I need to stay hydrated while fishing and I cannot always count on having a fresh water source nearby.
- I always consider safety when trying to select the best spot.
- I am mindful of the surroundings and potential danger.
- I bring my own first aid equipment for peace of mind and to handle minor emergencies.
- I often have to remove unsafe garbage and debris from fishing spot.
- To be safe, I try to avoid too much sun while fishing
- I struggle to become a better, more skillful angler. I want to teach my kids how to be better anglers, as well
- To feel safe, I tend to avoid strangers
- I have to free my spot from dangerous fishing tackle and line.
- I want more access, go to where the fish are

**Gains**

- I would use good, discarded tackle I found at the park
- I enjoy socializing while fishing
- I thoroughly enjoy a clean, environmentally-friendly experience
- One thing I enjoy about fishing is the sense of community with the other anglers at the park
- I prefer a more sustainable fishing experience
- I would fish with a stranger
- I benefit from a cleaner, environmentally-friendly experience
- I wish to fish in an informed and environmentally-friendly manner
- I enjoy fishing by species, and not all species are created equal
- When I catch, I gain a sense of accomplishment and enjoy the bounty

Figure 4.13. Empathy map framework – Urban Angler profile.

Participant survey responses were divided into quadrants on a chart: "Says," "Thinks," "Feels, and "Does" (Gibbons 2018a). Two additional groupings, labeled "Pains" and "Gains," were added to explore the Urban Angler's direct relationship with public park fishing. These additional groupings helped understand key pain points in the experience as they described design opportunities (Osterwalder et al. 2014, 14). Impediments or risks identified as friction points during the fishing experience were grouped under the "Pains" category. The "Gains" category captured actual or perceived user benefits experienced while fishing at public parks.

*Design Method: Insight Nuggets*

Large amounts of raw data are typically gathered during digital UXD research, making it challenging to share, requiring organization for proper synthesis (Sharon 2016). Insight nuggets are key research learnings, supported by compelling evidence, which provide a method to share research in a consumable way. They deliver a framework for organizing learnings throughout the process, and they highlight vital insights, or truths, that UX designers can act on more straightforward and faster (Sharon 2016).

As shown in figure 4.14, four highlighted insight nuggets revealed thematic distinctions representative of the Urban Angler's expectations and needs. Survey participants identified safety as a significant concern and essential to a good fishing experience. Environmental stewardship was prioritized by every participant, as demonstrated by their willingness to clean up after others and eco-friendly fishing selections. As they described fishing as a social and bonding experience, community or kinship was expressed as an essential need by participants. Due to the rewarding sense of

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accomplishment, successfully catching at least one fish was deemed necessary to enjoy

the fishing experience by most participants.



| "Safety is essential to a good fishing experience." | "Anglers are stewards of our natural environment." | "Community and kinship are part of the experience." | "Catching is as important as good fishing." |
| --- | --- | --- | --- |
| Safety is a major concern for anglers while fishing. | Improperly discarded tackle and line littering fishing spots is common; a danger to park visitors and wildlfe. | Anglers celebrate community & kinship. | Anglers prize accomplishment, skill and success. |
| | | | Successful anglers have to be self-reliant as park amenities are limited. |

Figure 4.14. Insight nuggets framework.

*Design Method: Theme Grouping*

The goal of synthesizing data in digital UXD is to make sense of observations and

find contextual relationships; to discover hidden meaning in user behaviors that can then

be applied to the experience design task (Kolko n.d.). Theme grouping was conducted to

influence connections by sorting data under distinct need-themes found in the insight

nuggets and the Urban Angler empathy map. As shown in figure 4.15, the resulting

theme grouping framework provided a visual representation indicating four Urban Angler

experience needs: safety, stewardship, kinship, and success.

*Safety* was primarily described by participants as an angler experience without

stray fishing line, improperly discarded tackle, or trash in the area. An environmentally

friendly angling experience exemplifying *stewardship* was described as having a pristine

fishing area that provided recycling opportunities for litter and unwanted tackle and

encouraged catch-and-release fishing. Urban Angler *kinship* was described as having

a sense of community, socializing, and sharing with strangers. According to the data,

anglers defined *success* as gaining a sense of accomplishment in urban fishing after
catching a target fish species while practicing acquired skills.
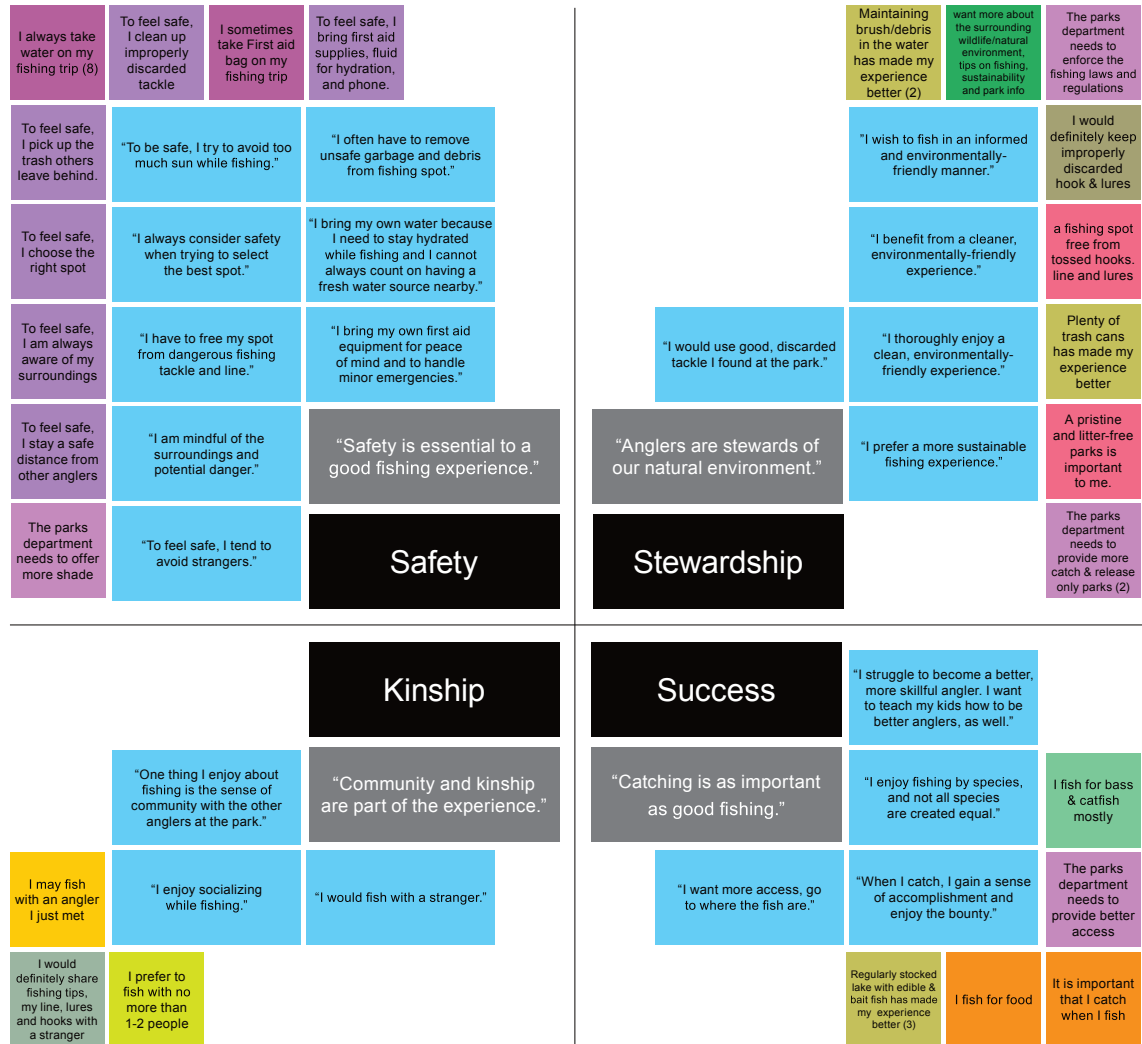


Figure 4.15. Theme grouping framework – merged insight nuggets and empathy map data

*Design Method: Features and Task Analysis*

As shown in figures 4.16a - 4.16b, a method inspired by the Kano analysis
called the Features, Activities, Tasks analysis was conducted to understand the design
opportunities presented by the need-themes (Martin and Hanington 2012, 50). Like the
technique developed by Dr. Noriaki Kano, the most critical park features to the Urban

Angler experience were determined and prioritized, while less beneficial features were deselected. This process generated an experience design solution that focused on primarily delivering the most helpful and most needed park features.

| Themes | "I, the angler…" (empathy tool) | | Existing Amenities | |
|---|---|---|---|---|
| **Safety** | "To be safe, I try to avoid too much sun while fishing" | "I often have to remove unsafe garbage and debris from fishing spot." | Water fountains. Water recharge stations | Park maps exist, but do not define specific fishing spots |
| | "I always consider safety when trying to select the best spot." | "I bring my own water because I need to stay hydrated while fishing and I cannot always count on having a fresh water source nearby." | No rescepticles to discard tackle. Trash cans are the only option | Open spaces, lighting |
| | "I have to free my spot from dangerous fishing tackle and line." | "I bring my own first aid equipment for peace of mind and to handle minor emergencies." | No first aid stations or onsite resources | Many trees in most parks. Some parks lack enough shade. Almost none have covered fishing spots. |
| | "To feel safe, I tend to avoid strangers." | "I am mindful of the surroundings and potential danger." | Plenty of trash/recycle bins | |
| **Kinship** | "One thing I enjoy about fishing is the sense of community with the other anglers at the park." | | A few benches exist for socializing, resting and recreation on the site, but rarely near the water. | A few long benches exist on the premises, but rarely near the water. |
| | "I enjoy socializing while fishing." | "I would fish with a stranger." | Educational signs exist to educate anglers on the type of fish in the water and possible bait | |
| **Stewardship** | I wish to fish in an informed and environmentally-friendly manner | I would use good, discarded tackle I found at the park | No amenities exist | The parks departments regularly trim the surrounding area near the water's edge. |
| | I benefit from a cleaner, environmentally-friendly experience | I prefer a more sustainable fishing experience | Plenty of trash/recycle bins | Signs exist with basic stweardship information. |
| | I thoroughly enjoy a clean, environmentally-friendly experience | | Most parks are not strictly catch and release. Fishing regulations are posted onsite and online. | |
| **Success** | "I struggle to become a better, more skillful angler. I want to teach my kids how to be better anglers, as well." | "I want more access, go to where the fish are." | The parks stock specific fish species by season or location | Signs on-site provide basic infomormation, but most information has to be accessed online or through angler interactions |
| | "I enjoy fishing by species, and not all species are created equal." | | The parks regulrly stock edible game fish. | |
| | "When I catch, I gain a sense of accomplishment and enjoy the bounty." | | The parks provide ada access, paved paths, kayak access, parking, railing, signs | |

Figure 4.16a. Feature, Activities, Tasks analysis – Needs, Themes & Features (NTF).

| What's Working | | What Needs Improvement | | What is Not Working |
|---|---|---|---|---|
| Water fountains. Water recharge stations | The parks regularly stock edible game fish. | A few benches exist for socializing, resting and recreation on the site, but rarely near the water. | The parks provide ada access, paved paths, kayak access, parking, railing, signs | No rescepticles to discard tackle. Trash cans are the only option |
| Plenty of trash/recycle bins | The parks departments regularly trim the surrounding area near the water's edge. | Many trees in most parks. Some parks lack enough shade to be safe. | No first aid stations or onsite resources | No amenities exist for unwanted or found tackle |
| Open spaces, lighting | | | | |

Signage Solutions

| | |
|---|---|
| Educational signs exist to educate anglers on the type of fish are in the water and possible bait | Most parks are not strictly catch and release Fishing regulations are posted onsite and online. |
| Signs exist with basic stewcvardship information. | Park maps exist, but do not define specific fishing spots |
| Signs on-site provide basic fishing tips, but most information has to be accessed online | |

Figure 4.16b. Feature, Activities, Tasks analysis – Practical Urban Park framework.

First, a Needs, Themes & Features (NTF) framework was produced to identify the relationships between the need-themes documented in the theme grouping framework and park amenities documented in the Space Saturate Group method (Martin and Hanington 2012, 106). The NTF framework revealed connections between public park fishing experience amenities and specific Urban Angler needs. This method was applied similarly to how UXD researchers analyze the relationship between user needs and digital product features (see figure 4.16a) (Schuler and Namioka, 1993, 144).

The Practical Urban Park framework, shown in figure 4.16b, was built to isolate the amenities failing to meet the Urban Angler needs. Park features and amenities were divided into specific insight categories defined by three questions: What's working? What needs improvement? What is not working? Nine of the features were mentioned or observed as needing improvement and involved seating, shaded areas, handicap

accessibility, first aid support, and communicative signage. Two features were mentioned as not working because they did not exist; they would have helped anglers properly discard or share unwanted end-tackle. Nine of the features were mentioned as needing improvement, and they addressed needs regarding adequate seating, shaded areas, handicap accessibility, first aid support, and educational signage. Five features were mentioned as working: water fountains and recharge stations, trash and recycling bins, open spaces and lighting, fish stocking programs, and vegetation management on waterfront banks.

*Design Method: Hierarchy of Urban Angling Needs*

The four need-themes defined in the theme grouping framework were reorganized into a Hierarchy of Urban Angling Needs (HUAN) to understand the Urban Angler's path toward achieving a delightful, or positive, fishing experience. As shown in figure 4.17b, this model was inspired by the work psychologist Abraham Maslow proposed in 1940 and its 2011 adaptation by Aarron Walter (see figure 4.17a) (Fessenden 2017).

Maslow surmised that human motivation was based on the pursuit of fulfillment through personal growth (Editors of Encyclopaedia Britannica 2021). His Hierarchy of Needs model depicted layered need levels organized into a pyramid. "Self-actualization" was placed above lesser psychological needs such as "esteem" and "belonging" (McCleod 2020). The lowest need levels represented the basic human necessities such as "safety" and sustenance (McCleod 2020). Walter adapted Maslow's work in 2011 by translating psychological needs to user needs; he placed levels representing pleasure and usability above levels representing reliability and functionality (Fessenden 2017).
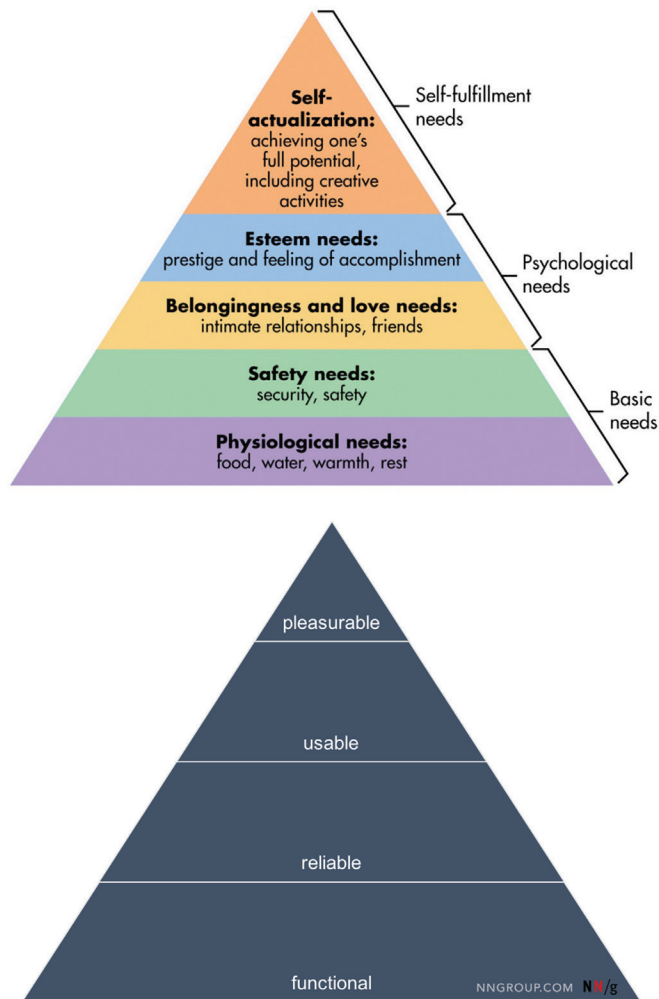
Figure 4.17a. Hierarchy of needs pyramids – *top,* Maslow's Hierarchy of Needs model (1940), diagram by Dr. Saul McLeod; *bottom*, Walter's Hierarchy of User Needs model (2011), diagram by T. Fessenden.

As seen in figure 4.17b, of the four need-themes derived from the theme grouping framework (see figure 4.15), "Stewardship" corresponded to Maslow's most basic physiological need-level by focusing on clean water, edible fish, and a pleasant environment. "Safety" aligned with Maslow's next need-level of security and physical well-being by outlining the angler desire for safe angling practices and safe environments. "Kinship" aligned with Maslow's middle need-level, describing the desire for belonging by presenting a need for a sense of community while fishing. "Success"

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aligned with Maslow's primary need-level as a desire for prestige and sense of accomplishment by presenting the need to catch fish skillfully.
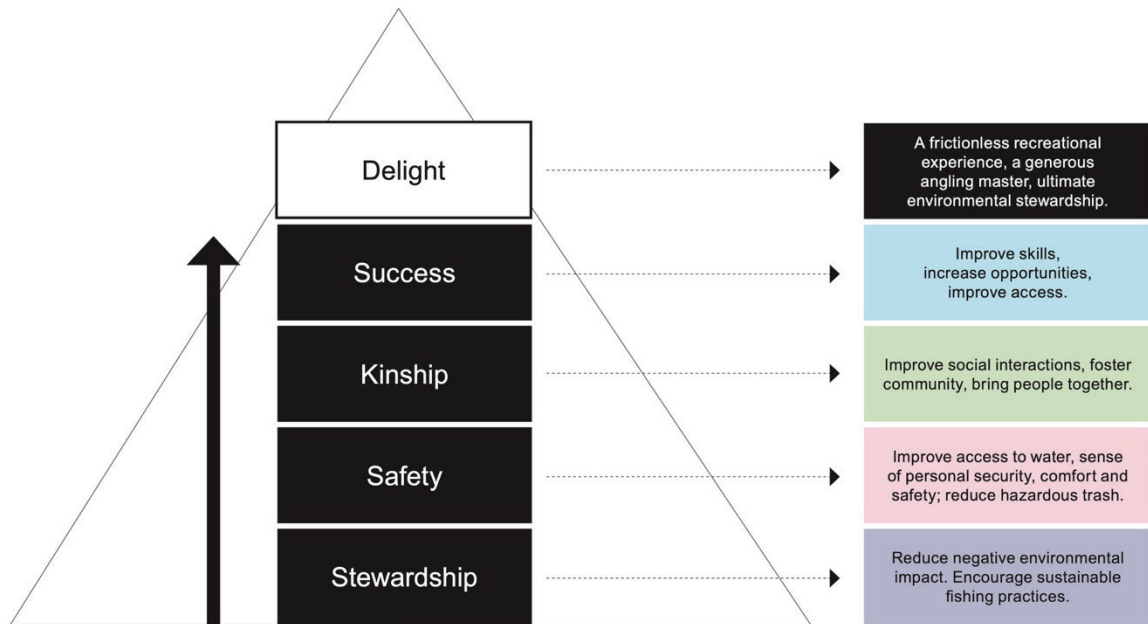


Figure 4.17b. Hierarchy of Urban Angler Needs (HUAN) framework

*Delight* describes the top-most positive emotion that the Urban Angler can experience when fishing at a public park. As with Maslow and Walter's pyramid models, also demonstrated in the HUAN framework, the top levels can only be achieved after all other lower user needs are satisfied during the activity (Fessenden 2020; Editors of Encyclopaedia Britannica 2020).

*Design Method: Proto-persona*

Digital UX designers, by definition, are "advocates for the end-user," and they commonly use a *persona* to represent the proto-typical user as defined by the research data (Gothelf 2013, 26). During a user's story, the main character is depicted by the persona to promote human-centered understanding through a typical "yet realistic" depiction of the user, as informed by empathy mapping (Norman 2013, 57; Harley 2015).

**Proto-Persona – Urban Angler**

| | |
|---|---|
| **Jehida**<br>(27 years old) | Single, but in a relationship<br><br>No Kids, but spends times with her nephews and nieces.<br><br>Goal oriented.<br><br>Does not mind hard work. Works long days as a administration assistant. Enjoys personal time on weekends<br><br>On a budget.<br><br>Enjoys outdoors & has an active lifestyle, and cares about the environment and wants to unplug from digital experiences while fishing.<br><br>Social and friendly.<br><br>Enjoys meeting nice people with similar interests.<br><br>**Behavior & Demographic** |

| **Pain Points & Needs** | **Possible Solutions** |
|---|---|
| Trash filled fishing spots.<br><br>Discarded hooks, lines and lures are everywhere.<br><br>No comfortable sitting places near the water to sit, social and fish.<br><br>Sometimes there's no shade.<br><br>Does not always feel like an environmentally-friendly experience.<br><br>Feels unsafe at the parks at night.<br><br>Doesn't always know about the area what is in the water or how to fish for it.<br><br>Getting skunked sucks and is frustrating. | Cleaner fishing spots & Cleaner water<br><br>A nice place to comfortably sit, socialize and fish<br><br>A more sustainable and eco-friendly experience<br><br>A sense of safety during the evening<br><br>Sense of belonging to a community.<br><br>Communicated fishing secrets and fishing tips<br><br>Skill-builders to help catch fish for the best experience. |

Figure 4.18. Proto-persona framework – Jehida, the Urban Angler. Image source, Facebook.com

Persona-building methods can vary, depending on the applied UXD approach, and can be a cumbersome and lengthy process. A professional UX practitioner may require months of in-depth research to explore as many as five personas in a project, focusing on various user types and their unique needs (Gothelf and Seiden 2016, 26). Based on Agile principles, the Lean UX approach was applied in this research study to streamline solution ideation and shorten the project timeframe. It also allowed for testable assumptions to be employed for later confirmation, resulting in a more efficient persona-building process (Gothelf and Seiden 2016, 27). The alternative *Proto-persona* permitted

a single user type to represent a broader user segment for rapid ideation and testing, resulting in a more adaptive UXD ideation and testing process.

The Proto-persona framework was comprised of quadrants, dividing personal traits into "behavior and demographics," "pain points and needs," and "possible solutions" (Gothelf and Seiden 2016, 28). For this thesis, the Urban Angler was cast as the Proto-persona, Jehida. She was a single, independent, goal-oriented, 27-year-old urbanite of Latin-American descent (see figure 4.18). She had no children but often cares for a niece and nephew. She was a hard-working administrative professional that worked a typical five-day workweek schedule and enjoyed personal time outdoors during the weekends. Because she was on a strict budget, she frequented free fishing spots in public parks near her downtown apartment to enjoy the outdoors, unplug from the digital space, and meet friendly people who share her interest in angling.

Jehida did not consider herself an expert angler. Still, she was generous with her knowledge about the activity and sought opportunities to build her fishing skills. She cared for her neighborhood park's natural areas and believed in environmental stewardship. She had several primary pain points, or friction, with the current urban fishing experience: trash-littered fishing spots, negative human impact on natural areas, an abundance of improperly discarded fishing line and tackle, a lack of decent seating amenities near the water, a reduced sense of safety, and a lack of usable information near the lake. A significant pain point for her was getting *skunked*, an Urban Angler term for unsuccessfully attempting to catch a fish during a fishing trip (CSBJosh 2019).

A cleaner lake and a litter-free fishing spot would meet Jehida's urban fishing needs by offering a more sustainable and eco-friendly fishing experience while

supporting a sense of safety. An excellent place to sit while she fishes and socializes could provide her with a sense of social belonging and comfort. Better communication in the park could inform her about the fish where she fishes. A skill-building tool could help her catch more fish for a sense of accomplishment and the best fishing experience.

*Design Method: User Journey and Target Opportunities*

According to the IDEO approach, a *user journey* is a mapping framework that helps visualize an experience from beginning to end (IDEO.org n.d.). The Nielson Norman Group describes journey mapping as a qualitative method used by UX designers to "discover, document, and share the bigger picture of what users want" (Gibbons 2018b). An Urban Angler user journey was developed to map Jehida's fishing trip to understand her experience and isolate the points where design opportunities would matter the most during the activity (IDEO.org n.d.).

As shown in figure 4.19, Jehida's user journey tamed the complexity of all the known Urban Angler experience facets, which represented her actions and emotions within the context of catfishing at Southside Lions Park (Norman 2013, 57). The journey was divided into four linear stages to isolate each step of the experience and identify critical points that cause positive reactions or user frustrations (Knapp et al. 2016, 59). Jehida's actions, goals, ratings, feelings, and experience opportunities were also diagrammed in the exercise.
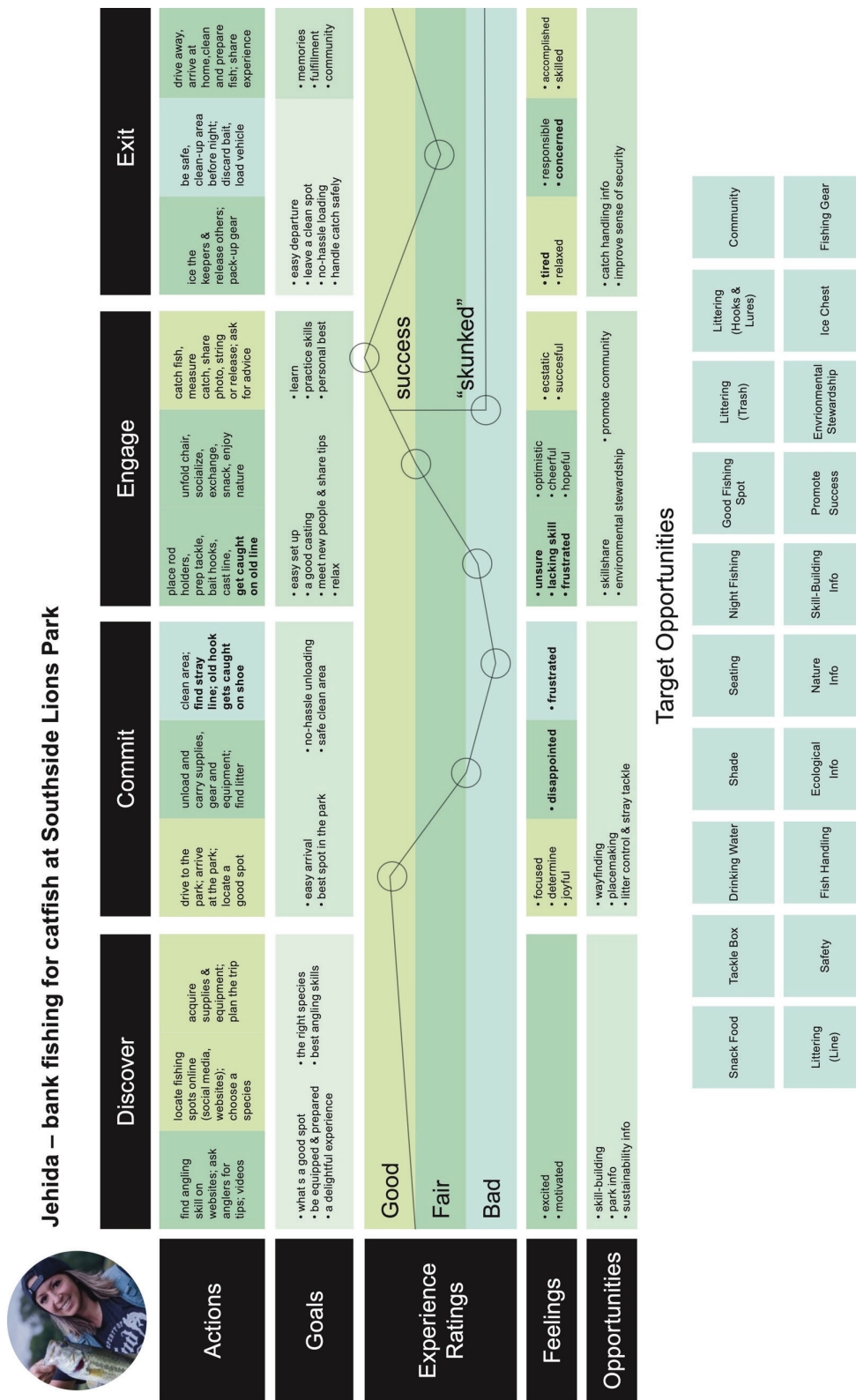
**Jehida – bank fishing for catfish at Southside Lions Park**

| | Discover | | Commit | | Engage | | Exit | |
|---|---|---|---|---|---|---|---|---|
| **Actions** | find angling skill on websites; ask anglers for tips; videos | locate fishing spots online (social media, websites); choose a species | acquire supplies & equipment; plan the trip | drive to the park; arrive at the park; locate a good spot | unload and carry supplies, gear and equipment; find litter | clean area; **find stray line; old hook gets caught on shoe** | place rod holders, prep tackle, bait hooks, cast line; **get caught on old line** | unfold chair, socialize, exchange, snack, enjoy nature | catch fish, measure catch, share photo, string or release; ask for advice | ice the keepers & release others; pack-up gear | be safe, clean-up area before night; discard bait, load vehicle | drive away, arrive at home, clean and prepare fish; share experience |
| **Goals** | • what's a good spot • be equipped & prepared • a delightful experience | • the right species • best angling skills | | • easy arrival • best spot in the park | • no-hassle unloading • safe clean area | | • easy set up • a good casting • meet new people & share tips • relax | • learn • practice skills • personal best | | • easy departure • leave a clean spot • no-hassle loading • handle catch safely | • memories • fulfillment • community |
| **Experience Ratings** | Good / Fair / Bad | | | | | | success / "skunked" | | | | |
| **Feelings** | • excited • motivated | | • focused • determine • joyful | • disappointed | • frustrated | • unsure • lacking skill • frustrated | • optimistic • cheerful • hopeful | • ecstatic • successful | • tired • relaxed | • responsible • concerned | • accomplished • skilled |
| **Opportunities** | • skill-building • park info • sustainability info | | • wayfinding • placemaking • litter control & stray tackle | | • skillshare • environmental stewardship • promote community | | • catch handling info • improve sense of security | |

**Target Opportunities**

| | | | | | | |
|---|---|---|---|---|---|---|
| Snack Food | Tackle Box | Drinking Water | Shade | Seating | Night Fishing | Good Fishing Spot | Littering (Trash) | Littering (Hooks & Lures) | Community |
| Littering (Line) | Safety | Fish Handling | Ecological Info | Nature Info | Skill-Building Info | Promote Success | Environmental Stewardship | Ice Chest | Fishing Gear |

Figure 4.19. Urban Angler user journey and target opportunities.

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Jehida's experience was rated as "Good" during the Discover portion of her story. The Urban Angler felt excited while she researched catfishing skills, new equipment, and the best fishing locations. After a high point early in the "Commit" portion of the journey, when Jehida traveled to the park, it deteriorated to "Bad" as she disappointingly realized that improperly discarded fishing line, discarded hooks, and garbage littered an otherwise excellent fishing spot near the water.

The Urban Angler was challenged early in the "Engage" portion of her journey as the independent Jehida required fishing advice from fellow anglers because of the lack of posted information about the natural area, the fish in the water, or helpful angling instructions. On the plus side, asking strangers for advice allowed her to socialize.

Jehida's experience was divided into two scenarios: one where she caught a fish during the trip and another where she did not. When Jehida was skunked, the rest of her journey was rated as "Bad." When she caught a fish, the overall trip was rated as "Good."

Despite notable low points, successfully catching a catfish set a positive tone for the whole journey. With Jehida's experience ending during the "Exit" portion of the journey, she responsibly handled her catch. She cleaned the area out of concern for the environment while sparing another angler the same frustration she felt earlier. She left the park feeling accomplished.

In all, 20 target opportunities for design ideation were identified during Jehida's user journey (see figure 4.19). They represented specific needs that required resolution to eliminate all friction from Jehida's experience at Southside Lions Park.
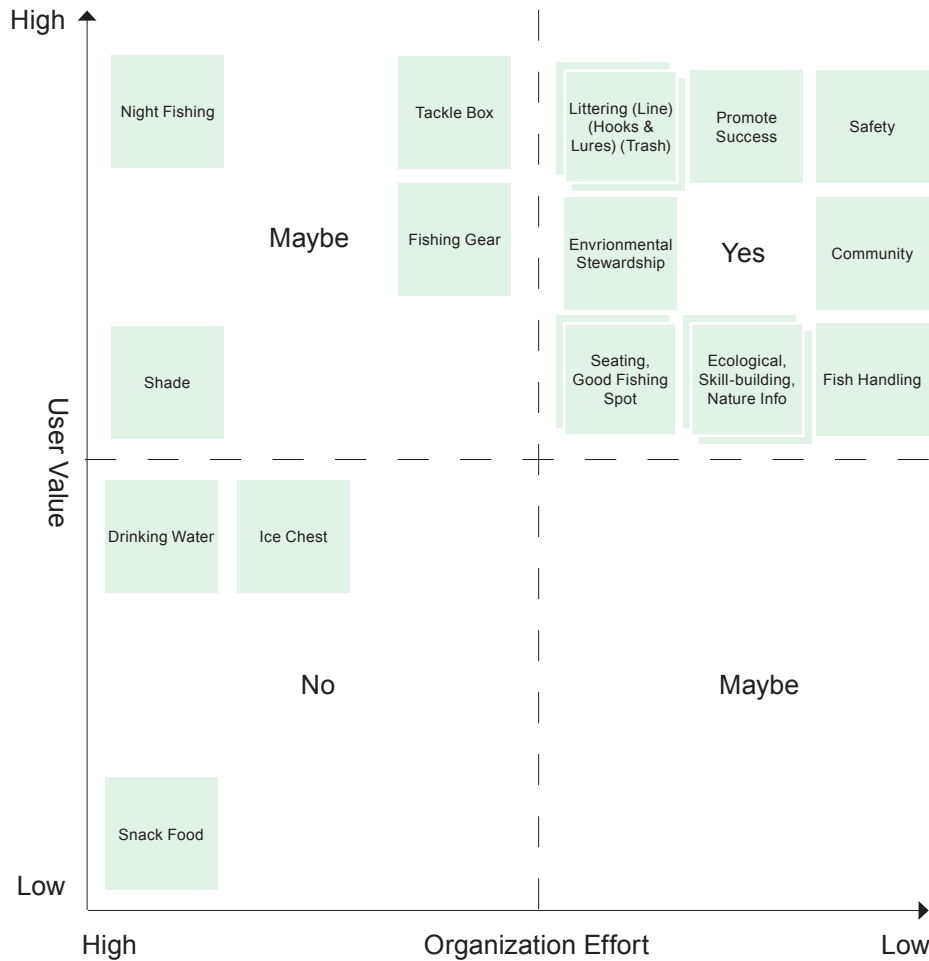
Figure 4.20. Opportunity Prioritizing matrix – target opportunities.

*Design Method: Opportunity Prioritization*

According to Sarah Gibbons of the Nielson Norman Group, UX practitioners need

to understand how to balance design opportunities with available time and resources. In

the Lean UX approach, "ruthless prioritization" is a crucial tenet. In that spirit, design

opportunities in Jehida's journey were culled by conducting an Opportunity Prioritization

method; a matrix was used to identify the most valuable user problems (Gibbons 2018b).

This method allowed opportunities to be rated during conversations with the Project

Stakeholders to isolate the most critical needs listed in Jehida's journey (Gothelf and

Seiden 2016, 22; Gibbons 2018b). Assuming an organization or public entity would be

tasked in the future with implementing the design solution presented in this thesis, the matrix weighed the value of solving essential user needs against the effort required by an organization to execute solutions. As shown in figure 4.20, six target opportunities rated high-value and low-effort: littering, the lack of fishing information, environmental stewardship promotion, fishing success, safety, community building, seating amenities, and suitable fishing spot identification.

*Synthesis Summary*

Digital UXD convergent thinking methods were conducted and applied during the Define phase of this thesis to understand the Urban Angler's needs and discover design opportunities. Data and insights collected from observations, surveys, and interviews during the Discover phase were sorted into themes, representing the user needs and urban park features.

The Proto-persona, Jehida, characterized the prototypical Urban Angler. Her user experience narrative was set at Southside Lion's Park in San Antonio, Texas. It was discovered that her delightful fishing experience depended on four interconnected need-themes: stewardship, safety, kinship, and success.

A sustainable and environmentally friendly fishing experience would require that Jehida find pristine, litter-free fishing spots with recycling opportunities that promote stewardship and catch-and-release. A safe urban fishing experience for her would provide security and an area free from discarded hooks, lures, and stray fishing line. A social fishing experience would allow her to share tackle and fishing tips in a way that supports a sense of community. A successful fishing experience would improve her skills to target and catch a specific fish species.

According to the Features, Activities, Tasks analysis of Jehida's typical fishing experience, critical design opportunities were revealed during her user journey. She experienced littering and discarded tackle early in the story, which meant that any solution had to resolve the problem before she arrived at the lake or enhance her pre-fishing clean-up. A lack of helpful information for skill-building presented an opportunity for tangible educational signage because she preferred to unplug from digital devices while fishing. The prioritized design opportunities concentrated on several amenities and programs that included promotion of responsible fishing, improved safety, community through kinship, dedicated seating amenities, and highlighting the best fishing spot.

*Design Method: Reframe*

According to IDEO, arriving at the correct solution requires understanding the design challenge (IDEO.org n.d.). This thesis's creative compass was set in a general direction at the research's onset by framing a broad problem with a preliminary "How might we" (HMW) question. During the Define phase, a structured data synthesis allowed "selected features and relationships" to be revealed in Jehida's user journey that implicated new design opportunities and constraints (Kolko n.d.). The Reframe method allowed opportunities in Jehida's journey to be viewed differently with a shift in the "semantic perspective" (Kolko 2019). After gaining a better understanding, the design challenge and opportunities were reframed with an improved HMW question: "How might we create a delightful fishing experience for Jehida, the Urban Angler, by encouraging environmental stewardship, underscoring safety, and nurturing a sense of community while elevating her fishing skills?"

**Reframe**

How Might We create a delightful fishing experience for Jehida, the Urban Angler, by encouraging environmental stewardship, underscoring safety, and nurturing a sense of community while elevating her fishing skills?
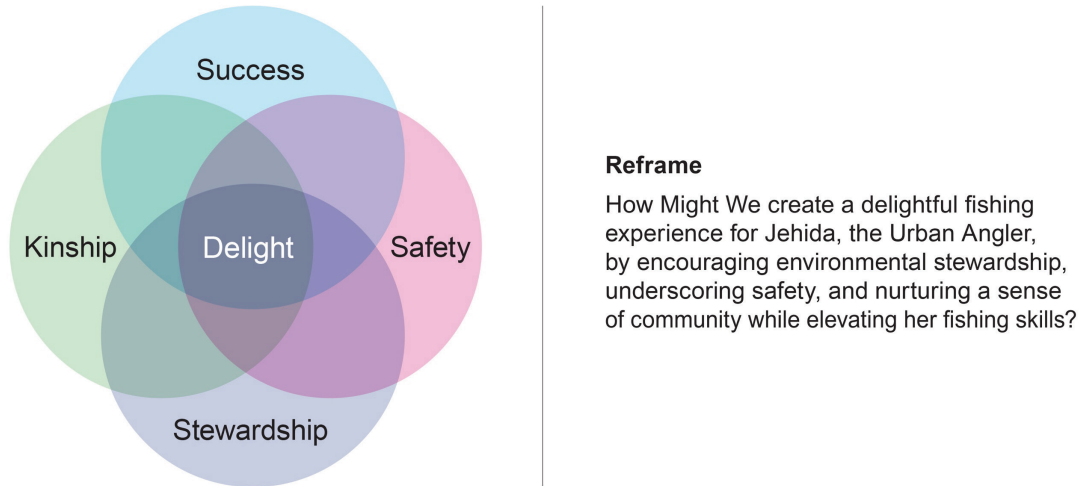
Figure 4.21. Need theme Venn diagram and reframed How Might We statement.

Additionally, a Venn diagram was created to visually depict how experiencing delight during the urban fishing activity directly depended on an experience design that holistically met the four categorized need-themes: success, safety, stewardship, and kinship (Simons 2014)( see figure 4.21).

*Project Stakeholder Validation*

The Synthesis Summary was presented to the available Project Stakeholders. They were interviewed as subject matter experts during primary research to acquire buy-in and confirm the findings before launching the Define phase (Eaton 2019). According to their feedback, the design research and synthesis methods used to gain the Urban Angler data were confirmed to correlate with digital UXD processes. The current urban fishing experience findings were confirmed to be plausible and representative; however, it was requested that any proposed park amenity design promote park systems as realistic experience-builders that connect with the local community in a meaningful and practical manner. It was also pointed out that angling instructors should be included as test participants to acquire deeper angler training insights during future research.

Furthermore, it was expressed that depicting the Urban Angler as a female representative for all urban anglers was realistic as it closely approximated the fastest-growing segment of urban park users and anglers.

**Develop: UX Design**

*Design Method: Experience Design Principles*

Design principles are a list of short statements used in digital UXD that represent the accumulated project wisdom and characterize the parameters of what could be the best design solution (interaction-design.org n.d.). Experience Design Principles (EDPs) were crafted using the need-themes described in the HUAN framework and Jehida's user journey map. These principles served as creative guardrails during ideation and promoted consistency across design iterations (IDEO.org n.d.) (see appendix F).

The first EDP read, "Environmentally positive," and advocated environmental stewardship and responsible fishing while mitigating a design iteration's negative impact on the environment. The next EDP read, "Safety and security first," and promoted safety by keeping a sense of personal security and safe fishing practices top-of-mind during ideation. The third EDP read, "Brings people together," and bolstered kinship, and helped promote cooperative community solutions that encouraged positive social interactions. The fourth EDP read, "Build better anglers," and prioritized success in a fishing experience by promoting skill-building and improving angling opportunities. The final EDP read, "Familiar and natural," and championed a self-actualizing and overall delightful experience that was approachable, intuitive, and reduced user frustrations.

*Design Method: Generative Ideation*

Problem-solving is at the core of the Develop phase of the Double Diamond process model. With a defined Urban Angler user problem and EDPs in place, the next step was to generate possible solutions (Nessler 2016). Generative ideation allowed for rapid concept development through progressive and incremental improvements (Gothelf and Seiden 2016, 37). Solutions for user needs discovered during the Define phase were explored and reviewed by available Project Stakeholders during several rounds of fast-paced ideation and design iteration (Gothelf and Seiden 2016, 38).

According to the Lean UX approach, the quickest method to convert abstract concepts into concrete solutions is sketching. Several blank paper sheets for sketching were folded to form multiple panels where each panel represented a prioritized design opportunity (Knapp et al. 2016, 107). Each sheet represented a set of relative constraints which characterized a specific experience theme. Concept development was conducted individually and alone to generate the best ideas (Knapp et al. 2016).

Multiple quick-paced ideation rounds were conducted to develop rough sketches of various experience solutions. The available Project Stakeholders immediately critiqued the work during a fast iteration process (Gothelf and Seiden 2016, 39). The right solution had to be a joy to use, abide by the EDPs, work holistically, and provide a sense of "deep delight" (Krug 2014, 9; Fessenden 2017). Also, any angler actions in the concepts had to collectively support the activity and address the reframed HMW (Norman 2013, 232).

From a UXD perspective, fishing is a collection of individual user actions that culminate into an activity (Norman 2013, 232). Thus, during ideation, certain actions that provided a delightful activity for the user were sketched: a means for proper trash

disposal, proper management of abandoned fishing tackle and line, social interfaces, skill-building, and measuring success. Good UXD was critical for how delightful Jehida would remember the interaction and the joy she would feel while experiencing urban fishing at the public park (Norman 2013, 10). Special consideration to affordances, or how she could interact with the amenities, was taken during ideation to provide better usability and an intuitive sense of function and purpose to the design (Norman 2013, 11).
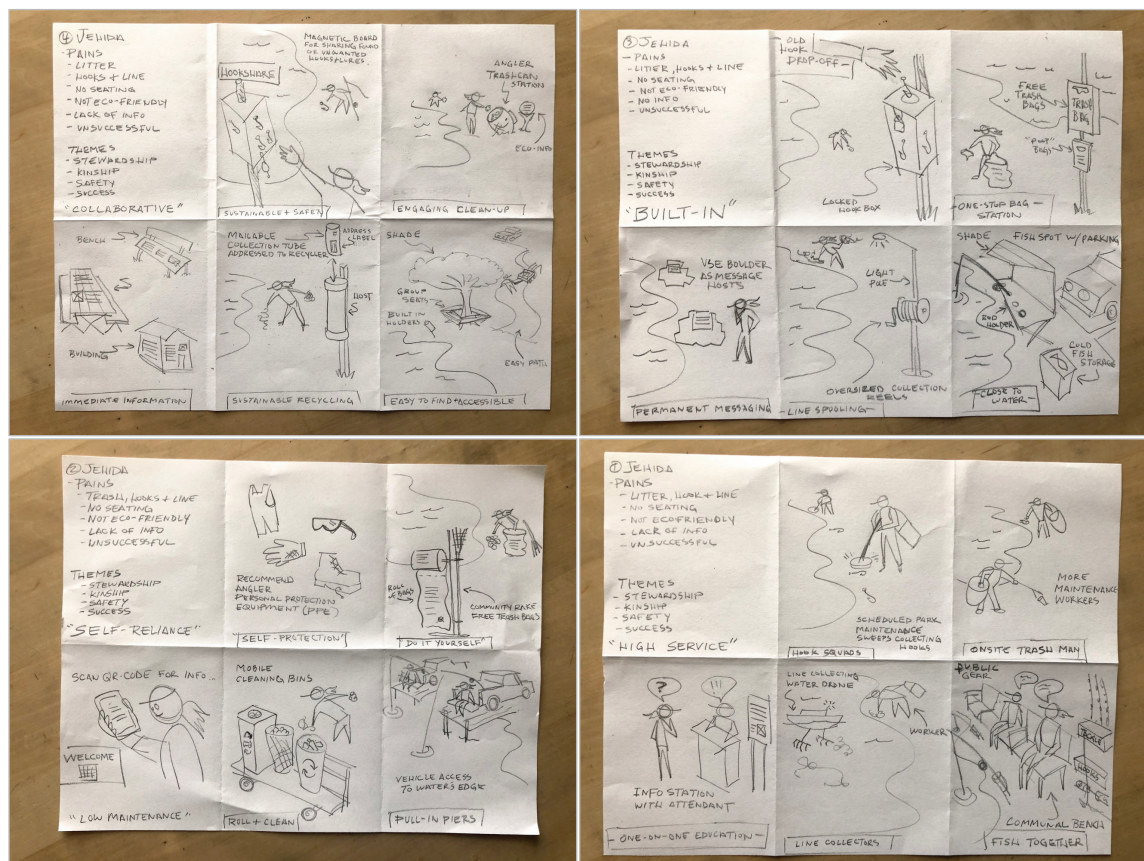


Figure 4.22. Generative ideation – sketches. *Top left*, "Collaborative"; *top right*, "Built-in"; *bottom left,* "Self-reliance"; *bottom right,* "High Service."

Jehida's level of engagement, as shown in figure 4.22, was adjusted with each concept. She was directly involved at every level during the "Self-Reliance" conceptual model, and she was characterized as merely a benefactor while engaging in the "High-

Service" model. Signifiers, or visible signals integrated into the design, were used in the "Built-in" concept to help identify the area as a fishing spot, such as having seats with built-in rod holder holes near the water (Norman 2013, 10). Natural mapping strategies, such as using fish-shaped bins, were used in the "Collaborative" concept to encourage children to "feed" the fish with trash (Norman 2013, 14).



Figure 4.23. Generative ideation – Project Stakeholder dot-voting summary.

*Design Method: Generative Ideation Evaluation*

Digital UX designers commonly narrow possible solutions down to the "best solution" by having their ideas evaluated by users and stakeholders (Gibbons 2019). Two of the Project Stakeholders and three anglers evaluated sketches completed during the generative ideation process by participating in a dot-voting exercise. Each participant

selected the fishing experience they wanted to see prototyped by marking it with

a colored dot (Gibbons 2019). Ultimately, the "Collaborative" conceptual model was

selected with 4 dots received. However, the selection's original seating concept was

replaced by two higher-rating seating concepts from the other models: one received 2

dots, and the other received 3 dots (see figure 4.23).

## Deliver: Prototyping and Testing

### *Design Method: Rapid Prototype - Storyboard*

Early in the design process, a storyboard prototype was built from the selected

"Collaborative" concept sketch. As a *rapid prototype*, the more detailed iteration served

as a demonstrative tool for testing, problem identification, building empathy for the

Urban Angler, and refining developed experience touchpoints (Knapp et al. 2016, 148).

The social, emotional, and environmental factors experienced by Jehida, as

discovered earlier during ideation, were formed into a set of four short narratives that

were crafted with only enough detail to provide relevant context (Knapp et al. 2016, 149).

Captions and word bubbles were added to the models to assist the narrative. An emphasis

was put on the human characters, and symbols such as arrows were used to show forward

progression in her story (Martin and Hanington 2012, 82).

As shown in figure 4.24, the first scenario, "HOOKSHARE AMENITY," of

the Cleaner Urban Fishing storyboard included a line recycling system with a mailable

collection tube and addressed improperly discarded fishing tackle. The second scenario

presented informational signage printed on the back of a park bench, delivering relevant

angling information and skill-building support. The third scenario, "FEED THE FISH,"

used a trash bin and an informational station to solve much of the littering problem. The

fourth scenario, "BUDDY BENCH," addressed the lake's lack of seating and social engagement support.
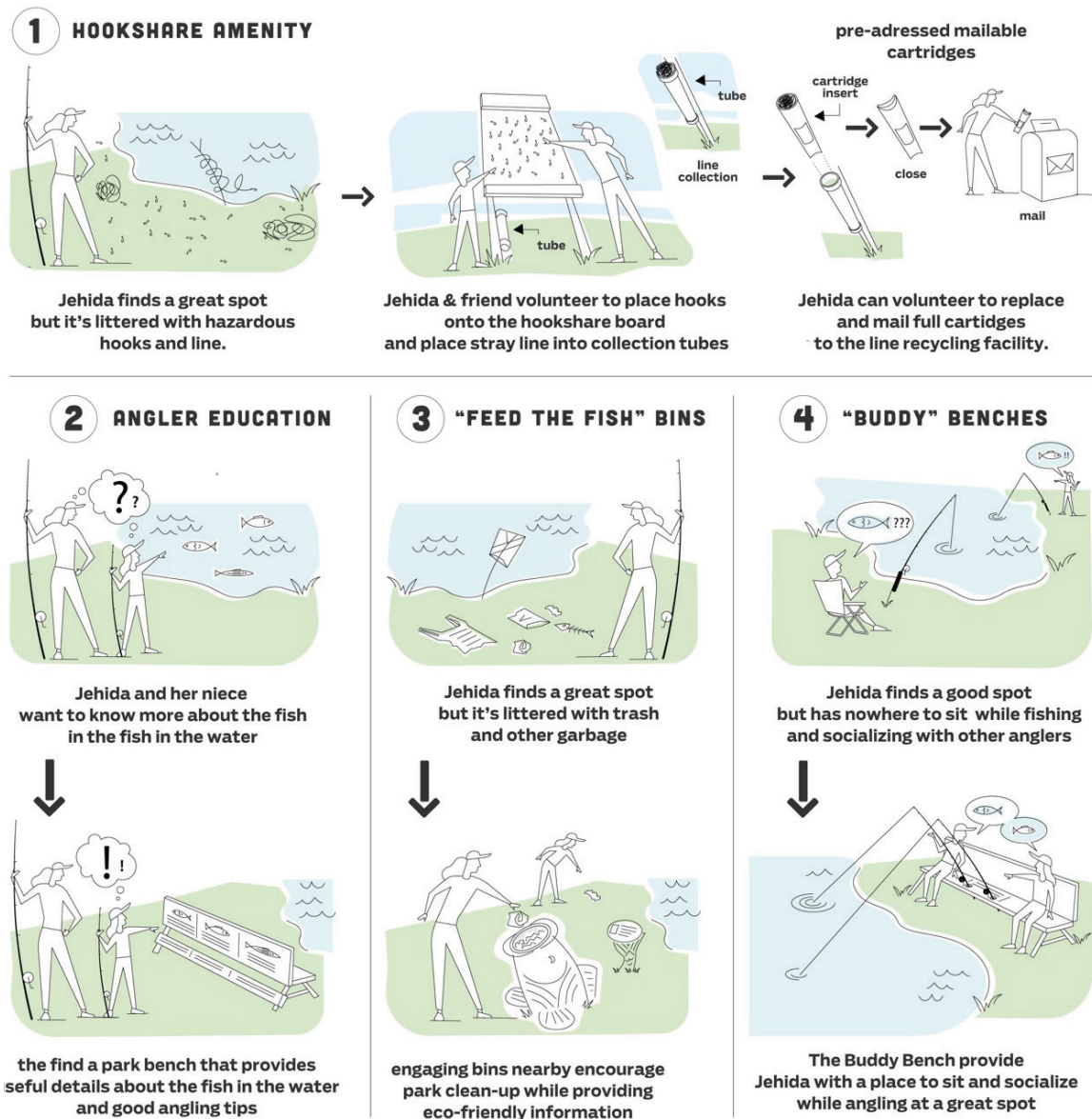


Figure 4.24. Rapid prototype – *Clean Urban Fishing* experience storyboards.

*Design Method: Rapid Prototype – Desirability, Feasibility, Viability Testing (DFV)*

The Cleaner Urban Fishing storyboard prototype served as a low-cost rapid prototyping method to gain insights. Building tangible prototypes in real environments

can be expensive, especially when coupled with COVID-19 pandemic safety requirements, so participant insights gathered beforehand proved invaluable for resource management. Two Project Stakeholders and 3 participants provided feedback on the concept's desirability, feasibility, and viability (DFV) (IDEO Design Thinking n.d.). Three questions were asked to frame the feedback qualitatively: Is this something you would want? Does it seem like a good long-term solution? Does it seem simple to use and execute?

To gather qualitative first-impressions as clear and concise responses, participants replied by one of three emoticons: a smiley face meant "go for it," a sad face meant "no way," and a straight face meant "needs improvement" (Knapp et al. 2016, 146).

*Data Summary: Rapid Prototype*

As shown in figure 4.25, the Cleaner Urban Fishing storyboard experiences rated well. "HOOKSHARE AMENITY" rated the highest with 11 of 15 possible smiley faces; though, it received 4 straight faces by the Project Stakeholders for viability and feasibility as concerns were expressed about how small children might access sharp hooks and lures. "BUDDY BENCH" received a total of 19 smiley faces out of a possible 30 with 11 votes for improvement. "FEED THE FISH" was rated very high by users with 2 smiley faces for desirability and its engaging nature; yet it received 1 sad face for feasibility as typically-low public park budget would pose a significant challenge to realizing the idea without outside sponsorship.
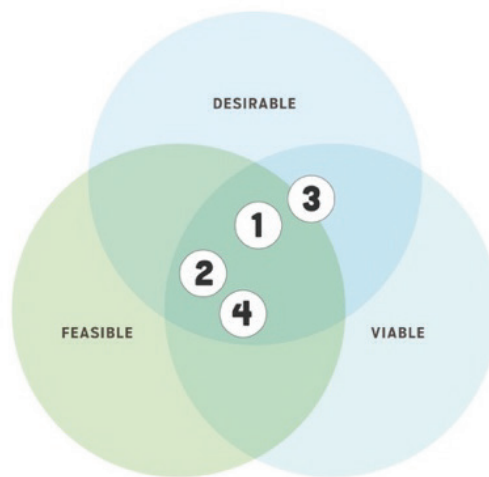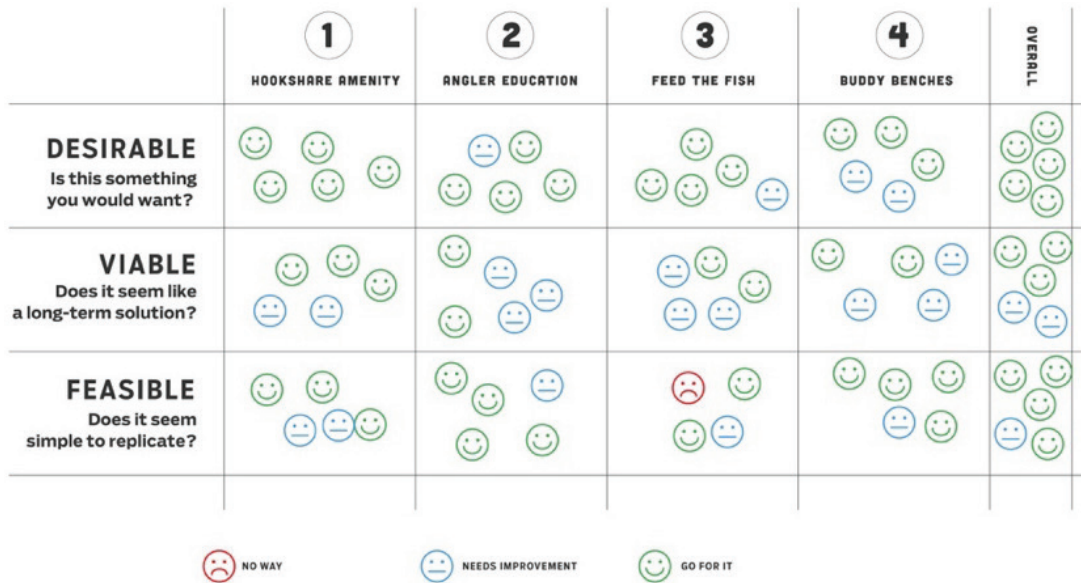
Figure 4.25. Rapid prototype - desirability, feasibility, viability (DFV) summary.

*Design Method: Wireframe Prototype*

The storyboard user test data informed the next design iteration, the "wireframe prototype." In digital UXD, wireframes are page layout schematics that show where content and functional elements are placed (Krug 2010, 36). Similarly, wireframing was applied to the *Clean Urban Fishing* virtual lakeside parksite concept. As a 3-dimensional (3D) model, it highlighted an experience of three tangible amenities (see figure 4.26).

Each amenity was dedicated to a specific action, defining *urban fishing* as a more

sustainable activity with a non-linear workflow having various engagement points.

The purpose of the *Clean Urban Fishing* wireframe was to test three things: the

effectiveness of the communication elements, the usability of the content architecture,

and the usefulness of navigational devices (Krug 2010, 36). A Goldilocks quality

approach gave test participants an understanding of the experience design with just

the right amount of detail to avoid an overly complicated prototype (Knapp et al. 2016,

170). Part of getting it right the first time was "to iterate forward," so perfecting visual

aesthetics was not considered essential at this juncture in the design process (Gothelf

and Seiden 2016, xv). Simple black-and-white renderings were built in SketchUp,

a 3D rendering application, to present a "walkable" workflow connecting the set of

amenities as a single virtual-reality experience. Park visitors were approximated in

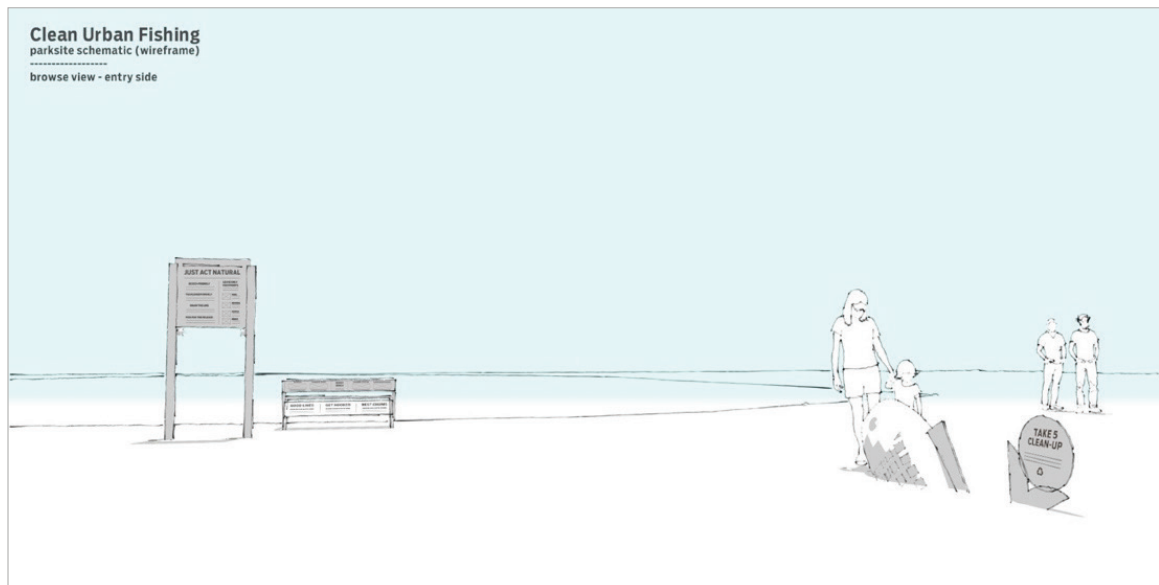the model to provide the place and its amenities with a sense of scale.



Figure 4.26. Wireframe prototype – *Clean Urban Fishing* concept model.

To uphold "familiar and natural," the fourth EDP, it was essential that a novice user quickly discover, understand, engage, and navigate the parksite. Signifiers were applied to encourage "knowing" what to do and when to do it at an intuitive level (Norman 2013, 210). Physical affordances were integrated into each station to clarify functionality. Symbols, or semiotics, were incorporated into the experience to facilitate understanding and provide meaning (Norman 2013).
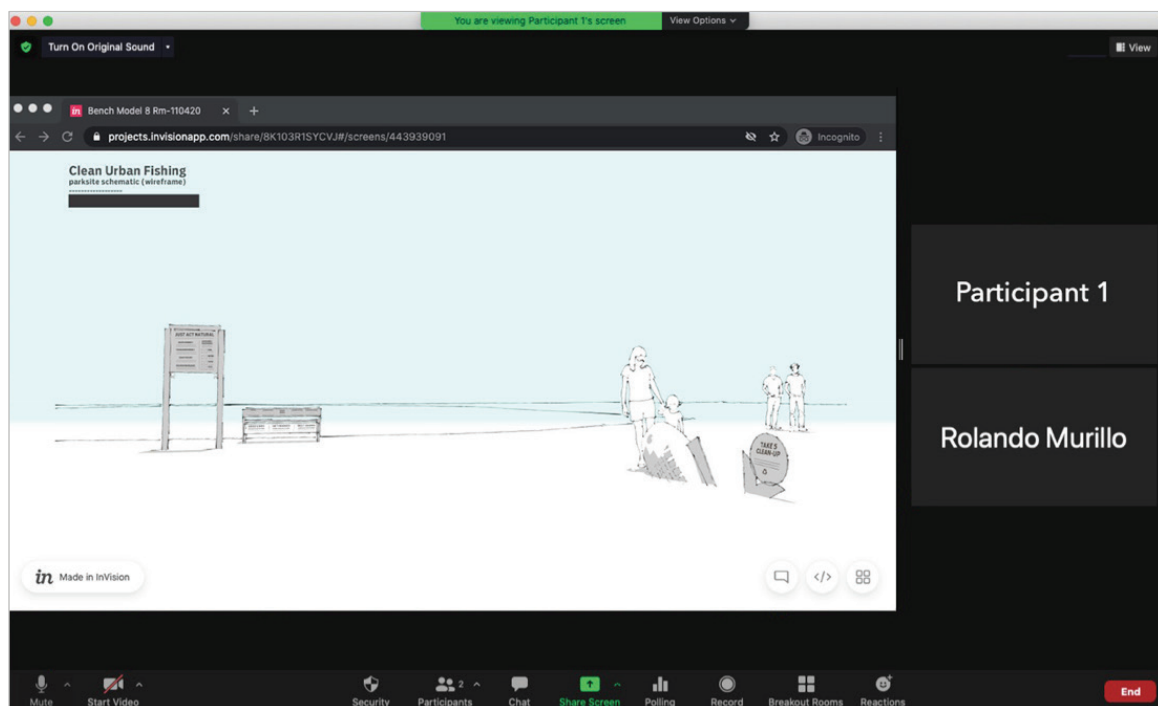


Figure 4.27. Wireframe prototype – Invision user test on Zoom.

*Design Method: Wireframe Prototype – User Test*

In digital UXD wireframe testing, participants were recruited to perform simple tasks: to review category name appropriateness, check the logic of content locations, and gauge navigation usability (Krug 2010, 36). For the *Clean Urban Fishing* wireframe, two of the Project Stakeholders and an angler were recruited to represent Jehida and participate in individual 30-minute user tests conducted remotely by video conference.

Figure 4.28. Wireframe prototype – "Take 5 Clean-up" bin.

As shown in figure 4.27, each participant was asked qualitative questions as they explored the 3D experience using a clickable, interactive prototype created with a UXD prototyping application called Invision (Krug 2010, 36) (see appendix C). A think-aloud

protocol, where test participants explained their thoughts and actions during the test, was applied to collect participants' positive and constructive feedback about affordances, usability, and content architecture (Martin and Hanington 2012, 87; Norman 2013, 206).
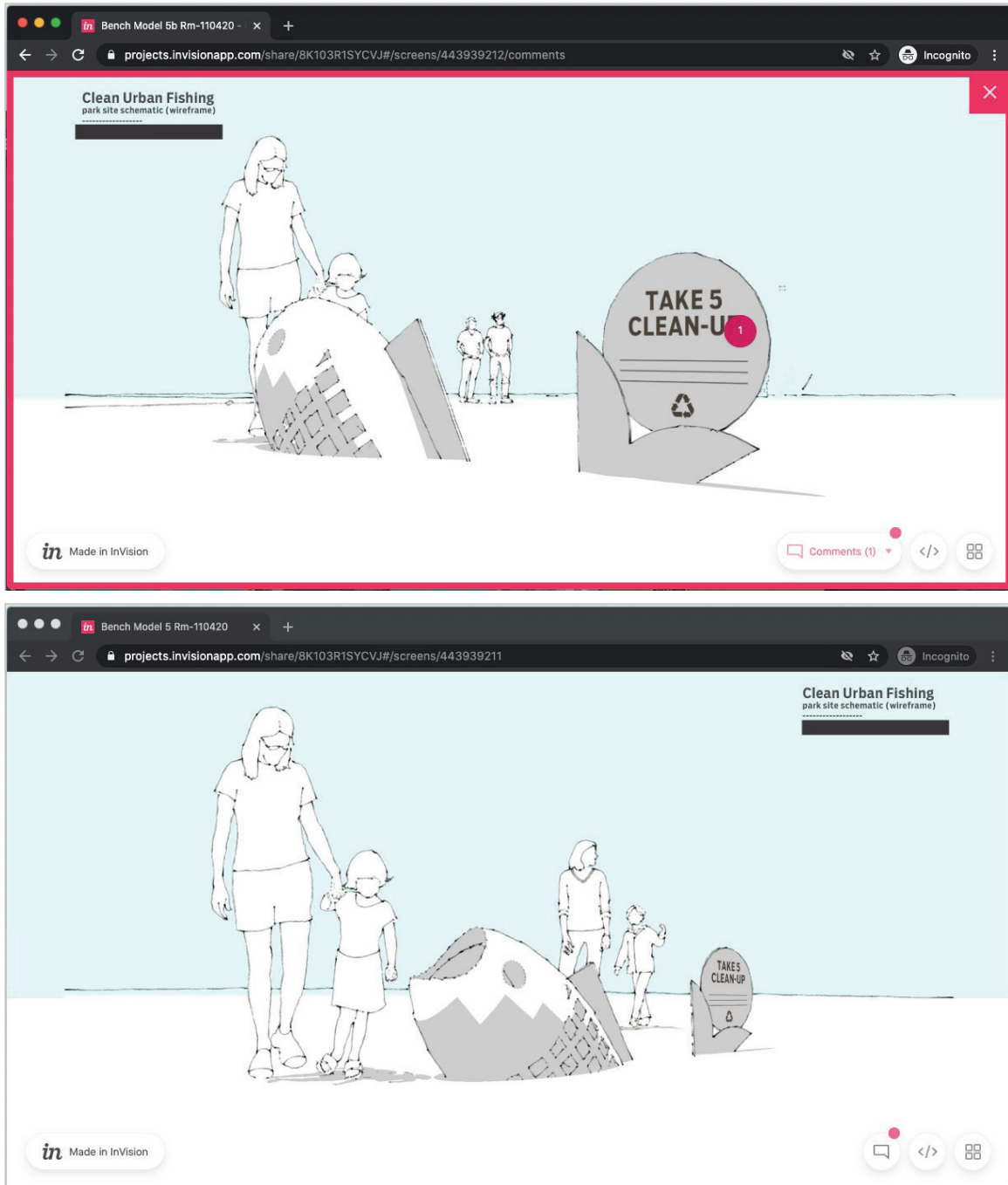
The model, also called the "Clean Urban Fishing parksite schematic (wireframe)," presented the prototype as an isometric rendering of a place near the water's edge (see figure 4.28). In the model, the parksite hosted three separate amenities that users could explore during the on-screen test. The amenity located furthest from the water was a low-profile sculptural element resembling a semi-submerged fish and identified by a sign attached to the tail-end ascended from the ground. The round sign was titled "TAKE 5 CLEAN-UP" and was accompanied by simulated text lines and a recycle symbol. The fish-shaped amenity's headpiece rested on the ground and housed a collection bin accessible through an opening resembling a gaping mouth.

The second amenity was a tall two-sided kiosk containing a rectangular center panel that read "JUST ACT NATURAL," held by two squared posts (see figure 4.29). On the left side of the panel were four additional sub-head titles accompanied by simulated text lines: "BE ECO-FRIENDLY," "TACKLE RESPONSIBLY," "DRAW THE LINE," and "FISH FOR THE RELEASE." The right side read "LEAVE ONLY FOOTPRINTS," followed by sub-heads titled "FOWL," "MAMMAL," "TURTLE," and "SNAKE." Simulated text lines near blank image placeholders were located under each sub-head.
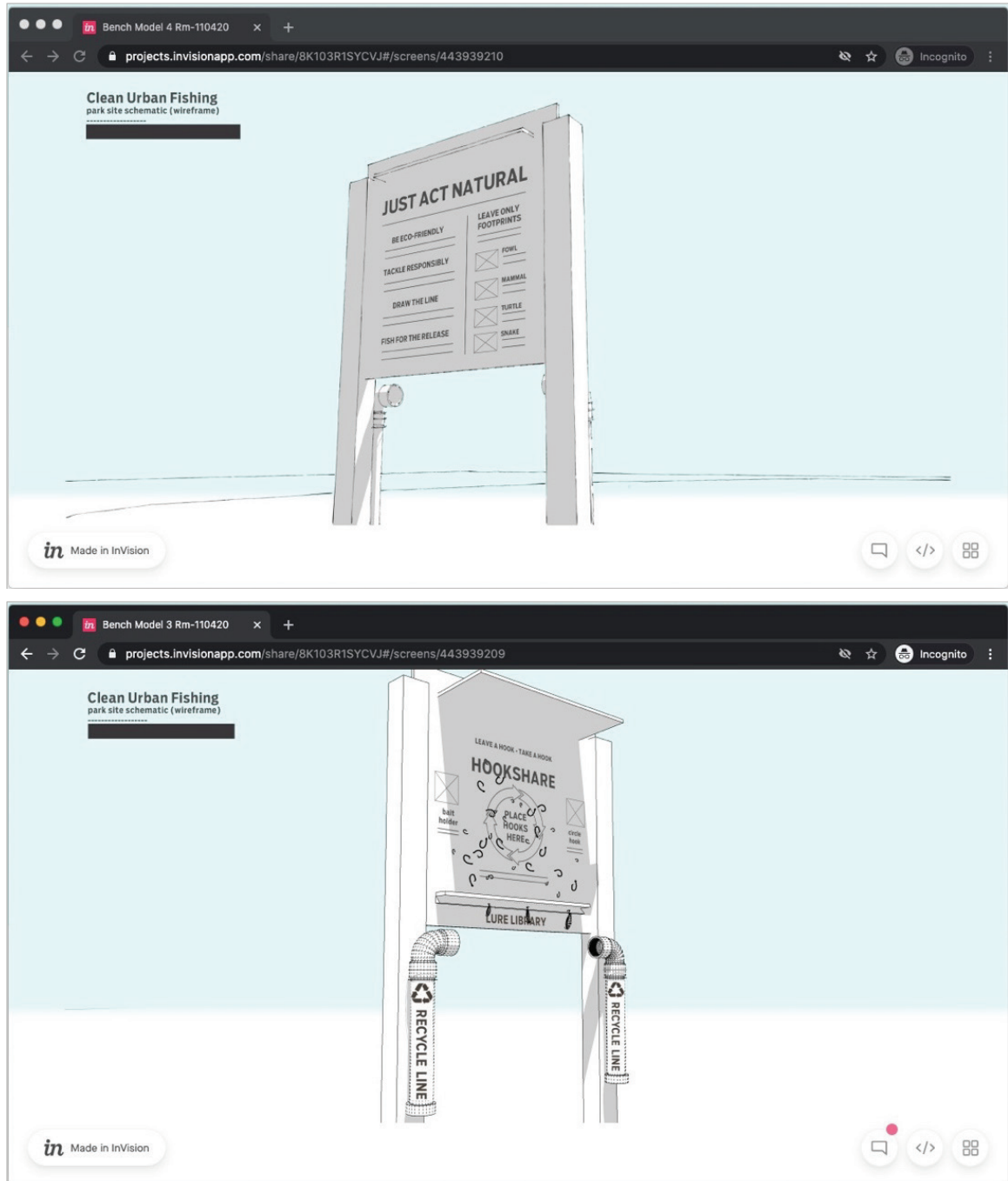
Figure 4.29. Wireframe prototype – "Just Act Natural" and "Hookshare" board.

The kiosk center board's flipside was titled "HOOKSHARE" and presented

additional features such as a flat awning, a shallow ledge catch, and two tubular

containers. Modeled hooks and lures partially covered a circular reuse symbol and large

text on the board that read "LEAVE A HOOK - TAKE A HOOK" and "PLACE HOOKS HERE." Smaller text read "bait holder" and "circle hook." The area below the ledge catch read "LURE LIBRARY." Tubular containers labeled "RECYCLE LINE" were attached to each square post and marked with a recycling symbol.

The third amenity resembled a two-person bench, backed by two flat pieces that hosted angling information. As shown in figure 4.30, the upper piece titled the amenity as "BUDDY BENCH." Additional text along the bench's length identified several species and was accompanied by simulated text lines and blank image placeholders. The text read "LARGEMOUTH BASS," "CHANNEL CATFISH," "RAINBOW TROUT," and "BLUEGILL." The lower piece's back had content in three sections, each with a title and supporting text line: "GOOD LINES," followed by "17 lb. test line works great for catfish"; "GET HOOKED," followed by "try larger 5/0 Kahle hooks for catfish"; "BEST CHUMS," followed by "catfish like smelly stuff like stink bait."

The front, or seating side of the bench, faced the water's edge. The inside back of the panel had readable content divided into three sections: the first section title read "CATCH A RAINBOW," the second section title read "EASY RELEASE," and the third section title read "BAG A CHANNEL." The first and third section titles were placed above image placeholders and measuring notch marks with corresponding subhead titles that read "ANGLING TIP" and "HANDLING TIP" with simulated text lines below them. "BEST KNOT TO KNOW" titled the bench seat center, near "The Palomar knot" and blank image placeholders flanked by two drilled-in fishing rod holder holes.
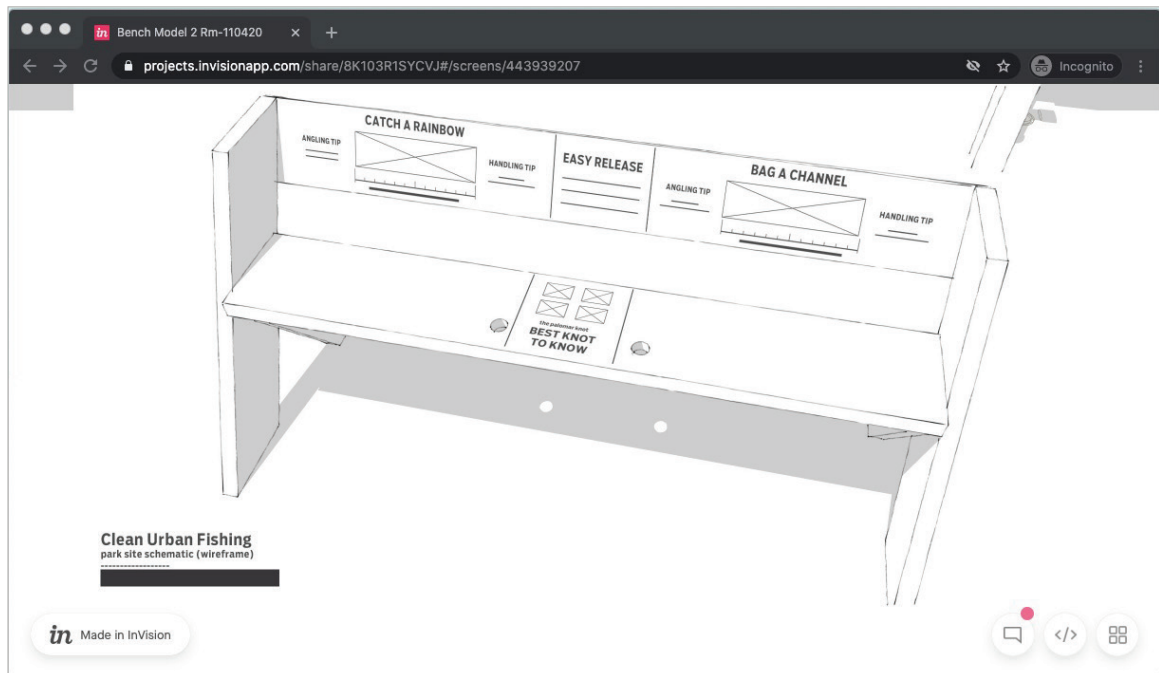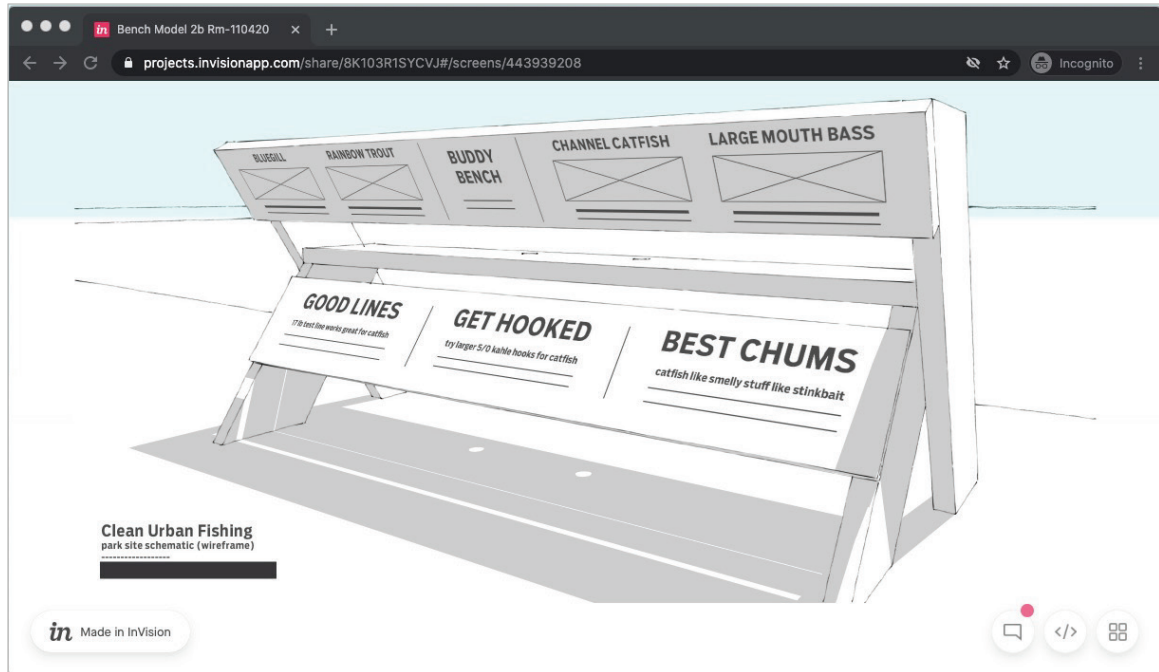
Figure 4.30. Wireframe prototype – "Buddy Bench" amenity.

| | Low | | High |
|---|---|---|---|
| **R1. How approachable does parksite seem?**<br><br>15 of 15 rating | User 1 rating = 5 of 5 | | |
| | User 2 rating = 5 of 5 | | |
| | User 3 rating = 5 of 5 | | |
| **R2. How easy was it to know the function of each amenity?**<br><br>13 of 15 rating | User 1 rating = 5 of 5 | | |
| | User 2 rating = 4 of 5 | | |
| | User 3 rating = 4 of 5 | | |
| **R3. How useful does the proposed information seem?**<br><br>12 of 15 rating | User 1 rating = 5 of 5 | | |
| | User 2 rating = 3 of 5 | | |
| | User 3 rating = 4 of 5 | | |
| **R4. How engaging are the messages?**<br><br>13 of 15 rating | User 1 rating = 4 of 5 | | |
| | User 2 rating = 5 of 5 | | |
| | User 3 rating = 4 of 5 | | |
| **R5. Overall, how would you rate this site?**<br><br>13 of 15 rating | User 1 rating = 5 of 5 | | |
| | User 2 rating = 4 of 5 | | |
| | User 3 rating = 4 of 5 | | |

Figure 4.31. Wireframe prototype – user ratings.

*Data Summary: Wireframe Prototype*

As shown in figure 4.31, positive feedback from the wireframe user test resulted in qualitative data that supported the experience's usability. Overall, the experience rated 13 of 15 among the users. One hundred percent of the participants described the parksite as approachable, with a total rating of 15. One hundred percent of the users demonstrated an understanding of the parksite's purpose, affordance, and signifiers. Of the participants, 13 of 15 users rated each amenity and feature high for understandability and ease of use.

The content architecture was well received, and all participants used it to accurately describe the purpose of, and navigate between, each amenity. When asked to rate the readable content's usefulness, the participants gave it 12 of 15. When asked to rate how engaging the content seemed, the participants rated it 13 of 15.
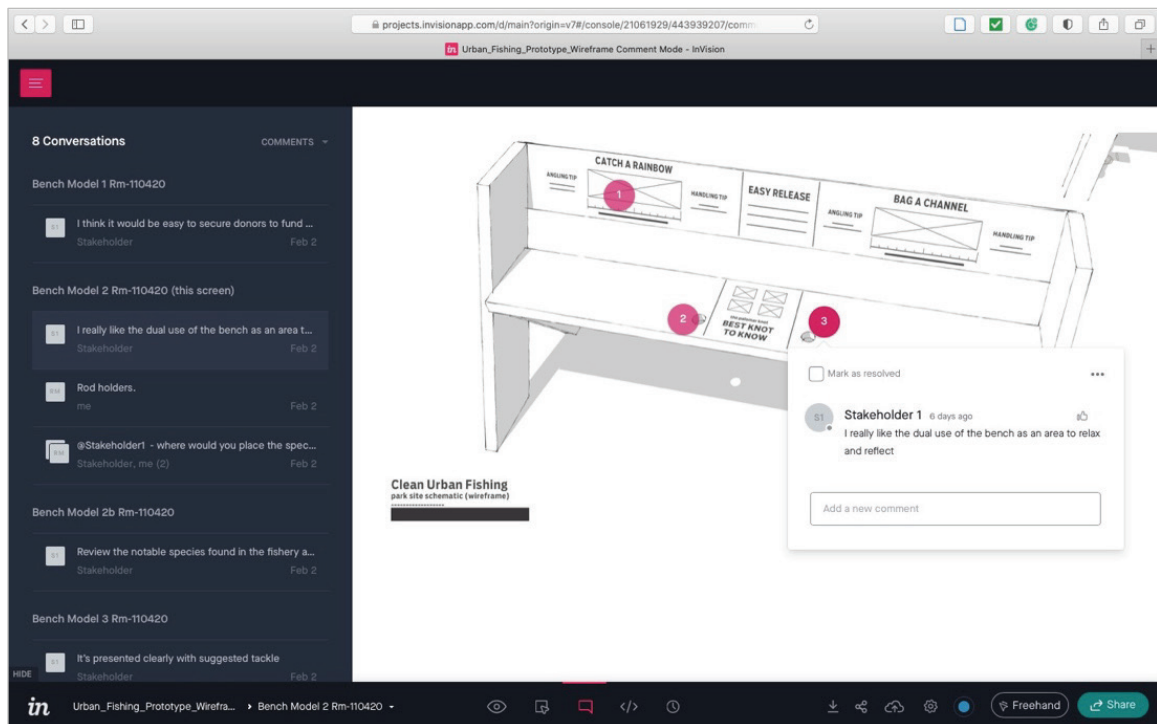


Figure 4.32. Wireframe prototype – qualitative feedback session, Invision screen.

When asked for qualitative feedback, the participants mentioned multiple improvement opportunities (see figure 4.32). Some suggested that the some parksite information might be challenging to see from different vantage points, especially while sitting on the bench. They mentioned that the angler education and environmental information were the most useful. It was also mentioned that the wordplay in the headlines was fun, but more explicit information was preferred for the supporting text. It was suggested that the ecological information could be more valuable if it were made

species-specific. One participant suggested that the catch receptacle and measuring marks on the back of the bench seat should be moved to a different location, but the other users found it helpful where it was presented. One of the Project Stakeholders mentioned that he would not use the bench as he prefers to "walk around" while fishing.





Figure 4.33. Medium-fidelity prototype – *Clean Urban Fishing* concept.

*Design Method: Medium-fidelity Prototype*

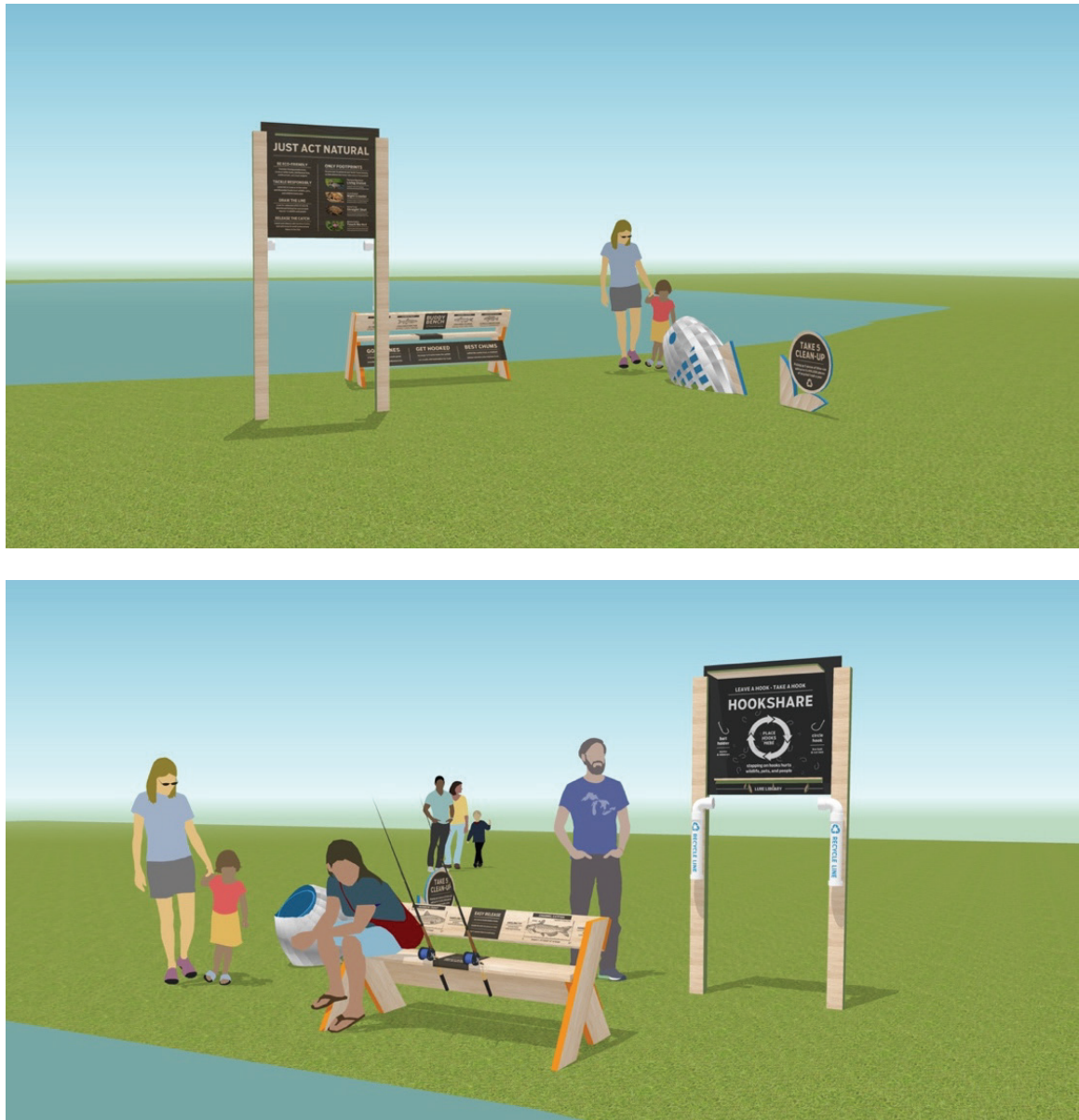Data from the wireframe prototype user tests were applied to a comprehensive medium-fidelity design update. The third iteration in the generative ideation process still served as an economical method to test functionality. The remaining assumptions were also be tested before conducting a live test of a physical high-fidelity prototype at a public park environment (Krug 2014, 36) (see appendix E).

This iteration of the *Clean Urban Fishing* experience included updated finishes, textures, and colors for a more realistic representation of the design (see figure 4.33). The added detail provided a more tangible experience for the participants to discover, which encouraged feedback for future improvements. The new Buddy Bench was given a raw wood finish suggesting it was economical and made from environmentally friendly materials. The line recycling tubes were simulated as being made of economical white PVC material with a mailable cardboard insert. The new Take 5 Clean-up amenity was simulated as if made of unfinished metal and natural wood and explained to be recycled materials. Simulated wood posts hosted the new Hookshare and Just Act Natural kiosk board, modeled in 3D as a printable black panel and described during user testing as having magnetic properties. An accent color system was added to each amenity to facilitate navigation and improve recall (Krug 2013, 67).

With the latest iteration, communication design elements were updated across the parksite. The typography, or lettering style, was refined, and recognizable images were added to present functional communication to test the message architecture's usability (Krug 2013, 39). Simulated wood-cut illustrations and colored photos replaced the placeholder images shown in the wireframe prototype. The letters were made larger to

improve readability, with explicit messaging replacing the placeholder text lines. Also, the Just Act Natural board content was made species-specific, and the Take 5 Clean-up recycling bin was relocated closer to the other amenities.
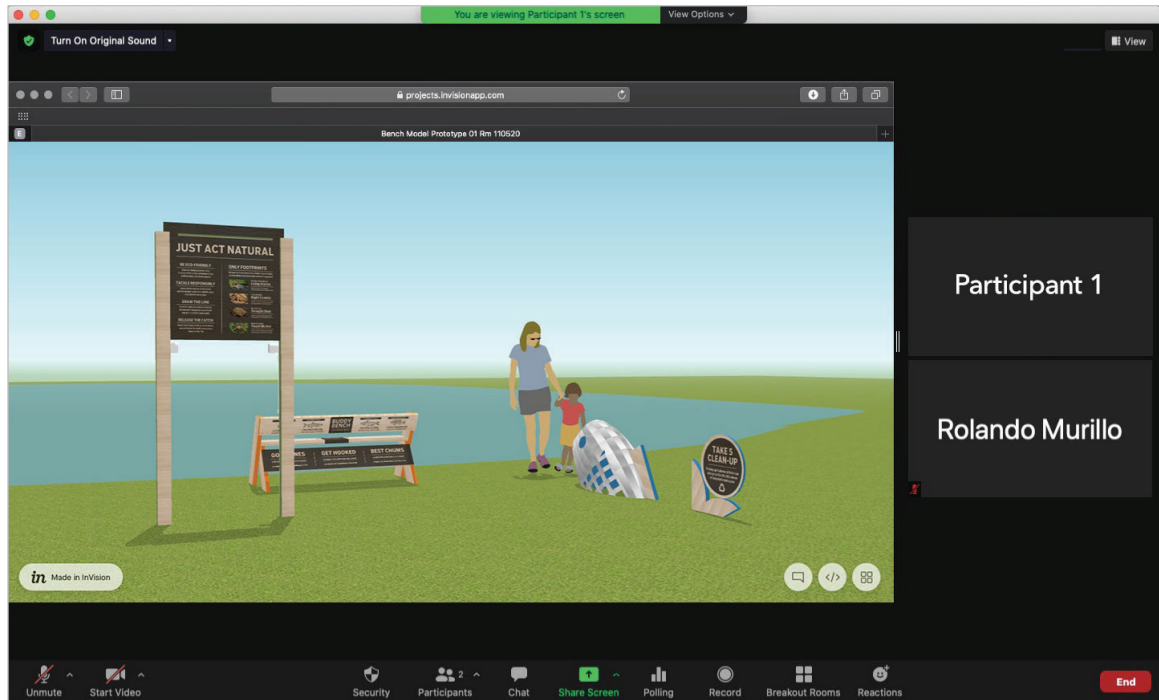


Figure 4.34. Medium-fidelity prototype – Invision user test, Zoom screen.

*Design Method: Medium-fidelity Prototype – User Test*

The updated design was presented individually in a user test involving tasks and interviews to two of the Project Stakeholders and an angler that had not seen the previous versions (see figure 4.34). Experts in usability testing for digital UX design have long held that the best way to understand what is not working in an interface is to watch someone use it (McCloskey 2014). As with the previous prototypes, this iteration was presented remotely in a clickable format.
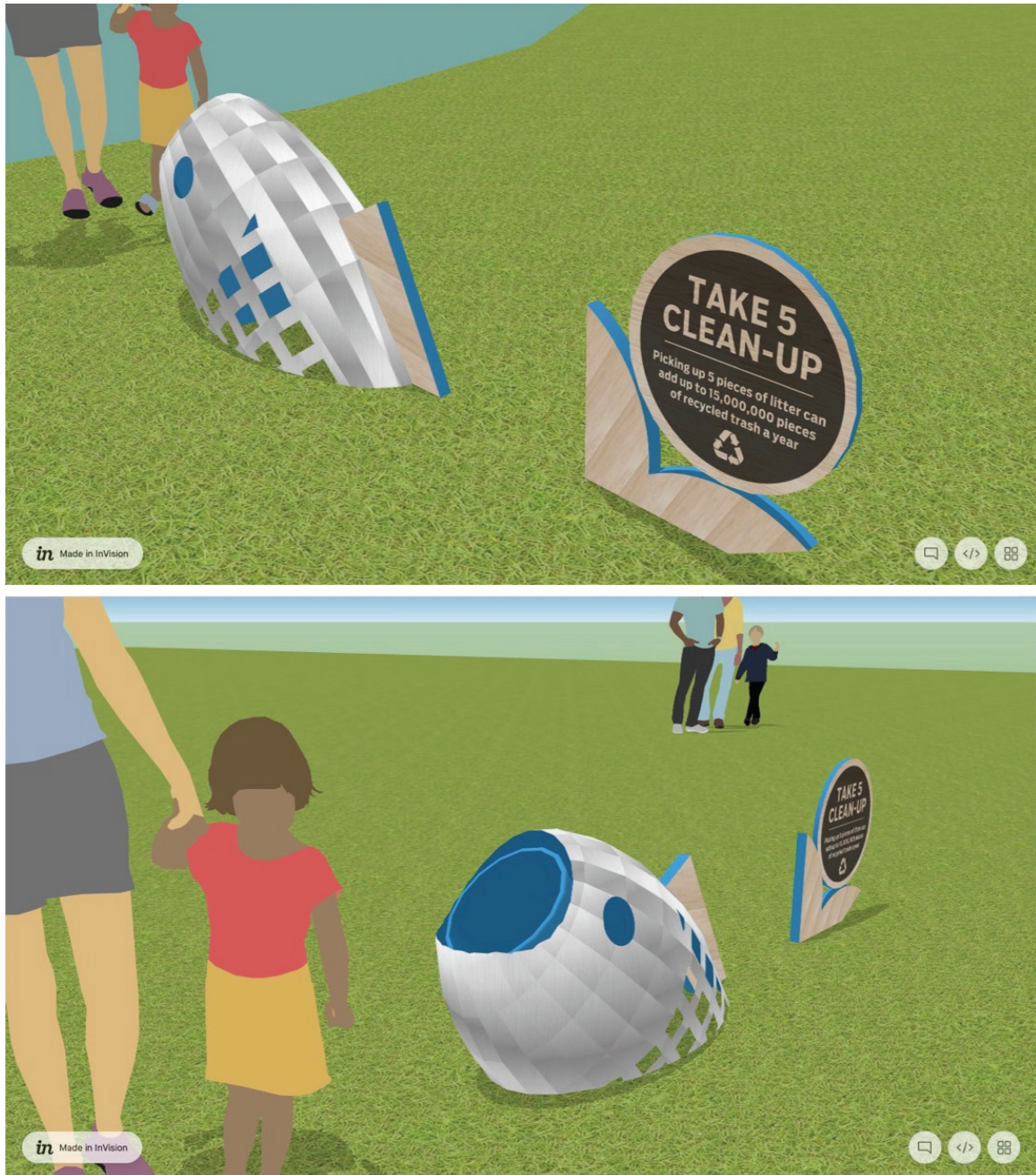
4.35. Medium-fidelity prototype – Take 5 Clean-up bin.

The 5Es method was used to test for five design qualities: the "effectiveness" to solve the problem, the "efficiency" of their use, how "engaging" it was to the user, how "error-free" the experience was, and how "easy" it was to learn (Queensbery 2004, 4).

Test goals were set to align with each "quality of the usability" (Krug 2010, 53). The content had to benefit the user, and the design had to facilitate decision-making. The content also had to appeal to the user, and the experience had to be satisfying. The Urban Angler's needs had to be met immediately, and tasks had to be performed effortlessly. The possibility for errors during user tasks had to be minimal, and actions could be easily reversed. Using the features required minimal prompting, and the user had to understand them and explain their function in few words.

Three one-hour user tests were conducted based on Krug's user testing framework (Krug 2010, 53). Each participant was greeted with a five-minute explanation of the test. Two minutes were taken to familiarize with the participant. A three-minute tour of the parksite was given while the participant explained what he or she could "make of it." Tasks were assigned for forty minutes, and for five minutes probing questions were asked about the participant's experience. The final five minutes were used to "wrap up" the test and thank the user (Krug 2010, 54) (see appendix D). Participants were assigned tasks based on scenarios that the Urban Angler would typically encounter. The participants were asked qualitative questions and encouraged to "think aloud" while performing the tasks (McCloskey 2014). They were asked to rate the design usability after completing each task. All non-user-rating responses were measured on a 1 to 5 scale, where the higher number reflected a more positive response.

In the initial scenario, the parksite was presented in full view. As the participants "approached" and explored the amenities, they "found" a discarded bottle on the ground. The participants were tasked with locating a nearby recycling bin, then asked to relay the meaning of "TAKE 5 CLEAN–UP," and told to rate how well the fish-shape design and

its sign helped complete the task (see figure 4.35). Participants were then tasked to find

and recite posted facts about the park's ecology and environmental stewardship. They

were then asked to rate the usefulness of the Just Act Natural board's information and the

ease of finding the amenity (see figure 4.36).



4.36. Medium-fidelity prototype – Just Act Natural and Hookshare board.
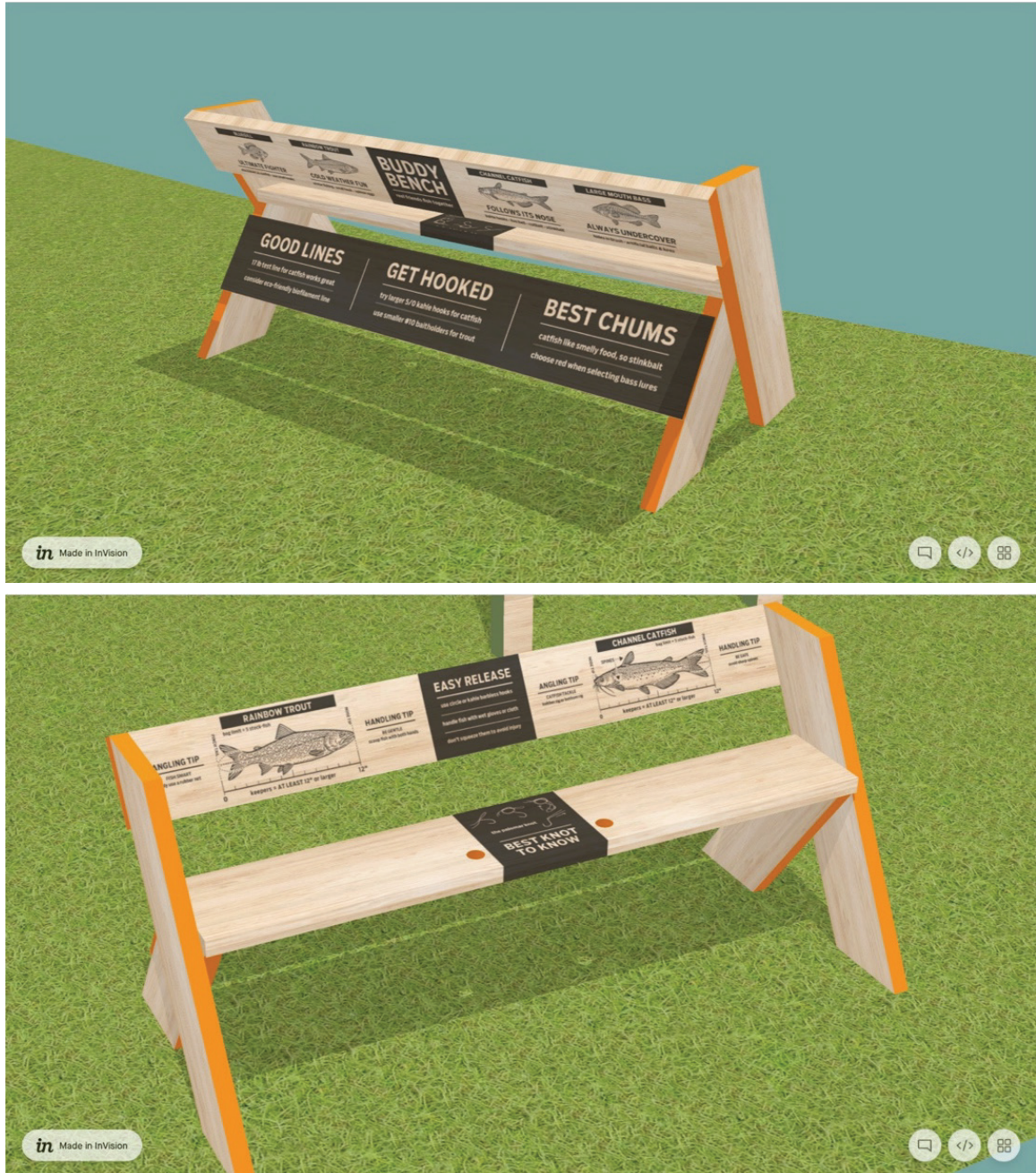
4.37. Medium-fidelity prototype – Buddy Bench.

The participants were given a second scenario; to discover discarded hooks, lures, and fishing lines and relocate them to a safer place. They were then asked to relay the Hookshare board's purpose and rate its perceived positive impact on the park's environment. The participants were tasked to describe how well the amenity facilitated

the disposal of the fishing line and rate how much they felt the line-recycling tubes would improve the park's environment. Users were also asked to rate how well a self-sealing mailable line collection cartridge would improve a community volunteer's recycling effort (see figure 4.36).

In the third scenario, the participants were asked to "stay" and "fish" in the virtual parksite. They were then tasked to locate information about any specific fish species local to the lake and relay the posted information to help catch it. They were asked to rate how engaging the information was and the ease of locating the details (see figure 3.37). While fishing, the participants were tasked to find the seating amenity, describe the purpose of the two holes in the center of the bench seat, and rate the integrated fishing rod holder concept. The users were also asked to rate how comfortable they would be to share the Buddy Bench with an angler they just met as they both fished.



4.38. Medium-fidelity prototype – Buddy Bench sitting area.

In the fourth and final scenario, participants were asked to pretend they caught a fish at the parksite. They were tasked to explain how they could identify the catch and measure its length to ensure it was a "keeper." (see figure 4.38). They were then asked to rate their enjoyment of the bench's images; plus, how likely they would use the posted instruments to identify and measure a catch in real life.

During the final stage of the test, additional unscripted questions were presented. Users were asked to rate the use of color, the overall design of the parksite, the choice of materials, the potential improvement of the environment of urban parks, and how much this experience design would improve their urban fishing experience at a public park. At the end of the test, the participants were allowed to relay final thoughts about the experience design and the overall *Clean Urban Fishing* parksite concept.

*Data Summary: Medium-fidelity Prototype*

The medium-fidelity prototype user test data was divided into a usability rating and a delightful rating. As shown in figure 4.39, the participants rated the experience with a positive average of 91% for performance across the qualities outlined by the 5Es; 0% was the worst performance, and 100% was the best. The design's ability to meet and facilitate angler needs, or its effectiveness, was rated at 85.8%, with the lowest rating at 80%. The immediacy and effortlessness with how angler needs were met, or efficiency, averaged 94.2%, with the highest rating at 100%. No mistakes during the task-driven test were documented; so, the design's error-free quality was rated at 100%, and the ease-of-use quality rated at 92%. The experience's overall engaging quality was rated the lowest at an 83% approval average by the users, with the lowest rating at 75%.

# 91%

**Med-fidelity Protoype
User Test Rating Average – 3 Users**

| | Low | High | Average |
|---|---|---|---|
| **Effectiveness**<br>The content benefitted Urban Angler needs and the design facilitated decision-making. | User 2 = 92.5%<br>User 1 = 85.0%<br>User 3 = 80.0% | | 85.8% |
| **Efficiency**<br>The benefits were felt immediately and performing tasks was relatively effortless. | User 3 = 100%<br>User 2 = 92.5%<br>User 1 = 90.0% | | 94.2% |
| **Engaging**<br>The content and design were appealing, and the experience was satisfying. | User 3 = 90.0%<br>User 2 = 85.0%<br>User 1 = 75.0% | | 83.0% |
| **Error-free**<br>Minimal potential for errors during a task and mistakes could be easily reversed. | User 1 = 100%<br>User 2 = 100%<br>User 3 = 100% | | 100% |
| **Easy-to-learn**<br>No prompting required to correctly perform tasks and the user could explain the purpose in few words. | User 3 = 96.0%<br>User 2 = 92.0%<br>User 1 = 88.0% | | 92.0% |

Figure 4.39. Medium-fidelity prototype – 5Es user ratings.

As seen in figure 4.40, the participants rated the parksite high for meeting the

Urban Angler needs, resulting in a delightful experience where 0% equaled the most

deficient performance, and 100% was the most proficient. The overall participant rating

for the medium-fidelity prototype averaged 91%. The design's ability to meet the

angler's needs for skill-building, or success, was rated at an 86.7% average. The design's

proficiency to meet angler needs for socialization and community, or kinship, was rated

at an average of 86.6%, with the lowest at 80%. The parksite's potential for meeting the

angler need for a safer experience, or safety, rated at 93.3%, with the highest rating at 100%. The participants rated the parksite at an average of 89.3% for meeting the angler stewardship need with a more environmentally friendly fishing experience that promoted recycling, catch-and-release fishing, and an appreciation for nature.

**Delightfulness Rating of the *Clean Urban Fishing* Parksite**

# 89%

**Med-fidelity Protoype**
**User Test Rating Average – 3 Users**

| | Low | High | Average |
|---|---|---|---|
| **Success** Improved fishing skills to legally target and catch specific fish species. | User 2 = 93.3% / User 1 = 86.7% / User 3 = 80.0% | | 86.7% |
| **Kinship** Promoted socializing and a sense of community by the act of sharing. | User 3 = 95% / User 2 = 85.0% / User 1 = 80.0% | | 86.6% |
| **Safety** Reduced stray hooks, lures and fishing line while fostering a sense of security. | User 2 = 100.0% / User 3 = 90.0% / User 1 = 90.0% | | 93.3% |
| **Stewardship** Promoted recycling and eco-friendly actions like catch-and-release fishing. | User 2 = 94.0% / User 3 = 88.0% / User 1 = 86.0% | | 89.3% |

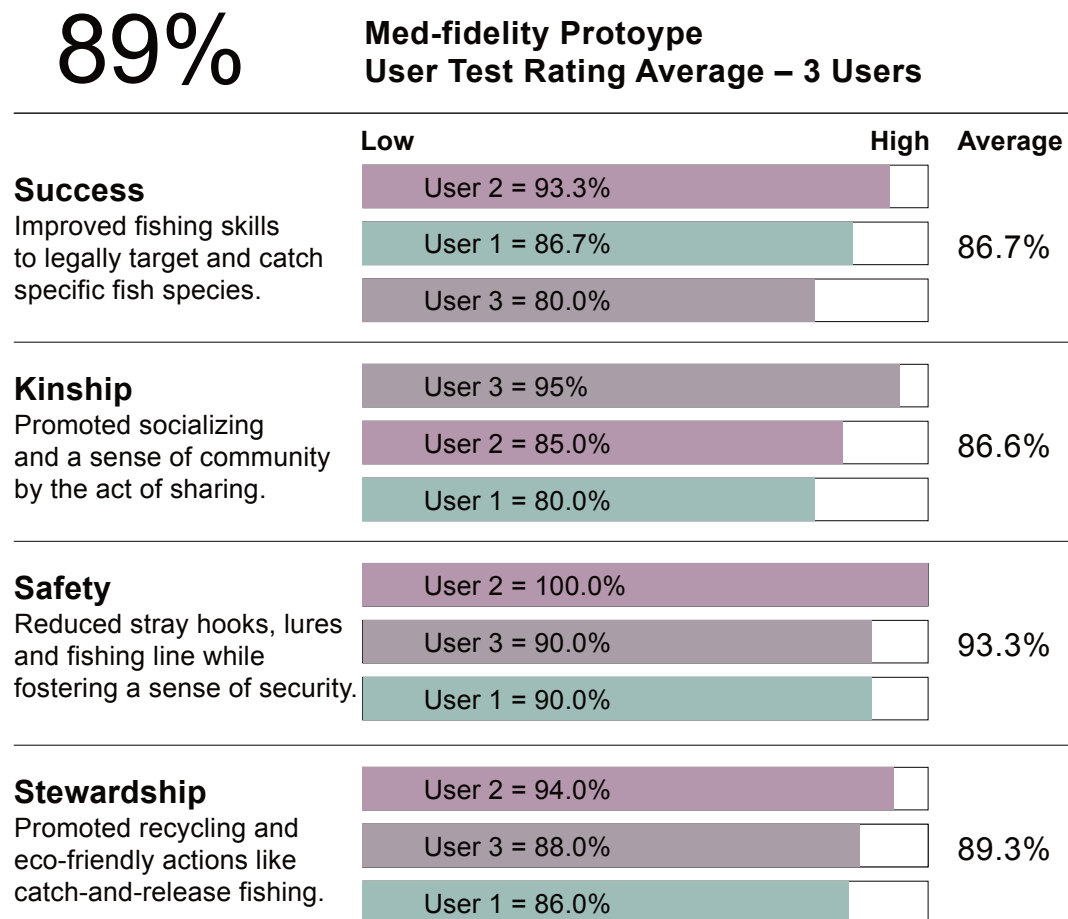Figure 4.40. Medium-fidelity prototype – delightfulness ratings.

Additional insights were documented during this user test for future iterations. A participant mentioned that the fish-shaped recycling amenity was fun but did not inherently communicate sustainability as it looked like a child's playground amenity. Another participant stated that he rated the amenity content low only because it targeted

a lower angler skill level than his own. He also said that the catch-measuring tool might be more functional in another area within the parksite, which echoed an insight collected while testing the wireframe prototype. The built-in rod holders on the Buddy Bench were well-received except for one of the participants who withheld a perfect rating until she could see and test them in person in a built iteration.

# V. OUTCOMES

This thesis's data indicate that it is possible to deliver a delightful non-digital urban fishing experience through the methodics of digital UXD. The *Clean Urban Fishing* concept's 91% positive rating for usability and an 89% rating for delightfulness demonstrate a clear improvement to an everyday urban public park fishing experience. Participant responses were promising throughout the multiple iterations. The lowest average rating of 83% for the medium-fidelity prototype's engagement and probable enjoyability is still a positive mark on the experience. Another positive note is a project stakeholder's willingness to present the Clean Urban Fishing wireframe prototype to donors for the purpose of soliciting funding for live-testing a high-fidelity prototype.

However, there are opportunities for improvement with future iterations. Since not every detail could be tested with 3D models, there is a real need for a high-fidelity prototype user test. Several data points revealed opportunities to improve navigation, as color usage was rated poorly. Informational content did not rate as engaging as expected for a delightful experience. Participants indicated unexplored friction points experienced by users that do not sit while fishing, which may be alienating an entire angler segment. The Take 5 Clean-up recycling amenity may be less of a beacon for recycling and more of a playground destination for children. The receptacle for measuring a catch rated low across two iterations and was ultimately left unresolved. Finally, some features require further testing before the data indicate design success or failure, such as the built-in fishing rod holders on the Buddy Bench and the overall look and feel of the parksite.

## VI. CONCLUSION

This research study on design methodology indicates that digital UXD methodics can be successfully applied to solve tangible or real user experience problems in non-digital environments. The conclusion was reached by using two approaches to discover, define, develop, and deliver a testable Urban Angler fishing experience solution: empathy-building HCD and innovation-building design thinking. Of which, the latter also served as the research and design process framework.

During the Discover phase, the scope was initially framed by a preliminary HMW question. Secondary and primary research methods were conducted to gather base knowledge, insights, and data. Immersion, observation, and participatory methods were conducted to gather data first-hand. User surveys and expert interviews were conducted to collect insights from knowledgeable sources.

During the Define phase, the downloaded data synthesis revealed meaning as card sorting methods identified patterns and connections. Empathy mapping methods were conducted to understand the Urban Angler. Data was distilled into a handful of insight nuggets and need themes. A theme grouping method formulated and promoted user understanding. Park features and the Urban Angler tasks were analyzed to develop a hierarchy of needs framework that outlined the make-up of a delightful urban fishing experience. A Proto-persona named Jehida was created to humanize the Urban Angler. A user journey was mapped to understand her needs and target design opportunities during her fishing experience that were then prioritized. At the end of the Define phase, the design challenge was reframed more holistically and comprehensively, garnering validation by the designated expert Project Stakeholders.

During the Develop phase, EDPs were formulated to guide generative ideation. Initial roughly sketched concepts were developed during the application of prescribed ideation methods to explore experience opportunities. Design options were then quickly iterated and refined during expert evaluations.

During the Deliver phase, prototype designs were progressively iterated forward. Rapid prototyping methods were conducted to devise the Cleaner Urban Fishing experience storyboard that led to a Clean Urban Fishing wireframe prototype, followed by a realistically modeled medium-fidelity prototype titled *Clean Urban Fishing*. A DFV test measured the storyboard prototype's desirability, feasibility, and viability using Project Stakeholders' input. UXD technology and tactics were applied to user-test the wireframe prototype's content architecture and initial usability. The medium-fidelity prototype was evaluated for usability and delightfulness by using a task-based test.

This research demonstrated the value of a digital UXD approach on non-digital problems. However, these methods are typically reserved solely for solving digital UX design problems. If digital UXD methodics were embraced by designers of non-digital experiences, such as park planners and park amenity designers, then many user problems that plague parks could be resolved in a human-centered manner. This theory was evident when observing urban anglers attempting to successfully participate in a fishing activity with minimal information and no dedicated amenities at a public park.

The *Clean Urban Fishing* experience was developed and tested as a virtual 3D model against the current urban fishing experience outlined in Jehida's prototypical user journey. However, a high-fidelity prototype user test conducted in an outdoor setting is

required to confirm if the results provide a delightful fishing experience for a larger urban angler population in a natural fishing environment.



Figure 5.1. High-fidelity prototype – Buddy Bench amenity.

## Future Research

The next step in this research is to live-test a built iteration after the COVID-19 pandemic has subsided (see figure 5.1). There is funding potential, as mentioned during wireframe prototype evaluations. So, an improved and high-fidelity prototype of the *Clean Urban Fishing* parksite experience may be built and user-tested at Southside Lions Park as soon as late 2021. An on-site user test would be an opportunity to evaluate and refine revised solutions that rated lower than expected during the medium-fidelity prototype evaluation.

Positive results for a built model could allow the *Clean Urban Fishing* concept to become a standard parksite in public parks across Texas. More locations could provide an

opportunity to research the needs of additional user types. More user research may result in an array of individualized fishing experiences across a spectrum of angler needs: micro-anglers, who target smaller species; mobile anglers, who roam while fishing; and mobility-impaired anglers, who face accessibility problems in public park settings. The additional user insights could be synthesized using multiple persona studies to expand on the Urban Angler proto-persona study, which may provide an even more delightful urban fishing experience with future design iterations.

Some novel design testing methods were devised, out of necessity, during this research study due to state COVID-19 restrictions regarding face-to-face human interactions. For example, still images of virtual prototypes rendered in Sketch-Up were used to conduct self-guided click-tests within an Invision platform. This previously unknown low-cost technique for remotely testing tangible environmental design concepts, or the Click-walk method, has future implications for how architects, urban planners, visual merchandisers, and experiential graphic designers evaluate and iterate solutions in the future. The resulting impact on cross-discipline design is worth studying.

Branding and in-depth visual design strategies were excluded from this thesis research because of the project's practical nature and focus on user experience design. However, brand communication strategies will be essential to future iterations; as a user interface method to improve public awareness, message retention, shareability, and building connections within communities. A more rigorous communication design process in subsequent iterations may reveal opportunities for enhanced visual design applications and user interface design.

The most enciting opportunity for future research revealed by this study is the change to how designers from different disciplines can interact with each other and share methods. The successful bridging of digital UXD methodics with non-digital user experience needs has demonstrated that delightful experiences can be created today in any environment, using an evidence-based approach, regardless of the available technology. Suppose non-digital designers strive to create user experiences that rival the high-rating usability of digital counterparts. In that case, this research provides a foundation to build novel methods and tools to serve that purpose. For example, many other existing non-digital experiences in public parks await improvements: wall-climbing, educational playgrounds, outdoor family grilling, hiking, mountain biking, and sports activities.

Improving the urban fishing experience with digital UXD methods is a beginning. Gaining user insights from other recreational experiences may offer an opportunity for a new UXD approach that is informed by digital UXD methodics but dedicated to real experiences. A "material UXD" can discover novel non-digital park uses such as outdoor workspaces, individualized leisure, individualized entertainment participation in group events, and living spaces in public parks. The untapped opportunities seem to exist readily, and now there is a defined methodic to discover, define, develop, and deliver a testable solution for all of them.

# APPENDIX SECTION

## APPENDIX A: Survey Questions

1. Which statement best describes you?
    a. I live in an urban area.
    b. I live in the suburbs.
    c. I live in a rural area.

2. How would you rate your level of angling experience?
    a. Expert (fish competitively)
    b. Somewhat experienced (I know what I'm doing)
    c. Gaining experience (I've learned a few things to get by)
    d. New Angler (first timer)

3. Which statement best describes why you fish? (select all that apply)
    a. I fish for food and nutrition.
    b. I fish for outdoor recreation and relaxation.
    c. I fish to become a better angler.
    d. Other. Explain.

4. How often do you fish at urban parks?
    a. Very often (more than once a month)
    b. Somewhat often (once a month)
    c. Occasionally (once every few months)
    d. Rarely (Once a year or less)
    e. I don't fish at urban parks.

5. While visiting public parks, how much time do you spend fishing?
    a. 100% of the time (the only reason I visit)
    b. 50% of the time (part of the reason I visit)
    c. Less than 25% of the time (I visit for other reasons)

6. While visiting public parks, how important is it to your enjoyment that you catch at least one fish?
    a. Very important
    b. Somewhat important
    c. Not Important

7. If you fish with others, how many other people do you prefer?
    a. 1-2 other anglers
    b. 3-5 other anglers
    c. I prefer to fish alone

8. When fishing with others, what level of experience do you prefer the group to have?
    a. All experienced anglers
    b. Various levels of individual angling experience
    c. All new anglers

9. Would you socialize and fish with an angler you just met at the park? (Y / N)

10. How important is it to your enjoyment that a fishing spot be free from discarded lines, hooks, and lures when you arrive?
    a. Very important
    b. Somewhat important
    c. Not Important

11. How important is it to you that the wildlife and natural surroundings at these parks be pristine and free from litter?
    a. Very important
    b. Somewhat important
    c. Not Important

12. How likely are you to properly discard a hook, or fishing line that someone else left behind?
    a. Very likely
    b. Maybe, if it is safe and convenient.
    c. Not likely.

13. How likely are you to keep discarded hooks, lures, or fishing line that someone else left behind?
    a. Very likely
    b. Maybe, if it is in good condition.
    c. Not likely.

14. How likely are you to share hooks, lures or fishing line with an angler you just met at the park?
    a. Very likely
    b. Maybe, if I have extra and they need it to fish.
    c. Not likely.

15. How likely are you to share fishing tips with an angler you just met at the park?
    a. Very likely
    b. Maybe, if I have extra and they need it to fish.
    c. Not likely.

16. When fishing at a public park, how often do you fish during the evening?
    a. 100% of the time (only fish at night)
    b. 50% of the time (arrive during daylight and stay after sundown)
    c. Less than 25% of the time (do not fish at night)

17. When fishing at a public park, what information listed below would be most helpful?
    a. Information about the fish in the water.
    b. Information about the surrounding wildlife & natural environment.
    c. Tips about how to fish.
    d. Information about sustainable or eco-friendly fishing.
    e. All of the above.
    f. Other. Explain.

18. When reading important information, what language do you prefer?
    a. English
    b. Spanish
    c. [Add other]

19. When fishing at a public park, do you most often eat and drink…
    a. …before you start fishing?
    b. …while you are fishing?
    c. …after you are done fishing?

20. Which statement best describes how you handle your catch?
    a. I keep what I catch.
    b. I keep the best catch-and-release the rest back into the water.
    c. I keep the best catch and discard the rest in the trash.
    d. I only catch-and-release.

22. Which statement best describes how you cleaned your last catch?
    a. I cleaned my catch at the park by the water.
    b. I cleaned my catch at the park on a table away from the water.
    c. I cleaned my catch elsewhere.
    d. Other. Explain

23. How often do you consume fish that were caught at a public park?
    a. never
    b. Very often (more than once a month)
    c. Somewhat often (once a month)
    d. Occasionally (once every few months)
    e. Rarely (Once a year or less)

24. List three (3) actions that you typically take to ensure a safe and healthy fishing experience for yourself and/or others while at the park.

25. Aside from a fishing pole and tackle, list three (3) things that you always bring on your fishing trip?

26. List three (3) things that an urban park department HAS DONE RIGHT to make your fishing experience enjoyable.

27. List three (3) things that the parks department COULD DO BETTER to make your fishing experience MORE enjoyable?

28. With which gender do you most identify?
    a. Female
    b. Male
    c. Transgender
    d. Other

APPENDIX B: Expert Interview Questions

Q1. What is your field of expertise and where do you practice it?

Q2. What role do you play in your organization?

Q3. What methods do you use in your role to complete your work?

Q4. What is an improvement needed in your profession that you'd like to see implemented?

Q5. How can what you do be applied to improve non-digital experiences in real environments?

Q6. What advice would you offer someone looking to improve user problems in public urban parks?

APPENDIX C: Wireframe Prototype - User Test, Qualitative Questions

Q1. At first glance, can you describe the purpose of this site?

       R1: How approachable does it seem (rate 1 to 5)?

Q2: As you discover, describe the purpose of each amenity.

       R2: How easy was it to know the function of each amenity (rate 1 to 5)?

Q3: What information on the amenities seems the most useful for you?

       R3: How useful does the proposed information seem (1 to 5)?

Q4: Does the information placement make sense to you? Explain.

       R4: How engaging are the messages (rate 1 to 5)?

Q5: Do you have any other thoughts about these amenities?

       R5: Overall, how would you rate this parksite (rate 1 to 5)?

APPENDIX D: Medium-fidelity Prototype - User Test, Tasks and Questions

Scenario 1. You have arrived at the Southside Lions Park lake for a day of fishing and come across this parksite. You decide to explore it.

> T1. You find a discarded recyclable water bottle. Dispose of it while at the parksite.
>
> > Q1. What does "Take 5" mean?
> >
> > Q2. How helpful was the Take 5 bin's design to the task? Rate 1 to 5.
>
> T2. Find an ecological fact, and a way to practice environmental stewardship.
>
> > Q3. How usefulness was the Act Natural information? Rate 1 to 5.
> >
> > Q4. How easy was it to locate the Act Natural information? Rate 1 to 5.

Scenario 2. As you explore the site, you find several hooks and lures on the ground, plus discarded fishing line laying near the water's edge where it can be hazardous to animals and people. The parksite offers a solution for this type of littering problem.

> T3. Find a place for stray hooks and lures so a child or animal can't step on either.
>
> > Q5. How easy was it to locate the Hookshare board (rate 1 to 5)?
> >
> > Q6. How helpful was the Hookshare board to making the area safe (rate 1 to 5)?
>
> T4. Explain how you can recycle fishing line while at the parksite.
>
> > Q7. How beneficial are the line recycling tubes to the environment (rate 1 to 5)?

Scenario 3. You decide to fish at the parksite.

> T5. Find a fact about a fish in this lake that improves your chances of catching it.
>
> > Q8. How interesting was the information on the bench (rate 1 to 5)?
> >
> > Q9. Rate how easy the information was to locate (rate 1 to 5)?
>
> T6. Find a place to sit while you fish.
>
> > Q10. Can you tell me what those two holes are for (rate 1 to 5)?
> >
> > Q11. Rate how much you like the idea of integrated rod-holders (rate 1 to 5)?

Scenario 4. You catch a fish (photo of Jehida shown).

> T7. Identify the fish, and measure it to check if it is of a legal size to keep?
>
> > Q12. How helpful were the images to identify the fish (rate 1 to 5)?
> >
> > Q13. How likely are you to use the bench to measure and ID your catch (rate 1 to 5)?

Probing questions.

        PQ1. Did you enjoy the color? Was it useful in navigating the parksite? Explain.

        PQ2. How much would this site improve the park's natural environment? Explain.

        PQ3. How much would this site improve your fishing experience? Explain.

        PQ4. How much would this site improve socialization during fishing? Explain.

        PQ5. What are your thoughts about the choice of materials? Explain.

        PQ6. Did you enjoy the design or the content? Explain.

        PQ7. Can you share any additional thoughts?

APPENDIX E: Medium-fidelity Prototype Content Details



Figure E.1. Medium-fidelity Prototype content detail – Take 5 Clean-up.

Figure E.2. Medium-fidelity Prototype content detail – Just Act Natural and Hookshare boards.

LARGE MOUTH BASS

ALWAYS UNDERCOVER
hides in brush · artificial baits & lures

CHANNEL CATFISH

FOLLOWS ITS NOSE
kahle hooks · live bait · cutbait · stinkbait

BUDDY BENCH
reel friends fish together

RAINBOW TROUT

COLD WEATHER FUN
winter fishing · small hook · salmon eggs

BLUEGILL

ULTIMATE FIGHTER
also known as sunfish · use small hooks

BEST CHUMS

catfish like smelly stuff like stinkbait

choose red when selecting bass lures

GET HOOKED

try larger 5/0 kahle hooks for catfish

use smaller #10 baitholders for trout

GOOD LINES

17 lb test line works great for catfish

consider eco-friendly biofilament line

HANDLING TIP
BE SAFE
avoid sharp spines

BAG A CHANNEL
bag limit = 5 fish
keepers = AT LEAST 12" or larger
PINCH TAIL
12"
SPINES
NOSE TIP
0

ANGLING TIP
CATFISH TACKLE
bobber rig or bottom rig

EASY RELEASE

use circle or kahle barbless hooks

handle fish with wet gloves or cloth

don't squeeze them to avoid injury

HANDLING TIP
BE GENTLE
scoop with both hands

NOSE TIP
12"
CATCH A RAINBOW
bag limit = 5 fish
keepers = AT LEAST 12" or larger
PINCH TAIL
0

ANGLING TIP
FISH SMART
only use a rubber net

the palomar knot

BEST KNOT TO KNOW

Figure E.3. Medium-fidelity Prototype content detail – Buddy Bench.

## APPENDIX F: Experience Design Principles (EDPs)

Environmentally positive: Reduce negative environmental impact & encourages sustainable and responsible fishing practices.

Safety and security first: Improve the sense of comfort and security while promoting personal safety.

Brings people together: Foster community and promote social interactions with strangers.

Build better anglers: Build skills, create angling opportunities, and improves accessibility. It is there to help when needed and still useful when everything is under control.

Familiar and natural: There's nothing to figure out. No question on how things work. It might feel unique, but it fits with people's expectations.

# GLOSSARY

**affordances.** The relationships between the properties of an object and the capabilities of the agent that determine just how the object could be used.

**Agile.** In UX design, the process by which design requirements and solutions evolve through collaborative efforts between designers, stakeholders, and users.

**applied ethnography.** An immersive method of studying human behavior through direct observation of users in their natural environment rather than in a lab.

**app.** A downloadable application, or interactive digital product, used on an electronic mobile device.

**card-sorting.** A research tool used to assess or determine the way information is grouped, labeled, and organized in a website or user experience.

**communication design.** The practice of developing and communicating messages to target audiences using fundamental principles of visual design.

**convergent thinking.** The process of finding the single best solution to a problem.

**delightfulness.** Any positive emotional effect that a user may have when interacting with a device, experience or interface.

**data download.** The gathering of discovered information to one viewable location.

**data synthesis.** The process of creating meaning or finding connections within data.

**divergent thinking.** The process of exploring multiple unique ideas or solutions related to a problem.

**emoticon.** A pictorial representation of a facial expression using punctuation marks, numbers, and letters used to express a person's feelings or mood.

**user empathy.** A process of understanding a user's expressions, needs, and motivations.

**experiential graphic design.** The orchestration of typography, color, imagery, form, technology and content to create environments that communicate

**framework.** A simple visual structure used to organize and present information and ideas to solve design problems more effectively.

**friction.** In user experience design, it is anything that impedes or prevents users from accomplishing their goals.

**generative ideation.** The process of developing multiple iterative solutions to a problem.

**Goldilocks quality.** The correct level of presentation fidelity for a prototype to be believable and still practical to build within a testing schedule.

**human-centered design.** A problem-solving approach that focuses on human needs, capabilities, and behaviors during the research, ideation, and testing processes.

**human-to-prototype.** A user's interaction with a prototype.

**immersion method.** To study users in their environments as they participate in activities relevant to the research.

**Lean UX.** A streamlined design process based on Agile principles to improve user experience design.

**Krug strategies.** A unique group of tactics developed by Steve Krug to quickly test usability in UX design.

**methodics.** The comprehensive inventory of methods in a field.

**natural mapping.** Conditions where the relationship between the controls and the object to be controlled is obvious.

**need themes.** Relationships that inform users need groupings.

**pain point.** A specific problem that a user experiences, also known as friction.

**placemaking.** A multi-faceted approach to the planning, design, and management of public spaces.

**primary research.** Process of gathering new information directly from users, subject matter experts, and stakeholders.

**prototype.** A scaled model that represents a testable version of a proposed design.

**rapid prototyping.** The process of iteratively mocking up quick and cost-effective models for testing with users, stakeholders, and even your teammates.

**Responsibility, Respect, and Honesty Guidelines.** Guiding principles for ethical user research devised by IDEO by putting the end-user top of mind.

**secondary research.** A research method that involves reviewing published data.

**signifiers.** Something that symbolizes or represents a quality or idea.

**user.** A person who uses or operates an object, machine, or application.

**user experience.** The testable ease or pleasure of using or operating an object, machine, or application.

**user needs.** Requirements that add value to a product, service, or environment for a user.

**user segment.** Separate users in distinct groups with shared characteristics.

**user test.** The method of testing the interface and functions of a website, app, product, or service by real users who perform specific tasks in realistic conditions

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