KITE: Research Roundup

Deliverable 4

Team Elevate Presents: KITE: Research Roundup

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Introduction

Problem Statement

KITE is a world-leading rehabilitation research institute at the University Health Network that focuses on independent living, restoration of function, prevention & enhanced living. They strive to make the daily lives of those affected by disability, aging, illness, and injury better. To continue with their mission, KITE needs to attract partnerships and funding. They realized the word “rehabilitation” has had a negative effect on their branding as it is often associated with substance abuse. KITE also wants the general public to learn about how they work with different communities to research healthcare issues and co-design solutions. They want to appeal to organizations that have goals that align with theirs so that they may establish meaningful partnerships. Furthermore, KITE wants to be recognized and reach out to potential partners who lack a direct connection to healthcare and help them realize how they can be involved in healthcare solutions. To aid KITE in achieving these goals, we must show partners that KITE is the ideal partner to work with when co-designing healthcare solutions.

Target Users

The solution that KITE requires needs to be usable by any stakeholder or potential partner who can provide them with funding. Our target users will not be specifically defined because a potential partner can be from any company, organization or community. Additionally, KITE themselves are users who must be considered as they would use our solution to show potential partners their co-design process and try to convince them to partner with KITE.

High-Level User Activities

Various high-level user activities need to be supported to achieve KITE’s goals. We first and foremost must capture the user’s attention in a memorable way that showcases KITE as a reputable institute that is worth supporting. This will instill confidence that KITE is an institution worthy of a potential partner’s support. The solution must present KITE’s research and resources (e.g. their testing labs, which can be toured), as well as introduce people to the process of how they work with communities to co-design healthcare solutions. We must also find a way to emotionally connect potential partners to KITE’s mission, and build these human connections to remind them why rehabilitation research matters. Finally, our solution needs to be repeatable and reproducible as opposed to a “one-time solution” so that KITE may utilize this tool or resource with any potential partner.

Current Solutions & Available Resources

KITE has numerous existing solutions in place to aid them in achieving their goals such as:

- Virtual & in-person tours
- Online workshops & design challenges
- The KITE website (news, events, about, researcher profiles, etc.)
- Healthcare programs & services, including research volunteer opportunities
- Social media presence
- Guest lectures, conferences, socials
- Products: branded merchandise, healthcare solutions & applications
- Scholarship opportunities

Initial Proposed Solution: Design Thinking Workshop

Description

The first idea that we gravitated towards was using the practices found in Design Thinking Workshops within our solution. In Design Thinking Workshops, participants are taught to think outside the box and follow a human-centred approach when creating solutions. This human-centred approach is based on empathizing with people to understand their challenges. Empathizing with the different challenges humans face can create a strong connection between an organization and a user. To form meaningful connections between KITE and potential partners, we wanted to facilitate a collaborative environment where partners could practice this form of thinking and co-design solutions with KITE. We would focus on getting potential partners to empathize with the problem, and showcase how KITE can follow through with these innovative solutions. This can also help identify opportunities in the healthcare industry for future partners who may not know they could design healthcare solutions.

Preliminary Goals

Our goal for this initial proposed solution was to make sure it was portable and reusable, meaning that we would not anchor our design to any one time, location or user. Another goal was to ensure that our solution can be easily used by anyone at KITE so that our product is the only thing someone at KITE needs to establish connections with potential partners. Overall, our goal is to give future partners an engaging experience that KITE can present to them to help build a strong lasting impression. KITE does have online workshops and solutions, but this can make it difficult to create meaningful partnerships. Potential partners may feel disconnected from them seeing as they have no personal experience involving KITE. Our solution must create the opportunity to feel connected to KITE's mission and goals.

Competitive Analysis 1: Design Thinking Workshops

Since KITE wanted potential partners to learn about, design with, and fund them, we searched for competitors who have accomplished these or similar goals. We looked at organizations that either held design challenge events, taught the design process, and/or were using a Design Thinking-based event as a way to raise awareness for their organization and get participants involved in their work. This led us to conduct a competitive analysis of secondary and primary groups.

Primary - UX Design Workshops

We defined "workshops" as educational events containing lessons that are guided by a facilitator. These sessions are limited by time, but participants are not challenged by a time limit. They can complete their tasks without the pressure of competing with anyone. Furthermore, participants join these events to learn new information, and may not have much, if any knowledge of what is being taught before the workshop. We wanted to analyze workshops as they are most similar to the solution we want to create. We want our users (who may not know about design or healthcare) to be able to learn about and apply the design process in a low-pressure environment.

Secondary - UX Design Sprints

We defined "sprints" as timed competitions in which the event hosts provide teams of participants with a challenge. Participants who enter these sprints are (for the most part) already familiar with the knowledge and resources needed to complete them. Participants join to compete with one another and test their skills under the pressure of a time limit. Teams' work is judged at the end of the event and they are awarded prizes and/or honours based on their achievements. We wanted to analyze sprints as we want to include rapid design activities in our solution.

Competitors

Our competitors were chosen based on the experiences of some of our team members with design thinking workshops and jams. Design thinking incorporates interactive ways of generating a solution for a problem through brainstorming and researching.

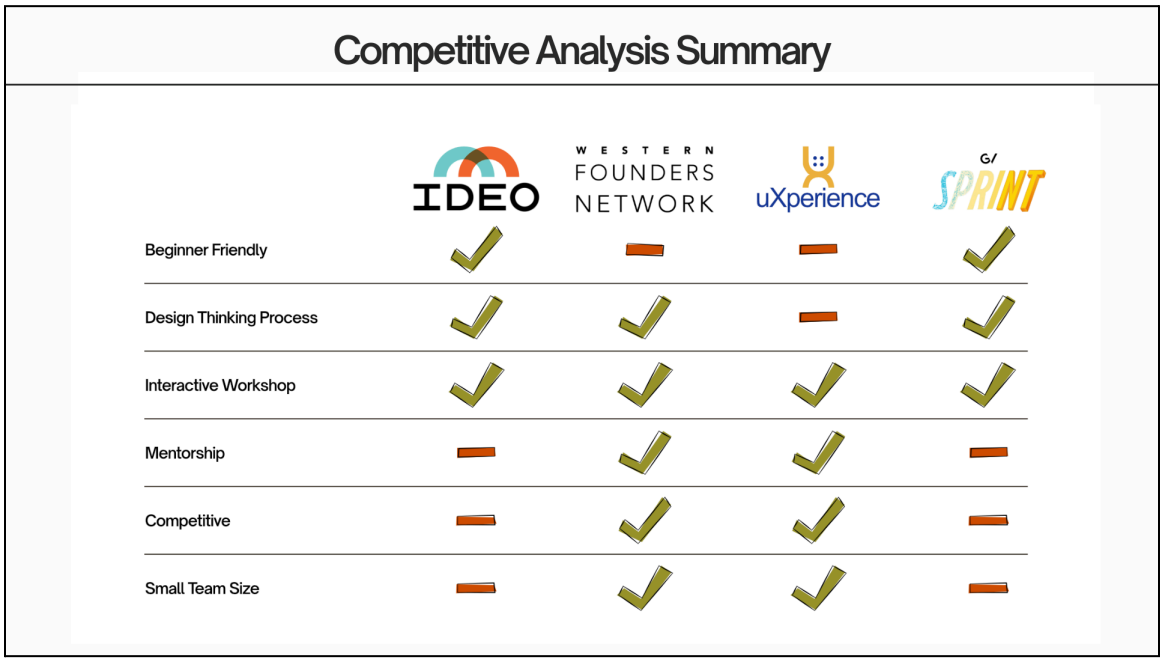
IDEO. ORG- Nonprofit design organization focused on improving health, economic issues, and wellbeing. Often partners with companies, governments, and communities.

Western Founders Network

Western University Tech Club- Case Sprints related to Business, Technology, Design, and Entrepreneurship.

Google Ventures Sprint Book
GV is a Venture Capital company that developed a framework of design and prototyping meant to be done in a 5-day process. Developed into a book named *SPRINT*.

Sunlife uXperience
Design Jam is run by the Stratford School of Interactive Design, University of Waterloo, sponsored by SunLife Financial, inviting undergraduate students to participate in a one-day design competition.



Competitive Landscape

We noticed multiple trends within how our competitors held their design events (workshops and sprints). First, we saw that design workshops and sprints were equally held online or in-person, and sometimes offered options for both. These events are mostly geared towards UX professionals and design students. The duration of the event varied from 2 hours to 5 days. Common tools used during these events included laptops, design software (figma, adobe, etc.), whiteboards, pencils, post-its, sketchbooks, notebooks, and prototyping materials. There were usually 1-5 main facilitators present who were working with UX professionals to supervise and aid the participants. Business leaders were sometimes present to judge the teams' final products, while key speakers were often there to present background information about the event. All events were done with participants split into teams of 2-10 people. The goals of these events always included improving teamwork and allowing participants to be creative with ideas, empathize with users by learning about different perspectives and applying the design process to solve a problem. They also created the networking opportunity, encouraging participants to meet

new people, mentors, and organizations. All events were held by reputable companies. We also noticed that design sprints often had cash prizes to further incentivize their participants to win.

Common Issues

Although having time constraints is useful for designers, we noticed that rapid pacing and the anxiety it brings on was a common issue. Depending on the time available and the problem to be solved, participants may feel overwhelmed by the challenge, pressured by the time, and may even suffer information overload (this can also happen in long events), diminishing retention of key concepts and diluting the overall effectiveness of the event. The quick nature of some workshops and sprints makes it so they cannot provide extensive insight into the design process. For example, participants may not have much, if any, time to conduct research. Additionally, these events may not allow sufficient time for in-depth exploration of complex topics or for adequately addressing participant's questions and concerns. Participants are also often limited to using the resources they already have and those provided by the event hosts as they may not have time to obtain others. The experience level of participants can also greatly vary, meaning some may have an advantage over others. Group management is also an area of concern as it is beneficial to know your team members and what skills they possess in advance of the event. Spending a lot of time getting to know others or deciding who should take on which roles can reduce the time available for designing.

Best Practices

By investigating our competitors' events, we were able to highlight the best practices they used for holding design workshops and sprints. They each had a facilitator or multiple facilitators to lead and guide the discussion. These facilitators presented the challenge and requirements in a clear, easily accessible manner. The materials necessary for participation were provided by the event hosts and brought by the participants, ensuring they were able to get started immediately. The team sizes were kept relatively small (approx. 4-6 people), making them manageable. Teams are encouraged to organize the work that must be done and allot time for each task to avoid burnout and running out of time. Finally, each event had participants following the steps of the design thinking process.

Opportunities for Differentiation

We identified many opportunities for differentiation through our analysis. As the competitor's events were all catered towards those in the design industry, we have the opportunity to differ by creating a solution that people without design knowledge can participate in. To avoid the aforementioned issues with both long and short events, we can estimate the time needed to complete each activity to calculate a comfortable amount of time for the solution/event to last. We can also try to minimize the amount of materials required in addition to those provided with our solution, as not everyone has access to the same resources. We also want to design our solution in such a way that it can be run with only one KITE facilitator as this would

save many potential facilitators' time. We would want to highlight user research in our event as it is vital to the design process, yet often glossed over because of time constraints and limited resources. We would want users to feel KITE's presence and support as not only hosts of the event (our proposed solution) but also as participants working alongside them. We will continue to consider how we can weave KITE's resources throughout the event to show stakeholders what they have to offer as design partners.

Competitive Analysis 2: Research Centers / Clinics

After showcasing our background research, we received feedback on possible ways of looking at existing solutions from other health organizations. We looked into several of the highest-earning organizations across Canada and under the University Health Network, which KITE is under. Learning about healthcare competitors helped us narrow what sort of solution we could develop.

The Princess Margaret Cancer Foundation UHN	○ Partnered with the UHN to raise funds for Cancer research ○ Good to compare due to being familiar with fundraising
camh Centre for Addiction and Mental Health	○ World leading research facility for mental health ○ Important to compare due to it's marketing in Toronto
Vancouver CoastalHealth	• Greater Vancouver • Primary, secondary, tertiary and quaternary care, • Home and community care, mental health services, preventive health and addictions services
SickKids®	○ A child hospital providing medical education ○ University Avenue in Toronto, Ontario ○ Top children's hospital in the world (Newsweek)

Change in Project Direction

Rationale

KITE's current challenges can be attributed to a lack of widespread promotion and knowledge concerning what KITE does and what the term "rehabilitation" means. Due to this, we have decided to focus on this issue: the lack of knowledge of KITE's work and rehabilitation within the general public. We believe that by memorably promoting KITE and teaching people

about rehabilitation, we can help KITE towards its other goals such as finding partnerships and getting people to support their cause. The institute must first be known, understood and supported through an emotional connection to create meaningful partnerships. By increasing public interest in rehabilitation, we will support and uplift KITE's reputation. This strengthens their case for funding applications and helps them gain recognition from potential partners.

Revised Problem Statement

To address the change in the direction of our project, we created a revised problem statement:

*"*How might we get **everyone** to take an **interest in, understand,** and **connect** with **rehabilitation** so that we can **help KITE secure more partnerships and funding**?*"*

Redefined Goals

This new direction allows us to confront the root problem of this design challenge, which is the lack of widespread knowledge and understanding of KITE to the general public. We believe that to design the best solution we must focus on these three pillars: Interest, Connect and Educate.

Interest

Our first goal is to find a way to get people interested in KITE's work and rehabilitation. We must grab the attention of users long enough to establish a personal connection to the values and objectives of KITE.

Educate

Secondly, we need to teach people about KITE and rehabilitation in a memorable way that is digestible to the general public. This will give people a better understanding of what KITE does, creating both an interest and connection in KITE.

Connect

Lastly, we need to get people to care about KITE and rehabilitation enough to support the work that they do at KITE. These individuals may become partners, help raise awareness of the organization, participate in their research or work with KITE to invent new healthcare solutions. Those who potentially work or partner with KITE may not realize how their skills, industry or occupation can be used in the world of healthcare. We need to show these people that they have a place in this industry.

User Group

Because KITE wants everyone to be interested in them, understand their work in research, connect with them, and support them, we realized that our target user group for our solution is **everyone.** We are excluding those who are incapable of learning about KITE such as children under 7 for example, who are not part of our user group.

Generative Research: Interviews

Methods

To design a solution that focuses on interesting, connecting, and educating the general public about rehabilitation, we conducted 10 moderated interviews to better understand our user group. We developed a framework for three themes: **Interest in Organizations, Experiences with Rehabilitation and Injury, and Education/Information Seeking Behaviours.**

Interest in Organizations/Companies (Brand Loyalty):

The goal of these questions was to discover what inspires people to be loyal to an organization or company. These questions would help us understand what it is that makes other organizations successful. We may be able to use similar tactics to garner attention and ameliorate KITE's image in our prototype.

Experiences with Rehab and Injuries:

Knowing people's experiences with rehab and injuries helps us connect with users through hearing stories about their lived experiences. Since anyone can encounter issues with their health, we believed that, even if participants had never gone through the rehabilitation process themselves, it was likely they would know somebody who has.

Education-Related/Information-Seeking Behaviours:

Lastly, our education-related and information-seeking behaviour questions will determine how we will educate the public about KITE and rehabilitation. We asked questions about how people stay engaged in professional settings, as well as what approaches they favour for learning things. It is important to note that the best method of learning things is different for every individual. However, certain trends did emerge. Additionally, we asked participants about what sort of information an organization would have to present to them to convince them the organization is worth supporting.

Our interview questions are as follows:

Generative Research Interview Questions

Demographic Questions

1. What is your name?
2. How old are you?
3. What is your occupation?
4. What do you like to do outside of academics/work time?
5. Have you ever heard of KITE before this interview? If so, what do you know about them?

Interest in Organizations (Brand Loyalty)

1. On the topic of interests, are there any organizations/companies you like/support?
2. What part of the organization motivates you?
3. What got you into it? Or how did you find out about it?
4. What do you like about it?
5. Have you ever heard of organizations focused on helping people with disabilities, illnesses, injury prevention, aging, or injury rehabilitation?
6. If you support this organization, what motivates you to do so?
7. How did you find out about this organization?
8. How did you feel about your experience with this organization?

Experiences with Rehab and Injuries

1. Have you ever experienced an injury requiring rehabilitation?
2. Do you know anyone around you who had a rehabilitation experience?

Education/Information-Seeking Behaviours

Sounds like you know a lot about [their hobby/experience]. When it comes to learning..

1. What helps you learn about things best?
2. What helps you stay engaged in educational/professional settings?
3. Was there a time you tried or had to learn something you thought you didn't like, but ended up enjoying it (**OR** found it to be useful)?
4. Think about a time you successfully learnt a topic you weren't interested in, how did you finally learn it?
5. How do you feel about online meetings/classes/workshops/training?
6. What (kinds of) information would convince you an organization is worth supporting?
7. What would you want to know about them?
8. What would interest you/encourage you to support them?

Participant Information

We conducted a total of 10 moderated interviews with close family members and peers that took place online and in person. However, we intentionally approached middle-aged and older participants due to the likelihood of those individuals having more experiences related to rehabilitation, aging, injuries, and illnesses. Before conducting our research, all team members completed the Tri-Council Policy Statement Course on Research Ethics (TCPS 2) to ensure we approached interviews ethically and responsibly. We made sure to gather consent from our participants and to record their voices to use the application OtterAi to transcribe our interviews.

Our participants' ages ranged from the following bellow:

- 1 Participant under 18* (16)
- 3 Participants between 19 - 25
- 4 Participants between 30 - and early 50's
- 2 Participants in their early 60's

*We received parental consent for the individual's participation prior to conducting the interview.

Analysis of Interviews

Thematic Analysis

Following the completion of our interviews, our team convened to reflect on and discuss the insights gained. The conversation made it clear that several key themes emerged from the responses of our interviewees. To systematically categorize this information, we selected pertinent quotes from the interviews and represented them with virtual sticky notes. These notes were then organized by related concepts, allowing us to pinpoint the central themes and patterns. Subsequently, we identified the themes most relevant to our research objectives. Our analysis resulted in an affinity diagram that highlighted six primary areas of focus (aside from demographics): learning, motivation, credibility, awareness, community, and the preference for online versus in-person engagements.

By categorizing the sticky notes according to these themes, it became apparent which thoughts, actions, preferences, and motivations were shared among the participants. We then distilled these observations into insight statements, providing a concise summary of our findings to inform and direct our team's design strategy.

Snippet from the thematic analysis. See appendix for full image and link.

Insights

Learning

- Most participants felt they needed interactivity to stay engaged and learn about something
- Most participants feel that having information presented to them in different forms of media helps them learn better
- Participants felt they learned better from instructors who were confident and passionate about the material
- Many participants learned by example/demonstration and repeated practice
- Participants generally preferred interactions to be in-person rather than online

Motivation

- Many participants are motivated to support and/or work for brands and organizations that help people
- Many participants are motivated to support brands and organizations through personal rewards: amusement, goodies, resume experience, personal development
- One participant mentioned that they keep their hobbies and donations separate (e.g. they join a fundraising marathon, but just because they like running.)
- Being part of a community was another important motivation for participants. They often got involved in activities because of others.
- Participants were motivated to continue activities that they did not enjoy at first because:

- they were able to overcome the challenge presented by the activity
- the activity was necessary to achieve certain goals
- they discovered new things about it that they enjoyed

Organization Information & Credibility

- To support an organization many participants want transparency and honesty (e.g. knowing where the money goes and how it helps contribute to the cause)
- An organization's purpose, mission and values are important for people to create a personal connection to the organization
- Positive reviews from people and results from the organization help to demonstrate the credibility and value of an organization

Awareness

- All the participants did not know what KITE is
- Many participants become aware of things because of the people in their communities (e.g school, work, local, volunteering, family and friends)
- Participants noted being involved in fundraising through marathons and post-secondary school events
- Other commonly mentioned methods of spreading awareness were through social media, advertisements, and online resources

Community

- People would follow their friends and family to enter a hobby/interest
- People feel deeply towards causes if people around them are affected by it
- People tend to join activities affiliated with their religious organizations and ethnic groups
- Many participants support brands/organizations that help the community

Pain Points

Upon reviewing our insights, it became apparent that our users' main concerns center on evaluating an organization's trustworthiness. Users start to question an organization's legitimacy and impact when it doesn't display ratings, reviews, or clear evidence of its achievements. The absence of financial transparency increases doubts, heightening fears of fraud. Furthermore, overly dramatic emotional appeals can seem manipulative, and the extravagant aspects of certain fundraising events may obscure their true purpose, undermining user trust and potentially deterring future involvement.

Another issue identified involves the challenge users face in accessing necessary information, often due to insufficient promotion or unclear instructions on how to utilize services. This can result in a frustrating experience for users seeking assistance, as they may feel uninformed about the resources available to them.

In the realm of education, users encounter barriers that affect their learning engagement. The lack of interactive elements in educational content can render the learning process unengaging, an effect that's amplified by uninspiring presentation and static learning environments. Content that doesn't adapt to various learning styles or incorporate interactive features may deter user interest further. Additionally, some users' general reluctance towards online activities can negatively impact the overall willingness to engage in digital learning spaces.

On a personal note, users frequently face difficulties connecting with the aims or causes of an organization. The perceived absence of personal benefit from supporting a cause can lead to a lack of motivation, resulting in disinterest and hesitation to contribute. This barrier often stems from a failure to see the personal relevance or rewards in supporting such causes, challenging the organization to make its goals resonate more personally with potential supporters.

Functional Requirements and Opportunities for Design

To address the pain points, we identified several opportunities for design while keeping the functional requirements in mind.

Fostering a sense of community

As we want to show that KITE is a community-driven organization instead of another corporate entity that only cares about profit and funding, our solution would need to highlight how KITE's research helps people, such as by inventing healthcare solutions for the community. This would involve visualizing KITE's impact on improving the lives of people with disabilities, or the aging population, hence enabling the members of the public to understand the rather abstract nature of KITE's work. Our solution could also require users to work together to overcome a challenge to foster a sense of community. Users would be further rewarded with the joy of accomplishing something with a group of people.

Helping users form personal connections

Our solution should help people build personal connections to KITE and rehabilitation. We believe that storytelling is a way we can connect our users' personal experiences to the world of healthcare to get them invested. To achieve this, we aim to make our solution interactive as our research has shown that participants were the most engaged & focused with interactive multimedia learning activities as opposed to more static methods. Delivering interactive

activities with multimedia elements would also enable us to better retain users' attention, providing them with the tools they need to focus on retention and core understanding.

Providing information & showing credibility

Taking a step back, we tried to understand why KITE failed to appeal to the members of the public to figure out how we could better educate them. Our research showed people greatly value credibility indicators when considering if an organization is worthy of their support. Key indicators include reviews and testimonials, results of past projects, or positive showcases of their work. Teaching people about KITE in a way that highlights their impact and achievements will reinforce KITE's credibility while allowing users to evaluate if KITE's values align with their own.

Challenge users & reward them

To motivate users to continuously engage with our solution, we may decide to challenge them to achieve a certain goal. Some participants from our research stated they enjoy a challenge and that overcoming a challenge gave them a sense of accomplishment. We could use gamification to combine interactivity with challenges to create a fun and engaging solution that will leave a positive impression on users.

Personas

We created our persons from the two main themes that we saw emerge from the motivations, preferences, behaviours, and values of our 10 participants. We named them The Community Helper and The Productive Passerby.

The Community Helper

The community helper is an active & empathetic person who is drawn towards organizations & activities that give back to their community.

Motivations

- Helping others to improve their quality of life
- Connecting with others on a deep level
- Bringing people together
- Sense of fulfillment in helping others
- Uplifting others & promoting positivity

"It feels good to know I'm making a difference"

Values and Goals

- Improving the lives of others
- Personal connections
- Teamwork
- Personal fulfillment
- Self-improvement
- Generosity
- Giving back to the community
- Having a visible impact

Tasks and Behaviours

- Helps people in both professional & personal settings
- Consults other's experiences and reviews to inform judgements
- Benefits from interactive learning and in-person connections
- Offers assistance to anyone in need
- Looks for opportunities to be helpful
- Tries to get others involved

Pain Points

- Will inconvenience themself to help others
- Limits themself to doing activities with a visible impact
- Devastated if their actions or the organization they support hurts others
- Disorganized & flashy events
- Cannot convince everyone to join their mission

The Productive Passerby

The Productive Passerby is a workaholic who speeds past others to get things done ASAP. They're always working towards their personal & professional goals.

Motivations

- Rewards such as goodies or a salary
- Self-improvement
- Sense of achievement

"What's in it for me?"

Values and Goals

- Achievements
- Self-improvement
- Functionality
- Simplicity
- Efficiency
- Profit
- Productivity
- Rewards

Tasks and Behaviours

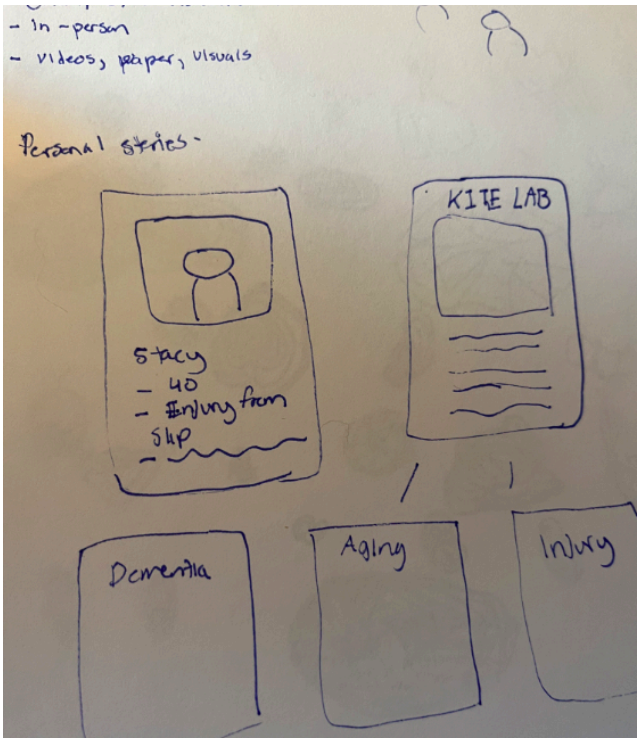
- Goal-setting & organization
- Prefers online meeting
- Multi-tasking
- Prioritizing work & goals over social life
- Gets tasks done as soon as possible, never wastes time
- Doesn't do anything without a purpose

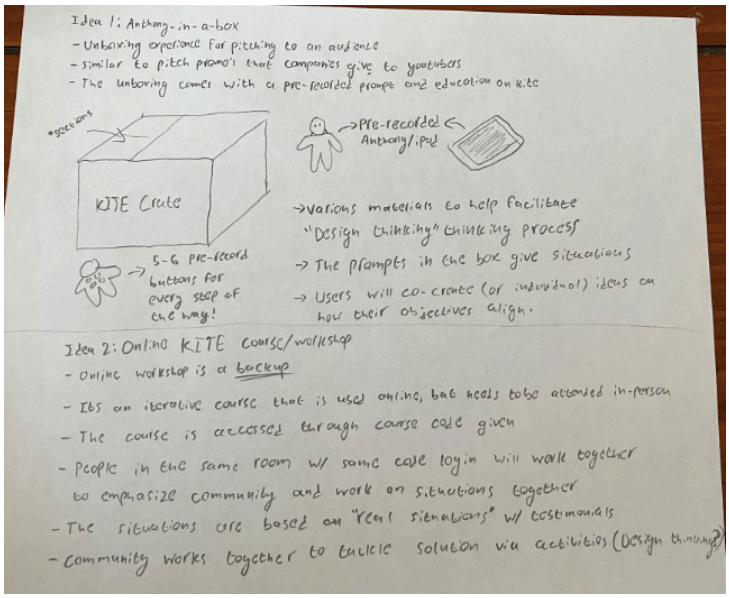
Pain Points

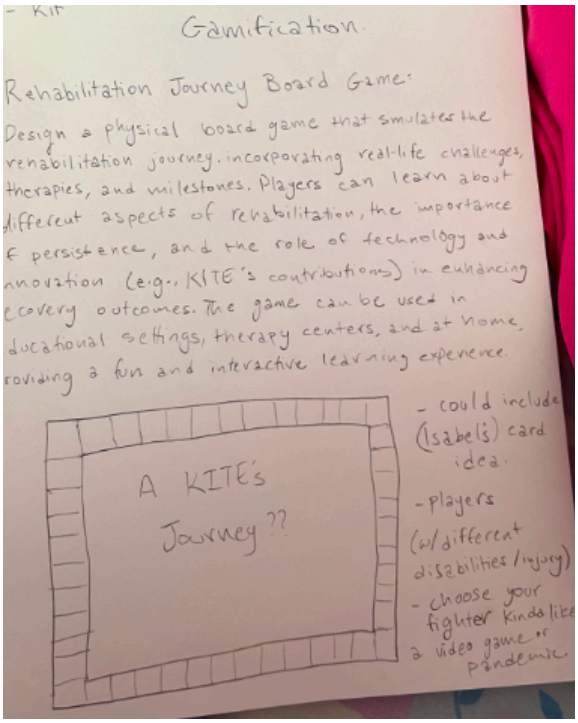
- Unreliable resources
- Major distractions & hindrances
- Disorganized & inaccessible information
- Feels cheated when not rewarded
- Has trouble connecting with others since their free time is limited
- Trouble relaxing, feels they're being unproductive

Ideation

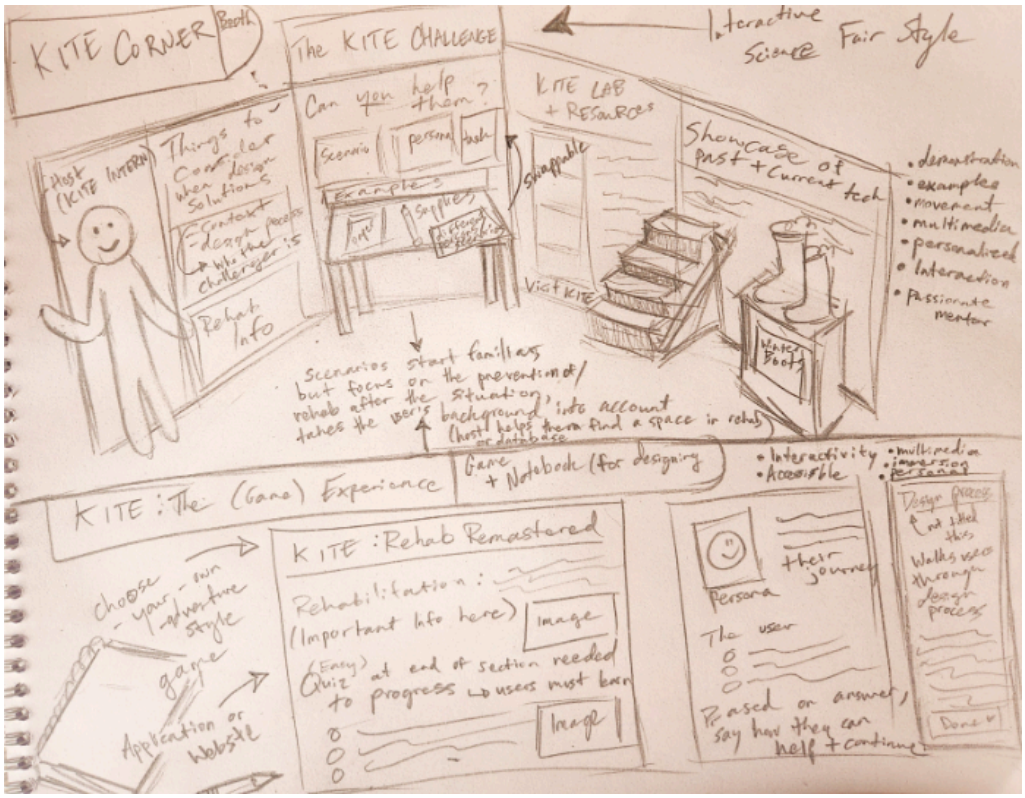
Based on our generative research we each ideated different solutions and sketched them out:






Gamification
Rehabilitation Journey Board Game:
Design a physical board game that simulates the rehabilitation journey, incorporating real-life challenges, therapies, and milestones. Players can learn about different aspects of rehabilitation, the importance & persistence, and the role of technology and innovation (e.g., KITE's contributions) in enhancing recovery outcomes. The game can be used in educational settings, therapy centers, and at home, providing a fun and interactive learning experience.
A KITE's Journey??
- could include (Isabel's) card idea.
- players (w/ different disabilities / injury)
- choose your fighter kinda like a video game or pandemic.


Researcher
Partner
Scientist
Intern
Target ?
Situation Card
Resources 1
Resources
People/Patient
Lab ?
Money Needs


KITE CORNER Booth
The KITE CHALLENGE
Can you help them?
Interactive Science Fair Style
KITE LAB + RESOURCES
Showcase of past + current tech
demonstration
examples
movement
multimedia
personalized
interaction
passionate mentor
Things to consider when designing solutions
Rehab Info
Scenarios start familiar but focus on the prevention of/ rehab after the situation, takes the user's background into account (host helps them find a space in rehab)
KITE: The (Game) Experience
Game + Notebook (for designing)
interactivity
Accessible
KITE: Rehab Remastered
Rehabilitation:
(important info here)
Image
(Easy) Quiz at end of section needed to progress → users must learn
Persona
their journey
The user
Raised or answer / say how they can help + continue?
Choose your own adventure style game
Application or Website

Solution

We have decided to follow through with creating a game for our solution. We are taking inspiration from games marketed as “escape-rooms-in-a-box”, as well as collaborative mystery games such as the “EXIT” series and “Journey 29” which has users solve puzzles to reach a common goal.

Rationale

Our decision to develop a game was informed by comprehensive research, including ethical preparations and in-depth interviews with a diverse group of participants. These interviews revealed key themes such as the importance of interactive learning through multi-media and the challenges of establishing an organization's credibility. The game addresses these insights by offering an interactive experience that educates users about KITE’s mission and research compellingly, fostering a sense of community and personal connection. By incorporating challenges and multimedia elements, the game keeps users engaged and motivated to learn more about rehabilitation efforts, making it an effective tool for conveying KITE's contributions to healthcare. This approach also navigates identified constraints, ensuring the game's appeal across various demographics and preventing information overload, ultimately enhancing KITE's visibility and support.

Game Research

As we were creating a game for our solution, we needed to research game design. Since we wanted users to work together to learn about rehabilitation in a fun and engaging way, we decided to investigate puzzle and edutainment games, as well as their effectiveness.

Effectiveness of Interactive Edutainment

All group members recalled edutainment games and shows from our childhoods. We were also able to recall the information we had retained from them. To further support our decision to make a game for our solution, we confirmed the effectiveness of edutainment games by reviewing academic literature. These quotes in particular stood out and informed us that a game was indeed an appropriate medium that could help us achieve our goals for this project.

"The games deliver supplementary skills like problem-solving, communication, and negotiation capabilities and the ability to monitor emotional intelligence; they prompt the players for collective action and stimulate their imagination!" - Katsaliaki & Mustafee, 2015

"Blended learning, which combines traditional learning and digital learning, has both the strengths of digital technology and the strengths of traditional learning in which students and the teachers both take part interactively. The fun elements of digital learning are combined with the effectiveness of traditional face-to-face learning." - Staffans et al., 2009

Player Types & Motivations

To understand player types, we researched the different motivations found in players. We each took a reliable quiz to discover our own motivations and player types and how they influence us. We used this information to tailor our game to the specific types of players who would enjoy it: those who like working together, helping others, learning new things, puzzling-solving, and interactive stories. We also paid attention to how each game we looked at motivated their players, whether intrinsically or extrinsically.

MDA

To be able to properly discuss games, our team learned about the MDA (mechanics, dynamics, aesthetics) taxonomy. We used this framework to help us evaluate other games, such as through a SWOT analysis, and learn about what made them effective.

Edutainment Games

To understand how edutainment games function, we revisited some of the games we remembered from our childhoods and investigated some that we had never played before, such as:

- *Poptropica*, an adventure puzzle game that features different eras and historical figures
- *Oregon Trail*, a resource management game set during a historic journey
- *Lemonade Stand*, a business simulation and resource management game
- *Cut the Rope*, a logic puzzle game that uses physics
- *Times Attack*, a mathematical combat dungeon crawling exploration game

We then discussed the games using the MDA framework to learn about how they accomplished their goal of immersing, educating, and entertaining their players. We also shared our personal opinions and spoke about the strengths and weaknesses of the games.

Puzzle Games

To learn about multimedia co-operative puzzle games, we decided to investigate *Exit The Game* and *Journal 29*, as they fit the criteria. We paid special attention to the systems that these popular games use to support players (via hints, and walkthroughs) and check their answers. This helped us come up with the design for our own digital component. We also decided to play one of the *Exit* games to get a sense of what our game could be like.

EXIT The Game

Exit The Game is a series of themed escape room in-a-box games meant to be completed with a group of players within an hour. The game features various puzzles that players have to cut, fold, and move printed pieces to solve.

MDA Framework

After we made it halfway through the game, we discussed the game using the MDA framework to understand how the game worked.

Mechanics

- Reading through information, recording clues
- Using the decoder disk
- Answer deck system
- Hint deck system
- Cut things out, reorder them
- Arranging the suspect tokens to visualize and make deductions
- Solving puzzles for each character
- Puzzles giving critical information/materials for upcoming puzzles

Dynamics:

- Paying attention to detail, making associations
- Using pen & paper
- Voice acting, and role-playing to set the tone, and other players followed suit
- Debates, discussions with each other
- Big group breaking into teams to tackle puzzles
- Competitive (“I wanna be the one to solve this!”)
- Collaborative (“What do you guys think?”)

- Not wanting to use hints (stubbornness, pride)
- Celebrating and sharing correct answers together (explanations, high-fives, making noise, congratulations), and sharing the pain of incorrect answers
- Changing perspectives physically, getting up to move, cut, grab materials, walk around

Aesthetics:

- Paddle boat trip to New Orleans
- Southern aesthetic
- Mystery storyline, players as detectives
- Other characters involved, standout personalities, wants, needs, motivations
- Old-school 1800s: Visuals, posters, the way characters talk & dress
    - Different kinds of images for locations, the bar, the ladies' salon
    - The old map, the newspaper clippings, the notes, the sheet music, the fonts
    - Adds to the immersion
    - Historically accurate items (boats, etc.) used in the puzzles
- Dialogue is written to give the feeling that everyone is hiding something

SWOT Analysis

We also performed a SWOT analysis to find opportunities for improvement that we could use in our own game.

Strengths

- Cheap, and easy to mass produce (small and compact)
    - all paper, sustainable
- Team-motivated, majorly collaborative
- 3D puzzles, interactive
- Good for a big group, and can break into teams even though it's intended for only 4 players
    - Bouncing ideas around
- Immersive
- Tackles intrinsic motivations
- Strong historical theme, learning about a different time period
- Helpful clues, strong hint system, never left completely hanging
- Different levels of hints, well-structured hints (tell you what you need to solve the puzzle, which is not always obvious)
- Strong puzzle design, adequate information provided to solve them w/o making it obvious (intuitive enough)
- An effective answer system helps guide you while maintaining suspense

- The app gives the option for music, tutorial, timer to further aid immersion (but the app is entirely optional)
- All one-time materials are recyclable
- Fosters teamwork

Weaknesses

- You need people you can collaborate with
- Hard to start at first, and might discourage people from digging deeper if they fail to go through the first few riddles, need patience and perseverance to move forward
- Reluctant to purchase games because of one-time use (waste of money)
- Easy to get caught up with the way something needs to be solved (the influence of others can redirect the direction of looking at the puzzle)
- Someone who knew the game retained attention in the beginning and minimized the time spent reading the rules
- The boat cards (from the special items box) are fragile and break apart easily considering the instruction told us to 'fold' things
- In a larger group, some players might not be able to be as engaged at all times
- One-time use

Opportunities

- Require more than 1 person to play, hence encouraging people to engage
- Have some easier riddles at the start so players aren't discouraged to continue
- Use more 'foldable' materials, like maybe stronger cardboard so users don't need to use tape to fix them (or maybe even plastic, not preferable though)
- Ease into the game so that users don't get discouraged in the beginning
- Making it longer to make it feel more worthwhile as a one-time game, having different parts/acts is good for taking breaks
- Making it multiple use (like clue), ex. Maybe the suspect is different each time, or maybe there's multiple mysteries
- Expansion packs
- Flashier items, more descriptive box art
- **Accessibility**: larger fonts, more recognizable on the answer card
    - Have symbols of people instead of just their portrait
- Make it more ready to play: Provide paper/digital file option/notebooks/scissors

Threats

- Non-destructive alternatives might be favoured as new players are reluctant to waste money on a one-time experience / replayable games
    - Games with extension packs/levels of complexity might be favoured
- Immersion:

    - Actual escape room experience can provide a more immersive experience (Eg. music, visuals..)
    - Games with stronger role-playing elements (more vivid characters, customizable player characters)
- Digital games physically prevent players from physically reading the answer card pile, skipping the riddle hence ruining the game entirely
- Games that ease players into them, games with stronger tutorials, less reading
- Flashier escape room games, more items, bigger items, more visually appealing, novelty (cool gadgets/accessories)
- Games with more eye-catching box art
- Games with easier opening puzzles, more captivating storylines

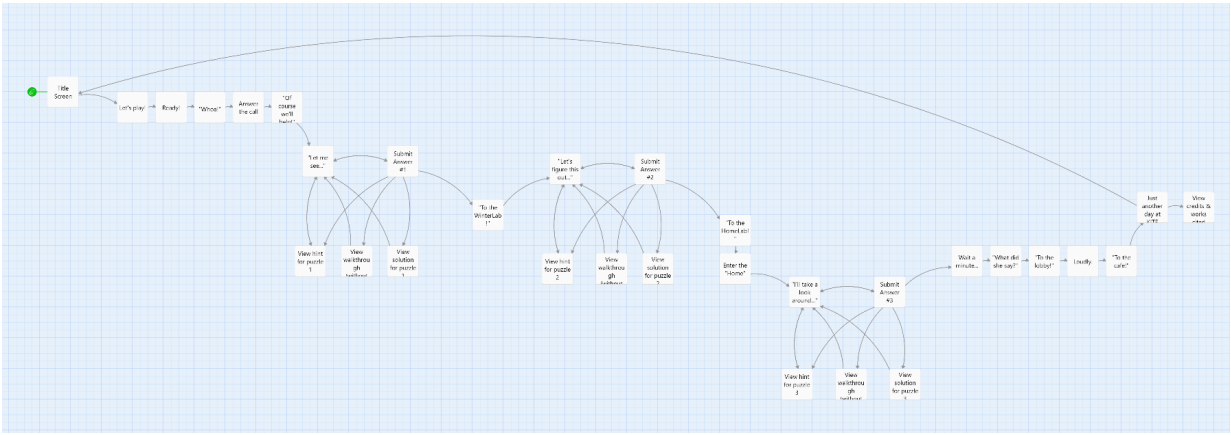
Low-Fi Prototype: Design

KITE: Research Roundup - Initial Design

Our original prototype was designed to achieve our three main goals (interest, educate, connect). The way we would present these goals was in the form of puzzles. We decided to base our puzzles on the KITE facility and real KITE research. Our team assigned each goal to one puzzle and we split up into pairs to work on them. Additionally, we incorporated a digital component to our game where the storyline, hint/walkthrough system, and user inputs would be presented. The program we used was Twine, which is a free beginner-friendly visual programming tool that is used to create non-linear narratives. Twine helped set the tone of the story using images and minor animations enhancing the experience of users when playing our game.

Development - Production

As stated previously, we used Twine to build our story, user inputs (such as inputting the solution of the puzzle) and game systems (hint/walkthrough systems).



(Image of Lo-fi Twine Wireframe)

When creating the puzzles, we used Adobe Illustrator to digitally format the puzzle. We then printed these designs out and cut them to the correct size. Additionally, we used leftover craft materials to create other pieces for our first iteration of the game.

Development - Beta-testing

Before we completed any play-tests of our game, we had to first test the prototype with ourselves to ensure the game would be ready for participants to play. We combined all the puzzles we completed separately into one full game. For this Beta-test we wanted to test if our game has a proper flow that users can follow. We each tested out a puzzle we did not work on and simulated what participants would try to do. Although we all knew the answers to the puzzles, we still wanted to check the quality of the mechanics for each puzzle and our Twine integration.

A few improvements had to be made for two puzzles. Puzzle 1 did not achieve the goal we set for it (Puzzle 1 was uninteresting but it was supposed to be the Interest puzzle), and Puzzle 2 was too challenging and complex (it was not streamlined towards one possible answer). We fixed these problems by either reworking the entire puzzle (Puzzle 1) or by simplifying the gameplay mechanics so they would be easier to understand (Puzzle 2).

Development - Finalized Lo-fi Prototype

Our final version of the Lo-fi prototype game is based on a fictitious story that we created to incorporate elements of KITE, such as their facilities (Labs) and research. The fictitious nature of the game makes some elements, such as the premise, not real. We are gamifying real facts and research from KITE to make it an interesting experience for participants to engage with, as found in our generative research and our research on the Edutainment game genre.

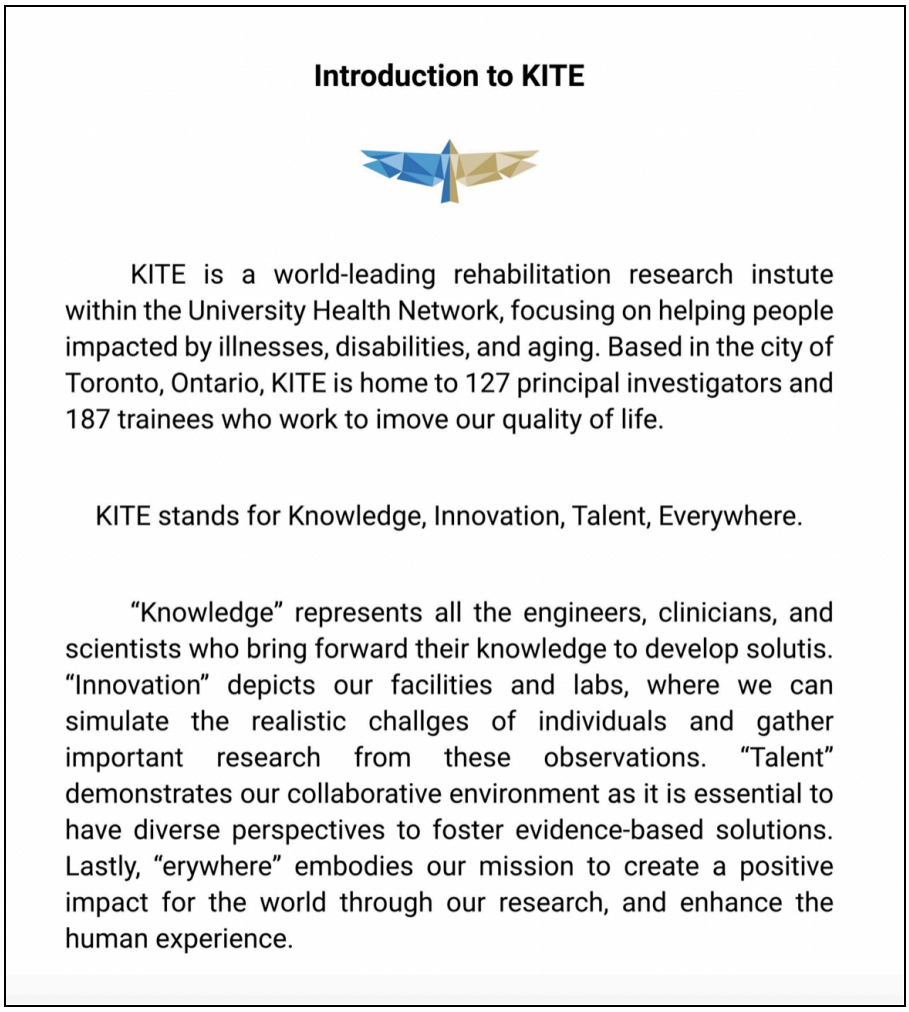
The introduction to the game starts with an explanation of the controls and how to use Twine along with the physical puzzles presented to the participants. Afterwards, the story begins with a fictitious story: The power goes out at the KITE institute and you are asked by the Director of KITE to help out with a few mishaps that occurred when the power went out. There are 3 tasks to be done, which are the 3 puzzles respectively, happening in the different labs and rooms within KITE.

Puzzle 1: Welcome to KITE!

The goal of Puzzle 1 is to provide “Interest”. This puzzle provides a brief introduction to what KITE is in the form of an old brochure draft. However, some of the words are misspelled, possibly being the key to unlocking the door at the WinterLab. Participants will have to repetitively read the brochure to find patterns and clues for the solution, which would help facilitate a better understanding of what KITE is and why they help people.

Interaction 1: Participants engage with the Twine story and click on interactive text such as “answering a call” to read a story about the problem description occurring in the puzzle

Interaction 2: Players are tasked to find a password that is encrypted in the paper prototype, that mimics a KITE brochure and describes the organization as shown below:



Introduction to KITE

KITE is a world-leading rehabilitation research instute within the University Health Network, focusing on helping people impacted by illnesses, disabilities, and aging. Based in the city of Toronto, Ontario, KITE is home to 127 principal investigators and 187 trainees who work to imove our quality of life.

KITE stands for Knowledge, Innovation, Talent, Everywhere.

"Knowledge" represents all the engineers, clinicians, and scientists who bring forward their knowledge to develop solutis. "Innovation" depicts our facilities and labs, where we can simulate the realistic challges of individuals and gather important research from these observations. "Talent" demonstrates our collaborative environment as it is essential to have diverse perspectives to foster evidence-based solutions. Lastly, "erywhere" embodies our mission to create a positive impact for the world through our research, and enhance the human experience.

(Image of Introduction to KITE Passage from Puzzle 1)

Interaction 3: Players must read the passage to search for five misspelled words (Institute, Improve, Solutions, Challenges, Everywhere). Next, players must write down the missing letters (ti, pr, on, en, ev) that are missing from the misspelled words, group them and unscramble them to get the passcode: "prevention".

Interaction 4: Players input a passcode into Twine, press OK and continue with the rest of the story leading into Puzzle 2.

Hint, Walkthrough and Solution:

Hint

In the passage, there are five words that aren't spelled right.

_ r _ _ e _ _ _ _ n

"Let me see..."

Walkthrough

Find the missing letters within the words that aren't spelled correctly.

This will spell out the password.

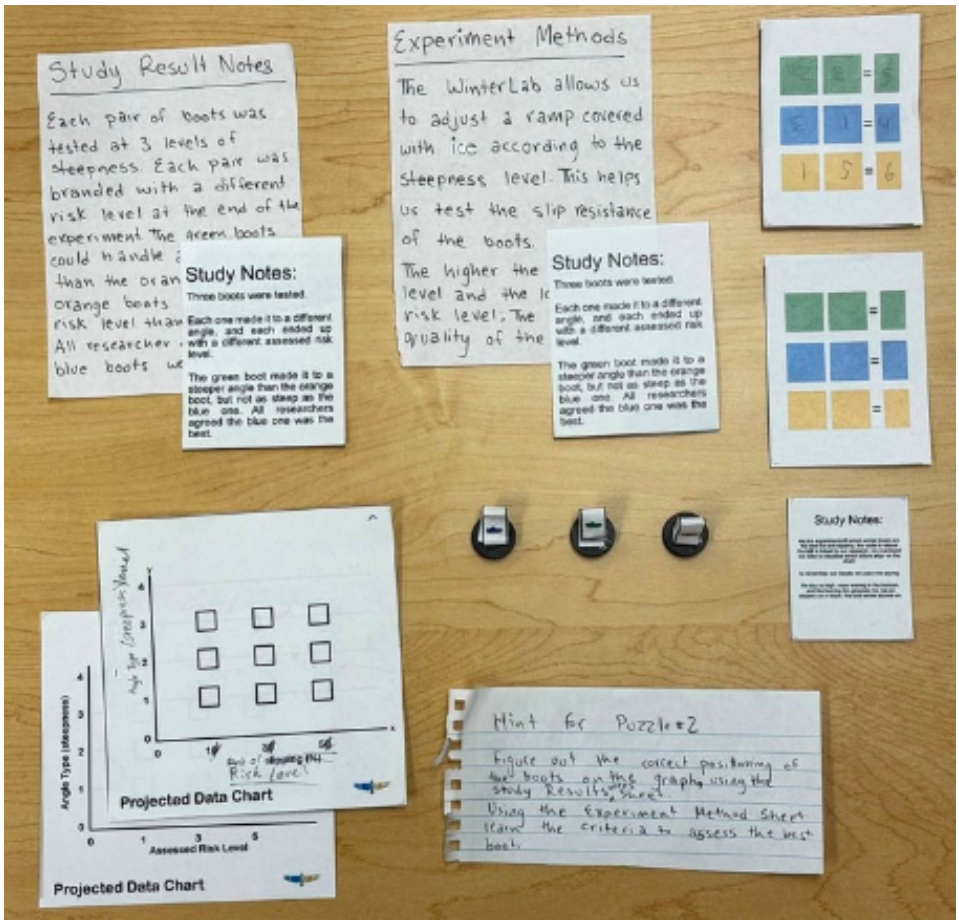
"Let me see..."

Solution

The password is "prevention"

"Let me see..."

Puzzle 2: WinterLab Reboot



(Image of all the Puzzle 2 components)

This puzzle was heavily inspired by actual research conducted by KITE to test the slip resistance of boots (Rate My Treads). The goal of Puzzle 2 is to “Educate”. We implemented a magnet mechanic where participants will have to find the correct placement of boots (with magnets on them) on the graph. They will have to understand the real research methods of the study and solve a logic riddle to find the right positioning of each boot. The code can be found by matching the colours of the boots to a calculation function.

Interaction 1: Participants will have to read the “Experiment Methods” Sheet and the “Study Results Notes” to find key information on the placement of the boots.

Interaction 2: The participants will place the boots on the graph according to the logic riddle given to them on the two sheets (“Experiment Methods” and “Study Results Notes”)

Interaction 3: Participants will input the coordinates of each coloured boot in the "Calculation Sheet"

Interaction 4: Participants will have to add the coordinates to get the final numbers needed for the code.

Hint, Walkthrough, Solution:

Hint

The "Study Notes" card contains the information you need to place the boots on the graph and find the correct order.

There is a specific order for the code, it is not the same colour sequence that you will get from the position of the boots on the graph.

"Let's figure this out..."

Walkthrough

Remember:

To solve this puzzle, you will have to find the position of each boot on the magnetic graph.

"Each pair was branded with a different risk level at the end of the experiment."

This means that each boot belongs in a different column on the magnetic graph.

Blue Boot Positioning:

On the Experiment Methods Sheet it says, "the higher the steepness level, and the lower the risk level; the better the quality of the boots".

In the Study Results Notes, the researchers agreed that the "blue boots were the best"

The blue boots should have the lowest risk level and the highest steepness level out of all the boots.

Green Boot Positioning:

The green boots can "handle a steeper angle than the orange boots".
This means the green boots should be positioned in a higher row than the orange boots.

Orange Boot Positioning:

The orange boots had "a higher risk level than the green boots".
This means the orange boots are positioned in a column that's to the right of the column that the green boots are in.

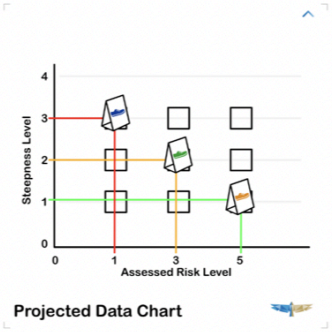
The Code:

Fill the boxes on the small equation sheet with the coordinates of the boot that correspond to the colour, one number in each box. Add the two numbers together and record the sum. The three numbers, in top-down order, make up the code.

"Let's figure this out..."

Solution

The answer to the graph is:



Projected Data Chart

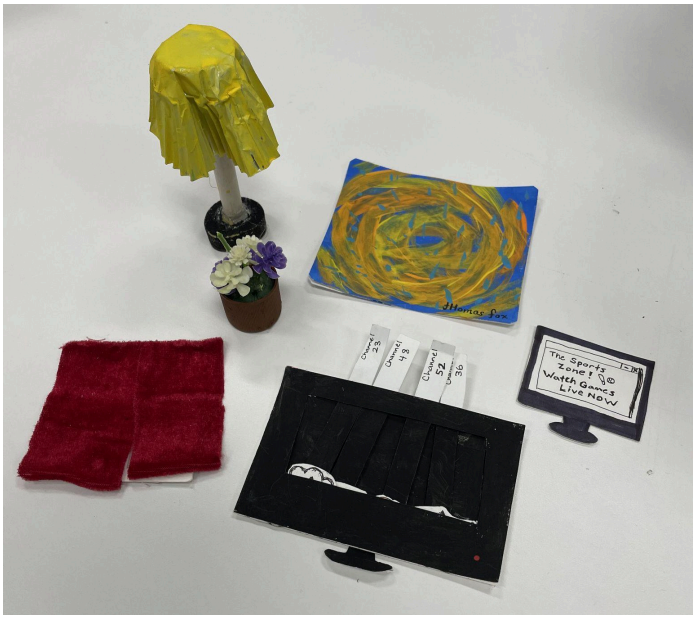
2	3	=	5
3	1	=	4
1	5	=	6

The correct order for the code is: Green # , Blue # , Orange #

The code is: 546

"Let's figure this out..."

Puzzle 3: Grandma's Lost Phone



(Image of miniature furniture models based on the HomeLab)

Puzzle 3 is our Connect puzzle. The objective is to make an emotional connection with the character that is associated with the puzzle: an older woman (Grandma). This character was

written as one of the volunteers who participated in research studies conducted at KITE's HomeLab. We believe that by highlighting the problems Grandma goes through in her life, we can establish an emotional connection. That means this puzzle is very story-driven.

Interaction 1: The players will look through each item to find a capitalized letter hidden somewhere within the item.

Interaction 2: Players will notice that the T.V. has multiple letters on each channel, the computer monitor points out the sports channel, alluding to using the letter found on the sports channel found in the T.V.

Interaction 3: Once the players gather all the letters in the items, they will need to unscramble letters to find the word "COUCH" which is the solution to this puzzle.

Hint, Solution and Walkthrough:

Hint

There are letters scattered around each object.

"I'll take a look around..."

Walkthrough

Inspect each object thoroughly, there may be hidden letters within each object.

You will have to turn around and take apart certain objects.

The computer screen gives you a hint of which channel to choose on the T.V.

Make sure that you unscramble the letters to get the solution!

"I'll take a look around..."

Solution

Flower vase: The letter is underneath the flowers, lift up the base to reveal. The letter is C.

Lamp: The letter is on the underside of the lamp shade. The letter is O.

T.V and Computer Monitor: The monitor tells you to check out the sports channel on the T.V. The letter on the sports channel is the correct one. The letter is U.

Window: The letter is behind the curtain. The letter is C.

Painting: There is a capital letter in the artist's signature. The letter is H.

Unscramble the letters to spell the word: **COUCH**

"I'll take a look around..."

Low-Fi Prototype: Testing

Overview of Lo-Fi Prototype Testing

Participants

For Lo-Fi Prototype testing we wanted to recruit participants to form two groups of three people. We specifically chose people who already knew each other and were friends before the study to simulate a casual "game night" between individuals who get along with each other. Our first group of participants were notably more experienced with games in general, while our second group mainly had those who played games casually. Using this observation we noticed that the first group seemed to be more confident and had certain players taking the lead at different points. This group understood what to do next and tried to be more immersed in the story by reading the narrative aloud. The second group read things in silence most of the time. This was important to highlight because it shows how different groups of people can display various dynamics and player types, contributing to contrasting opinions on our game.

Before both tests, we asked participants for their consent to be video-recorded for the duration of their playtest. Furthermore, we provided compensation for our participants to thank them for their time and participation.

High-level goals

Our overall goals were to:

- Test out the general mechanics of our game and evaluate whether we were able to achieve our three main goals (Interest, Educate, Connect).
- Find out if our puzzles made sense, and if participants were able to complete them without seeking the answer.
- Observe any group dynamics that come out from playing our game
- Investigating if our solution is effective, and does our game provides Interest, Educates and Connects with participants.
- Test to see if reaching these goals makes participants more willing to support KITE.

Components of the Test

This play-test consisted of a Pre-test survey asking for consent to record video and audio of them. Moreover, we wanted to know the participant's knowledge level of games and KITE. During this test, we used a logging sheet to record our observations (see Appendix). After both tests were completed we held a small group discussion of overall thoughts and feelings towards our game and asked questions that were specific to a group's play session. Afterwards, we directed the participants to complete our Post-test survey that asks for feedback on each puzzle,

any suggestions they have to improve our game, and if they now understand more about KITE after completing our game.

Findings from Lo-fi Testing

Users' General Response

All participants wanted more visuals and less text on Twine. Multiple participants thought that it would increase the immersion because it would simulate moving to a different setting within the KITE facility. The hint/walkthrough system proved to be very useful but needed to have more details to give more guidance on what to do. The overall response to our game was that it was fun and interesting, but unfortunately, we did not achieve the goals set in place for each puzzle. Many participants have explained that they understood what KITE was at a surface level and that they would not support KITE even after playing the game. We did receive an insight that explained how they would not support KITE, but if they were to hear about KITE somewhere they would recall that KITE is the research facility that is associated with this game.

Visuals are vital

The most common piece of feedback was to incorporate more visuals in our game to increase immersion but also help guide them throughout the story. Seeing as these tests were with our Lo-fi prototype, all components, including the Twine build were very basic. Our main focus was to test the functionality of this game. One participant suggested making the Twine background to be images of KITE's labs and having the setting change throughout the story. This shows the participants that the story has progressed. Furthermore, there were many complaints about having too much text on Twine and Puzzle 1. One participant mentioned how they would skim over the story on Twine and that many participants found the first puzzle somewhat boring. Skipping over the story is very detrimental to our game since Puzzle 3 relies on this narrative. Going forward, we wanted to add these visual updates on Twine, along with updating the aesthetics of the other puzzles as well.

Signifiers were lacking

Both groups had a very hard time completing Puzzle 2, which was because there were not enough signifiers for the puzzle. The "Calculation" sheet caused the most confusion since participants did not know what to do with that piece of paper. Each group viewed this sheet upside-down as there was no signifier for the correct orientation. Because of this, participants kept on getting the wrong answer making them second-guess themselves and overthink. We found that participants would lose their confidence when getting the wrong answer and would reevaluate their entire process even if they got the first part of the puzzle correct. Some

participants verbally explained they did not understand what this sheet is used for, resulting in us adding more signifiers for Puzzle 2 to better explain the usage of this sheet.

The hints needed to be more informative

All participants explained how they thought the hint system was good. However, we did notice the hint for Puzzle 2 guides the participants up to a certain extent. It could have been worded better, leading one of the groups down the wrong path. The hint only covered one part of the puzzle, resulting in the second part of the puzzle not being properly defined. Participants have said how it would be nice to include guidance on both puzzles within the hint. We added this change on Twine so that our Mid-fi testing will have a hint that will properly guide participants.

Immersion is key

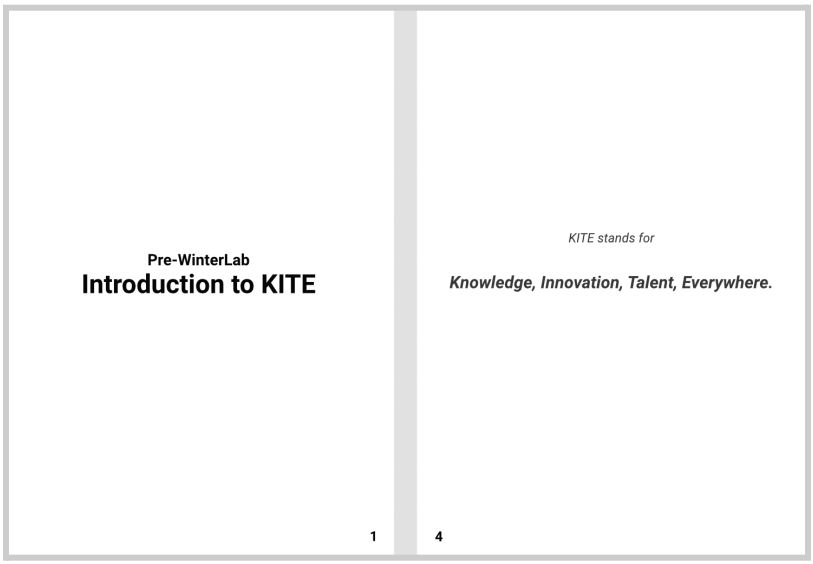
Both groups have shown that immersion helps them absorb information. Although Puzzle 2 was hard to complete, participants still felt that it was interesting. One participant explained how they enjoyed feeling like a researcher since we provided them with “Experiment Methods” and “Study Result Notes” simulating resources that researchers would have. The integration of real research and data received good reviews overall. To enhance immersion within our game we will be focusing a lot more on the aesthetics and visuals, and designing game pieces to look more like “Researcher notes”. This finding is especially important for our Mid-fi prototype because we focus on this insight to improve upon Puzzle 3 as it did not properly give an emotional connection to participants.

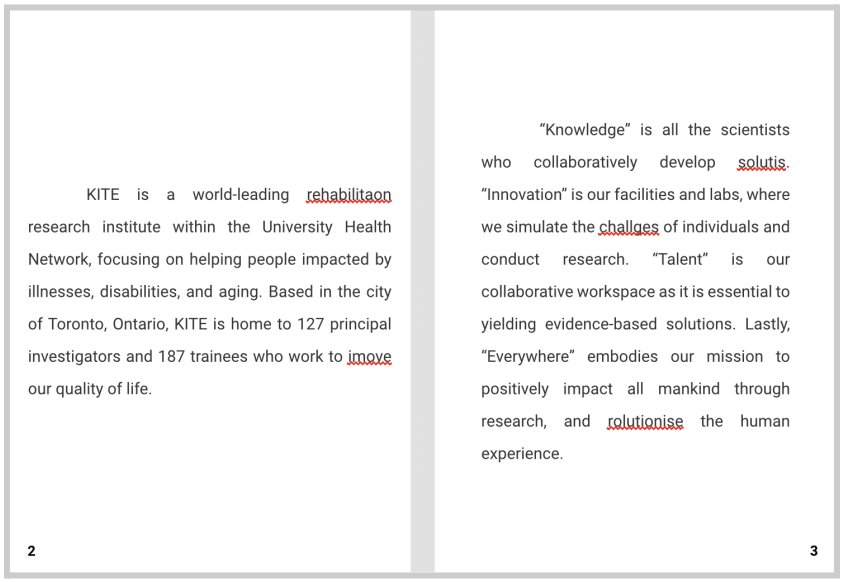
Mid-Fi Prototype: Design

Changes from the Low-Fi

Following the feedback from our low-fidelity prototype testing, we enhanced our design for our medium-fidelity prototype. Our analysis of user criticisms allowed us to refine the initial prototype, specifically addressing key concerns like the overly challenging Puzzle 2 and the need for additional visuals. Once these adjustments were made, we transformed the game into a medium-fidelity prototype and carried out two phases of user testing.

Puzzle 1: Welcome to KITE!



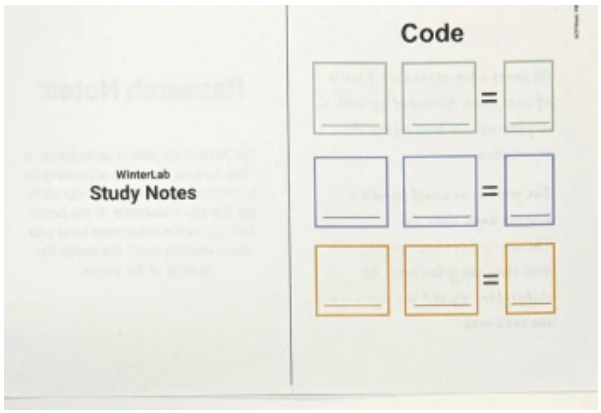


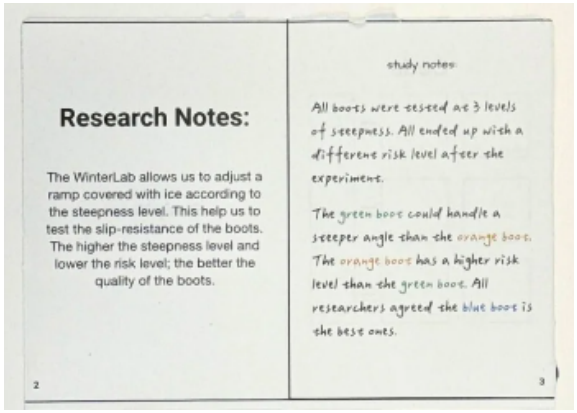
(Image of our Mid-fi Puzzle 1)

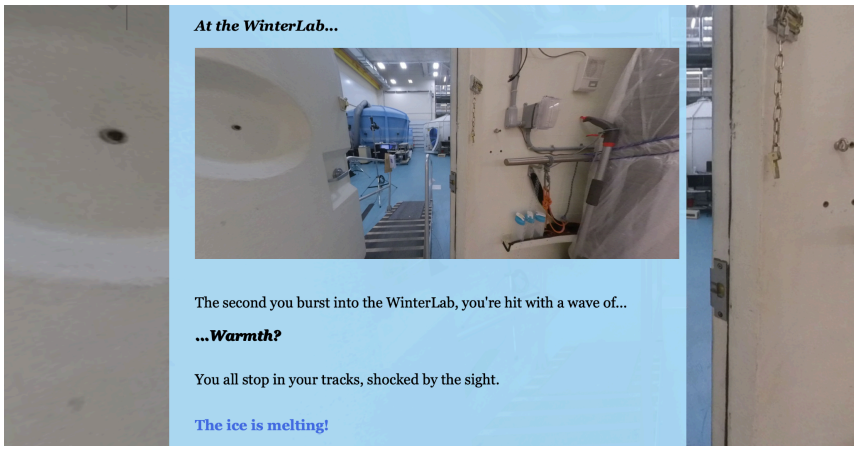
In the initial puzzle, we maintained the interactions as they were in the Lo-Fi prototype but introduced several modifications:

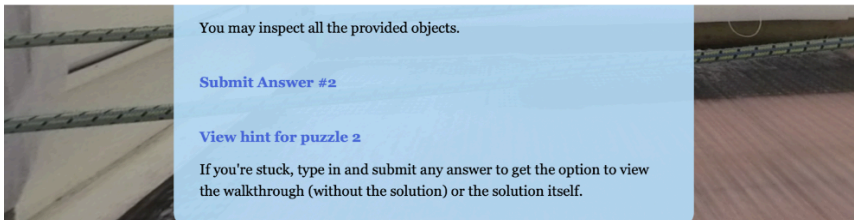
- We reconfigured the Introduction to KITE section into a booklet to align with the narrative of discovering a passcode among essential lab documents.
- We substituted 'institute' with 'rehabilitation,' eliminating 'ti' to simplify word unscrambling challenges, as participants found it hard to deduce 'ti' or 'it' from 'institute.'
- We replaced 'Everywhere' with 'revolutionise' by omitting 'ev' to address confusion among players regarding whether 'erywhere' suggested 'ev' or 've.'

Puzzle 2: WinterLab Reboot





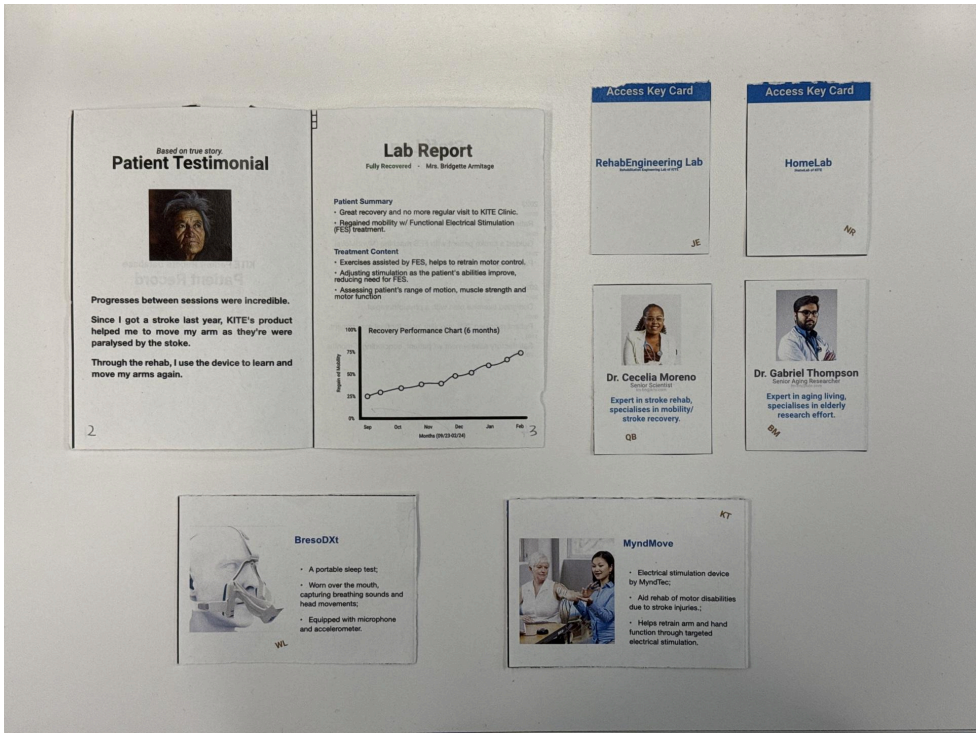




(Images of our new and improved Mid-fi Puzzle 2)

- Converted into a booklet design to engage visual interest
- Adjusted various elements of the graphic design
- Switched 'Calculation Sheet' to 'Code' sheet, utilizing underlines to denote orientation
- Refined the appearance of the content

Puzzle 3 Pivot: Database Codebreak



(Image of our new Puzzle 3)

Our user testing sessions supported our belief that the previous iteration of Puzzle 3 did not effectively communicate KITE's principles and research to participants. Getting players interested in KITE's work was the aim of our project. Players complained that they "don't know what's going on" and were having trouble interacting with KITE when the third puzzle was first released. The prior iteration, while an intriguing concept incorporating tangible three-dimensional sculptures (generating a "wow" effect), was regrettably unfinished and did not further the main objectives of our project. To solve this problem, we decided to start over and construct puzzle 3 to give users a clear idea of what KITE accomplishes. At the same time, we wanted to pique users' interest using interactive components, as our research revealed that interactive elements help users learn more effectively.

In light of this, we completely redesigned Puzzle 3 to educate players about KITE as an organization. Specifically, we reduced the difficulty of the puzzle from being difficult to being rather easy, requiring players to comprehend KITE's mission before they can decipher the password. This method alluded to a popular theory in game design, according to which players

become fixated on finishing the trickier levels and forget all of the game's educational elements. We, therefore, decided to use this approach to provide players' retention of pertinent knowledge about KITE more weight than a demanding gaming experience, thereby guaranteeing that this puzzle strictly complies with our project's objective.

A straightforward 6-letter code that was broken up and strewn over the items that were offered as hints made up the password. The Patient Record booklet must be matched with various KITE materials, and the player will receive a fraction of the password for each correct match. The player would then use the final password as the Twine solution by arranging them in the booklet's order of appearance. In retrospect, the design was very inventive because the password-matching procedure creates a balanced challenge for the problem, preventing players from becoming distracted by solving it and forgetting any of the KITE material. To accomplish this, the password was intentionally made difficult by requiring the use of the appropriate two-letter option for each slot and their proper order. As a result, rather than attempting arbitrary combinations and entering them into Twine, players would find it quicker to solve the puzzle in its intended manner.

Key Findings from Mid-fi Testing

Successes:

- Participants gained valuable knowledge about KITE from the puzzles, sparking further interest in the organization and even desires to visit KITE's headquarters.
- The game was appreciated for being grounded in real information from KITE.
- The storyline and the escape-room-in-a-box concept with a Twine digital companion were highlighted as engaging and innovative features, particularly the magnet system in Puzzle 2, which was noted for its uniqueness.
- Testers felt the game captured the essence of KITE effectively, finding the exploration of KITE's daily work fascinating. The physical components of the game were also well-received, offering tangible interaction beyond screen-based digital gaming. The clarity provided by Puzzle 3 on KITE's operations was crucial in meeting the project's goal of fostering interest in KITE.
- Puzzle 3 was recognized for connecting players more with KITE and offering a realistic interpretation of KITE’s research work, using actual KITE products, methods, and laboratories as inspiration for the puzzle designs.

Failures:

- **Mechanics-induced Error:** A technical glitch in Twine's validation system initially rejected the correct answer for Puzzle 1 due to an extra space, necessitating moderator intervention and subsequent adjustments to the system.

- **Too Much Text in Story (Twine):** A group of testers found the story too lengthy, leading them to skip narrative elements on Twine. This feedback, coupled with their attempt to use ChatGPT to solve a puzzle and their aversion to reading, suggests that the game might not cater well to those disinclined towards reading or with reading challenges.

- **Inadequate Instructions:** The same group criticized puzzles 2 and 3 for being confusing and cited unclear instructions. This issue, though not reported by other testers, reinforces the notion that the game may not be ideal for non-readers.

- **Hints and Graphics:** Feedback indicated that hints could be made more specific and less repetitive, highlighting a need for review. Enhancements in graphics, prompted by feedback from lo-fi testing, were positively received in the medium-fidelity prototype.

In conclusion, while the game successfully conveyed the essence of KITE and engaged most players effectively, key areas for improvement include refining the narrative's conciseness, enhancing hint specificity, and addressing technical and instructional clarity to better accommodate a diverse player base.

Mid-Fi Prototype: Testing

Test Plan

Participants

For our medium fidelity user testing, we recruited two sets of two and four participants, respectively. Participants came from a variety of academic backgrounds, including UX design, game design, and criminology majors. The first group of two players were non-gamers who struggled and said they didn't enjoy our game; the second group of four players were frequent gamers who said they loved the game and wanted to learn more about KITE after playing it.

Our desired number of players was three per play-test group. However, due to schedule issues, we were only able to set up two people for the initial test. Our ideal participants were groups of friends because it was easier to imitate teamwork and the familiar comfort of playing a game with others.

We were surprised to be able to recruit four people for the second round of mid-fi testing, even though none of them knew each other. However, we took this as an opportunity to put the group dynamics to the test, as everyone came from diverse backgrounds and had distinct abilities. How would they engage with one another in the game, and how would they cooperate? How would they react if they got the right or wrong answers?

We intended to test the enhanced functionality of the Twine digital companion as well as our physical puzzles. The objective was to evaluate the dynamics of player interactions with one another and to see how the game would appear. Testing, if the plot made sense to gamers who read them all the way through, was another objective. Additionally, we were interested in observing the reading habits of the participants, such as partial or complete text skimming. Furthermore, we sought to confirm whether our approach was successful in achieving the four previously mentioned objectives.

Testing Process

Our testing procedure encompasses several key steps: Initially, we conduct a pre-test survey to gather participants' consent for video recording their gameplay. For those who prefer not to be recorded, either visually or audibly, we make sure to adjust the camera setup to exclude them from the frame or to mute their audio in post-production, honouring their privacy preferences. During the actual gameplay, our team members serve as moderators, ready to step in should any unforeseen events arise. However, unless necessary, moderators refrain from interacting with the players to maintain an unbiased testing environment. The moderators record all of their observations on a logging sheet, which is separate for each testing group **(see Appendix)** Following the gameplay, we hold a post-test discussion where participants are encouraged to share their thoughts, suggestions, and any feedback they have about the game openly. This discussion is also recorded on video to capture their responses comprehensively. Additionally, To show our appreciation and compensate our play-testers, we gave pizza and other foods at no more than $10 per individual as an incentive for their participation.

Pre-Test Questions

Our Pre-test survey served as a consent form for our play-testers. The questions in our consent form included:

1) Do you consent to participating in our play test study and recording observations of your play session?
    - ☐ Yes
    - ☐ No
2) Do you consent to having your voice recorded?
    - ☐ Yes
    - ☐ No
3) Do you consent to being video recorded?
    - ☐ Yes
    - ☐ No
4) What is your name?

    _____

We included three different types of consent questions because we wanted to make sure the play-testers knew what they were agreeing to. We also found it helpful because some participants did not consent to being video recorded but did consent to being audio recorded. By keeping everyone's preference in mind we were able to successfully record our play sessions.

Post-Test Questions

For medium-fidelity testing, instead of having a post-test survey, we decided to hold an open discussion. To begin the discussion we asked our play-testers questions about the game and KITE as a whole, such as:

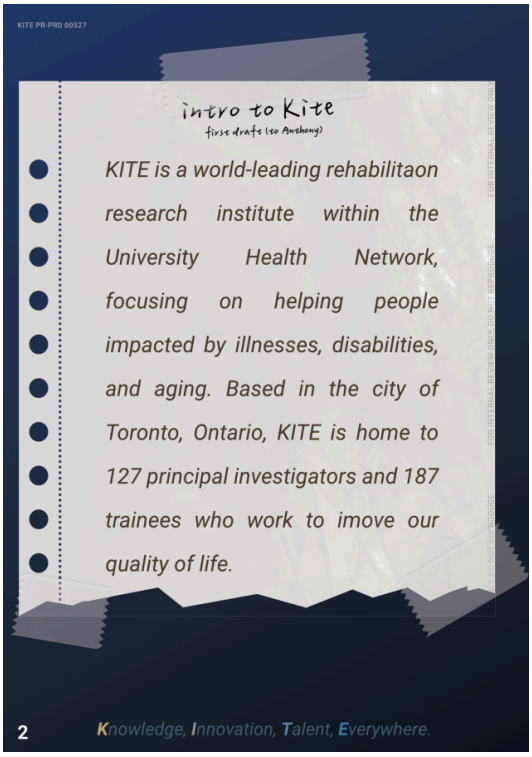
1. What did you think of the game?
2. How would you describe your overall experience playing this game?
3. What did you think of each puzzle? Which one did you like the most and why?
4. On a scale of 1-5 (1 being easy and 5 being difficult), how would you rate the difficulty of each puzzle?
5. After completing this game, what have you learned about KITE?
6. If you were to hear or see KITE somewhere, would you associate them with this game?/Would you make that connection?
7. Now that you have some knowledge about KITE, do you see yourself supporting them as an organization, or spreading the word about them?
8. How likely are you to use their resources in the future now that you've learned and seen firsthand what KITE does?
9. Please give any feedback or comments in general about the game and how we can further improve it.

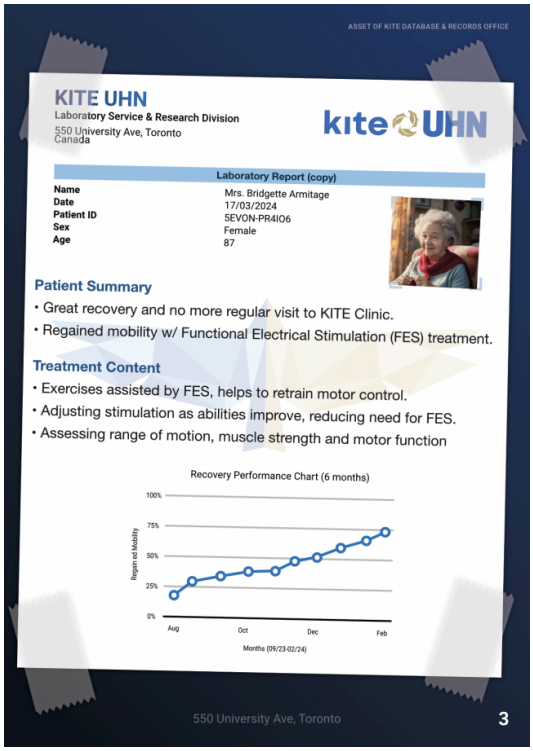
Logging Sheet

Medium-Fidelity User Testing Group 1: Three
Medium-Fidelity User Testing Group 2: Four

Improved Mid-Fi Prototype: Design

The principal changes we made to our Mid-Fi design included adding detail to the visuals of the puzzles to simulate a lab in a fun tone with the colours and mimicking real-life objects such as the tape on the piece of paper. Other changes were made to the structure of the puzzle. We used the feedback given to us to update the Twine portion to ensure there were no grammatical errors or difficulties with the mechanics.





(Images of our Mid-Fidelity Puzzles included in our box)

Improved Mid-Fi Prototype: Testing

We conducted a final test on our work with one group, particularly with an age group that included older participants. Although we obtained positive results from our testing with younger adults, we wanted to make sure that we were including the feedback of multiple age groups. The group we tested with was one of our members' parents, who have experienced issues with injuries and illnesses such as sleep apnea. Having background knowledge of our participants was important for hypothesizing what outcomes would arise from the testing. Details on participants are below:

Participants:

- 50+ year old married couple, male and female
- Participant 1 (Male): Computer Programmer, who has dealt with multiple injuries
- Participant 2 (Female): Housewife/University Student, has sleep apnea
- Native language is Spanish, Proficient in English

Pre-test questionnaire results:

- Participants consented to be recorded
- Participants have never heard of KITE UHN or the Toronto Rehabilitation Centre
- When hearing the word “rehabilitation”, they think about injuries, drug rehab
- Participants do not play games often and play board games 1-2 times a year

During Testing

- The participant had difficulties unscrambling a word due to the language barrier, realized after using hint and walkthrough
- Expressed feelings of frustration after realizing where they messed up on a part of a puzzle
- Strong dynamics between players, high-fiving and expressing feelings of accomplishment after inputting the correct code into the game
- Began reading the narrative on Twine out loud as the game progressed. This included making up voices for the narrative and characters such as the “Board of Directors” in the game.
- Thinking out loud, discussing and problem-solving
- Utilized clues after trying to input an answer and getting it wrong

Post-Test

- Completed puzzles in a bit over an hour.
- Participants said they have a better understanding of KITE compared to when they didn’t know of the organization’s existence

- Participants were surprised by the variety of problems that KITE focuses on, such the boot testing and injury prevention
- Participants enjoyed the variety of puzzles and hint systems and noted they liked the interactivity of the magnets included.
- Overall ranking of 3 for difficulty.
- Participants felt frustration during the first puzzle but were reassured knowing there were hints to lead them to the correct answer.
- Participants said the puzzles were an interesting way of learning about KITE, but pointed out that they felt there could be more details included about the rehabilitation process, or felt that they missed some parts of the information
- When asked about supporting KITE, participants were unsure of how they would go about helping the organization but expressed interest in such causes that KITE works on.
- Participants liked that they were able to work in a team because they said it helped them work collaboratively and share ideas.

Next Steps

To further enhance our game, we plan on expanding it by adding more puzzles, thereby enriching the gameplay experience and providing players with additional challenges. Recognizing the importance of diverse player feedback, we aim to test the game with a broader demographic to ensure it resonates with a wide range of users. Since we mostly tested with university students, it would be important to test with users of different age groups and see how they react to the game. Continuous improvement and iterative testing will remain central to our development process, ensuring each aspect of the game is refined to its utmost potential. Alongside these enhancements, we are considering incorporating sound design into Twine, our companion application, striving to have an auditory element in the game to contribute effectively to the immersive experience. Alongside incorporating sound effects, another thing to consider is having a text-to-voice element for accessibility. Visual improvements are also on our agenda, with plans to elevate the aesthetic appeal and clarity of the game's interface, both the physical components as well as the digital component (Twine). Additionally, furthering the development of Twine to create a more immersive experience, we're considering adding a timer to introduce a greater level of challenge and excitement for users. These steps collectively represent our commitment to evolving the game into a more engaging, inclusive, and polished product.

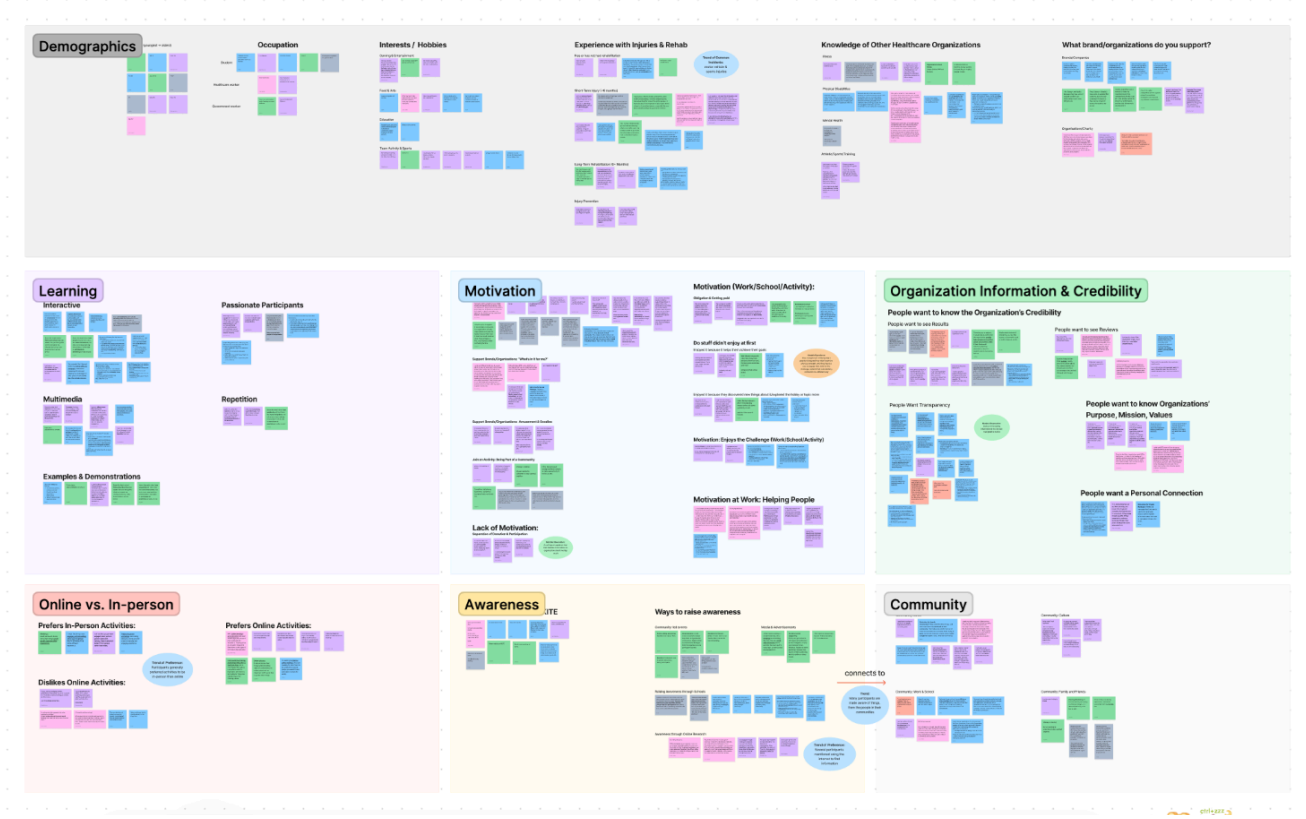
Implementation Plan

In the development of our game, careful budgeting and cost estimation will lay the foundation for our next steps, which include pitching our concept to potential collaborators. By partnering with established board and digital game developers and publishers, we aim to leverage their expertise and resources to bring our vision to life. Collaborating closely with KITE and our partners will ensure the game accurately reflects the organization's values and research. A strategic advertising campaign will help us reach our target audience, as we plan for wide distribution, where users will be able to purchase this game at any game store, underscoring our belief that our users encompass everyone. To maximize impact, we intend to integrate the game into KITE events, conferences, field trips, and fundraisers, making it a versatile tool for engagement and education. Additionally, we're considering the development of educational materials and lesson plans for teachers, which may include downloadable presentations and worksheets to accompany the game. This would potentially transform the game into not just a source of entertainment but also a valuable educational resource for middle school or high school students, offering easy access and straightforward implementation.

Appendix

Affinity Diagram

https://www.figma.com/file/KkMrStvnquIIdpgliSZ7gv/UX200-Team-Elevate?type=whiteboard&node-id=0%3A1&t=Ri1hmwu3AFt3Wimm-1



Twine Screenshots

Mid-fi Twine screenshots: Twine Prototype Screenshots
Improved Mid-fi Twine screenshots: Final Twine Screenshots

Links to Logging Sheet:

General Logging Sheet Template: Template
Low-Fidelity User Testing Group 1: One
Low-Fidelity User Testing Group 2: Two
Medium-Fidelity User Testing Group 1:Three
Medium-Fidelity User Testing Group 2:Four

References

This final report is a compilation of our past deliverables. All of the information and data found in this document are heavily referenced by these previous reports:

UX200 Deliverable 1 - Team Elevate

UX200 Deliverable 2 - Team Elevate

UX200 Deliverable 3 - Team Elevate

Katsaliaki, K., & Mustafee, N. (2015). Edutainment for Sustainable Development: A Survey of Games in the Field. Simulation & Gaming, 46(6), 647-672. https://doi-org.libproxy.wlu.ca/10.1177/1046878114552166

Staffans, S., Wiklund-Engblom, A., Hassenzahl, M., Sperring, S. (2009). Doing It Right: Combining Edutainment Format Development and Research. In: Chang, M., Kuo, R., Kinshuk, Chen, GD., Hirose, M. (eds) Learning by Playing. Game-based Education System Design and Development. Edutainment 2009. Lecture Notes in Computer Science, vol 5670. Springer, Berlin, Heidelberg. https://doi-org.libproxy.wlu.ca/10.1007/978-3-642-03364-3_3