Seeking Paths In Life

Build future paths through in-depth conversations and planning

By

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MDES 2023

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Acknowledgments

I arrived in Vancouver alone in 2021 and joined the MDES Interaction Design program at Emily Carr University of Art + Design. Over the past two years, I've gained knowledge, friendships, and treasures more precious than gold. I often find myself incredibly fortunate and want to extend my sincerest respect and gratitude to those who have been part of my journey.

I sincerely thank Jonathan Aitken, my academic supervisor at ECUAD. His guidance has been invaluable, shaping my academic journey profoundly. My heartfelt thanks also go to my mother for her unwavering support. The encouragement they both have provided has been my driving force.

I'd also like to acknowledge the faculty and staff members at ECUAD, whose expertise has enriched my learning. Here also to my fellow peers; their companionship and friendship have made this journey memorable and inspiring.

Last but certainly not least, I want to shout out to Tara. Her assistance and encouragement have been paramount to me. Her help has contributed to the maturity and refinement of this thesis.

“朋友啊！在你的心田里，只种爱的玫瑰。”

—巴哈欧拉

“O FRIEND! In the garden of thy heart plant naught but the rose of love.”

—Bahá’u’lláh

Glossary of terms

Pathseekers

Pathseekers refers to the primary target audience of this design research project. They are young adults, typically aged 20 to 30, who may feel confused and uncertain or unsure where to start when planning their future lives or careers.

Artificial intelligence

Artificial intelligence (AI) refers to developing computer systems capable of performing tasks that typically require human intelligence. It draws on concepts and techniques from computer science, mathematics, neuroscience, etc. to create intelligent systems. These systems use algorithms and statistical models to analyze data and can learn and self-evolve.

Chatbot

A chatbot is a computer program designed to simulate conversations with humans, typically using natural language processing (NLP) and machine learning techniques. Chatbots usually communicate with users via the internet. The development of chatbots is heavily dependent on the development of AI. The new generation of chatbots can perform NLP to communicate with humans using language that humans perceive as seamless and spontaneous.

Long-term life plan

A long-term life plan is a comprehensive plan for an individual's future, covering various aspects of life such as career, family, and personal growth. Such a plan contains at least one end goal and many details on how to carry it out.

Natural Language Processing (NLP)

Natural Language Processing (NLP) is a subfield of artificial intelligence. NLP programs can learn and understand human language. Through NLP technology, humans can give computers more complex and detailed instructions, and also issue and continuously modify specific instructions to make a computer more proficient in completing tasks. The primary goal of NLPs is to enable computers to communicate with humans using natural, uninterrupted language.

Supervised learning

Supervised learning is a type of machine learning in which an algorithm predicts output variables based on known input variables in supervised learning. The goal is for the computer algorithm to learn a general mapping from inputs to outputs, which can then be applied to produce new and unseen data.

Abstract

This thesis project aims to create a digital toolkit to help users develop a long-term life plan, track their progress towards goals and adjust their plans as needed. The toolkit provides exercises for interactive discussions, support for initiating and conducting in-depth conversations, and tools for expectation management, ultimately supporting the user's personal growth and development.

Young people (here categorized as those aged 20-30) face many unique challenges. Particularly in our current social context, where globalization and technological advances have brought about many educational and employment opportunities, the abundance of choices can lead to decision fatigue, stress and confusion. Building plans and setting goals are crucial for making informed choices and reducing stress. As such, this thesis refers to these young people, looking to determine their way in the world, as *pathseekers*.

My research began with the hypothesis that talking about death or death-related topics would lead people to reflect on building a better life and to spontaneously begin to create a life plan. However, during interviewing and prototype testing, it became clear that talking about death, while having some positive implications, did not directly lead pathseekers to create a long-term plan. Consequently, the focus of this study shifted from talking about death to more explicitly supporting young people to build a better life by creating and maintaining a long-term life plan.

I chose human-centred design principles to investigate how to help users establish long-term plans and achieve a satisfying future. The primary research methods used encompass questionnaires, workshops, and prototype testing, supplemented by secondary research conducted through a literature review.

Over the course of my research, I produced two design prototypes during the concept development phase by integrating design principles and drawing inspiration from existing conversation-assisted applications. The core design solutions of both prototypes are focused on assisting users in building executable long-term life plans through in-depth dialogue and inviting users to initiate discussions with family, friends or colleagues for consultation and learning. Prototype 1 is an offline card game that allows pathseekers to create avatars that represent their ideal life now and in the future. Through conversations with other participants, users gain insight and information and develop plans for a deliberate future. Prototype 2 is a digital, gamified tool with an AI-

powered chatbot. Pathseekers can collaborate with trusted advisors to create multiple routes to their goal, and ultimately choose the most appropriate path.

Ultimately, this thesis explores designing and developing a long-term plan-building tool that combines gamification, self-reflection, and artificial intelligence. Through semi-structured interviews and experiments, my research provides insight into the target audience's challenges, and develops and designs an AI-driven, gamified toolkit specific to their needs, while also considering the potential and limitations of AI in this context. This toolkit enables pathseekers to build comprehensive long-term life plans and lets them make their choices and support their personal fulfillment.

Keywords

young adults, human-centred design, decision fatigue, gamification, life planning, in-depth conversation, self improvement app, artificial intelligence

Thesis Statement

This thesis project aims to facilitate long-term personal growth and development in young adults by supporting them in creating comprehensive long-term life plans. An artificial-intelligence-based, gamified toolkit guides users to engage in interactive discussions, connect with trusted others, gather relevant information, and engage in reflective exercises to create deliberate plans towards their self-determined goals.

Introduction

The life stage of 20 to 30 years old can be a challenging period. Globalization has brought countless job opportunities, allowing young people to "connect with employers locally and globally," while creating many more choices and decisions (World Economic Forum, 2018). In "Psychology Today," Shpancer (2023) notes that young adults can experience decision fatigue when faced with too many choices, leading to stress and indecision. However, it is possible to reduce this confusion and indecisiveness. One way to do that is to imagine an ideal lifestyle and develop viable plans. Planning ahead

allows young people to take better control of their lives and reduces the confusion and discomfort they feel about an unknown future (Heyd and Miller, 2010). These plans can be adjusted and checked to ensure that expected outcomes remain feasible. In order to make plans, the target user needs to anticipate what might happen. For example, will I find a better job? Will I get married and start a family in the future? These events are complicated to predict accurately but have a high probability of happening. Therefore, helping users to anticipate and think about how to react and respond when these events occur is another research priority. Even though these things happening may change the plans they have already made. Thinking about and anticipating responses and reactions may give them experiences that support their new, adapted plans.

In "Academic achievement: The role of goal orientation, self-efficacy, and study strategies," Henderlong Corpus and O'Neal (2007) found that planning and goal setting are essential factors in young people's academic success. Planning helps people have a general idea of what's to come but also reduces stress and pressure about the future, by giving them a greater sense of control over their lives. Making plans can include more than a consideration of an idealized state of things, and can also include the worst possibilities for the future. Expectation management is a way to give people a reasonable and more comprehensive perception of their possible futures.

At the same time, young people may find it difficult to independently formulate a long-term, viable life plan. They may not have enough life experience and knowledge to determine what they want to do with their lives and plan accordingly. To counter this inexperience, my research suggests that both learning and counselling are needed to create an effective plan. By doing guided research on the internet and having in-depth conversations with different people around them, pathseekers may gain a deeper understanding of their own lives. They can also enrich their knowledge about their future by having in-depth conversations with more experienced elders. Conversations and exchanging ideas are essential to people's daily lives. They can gain more diverse ideas and widen their mind's horizons through communication. It allows people to create better, more realistic long-term plans.

In order to facilitate the building of these long-term plans, I developed a design goal to build a toolkit or interactive experience to help 20-30-year-olds develop long-term life plans through learning and communication. Through this game or toolkit, these individuals can help each other or draw on the strengths and knowledge of others in their lives to achieve their goals. Anticipating what might happen in their lives might

prepare them more for the future. And even in the future, they can modify their choices or plans to ensure they live a life that makes them happy and fulfilled.

Context

Young adults in 2023 face countless choices in their jobs and studies. The rise of globalization and advances in technology have opened up numerous job opportunities, including telecommuting and connecting with companies and individuals around the world via the internet. As such, young people are moving to other countries and living in different cultures to access educational and employment resources. These developments have made a plethora of career, travel, and even educational options. In Globalization of Youth Culture: The Role of Youth in the Global Economy Hickey (2018) explores how young people use technology to travel and connect with people worldwide. He indicates that this has led to new forms of cultural exchange and identity formation, and that these exchanges have created new life opportunities. Undoubtedly, globalization and the norm of living across borders have created a more comprehensive range of opportunities for people.

With such opportunity comes more confusion and disorientation. There are many reasons for this confusion. For example, young people are bombarded with a lot of information daily, especially with the rise of social media, where they are constantly receiving the opinions and judgments of others, which can draw their attention away from their own opinions and goals. In It's Complicated: The social lives of networked teens, Boyd (2014) points out that social media has become an integral part of young people's social lives and has both positive and negative effects on their development and decision-making. She argues that social media has become essential to young people's lives, shaping how they communicate, socialize, and express themselves. But she also emphasizes its unique challenges to young people, such as privacy concerns and exposure to excessive social complexity.

Due to the fast pace of contemporary life, people have less and less time to pause, so much so that people have lost the opportunity to think about these choices and reflect on their lives. In “Creating space for young people's futures,” Rosenfeld (2019)discusses how the fast pace of modern life makes it difficult for young people to find the time and space to think about their future plans. The article emphasizes that having opportunities for young people to reflect and build goals is essential to promote their well-being and success.

Most young people today are at the crossroads of education and work. Some have just graduated from school and are ready to find a job. Others are considering living in another country and experiencing different cultures. It is easy for them to feel confused about what path to pursue, and consequently anxious. As a result, the current situation leaves many young people in their 20s feeling busy and exhausted, but unsure of how to get away from this indecision and anxiety. In “Future orientation: developmental and ecological perspectives”, Seginer (2009) argues that having a clear understanding of future goals and plans can help young people cope with stress and uncertainty and provide a sense of direction and purpose. First, planning can reduce tension and help people feel more in control of their future. Additionally, planning can help them create a roadmap for success. Setting goals and creating a plan to achieve them can increase their chances of success in meeting those goals, and building a more intentional life. But because of the circumstances discussed, pathseekers may not have the resources or capacity to make a long-term life plan. They might not know how to start, what to research, how to ask for help, or how to initiate a targeted conversation.These challenges reveal an opportunity for a designed interaction to facilitate building a life plan.

Target Audience

In order to create an intervention that elicits thoughtful and useful responses from pathseekers (and the people they ask for advice), it is crucial to identify the characteristics of this group. As mentioned above, many young adults face unique challenges, such as being overwhelmed by social media or lacking opportunities for reflection in their fast-paced lives. At the same time, this group also has unique strengths and potentials. Arnett (2000), a developmental psychologist known for his work on young adulthood, labels this age group"emerging adulthood." Arnett describes those in this age group as at a distinct stage of adulthood, with four key characteristics:

- The first characteristic is identity exploration. Young adults often engage in self-discovery during this stage, and may make many important decisions about careers, relationships and personal beliefs.

- Another characteristic of the group is instability. New generations frequently change their living arrangements, educational pursuits, jobs and relationships. This instability can lead to disorientation or uncertainty about the direction of one's life.

- Emerging adulthood is also characterized by self-centeredness, meaning individuals have a relatively high degree of independence and freedom, allowing them to focus on personal growth and self-development. Sometimes this self-focus can lead to disorientation or disconnection from societal expectations.

- A final characteristic is that they have unlimited possibilities. Emerging adulthood is considered a time of great potential and openness to many possibilities. Young adults explore a variety of paths, experiment with different lifestyles, and pursue a range of opportunities that can contribute to their sense of being lost in these choices.

Arnett's research underscores the importance of understanding the experiences and challenges that emerging adults face during this time of transition. Therefore, the ultimate goal of this design project is to help these pathseekers better cope with life's challenges and choices and ultimately build a better life.

While I'm the principal investigator of this research, I'm also a 26-year-old, who often feels confused and lost. This disorientation is not harmful or overwhelming; it feels more like the anticipation and excitement of a young person trying to find his place and direction in life. Sometimes I look back at past choices, such as giving up job opportunities in China and moving to Vancouver to pursue higher education. Making that choice was like trying to find the right way at a crossroads, and sometimes I wished I'd had a GPS to guide me. This desire for guidance is what motivates me to undertake this design research. The sense of being at a crossroads inspired me to name this group of people who, like me, are in their 20s and 30s and feeling confused and lost, *pathseekers*. There are two reasons for this name. First, many young adults in their 20s are going through a "path-seeking" experience, trying to identify their goals in life. In addition, unlike getting lost on a field trip, there is no right or wrong path to take in life. There is no single or linear path to adulthood in the emerging adulthood stage; there are variables and individuals instead (Arnett, 2014). Therefore one single tool would not be able to help all pathseekers find the right path, suitable for them as an individual. Each person needs to explore independently and build a unique perception and direction of development.

In summary, the target audience of this project is young adults between the ages of 20 and 30. They'll be referred to here as *pathseekers* - people looking for the most suitable route in life. As the primary investigator and participant in this research project, I also include myself as a pathseeker.

Framing

These pathseekers seem to need some outside assistance to help them identify or potentially solve the challenge of designing their lives. On a social level, when faced with a problem that they cannot solve individually, it is common to turn to others for advice, often through direct ways of communicating, like having conversations. People tend to engage in social sharing and seek advice from others as a way to reduce risk and make more informed decisions (Kameda, Takezawa, Tindale, & Smith, 2002). But while they may be talking about their struggles with people they love or trust to get emotional feedback and insight, many of these exchanges may only satisfy people's need to be heard by others. There is no doubt that such conversations are vital, as they provide positive emotional feedback and deepen interpersonal connections through affirmation and encouragement. Having social support from friends or peers when facing difficulties often significantly enhances emotional well-being (Carpenter & Moore, 2006). However, during this study, it was found that these supportive conversations did not help participants systematically and effectively resolve their difficulties. Participants weren't motivated to build a plan to help them reach their ideal state of life or resolve a problematic situation.

Early in the project's development, one research question was: How do pathseekers start and engage in deep conversations? And how can they use guided conversations to help them build a sophisticated long-term life plan? Initially, the groundwork for the project was laid by enriching my understanding of how deep conversations impact and help this specific age group. Through several interviews, I learned that most people use discussions with someone close to them to express their anxieties about life. After these conversations, as suggested by the work of Carpenter and Moore (2006), participants did often feel more emotionally stable and had increased confidence. A similar study by Chris Segrin (2000) shows that effective communication in intimate relationships can be significant in maintaining psychological health and well-being. Segrin further highlights the need to nurture communication in close relationships as a way to promote mental health, provide positive feedback, and prevent depression and loneliness. However, the positive emotions elicited by these conversations usually do not last. Instead, the momentary positivity is exhausted by the recurrence of core issues. Extracting one's self from these core problems requires a more straightforward approach and plan. As discussed in *Designing Your Life* (Burnett, B., & Evans, D., 2016), identifying problems, and systematically planning to solve them, is critical.

Having in-depth conversations can help pathseekers alleviate the issues they face. And they allow individuals to explore their values, beliefs and goals, and to gain a deeper understanding of themselves and their place in the world. Through these conversations, individuals can develop a sense of purpose and direction and find meaning in their experiences and relationships (Rosado, M. C., 2020). Helping people start and engage in deep conversations has the potential to do all of this. But pathseekers usually need a fixed topic to move beyond affirming conversations to the type of detailed conversations that inspire plan making. Early in the project, I hypothesized that talking about death would help pathseekers develop a more profound sense of self and facilitate the creation of a life plan. Some psychological and sociological research suggests that discussing death and mortality can positively affect life, including improved mental health, reduced anxiety about death, and increased appreciation for life. Pennebaker, J. W., & Chung, C. K. (2011) found that thinking about death can help individuals clarify their values and priorities, leading to a greater sense of life purpose and meaning. So could a clearer perception of life goals and values help pathseekers create a practical life plan to reach their goals? But because death is a topic avoided in many cultures, talking about it can also trigger anxiety and depression. One of the project's initial challenges was to make talking about death feel natural and easy for people.

Experiment

In the fall of 2020, I conducted semi-structured interviews with a group of 4 volunteers drawn from my cohort of grad students. The primary purpose of these interviews was to learn how pathseekers perceive the topic of death, how they talk about death with those closest to them, and whether having a conversation about death can help them gain new insight about their lives and motivate them to build a better future. These recorded interviews reveal that despite the interviewees' different cultural backgrounds, they all tried to avoid discussing death-related topics with others to a greater or lesser extent. While some respondents indicated that they had consciously brought up the issue of "making a will" with family members and wanted to prepare for the possibility of death by making it in advance, these conversations were usually ignored or avoided. These interviews indicate that few people are willing to talk about death when they are still healthy.

Therefore, I designed a game prototype to serve as an experiment. The game prototype was designed to help people discuss death-related topics more easily and

naturally, to give them positive emotional feedback during such conversations, and to help them gain insight into their life after the conversation (figure 1).

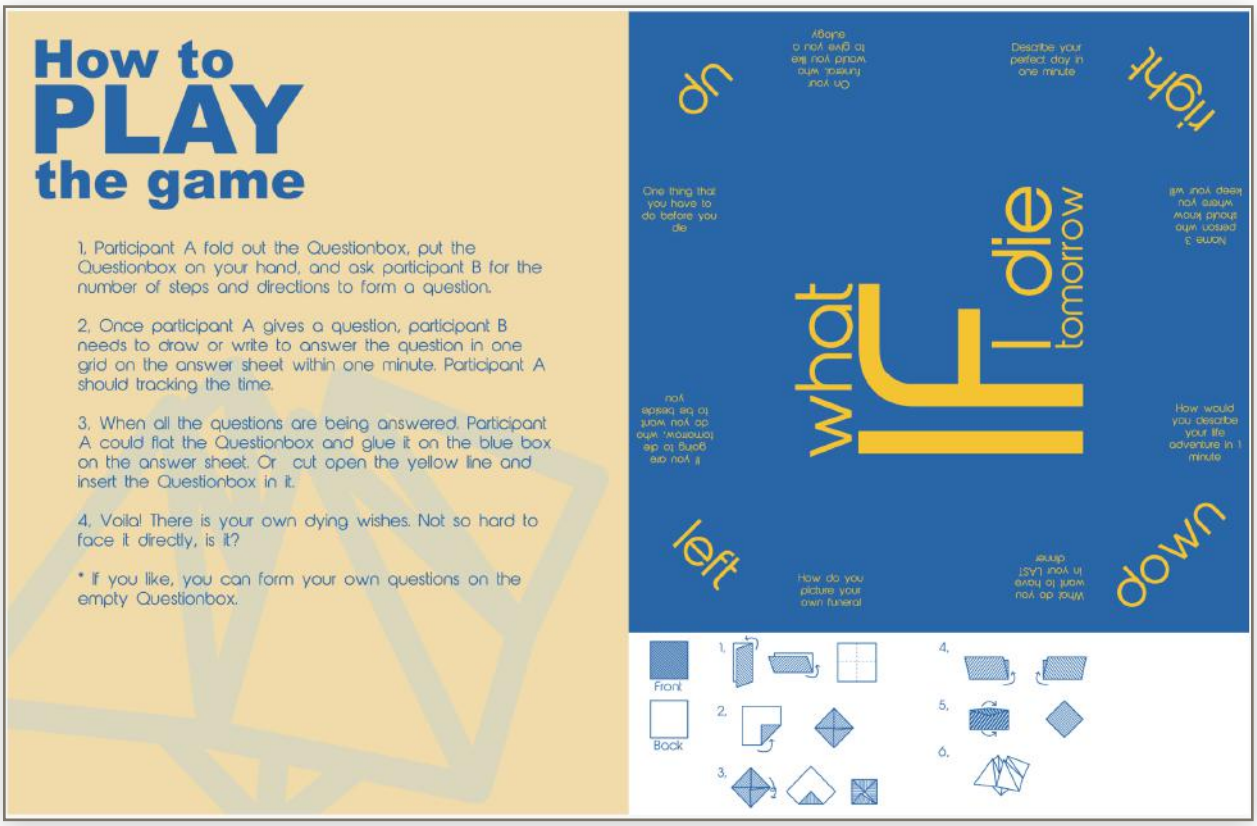


Figure 1: Origami game

The original form of the prototype was an origami game that many interviewees had played in childhood. As shown in Figure 2, each of the eight sides of the origami has a question about death. The question pool includes questions like how the player would like to organize their funeral, and who they would most want to see before they pass away? The question pool is vast. In addition, the game includes a blank sheet of paper for players to fill out their own questions about death. The game requires at least two participants. Players randomly pick a number or direction to reveal a specific question on the origami. Then they have 60 seconds to write or draw their answer to the question on another piece of paper. In such a brief period, the player does not have the opportunity to think profoundly and can only respond instinctively. After all players respond to all eight questions, they can unfold the origami and glue the questions to the pages with their responses. At this stage, each player has created a low-resolution reflection on death.

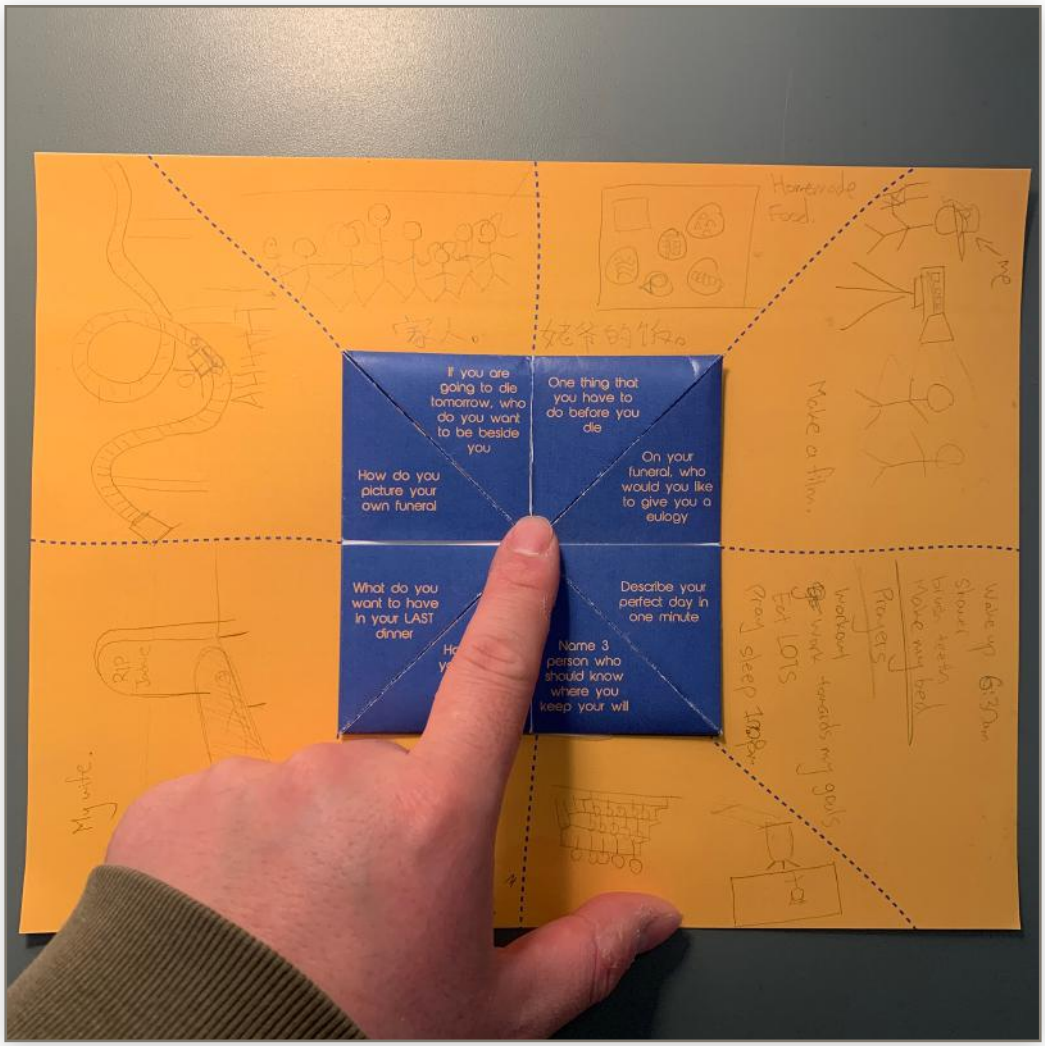


Figure 2: The results of prototype 2

The test results of this prototype and follow up interviews with participants highlight many successes and shortcomings. Some participants reported that exploring the topic of death with another player was an effective trigger for a deeper conversation, as playing the game made them feel more relaxed and open to death-related issues. The short amount of time allowed for responses to the origami questions, however, caused other participants' answers to be largely superficial, which then caused them to have difficulty in generating deeper discussion. Ultimately, in either case, there was no evidence that players were motivated to start building life plans after the game or conversation was over. Helping people talk about death has positive implications, but it seems these positive implications do not motivate people to consciously work toward building a better life.

Reflection 「Project Pivot」

The results from the origami and interviews were analyzed using Miro, and then used to generate an affinity map intended for subsequent brainstorming and product iterations (figure 3). While the prototype had been successful for prompting discussions about death, these reflections were usually contained within the discussions generated by the game, and did not substantially impact the participants' lives or planning for the future. The results were less than satisfactory; participants were not motivated to take any action to frame a life plan after the game ended.

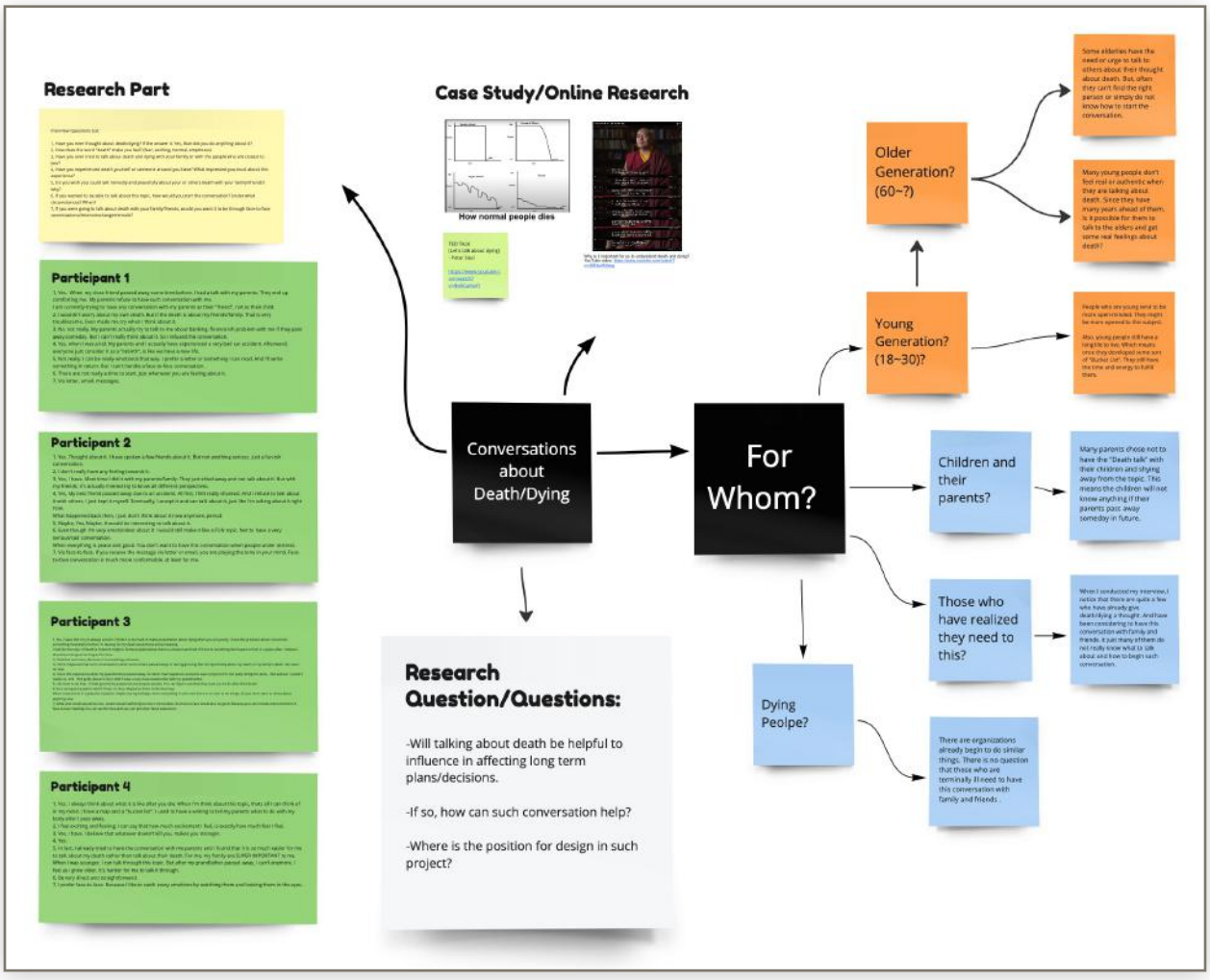


Figure 3: Affinity map of user feedback on origami games made with Miro

This challenge bottlenecked the research. To better understand the needs and problems of pathseekers, I created several personas in Miro (figure 4). While each persona represents a different age group or lifestyle, each individual could benefit from a more natural and pleasant death-related conversation. Engaging in and learning from conversations can be highly beneficial for individuals for reflecting on their lives and improving their overall well-being (Aakhus, 2007). Reflecting on death specifically can lead to prioritizing healthy behaviours such as exercise and healthy eating (Greenberg & Arndt, 2008). These conclusions were reflected in the participant interviews, where participants reported that the in-depth conversations led to much inspiration and positive impact. One participant expressed that discussing the questions/topics in the origami game with his close family members brought back many memories of the past, which clarified his current focus in life. As the initiator and a participant in the experiment myself, I also invited a family member to play, and we had a profound conversation about our core values and worldviews because of this game. McAdams (2008) explains that in-depth exploration and expression of personal stories can support individuals to better understand their own identities, establish connections with others, and find their place in society. So while the conversations about death were themselves beneficial, it was likely the sharing of stories, rather than the topic, that could support pathseekers in creating life plans.

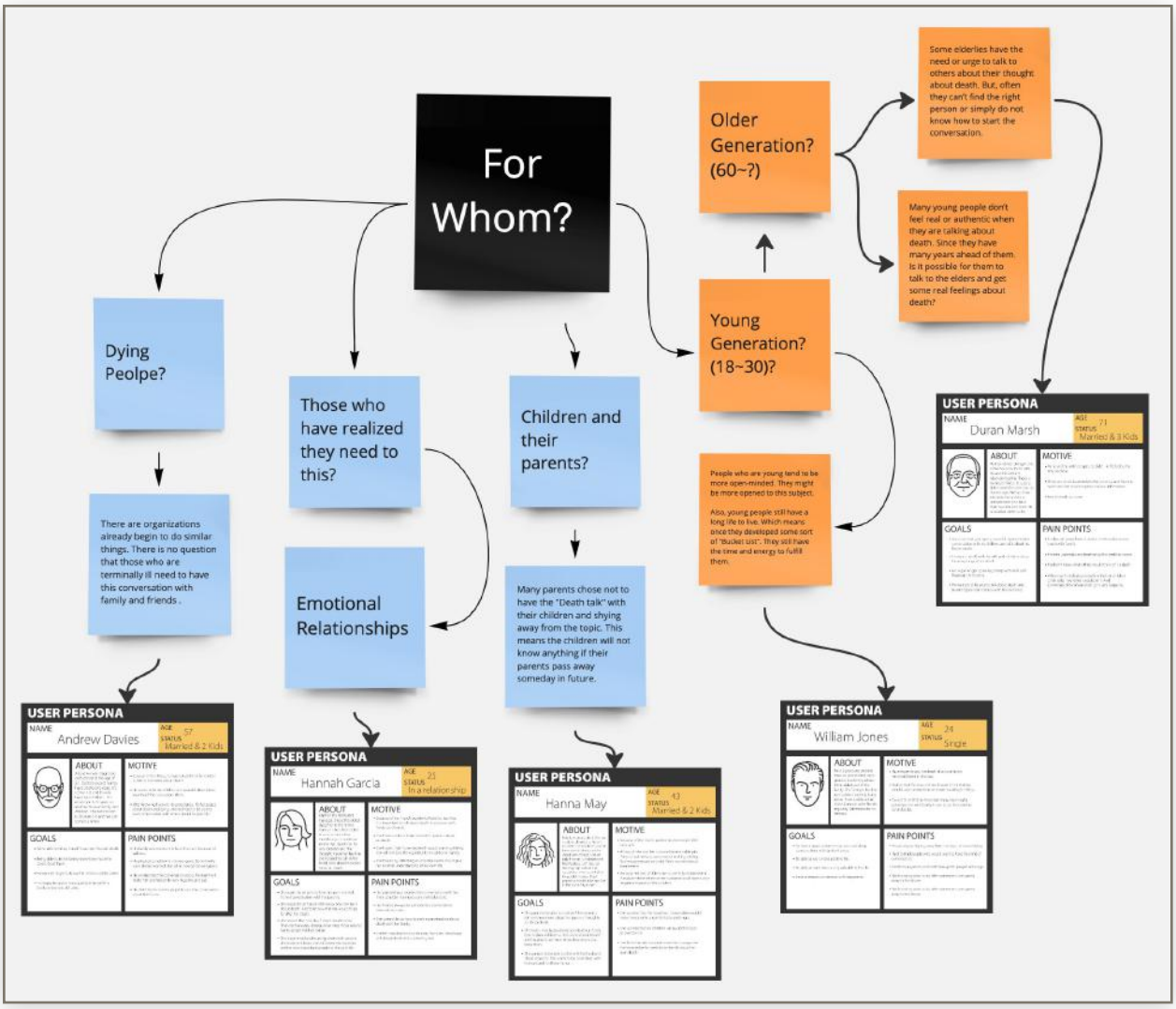


Figure 4: Personas of *Pathseekers*

The deep conversations with trusted advisors that arise from a profound topic like death have great potential to motivate the building of life plans. In the experiment, many players decided to develop a "bucket list" when answering questions about death, creating a list of goals and dreams they wanted to accomplish before they died. The conversations did indeed prompt them to reflect on and plan for their lives, though in a vague way. This indicates a potential for pathseekers to design their future directly through one or several in-depth conversations about building a better life, if they can be prompted to be more explicit about their conversation goals, giving them more to look forward to and motivation to create a better future.

I developed a preliminary design principle, based on the above (figure 5). At this point, my research pivoted from helping people talk about death to assisting pathseekers in building long-term future life plans by finding information on relevant topics, having deep conversations, and constantly tracking and revising their plans to reach an exciting future.

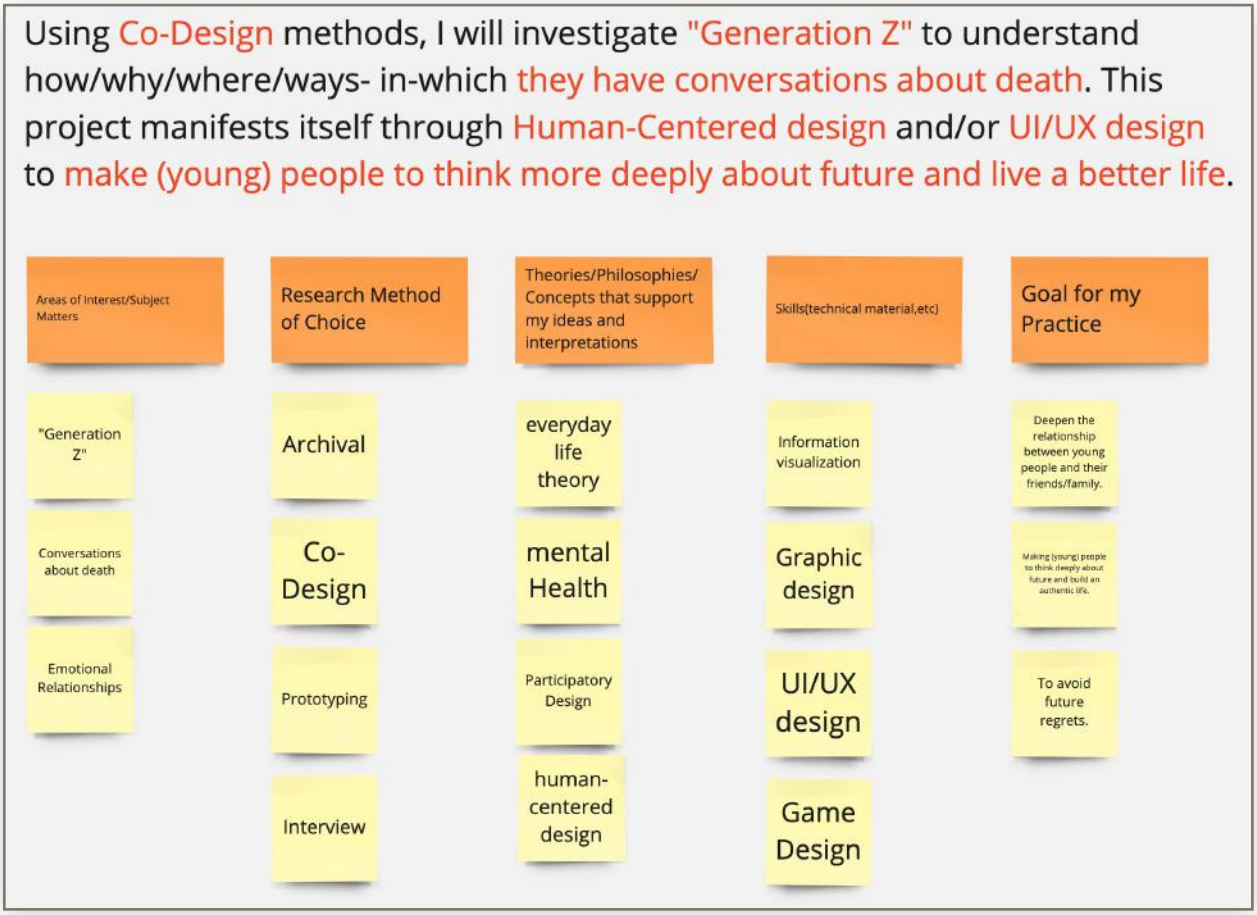


Figure 5: Preliminary design principle

Revised Research Statement

The study will investigate how 20-30-year-olds (pathseekers) engage, learn, and seek advice through deep conversations with trusted advisors, and explore how these interactions can be supported to inspire and support pathseekers in making a future life plan.

Precedents

Products designed to help young adults create long-term life plans are relatively common on the market. When pathseekers are facing stress from life, many choose to read books on life philosophy to try to find some comfort. Long & Long (2019) found that reading books can provide individuals with psychological satisfaction, comfort and emotional support, and coping strategies or insights to help cope with life's stresses and dilemmas. However, these books or toolkits, like my origami game, do not offer direct support for building a realistic and detailed life plan. They do not enable pathseekers to learn through communication with others and systematically create multiple long-term life plans with milestones.

Many game developers or app creators also design products to facilitate conversations between people. These programs often serve as "conversation icebreakers." The scenarios for using these products, however, usually involve strangers or acquaintances trying to get to know each other better. Some of these products can also inspire deep conversations, as they provide some profound questions for users to discuss. But these questions usually have a vast range of topics. After the conversation, the relationship between the individuals may deepen, but there is no progress in resolving stresses or struggles.

Four examples of insightful books and conversation inspiring apps are discussed below. While each intervention is a beneficial and useful product, none combine the inspiration of deep conversation with guidance for using that inspiration to create a long-term life plan.

Case Study 1

Designing Your Life: How to Build a Well-Lived, Joyful Life by Bill Burnett (2016)

This book emphasizes the importance of a creative and iterative approach to designing your life. It provides tools and exercises to help readers clarify their values, determine what brings them joy and fulfillment, and develop a workable plan to achieve their goals. The author believes that life is a design problem. Like any other design problem, the individual can approach life systematically and creatively using design thinking principles. People can define what they want, prototype different solutions, and test them to find the most effective solution. The author mentions several different

practical ways to help people reframe their lives and make plans. Identifying and exploring the most significant issues in one's life is an initial step toward finding solutions. Then reframe these problems and develop prototypes that have the potential to solve them and experiment with them. I will use the results of the origami and conversation experiments I have conducted to make iterations and enhance the design of my intervention, leading pathseekers to create a more satisfactory life that meets their expectations.

Case Study 2

Trello (Project management app) by Fog Creek Software

Trello is a project management app released in 2011 to create long-term goals and action plans. The designers designed the app's user interface to be simple, intuitive, and user-friendly. Users can create boards to represent different goals or tasks and move them through various stages of completion. In Trello, users can create cards to represent stages or milestones on their boards. Users can add details, deadlines, lists, attachments, etc., to help them track the plan's completeness in the future. Users can use this tool to organize their lives in detail and make clear plans for a predictable, short-term future.

Case Study 3

Innermap (Personalized plan building app) by Innermap Inc.

Innermap is a product that uses AI to help users create a personalized life plan by having them fill out a self-assessment questionnaire about their values, goals and priorities. It then uses machine learning algorithms and expert analysis to create a personalized life plan for the user. The plan includes actionable steps users can take to achieve their goals and align their lives with their values. The plan is also customizable, allowing users to adjust their goals and priorities as circumstances change. One of Innermap’s unique features is that it uses artificial intelligence to identify patterns and insights that users may not immediately see. This information can create a more effective and personalized life plan.

Case Study 4

TableTopics (A card game to help facilitate deep conversations) by Cristy Clarke

TableTopics is a game that provides conversation starters and thought-provoking questions. The designers designed it to stimulate exciting and meaningful discussions. The game comes in a box filled with cards. Each card has a different question or topic printed on it. The idea is for each person to draw a card and answer the question. TableTopics is a great way to get people to talk and interact with each other in a fun and relaxed environment. The designers created the questions on the game cards to be thought-provoking, and participants are often encouraged to share personal stories or opinions. It can also be played with groups of varied size, and can be used to break the ice at a party or event or in an intimate group to bring the participants closer to each other.

Summary

Bill Burnett's (2016) research aims to help regular users see and design their lives through the lens of a designer. Users can systematically identify problems and try to solve them by adopting the practical approaches mentioned in the book. However, these solutions mentioned are sometimes too simple and one-dimensional. The book provides readers with valuable tools and exercises to apply design thinking to their lives. But some of the solutions can feel overly simplistic or even singular. And most of the examples and approaches in this book overemphasize careers and finding a satisfying job. This may not be vital for everyone looking to lead a good life. Some readers may think this book neglects other important areas of life, such as relationships, the spiritual world, and personal growth.

Trello and Innermap share one great feature. They allow the user to change the plan depending on what happens. This is an important mechanism when building a plan, because no one can predict the future when developing a life plan. Innermap's features and methods inspired many of the design choices I made with my own intervention, such as using the power of artificial intelligence to help users have a more comprehensive view of their life plans. However, the ultimate goal of Innermap is different in that Innermap wants to help users build a more personalized lifestyle to help them live better in the current moment. My project, on the other hand, aims to help users develop and execute a life plan that will lead to a more satisfying future.

Popular party game, TableTopics, effectively encourages meaningful conversations. TableTopics provides a platform for individuals to explore topics that players may not have discussed before. The creators designed these topics to be thought-provoking and help players better understand each other. And because TableTopics covers a wide range of issues, including history, politics, culture, personal experiences, and more, it can help players increase their knowledge and awareness of different perspectives and topics and develop greater empathy and understanding. However, the game has limited opportunities for player interaction, beyond answering questions. This can limit the depth and quality of social interactions in the game.

Each of these products have benefits to varying degrees but also have some shortcomings in terms of my intervention's goals. No product on the market appears to combine these features to help pathseekers develop and execute a life plan, which opens up a design opportunity for this project.

Secondary Research

To better understand pathseekers's needs and inform the final product, I considered existing study on topics of what influences decision-making in young people, life planning, and gamification for the purposes of learning. As expected, products designed to help users create and build schedules are ubiquitous, and there is much research about how pathseekers make plans. In *British Educational Research Journal, Bradford and Wilson (2015)* explore how young people make decisions about their goals and career choices. The study identified three key factors influencing young people's decision-making: family background, gender, and socioeconomic status. The authors concluded that these factors influence young people's decisions when making life plans and also affect their access to information and resources, and therefore the clarity with which they plan their lives. This suggests that young people may need support from people with higher social status or more life experience while planning. H. M. Hsu and C. W. Chou's (2013) study on career counselling programs supports this conclusion, as it demonstrates that career counselling can significantly improve students' decision-making abilities and career readiness behaviours. Similar mentoring or guidance could provide pathseekers with valuable information and guidance to help them similarly make informed decisions about their futures.

Furthermore, Heyd & Miller's (2010) research reveals the need for life planning and argues that life plans are the cornerstone of the conception of the good life. However, in most cases, people focus on career planning and neglect to plan for other aspects, such as lifestyle or relationships. The concept of an all-inclusive planning approach is under-explored.

The feedback from my earlier experiments on talking about death indicates that the pathseekers accept games or gamification tools relatively well. Participants found using a game helpful in practically approaching an overwhelming topic. Dicheva et al. (2015) reviewed and analysed existing literature on gamification in education, demonstrating that gamification has found application in various educational contexts, including primary, secondary, and higher education, as well as corporate training. Dicheva et al. (2015) conclude that gamification can improve learning outcomes, such as knowledge acquisition, retention and transfer, engagement, motivation, and satisfaction. Another study by Hamari et al. (2014) suggests that gamification can enhance user retention and knowledge transfer and thus improve learning outcomes The authors note that further research is needed to determine the best ways to use gamification and to understand the mechanisms underlying its effects. But gamification itself has been demonstrated to be an effective tool to increase motivation, engagement, and learning in various contexts.

While life planning is necessary to build a better life, current models, which focus on career direction to the exclusion of other aspects, fall short. Using gamification tools may help pathseekers consider their lives more thoroughly and effectively in planning, and also motivate them to be more active in completing their plans. Additionally, getting some professional or mentorship support can improve these preparatory behaviours.

Research Methodology

While the secondary research provided valuable insights into the need for supported life planning for pathseekers, there was still much to discover about the potential design of such a tool. While I knew my aim was to help pathseekers address their challenges and difficulties and design their lives by planning ahead, and that the final design outcome of the project would be a digital toolkit to achieve this purpose, I decided to use human-centered design as the primary research methodology to determine the details of that toolkit.

Human-Centered Design

Human-centered design is an approach that aims to solve problems. In this approach, the designer prioritizes the needs and perspectives of the user and puts the user's needs, wants and suggestions at the center of the design process. This approach requires the designer to understand and empathize with the target users to understand their true needs and requirements. It emphasizes empathy, creativity, and experimentation, aiming to create solutions that are functional, enjoyable, and engaging for the end user. It involves understanding the target audience's needs, behaviours, and preferences through various research activities such as observations, interviews, and surveys. It identifies the problem from the user's perspective, then conceptualizes and designs a prototype of a potential solution. Moreover, after creating a prototype, designers need to adopt the users's perspectives to test and iterate the product.

A human-centered design (HCD) approach can increase the usability of a design outcome. In the case of my project, HCD had the potential to make the toolkit or experience easier to use, more intuitive, and more effective. It can also lead to increased user satisfaction and adoption. Finally, HCD can lead to a more innovative product by leveraging end users' unique perspectives and insights. IDEO (2015) notes that HCD "means believing that the people who face those problems every day are the ones who hold the key to their answer" (p. 9). In conclusion, my main reasoning for using human-centered design as a primary research methodology is that making a life plan is an individualized affair and it is important to ensure that the final product or service meets the needs of each individual user. And that this design approach can increase usability, reduce risk and improve innovation.

Primary Research

I conducted interviews and questionnaires, and used affinity mapping as investigating activities. My purpose was to explore how pathseekers start or engage in deep conversations. Who are the main participants in these deep conversations? Furthermore, does engaging in these discussions help pathseekers build self-awareness and start planning for their lives? I divided the investigation into several stages, beginning with a questionnaire to obtain primary data. Next I organized and conducted workshops to gain closer contact and understanding with the target group.

Finally, I summarized and analyzed the data using affinity mapping to generate practical design principles.

Questionnaire

First, I needed to investigate how pathseekers both start and engage in deep conversations. Rimé (2009) demonstrates that deep conversations with others can significantly reduce psychological stress and anxiety and help build better mental health. These conversations include, but are not limited to, more profound or in-depth conversations that pathseekers have with their family, friends, or even strangers. Rimé and similar researchers, however, are not considering these conversations with a clear goal, such as developing a long-term life plan, in mind. Therefore, exploring and accumulating more raw user data in the design field was necessary.

Conversation is one of the most common ways that people communicate with others. However, I had not yet determined what precipitates or even what defines deep conversations. In the summer of 2022, I generated several research questions about deep dialogues, seeking answers to questions like "How do young people in their 20s and 30s engage in deep conversation?" and "How does the content of the conversation help facilitate real-life decision-making after it has taken place?"

I used questionnaires as the research method for answering these questions. This method was well suited for the study because the questionnaire gave respondents maximum freedom. They could answer the questionnaire in a situation where they felt most comfortable and relaxed. This was particularly important because the questionnaire's content includes some questions about the preferred environment in which to conduct in-depth conversations, so the respondents' emotions while participating in the research are also one of the essential elements in the study. Because the questionnaire is standardized, all participants read and answer the questions in the same order, reducing the possibility of misunderstanding or misinterpreting the content and making the results more accurate,and easy to organize and quantify the results. More importantly, the questionnaire was anonymous and confidential, encouraging respondents to be more honest and forthcoming in their responses.

I conducted this questionnaire during June 2022, when ECU professor, Zach Camozzi, led the entire 2023 grad student cohort on a camping trip as part of a guided

research session. The purpose of the camping trip was to allow the group to do some user testing in a natural environment or to conduct research for an already existing design project. The trip required the researchers to leave the urban environment the school is located in, and gain new perspectives in a natural setting. It had many benefits for this research topic; placing the respondents in a natural and comfortable environment may have been beneficial in obtaining more accurate data. Therefore, I sent out questionnaires during this camping trip.

The main contents of the questionnaire were as follows:

- In your past experience of having deep conversations, what was your relationship with the other person? What impresses you the most about that/those conversations?

- What provoked the conversation? Was it spontaneous or planned? What are the factors that make you consider it as an Authentic/Meaningful conversation?

- Do you think the location/environment was crucial for that/those conversations?

- Will you make some changes in your lifestyle or make some better life choices based on a meaningful conversation? If so, how?

- Do you prefer to have a meaningful conversation via phone/video chat or face to face? Why?

- When you are confused with major life choices and don’t know what to do, do you think having a conversation with people you trust will help you move forward?

- Thinking back, tell us about a moment if there was a conversation that prompted you to make a different life choice.

I collected 12 responses by the end of the questionnaire period and used Miro to organize and analyze them. Miro is an application that runs on a PC or mobile device. It is a digital collaboration platform designed to facilitate data visualization and project management. These two features were particularly important in my research due to though there were fewer participants in the questionnaire or workshop, the data provided by them needed to be interpreted and analyzed in depth and in detail. This makes Miro particularly important. The questionnaire's content was divided into several aspects, allowing users to give their opinions on different questions. I used colored

sticky notes to represent various aspects (figure 6) and categorize data types, and arrows linking notes to show their direct connection. This approach allows for more transparent and logical reading and analysis of the data.

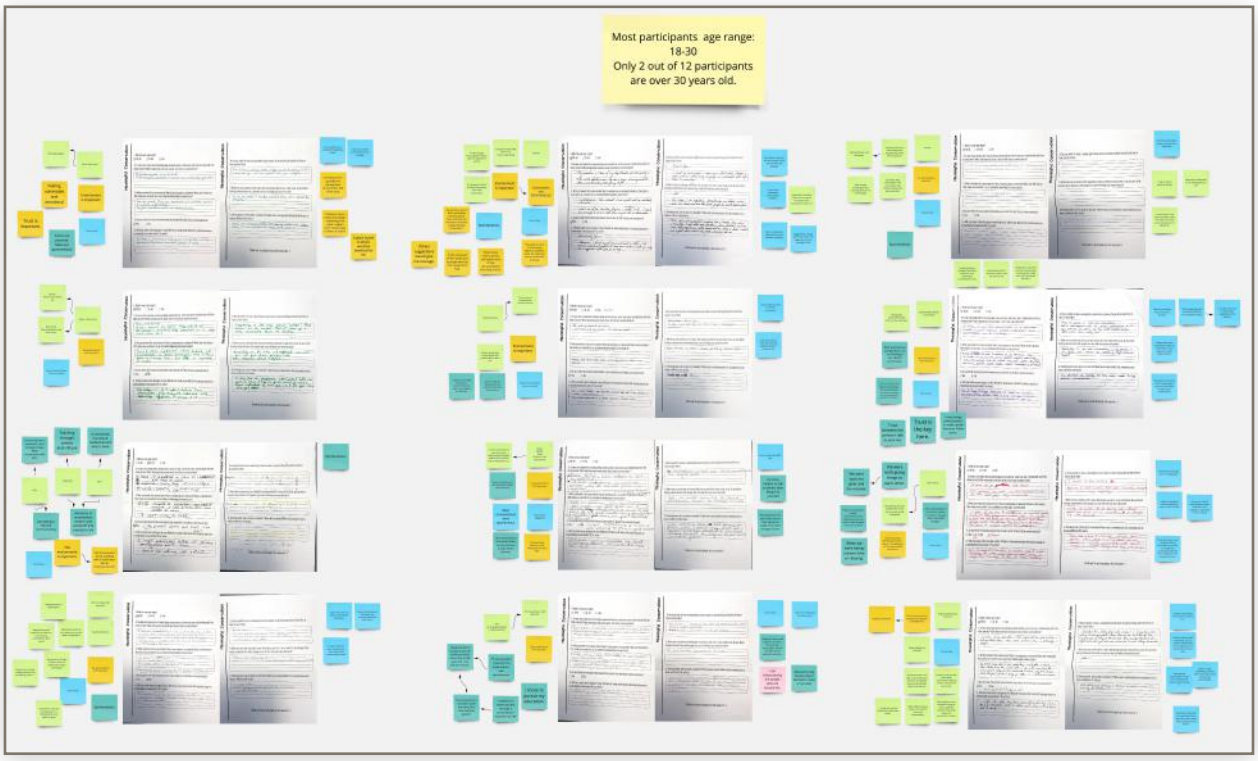


Figure 6: Data visualization and affinity mapping of questionnaire results

The results of this questionnaire indicate that environmental factors do not play a dominant role in provoking in-depth conversations. Some respondents did consider the importance of the environment where the conversation took place and expressed their more specific requirements. Nevertheless, in most cases, the condition of the environment was not the main instigator for a deep conversation. Most participants indicated that in their past experiences, deep conversations were usually spontaneous and not planned. They discussed their lives with family or friends face-to-face and started meaningful, deep conversations without actively realizing it. When talking about their partner in the deep conversation, all respondents indicated that they usually had these conversations with someone close to them. Conversation partners were family members or their partners, sometimes friends or mentors. Respondents identified trust as a critical factor in having deep conversations. People need to feel relaxed and trust someone before they can start a deep conversation about life reflections and things related to core issues.

I next grouped the topics of the conversations into separate categories. In each respondent's experience, these in-depth conversations had varied and unique content and focus. However, they all reported that these in-depth conversations positively impacted their lives. Some respondents reported that simply expressing themselves in these conversations helped them better understand their own thoughts, which echoes my own experiences as a pathseeker

However, because these were impromptu conversations, choosing and staying on topic was not easy for pathseekers. Thus, even though these conversations have the potential to help individuals build better lives, these abilities are not fully realized. These results suggest that supporting pathseekers to have planned and targeted conversations, and bridging those conversations into planning and taking actions on those plans could be an effective way to help pathseekers design and build better lives.

Co-Creation Workshop

From the questionnaires, the respondents agreed that deep and meaningful conversations with others they trust could positively affect their lives. However, they did not share what these positive effects were, and whether they had gained any information or knowledge that could help them build their lives after these conversations. Therefore a Co-Creation Workshop was held with volunteers from the same group of grad students to address these questions. The aim was to help designers understand how users obtain valuable information from conversations and utilize it in their lives.

The first part of the workshop was a brainstorming session about exploring the environment for deep conversations and the characteristics or traits of the conversation partner. A large sheet of white paper was prepared and divided into two sections: Environment and Individual (figure 7). First, participants were encouraged to imagine that if they could invite their most trusted or intimate person to a deep conversation, what kind of environment would they want that conversation to take place in? Any elements or details that came to mind were written on sticky notes and posted in the environment section. Afterwards, participants were encouraged to imagine that they had encountered a complex problem and wanted to talk to someone else about the uncomfortable situation. What characteristics or qualities of another person would make participants feel comfortable communicating with them? I then placed these

characteristics or qualities in the individual section. Finally, I asked the participants to select two elements from each Environment and Individual section that they deemed most important and to use a third colored sticky note to express the reasons why. To more visually determine which elements were the most important, participants began to summarize the sticky notes spontaneously and successfully grouped them into four categories. The participants eventually developed a large mind map for the research and spontaneously began to build affinity diagrams.

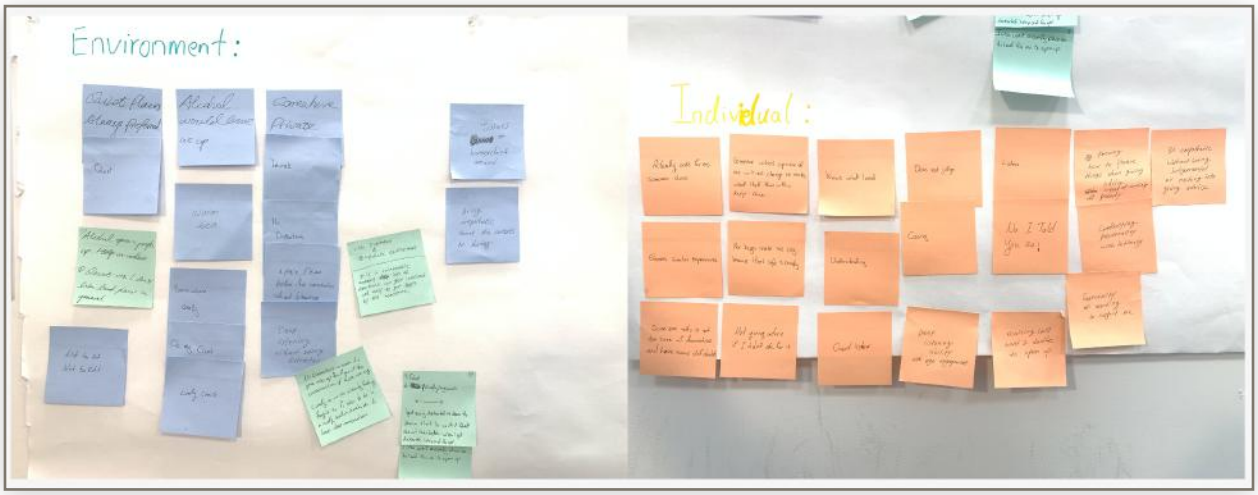


Figure 7: Results of the brainstorming

Workshop participants and I began analyzing the data from the first activity of the workshop together. The results revealed that although people are likely willing to cover complex, even stressful topics in deep conversations, they still wanted the context in which the discussions took place to be relaxed and safe. On the other hand, there were few specific requirements for the physical environment; any quiet or comfortable setting was appropriate. Regarding the conversation partner, participants agreed that trustworthiness was essential. It is also desirable that they have some knowledge or experience to help the conversation initiator. As such, these conversation partners that pathseekers invite will be referred to as *trusted advisors* - while they may be any age or relationship to the pathseeker, they are highly trusted, and the pathseeker is hoping to draw on the trusted advisor's experience and extrapolate it to their own.

This means that the conversation initiator has some realistic expectations of the conversation. While expressing oneself in a conversation is crucial, people also want a conversation or communication that solves practical problems. Research has shown that these conversations help both participants to exercise their thinking and learn new

things. *Interthinking* is a concept developed by Littleton and Mercer (2013). They describe *interthinking* as "a distinctive pattern of thinking that takes place between individuals during conversational activities." This mode of thinking involves more than just sharing ideas or information; it requires multiple negotiation, challenge, support, and learning methods. Pathseekers can engage in meaningful conversation and benefit from ideas created during interthinking.

The second part of the workshop was a test of a prototype. I asked participants to think back to important decisions, then asked if they had consulted others for advice before making the decision. If the answer was yes, I asked them to imagine the outcome if they had made that decision independently. If the answer was no, I asked them to imagine alternate realities and record all possible scenarios on paper as words or drawings (figure 8).

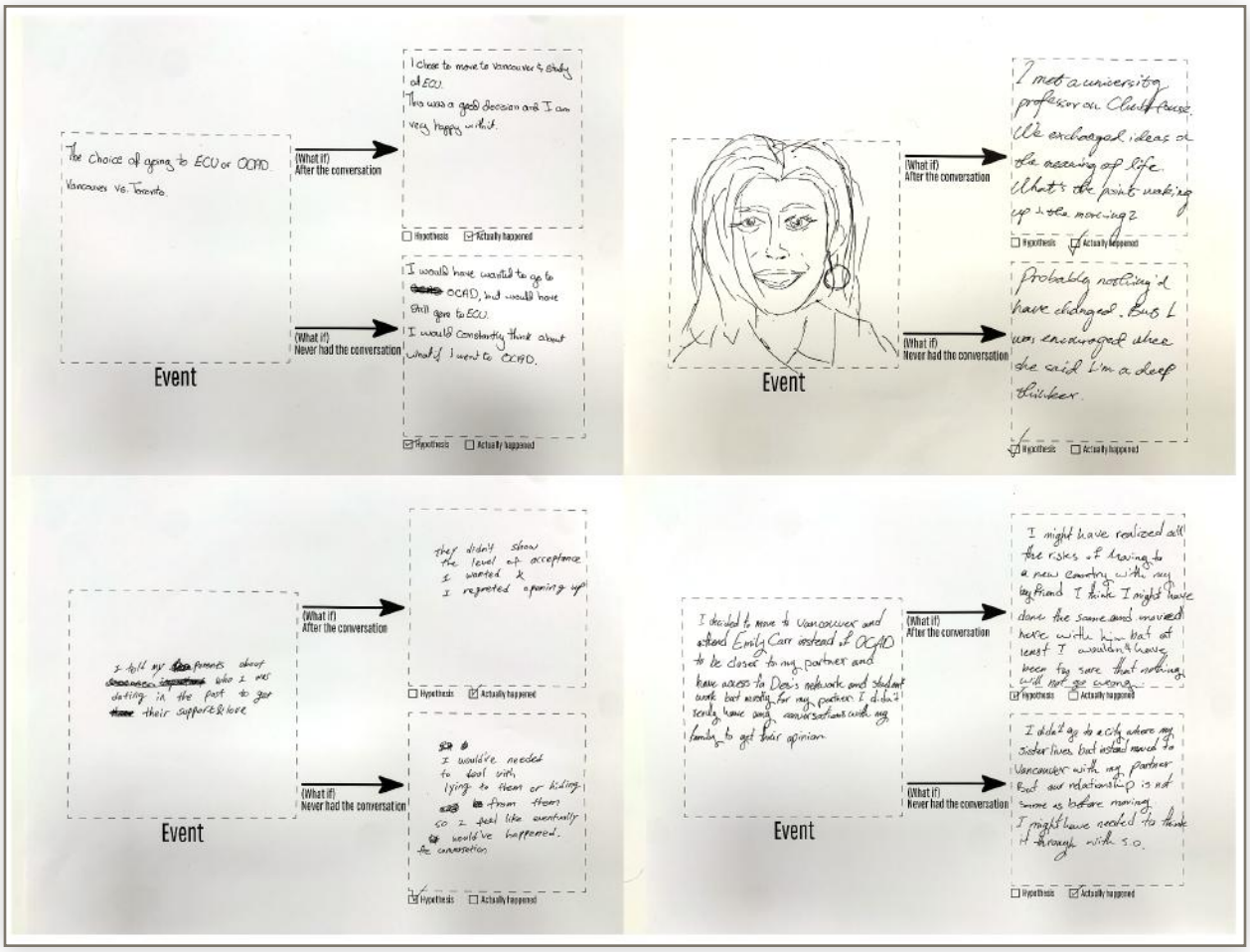


Figure 8: Test results of the workshop prototype

This workshop aimed to understand whether there were conversations in the participants' pasts that helped them make decisions and build their lives. Do people develop new insights into their lives as a result of following or disregarding the advice of others? If the answer is yes, what are the characteristics of these conversations? Workshop results showed that people tend to seek the advice of others when making major life decisions. Before seeking advice, however, participants usually already had a preference. Therefore, the conversations were often more of an approval-seeking practice than a complete transfer of decision-making to others. Additionally, as participants engaged in discussions, they shared that these decision-making processes often involved seeking not just one person's insights, but discussing them with many different people to build a wider awareness. When I asked participants to imagine an outcome based on the opposite choice of having or not having a conversation , they indicated that they would likely make similar decisions. This suggests that pathseekers may rely more on their own abilities and knowledge when building their lives. This counters my own experience, where I see out conversation and often shift my plans

based on others' perspectives. This contrast highlights the importance of seeking out co-creation workshops as a designer like myself may project our own experiences onto others, only to find that we are an outlier.

Affinity Mapping

The questionnaire and workshop activities introduced far more topics than I had originally envisioned. Details about the in-depth conversations varied greatly depending on individual differences. In order to categorize and summarize this research data to derive insightful solutions, I created an affinity map. Affinity maps, also known as affinity diagrams, are defined by Cooper (2014) as "a method for organizing ideas and data by grouping them into related clusters or themes… Affinity mapping helps designers visualize research data and identify patterns and insights that can lead to solutions and enhance the user experience". Below is a detailed view of the affinity map I created, which shows the diverse results of the questionnaire and workshop activities (figure9). The differences in pathseekers' experiences of deep conversations reveal some potential design principles.

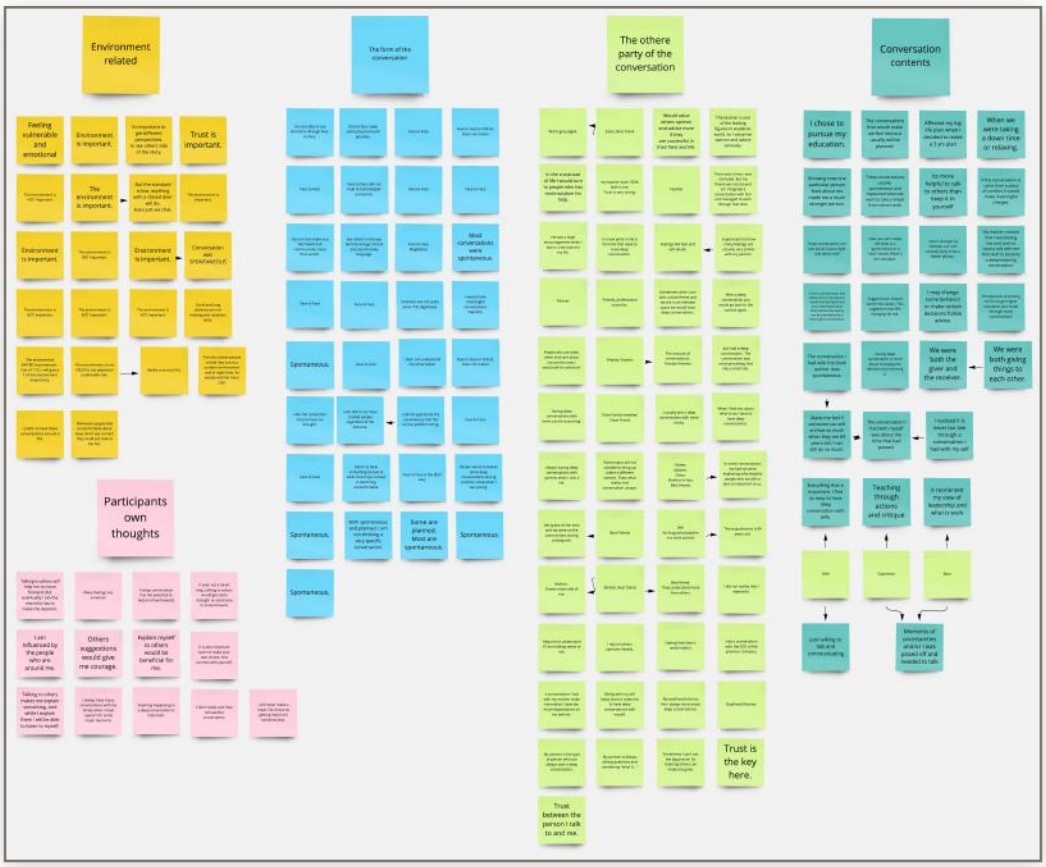


Figure 9: Detailed view of the affinity map

Summary and Design Principles

Through the above interviews, workshops, and secondary research, I gained a more comprehensive understanding of how pathseekers build their lives through conversation and learning. Pathseekers may have several in-depth conversations to help them improve their lives in difficult situations. These conversations, however, are more likely to help with short-term difficulties than trigger more systematic long-term plan making. Better life planning could be achieved if these conversations were guided and targeted. Pathseekers need a tool to help them get goal-driven information from the conversations and to apply it to their life designing.

My secondary research on games and gamification tools indicated that they are an effective way to help people face complex topics. Users can confront a serious topic more easily through a game or a gamified digital tool. In the case of my intervention, gamification design can increase the involvement of both the pathseeker and the people they invite into conversation. The content of the conversations, or the pathseeker's thinking process, can be easily recorded through a digital tool and applied to their lives. A gamification framework can offer pathseekers both an organizing structure and delight, directing their focus while encouraging ongoing participation.

By first identifying what was missing from pathseekers' lives to support them in life planning, and then considering different approaches to help them find that support and apply it to their lives, I have formulated the following design principles, which guide the general parameters of my design outcome.

- When pathseekers use the game tool to make long-term plans, they should be able to invite different trusted advisors at any stage to help them make a plan or understand a current situation. There should not be too many restrictions imposed on the pathseekers' choice of or interactions with trusted advisors.

- Pathseekers should be able to pause using the toolbox at any time, and should be able to return to where they left off at any time. The toolbox/game tool should not cause any stress or anxiety to the user.

- Design outcomes should take into account the needs and preferences of users, to help pathseekers create and design a plan or lifestyle that best suits each individual.

- The user should have the ability to change or redefine their plans or goals at any time.

- The design outcome should use simple and clear visual language to help pathseekers set, monitor, and change their plans or goals. It should be easy for them to check their progress and achievements at any time.

Design Outcome

Concept Development

During the development phase of the final design, I generated ideas based on these design principles through brainstorming, integration, and visualization. During the intensive research period, the positive impact of deep conversations came to light. This inspired me to look to the many dialogue-assisting apps that already exist in the market. One of the possible solutions I considered was to design a conversation-assisting tool that helps users stay on topic, in order to expand on a single issue, and eventually get some practical guidance. However, the previous research I conducted has shown that individuals often lead completely different lifestyles and have entirely different ideas about what a better life is, and how to go about building it. Even a chat-aiding tool with a vast database can hardly encompass everyone's problems and confusion. I was drawn back to IDEO's (2015) principle for human-centred design: "People who face those problems every day are the ones who hold the key to their answer" (p. 9). Although a database covering all the questions that users may ask is not possible to build, a more feasible design could be a tool that assists users in being aware of their own confusion and helps them find answers themselves.

I moved forward with this concept to develop Prototype 1, keeping in mind the design principles outlined above (that the core of the design be to support pathseekers build an executable long-term life plan in a game or gamification tool, that motivates and supports in-depth conversations, progress tracking and user modification of the stated goals at any point).

Prototype 1

This design prototype is an offline toolkit, comprised of a card game. It aims to help pathseekers deepen their understanding of their current life and obstacles by building an avatar representing their present. The card game allows pathseekers to invite trusted advisors to join and develop their own avatars, with whom they can co-imagine their future life. After creating an image corresponding to their present life, users can visualize the apparent difference between the present and the future by creating another avatar corresponding to their desired future. After completing the avatars, pathseekers can use these images to communicate with trusted advisors or consult them to identify aspects where they need to seek out information towards building their ideal life. The ideal result of the prototype is that pathseekers use the inspiration gained through their avatars to develop their own plans and change their lifestyles to achieve their desired future.

In the prototype, the player first receives a blank identity card (figure 10). This card offers different slots for the user to paste stickers representing their "present" (figure 11). These stickers provide some basic information or details. Players can also fill in the identity card with text or drawings if the stickers lack the necessary elements or are insufficient to represent them. Future iterations of this prototype could include additional stickers. After players have completed the identity cards representing their present, they can invite trusted advisors to have a conversation at any time. The main content of the discussion will be limited to the imagination of the future and what it might take to get from the present reality to that imagined future. Players can try to build a "time machine" (figure 12), and imagine their present life from a future perspective. Eventually, players can use these completed identity cards and build long-term or short-term plans to reach those futures.

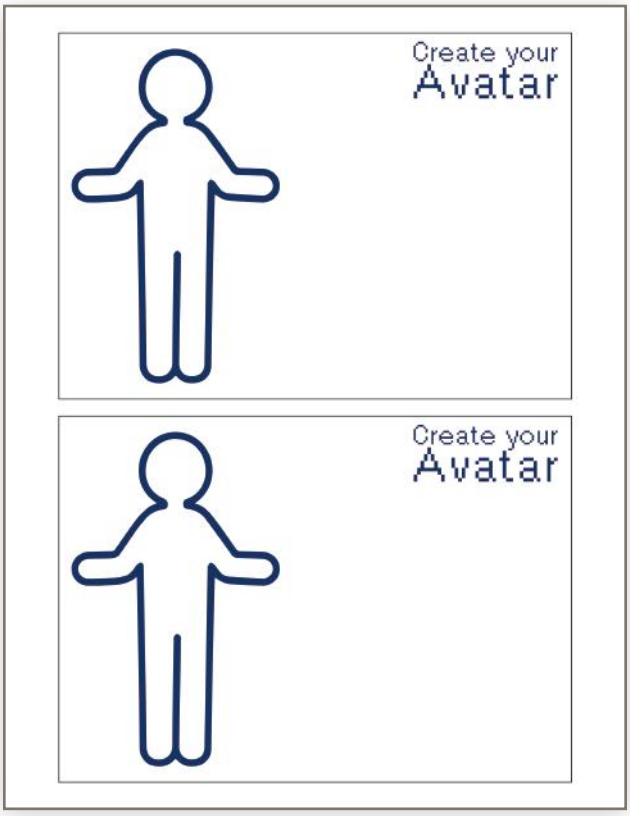


Figure 10: Blank identity card

Figure 11: Different stickers

Figure 12: Mock up of game “Time Machine”

By using an avatar, this prototype requires pathseekers to subsume their identity. This creates a third-person perspective during the game, which can help alleviate anxiety when considering problems or planning, as the user is in a position to empathize with the avatar rather than being the focus themselves. This perspective allows pathseekers to think outside the box when approaching their problems. In a study by Kross (2005), she found that when participants used a third-person pronoun to view issues that brought negative emotions, they could better regulate their emotions and engage in more effective decision-making, which is ideal for this prototype.

Additionally, pathseekers creating avatars in the prototype from a third-person perspective also pushed them to see more clearly what life is like at present. This makes pathseekers more aware of what their goals and aspirations are. Additionally, Sundar and Limperos (2013) found that players may use avatars to represent an idealized version of themselves in games, providing a sense of self-improvement and social comparison. This finding reinforces the idea that players can build an avatar representing their future self, and by comparing the "present" and "future" avatars, can better identify one or more paths to their ideal future. This suggests that the use of avatars in games can help players more easily and accurately represent their desired self-image, develop a deeper understanding of their current lives, and gain the satisfaction of immersion and self-improvement by visualizing their idealized selves. Ultimately, helps pathfinders realize their life goals.

Reflection

While this prototype has the potential to generate thought and start conversations, I realized it has many limitations. The prototype was run through several designers, to get feedback and professional input. Participants in the beta test displayed that even if the pool of stickers representing the "present" and "future" was significant, including sufficient elements to represent everyone was not possible. And because the conversations between pathseekers and trusted advisors were virtually unguided and unrecorded, those conversations can veer from the intention of the prototype. My experiments showed that these conversations were usually one-offs, and that it was almost impossible for pathseekers to review these critical conversations afterward. The unrecorded nature of the conversations leads to inefficient use of the information generated in the discussions. Although participants provided significant support for Prototype 1 as a gamification card tool during the experiment, various challenges hindered the ability to iterate on the prototype and effectively address the practical

dilemmas faced by pathseekers. In light of these concerns, I collaborated with the participants, who are also fellow designers, to brainstorm potential solutions.

The "Time Machine" aims to assist Pathseekers as much as possible through detailed planning to achieve a satisfactory future. Designers need to consider the geographical and cultural diversity of Pathseekers in advance. The preceding text has already described how planning for the future is a shared endeavor among people. Individuals typically engage in future planning to improve their quality of life or satisfaction. In varying cultural contexts, Pathseekers seek advice through different channels. These channels may include informal conversations with family and friends, seeking guidance from mentors or elders in the community, or seeking advice and guidance through online platforms. Cultural norms, accessibility, and personal preferences would influence people's choice of seeking advice (O'Kane, 2014). However, in some cases, embarrassment or shyness can be a typical obstacle most young people encounter when seeking help (Yap, Reavley, & Jorm, 2013).

For example, as a designer from China, I have a deeper understanding of traditional Chinese culture. While Del Mauro and Jackson Williams (2013) have shown in their study that counselling services can only be effective when individuals are willing to seek help, Chan & Ritchie (2011) found in their own research that in China, seeking help from professional psychologists or career counselors is often hesitantly sought due to cultural stigma. Therefore, people are less likely to seek out professionals and seek advice proactively. Instead, the most common scenario in life planning for Pathseekers in China is through trusted and familiar peers and family members at feasts or gatherings. " Importantly, this platform accomodates a range of different styles of advisors and advice.

Brainstorming and Introducing the Field of Artificial Intelligence (AI)

After determining that the card game format was not ideal for this project, some workshop participants pointed me towards Artificial Intelligence (AI) as a possible solution. AI, which is becoming increasingly popular among the general population, consists of computer systems capable of performing tasks that typically require human intelligence by using algorithms and statistical models to analyze data and provide personalized suggestions and experiences. It can be used to personalize educational programs, direct learning, and create entertainment content, so that users receive more

specific information or support. By understanding individual preferences and needs, AI can also increase user satisfaction and engagement, and automate repetitive and time-consuming tasks, allowing people to focus on more meaningful and creative work.

As the primary researcher of this project, I was initially skeptical about including AI. Even as a pathseeker myself, who regularly uses two personal digital assistant tools daily, Siri from Apple and Alexa from Google, I felt uncertain about introducing AI into this design project based on my interaction experiences with these products. AI, however, has grown past these widely-adopted assistants, in particular with OpenAI's release of ChatGPT (Chat Generative Pre-trained Transformer), in November 2022. ChatGPT has several features that make it a powerful natural language processing (NLP) system. NLP is a branch of AI that focuses on the interactions between computer and human language; ChatGPT uses it to understand the context of a conversation and generate appropriate responses. In addition, ChatGPT can generate responses in different styles, such as formal, informal, and humorous (Deng & Lin, 2023). The recommendations of my colleagues, improvements in NLP since the development of digital assistants I was familiar with, and the thoughtful use of AI as an element in a larger product like Innermap (see Case Study 3 above), caused me to realize that this evolution of NLP in AI could allow me to use AI as a tool for my design project, to guide users in their communication with trusted advisors, and to review the web and provide timely information as pathseekers craft future plans.

It is worth noting that in my design project, AI is used only as a tool to enhance the experience of using the app; it serves the foundational HCD approach. Due to the highly customizable nature of AI, the game's built-in AI can give each user suggestions about their future and knowledge relevant to the goals the pathseeker has described. AI can make the process of making plans a customized experience. Furthermore, I break down AI into specific tasks. The AI is present only as a guide and to provide necessary information when pathseekers need it. It does not interrupt when users communicate with their trusted advisor nor emphasize its presence. It also does not try to replace the role of the trusted advisor. The design process and where I choose to use AI is HCD-based. While it may have the ability to help designers make design decisions in the future, that is not how I have chosen to use it here.

There is precedent for using AI for chatbots to support people in other ways, such as the X2AI project—a mental health chatbot designed by clinical psychologist and AI researcher Rauws (2015). His team of mental health experts and software engineers developed an AI-powered chatbot to provide mental health support to users. The

chatbot uses NLP and machine learning algorithms to understand the user's concerns and distress, and to provide personalized advice and support,effectively reducing depression and anxiety symptoms in college students. It also demonstrates some effectiveness in improving users' self-esteem and reducing stress (Zhu et al., 2019). This study indicates that AI-based chatbots can help people address psychological issues and improve mental health.

Some may still question if AI technology is advanced enough yet. The emergence of products such as Chat GPT and X2AI shows that AI is mature enough to help human users learn and reflect on their experiences. For example, AI can process information with efficiency and speed that humans cannot achieve, so people can use AI to quickly retrieve information from the internet. Since pathseekers are young people in their 20s and 30s, most have an easy affinity with modern technology. Tully (2003) has shown that young people adopt and integrate modern technology into their daily lives more quickly and readily than others . The demographics of pathseekers means they will likely quickly adapt to an AI supported tool - AI is likely to attract their interest, rather than confound or repel them.

Specifically, this project can incorporate AI so that pathseekers can generate targeted questions to gain insight into their current concerns while having readily available assistance to find information to support the deep conversations that emerge between themselves and the people they invite. Ultimately, AI will help users reflect on their lives and make long-term life plans.

Prototype 2

Prototype 2 iterates on the first prototype by providing a digital tool that utilizes artificial intelligence to support pathfinders in building viable long-term life plans through learning, communication, counselling, and reflection. In Prototype 2, users are encouraged to define their long-term goals, and invite an in-person trusted advisor, like a family member, close friend, mentor or colleague, to help them create a life plan or share experiences that might inform the pathseeker’s development of a plan. After a draft plan is created, the AI can automatically generate future challenges/opportunities that pathseekers may face. This feature prompts users to consider unexpected life paths and plan their responses accordingly. These challenges/opportunities will be generated in response to the user's plans or experiences, and can be highly personalized, impacting the user’s hypothetical life both positively or negatively. While

users can choose to respond to these challenges/opportunities on their own, seeking help and advice from other advisors is recommended.

Another feature of the tool is that users can set different end goals and create parallel plans for those goals. After they complete all the plans, they can choose the most appropriate/satisfactory/feasible plan to start.

The following are the starting principles:

1. The digital toolbox should help users express their aspirations in a structured way by prompting them to identify and define their long-term goals and aspirations.

2. The AI feature should encourage users to consider and plan for unforeseen situations by introducing unexpected events that may affect their life plans, thus building resilience.

3. The toolbox should help users with social learning. It enables users to interact collaboratively with trusted advisors to facilitate sharing experiences, exchanging knowledge, and learning from others' perspectives.

4. The toolbox should show the user multiple potential paths to achieve different goals and recommend that the user discuss them with trusted advisors before making a decision.

5. The AI should only be in the toolbox as a guide and information provider. It should not be a leading or active participant, or decrease the chances of users inviting trusted advisors.

More details of the prototype are illustrated below.

User Flow Chart & Wireframe

I divide this gamified digital toolkit prototype, called “Time Machine” into four stages (figure 13). The built-in AI guides users through all the steps, creating at least one executable long-term plan by the end of stage 4. While the tool has some gamification features and graphics, it is not a playable toy that provides entertainment. Each of the four stages are explained below.

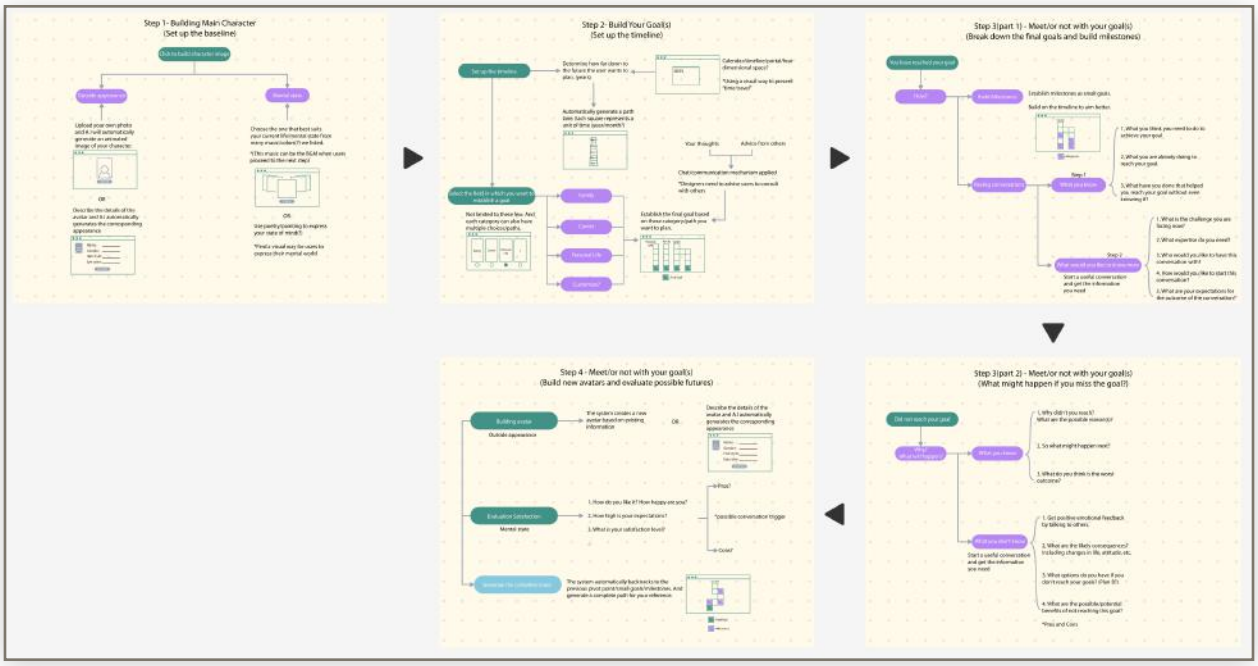


Figure 13: User flow chart of prototype 2

In the first stage of “Time Machine,” the pathseeker generates a virtual avatar in the toolkit according to their needs and choices (figure 14). After the user has created an avatar, the AI prompts the user through dialogue to evaluate their own current mental state and satisfaction with their current life. The toolkit will automatically generate a page that represents the “the present", showing the user's current status, lifestyle, and avatar image. In a later step, the AI will automatically create an image based on what the pathseeker's avatar would look like several years later, and this will be used as the AI's appearance in the toolkit. The aged avatar will give pathseekers the impression they are talking to their future selves.

The second step of the toolkit helps pathseekers identify their goals or ideals (figure 15). In this wireframe, pathseekers set their final destination and create a timeline for completion based on their goals and capacities. Players can select the field they want to plan in this step, and invite trusted advisors to participate in making the plan. To encourage pathseekers to talk more with their trusted advisors, the AI will suggest "Take a break" at key screens to allow players to become more immersed in and learn from their conversations with advisors. At the end of the conversation, the AI will provide a "Journal" interface that allows players to immediately record the content and conclusions of their conversation. After the recording, the AI will support pathseekers in setting an end goal for the route with their trusted advisor. Players can have more than

one end goal and set different planned routes based on multiple goals. After the player has set all the end goals, they will need to choose one of the routes, and use that to start Step 3.

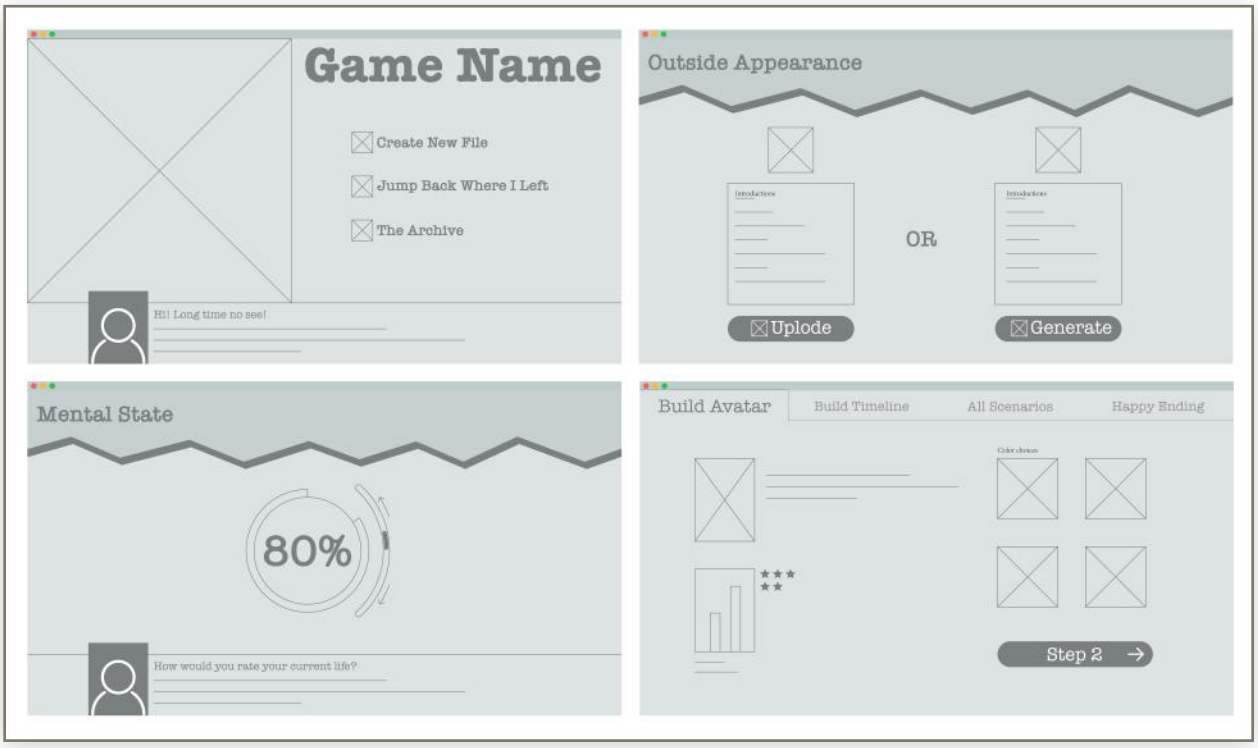


Figure 14: Wireframe of step 1

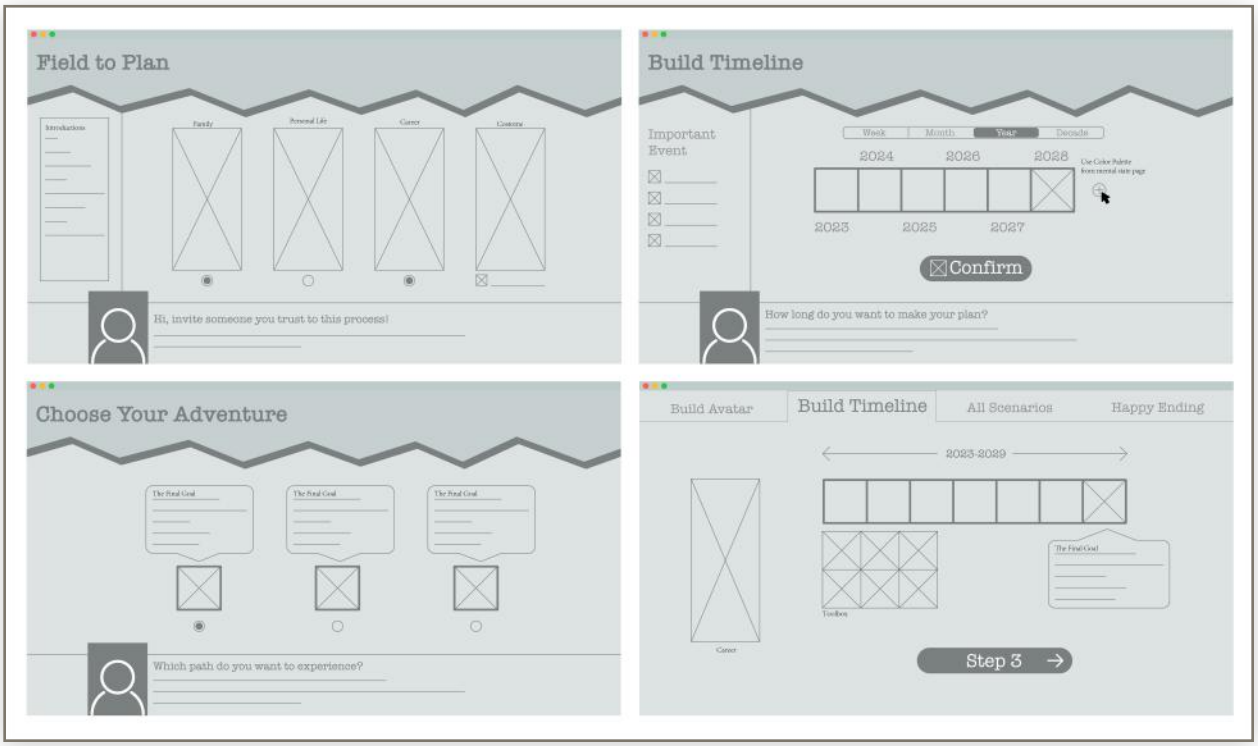


Figure 15: Wireframe of step 2

In Step 3, pathseekers learn and reflect on knowledge and experiences that can help them to reach one of their ultimate goals (figure 16). The AI will guide users, directing them to knowledge or information specific to their goals, to help them understand more comprehensively how to accomplish those goals. Pathseekers will then work with their trusted advisors to create a more specific timeline, focusing more on building milestones than deadlines. Pathseekers will discuss milestones with their trusted advisors, recording their comments. At this stage, the AI will generate one or more unexpected events at random stages of the timeline that could potentially change the user's entire life plan, either positively or negatively. Users, alone or with a trusted advisor, will think about their response and decide if the occurrence will alter the original end goal, or the path toward it. This process prompts pathseekers to think about and plan for unknown but possible future events. The process can also provoke profound conversation between users and trusted advisors, allowing them to learn from others' experiences and thought processes. Finally, if pathseekers have set multiple end goals in various fields in Step 2, then at the end of Step 3 the AI will ask users to select the next destination and continue with another version of Step 3.

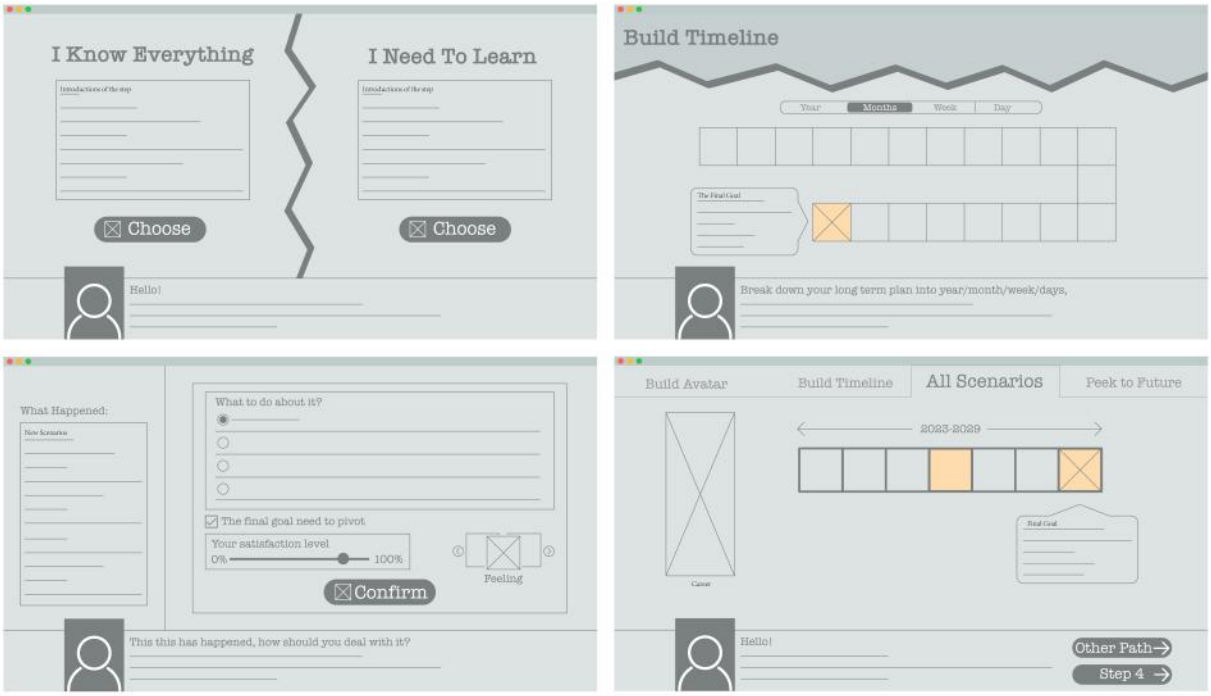


Figure 16: Wireframe of step 3

After users complete the above three steps, the AI will show possible plans and routes for pathseekers to view in Step 4 (figure 17). The AI will guide users to rate different paths and final results, either alone or alongside a trusted advisor, and to have an in-depth conversation with the AI or the trusted advisor about which paths they prefer and why. This step allows pathseekers to view the complete details of any routes and to alter them at any time, as events occur or their preferences shift. As an intelligent assistant, the AI will answer any questions or doubts generated by the user during this step. If pathseekers return to this toolkit at a future date, the AI will also display a progress bar representing milestone completions for users to view and check, creating feelings of accomplishment.

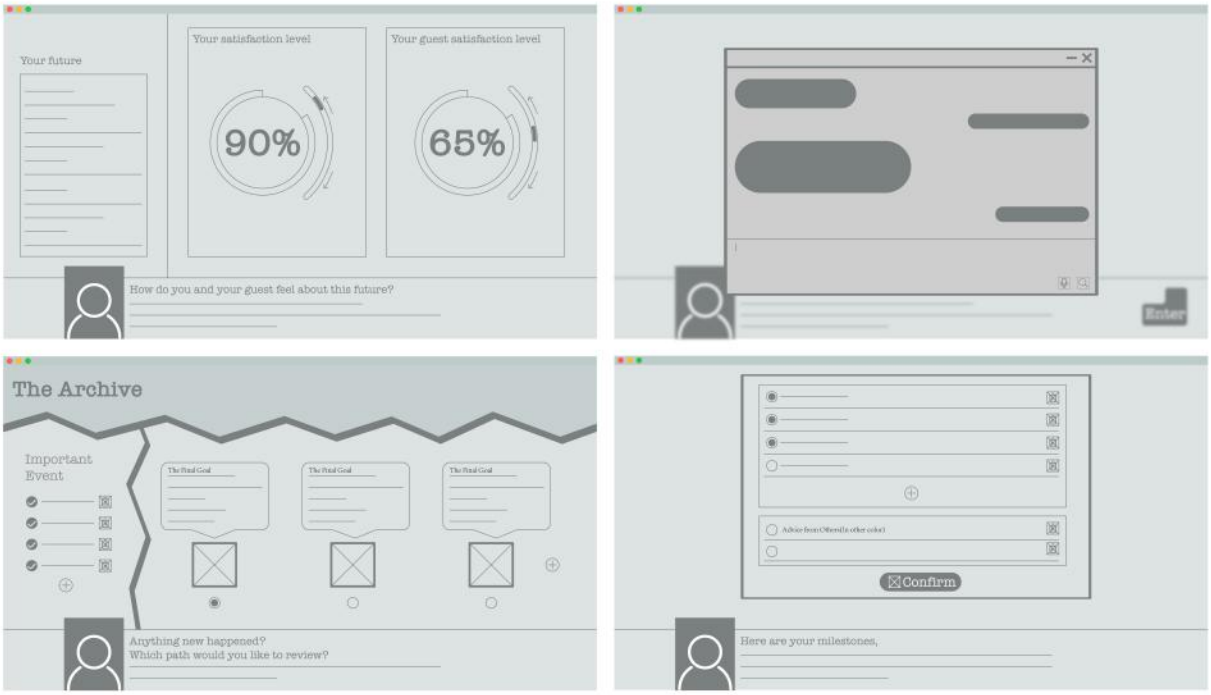
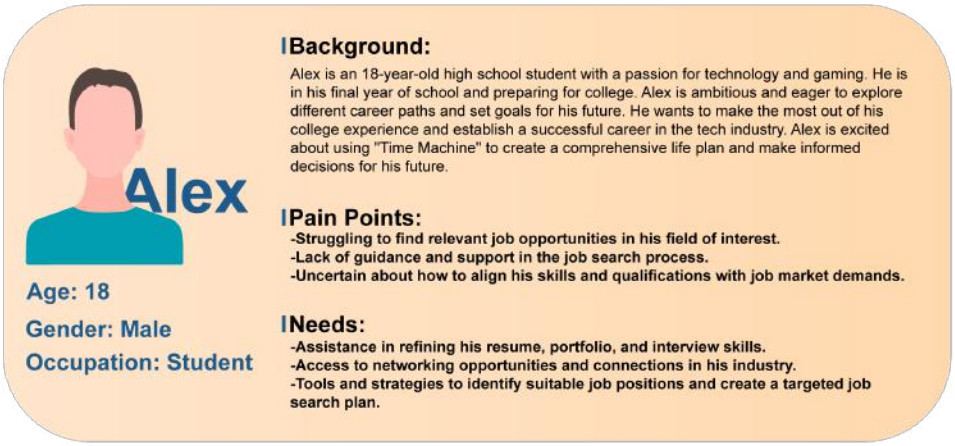


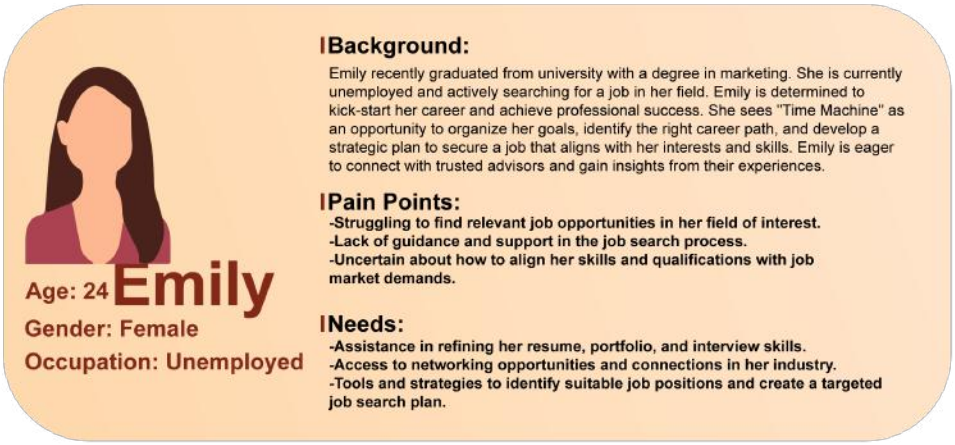
Figure 17: Wireframe of step 4

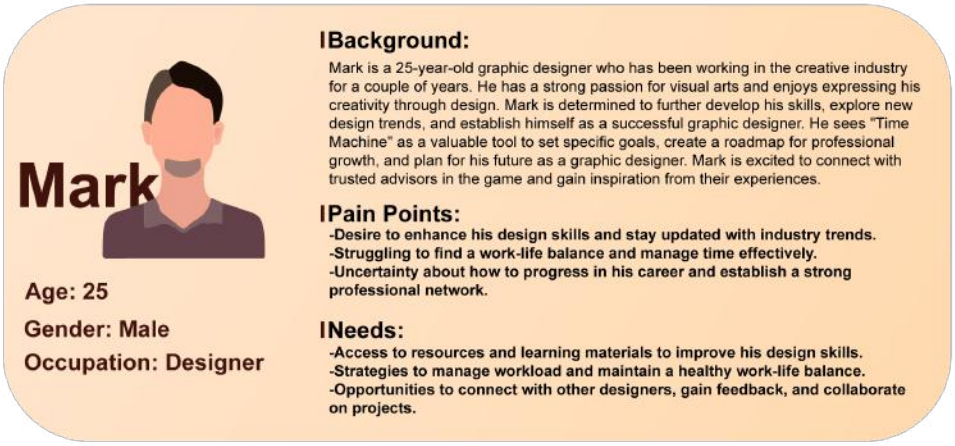
I designed this toolkit to help users create and choose the most satisfying life plan for themselves, and to support them in executing that plan. Players can engage in the toolkit for a few days or for weeks. They can save and quit anytime during the toolkit and return to the interface they left last time. The toolkit encourages pathseekers to invite trusted advisors and to work with them to build a plan. Furthermore, after the completion of the plan, pathseekers can use the toolkit to track their progress and points of completion to help them stay on track in the long term.

Persona & User Scenario

Based on the above description of toolkit steps, I created three different Personas to demonstrate the target user group for which the toolkit is intended. Each represents different life stages experienced within a similar age group, and demonstrates various pain points representing their needs. The following is a detailed description of these three personas.







Mark, a graphic designer based in Vancouver with several years of experience in the creative industry, recently faced much uncertainty about his life and wanted to use "Time Machine," an artificial intelligence-assisted plan-making toolkit, to help him figure out his life plan for the next five years. Mark started the toolkit on a Saturday evening and followed the toolkit's instructions to create a long-term life plan for the future.

First, Mark needs to create an avatar in the toolkit (Figure 18). Mark can upload an actual photo of himself and have his avatar generated by AI, or he can choose from different elements to compose his avatar. Mark chose to make his own. He created an avatar based on his appearance from various facial shapes/hair styles/colors. The toolkit's built-in AI then automatically generated a more detailed, older version of Mark based on the avatar Mark created and used it as the face of the AI to start chatting with Mark. The AI asked Mark how satisfied he was with his life and selected a few emojis from a pool that best represented how he was doing to create a baseline and generate a completion report for Step 1.

Figure 18: Step 1 of the toolkit, create users avatar

Next, under the guidance of the AI, Mark moves to Step 2 and begins to set a timeline for his plan (Figure 19). Mark would like to create a five-year long-term plan from 2023 until 2028. Once he sets the timeline, Mark determines several goals for his

future development. First, he hopes to be hired by Apple and become a UI designer. However, at the same time, Mark would like to return to school and earn a master's degree in design. Mark finds both goals equally appealing and hesitates to choose between them. The AI asks Mark if he needs help and suggests that Mark invite a trusted advisor to help him choose a different goal and move on to step three. Mark follows the AI's advice and decides to invite his father to work with him the following day. He then saves his progress and exits the toolkit.

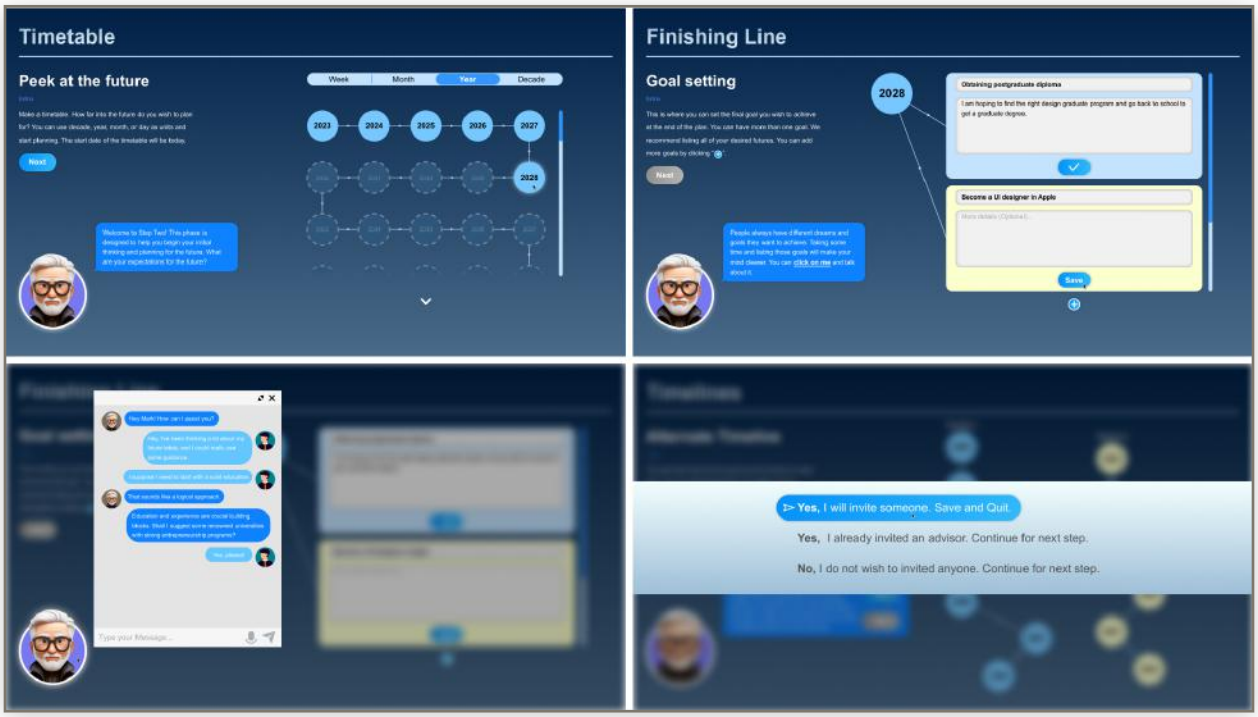


Figure 19: Step 2 of the toolkit, create timetable and set goals

Mark begins working with his father on the next step the following day. Together, they log into the toolkit and return to the screen Mark left in Step 2. The AI shows his two goals and encourages him to discuss them with his father and decide together on their first "adventure" for step 3. Ultimately, Mark opts for higher education and initiates the next step (Figure 20). First, Mark asked the AI to provide some information about master's programs in design to deepen his understanding of acquiring a master's degree. Then, Mark and his father divide the five-year plan into months and set milestones to achieve this final goal.

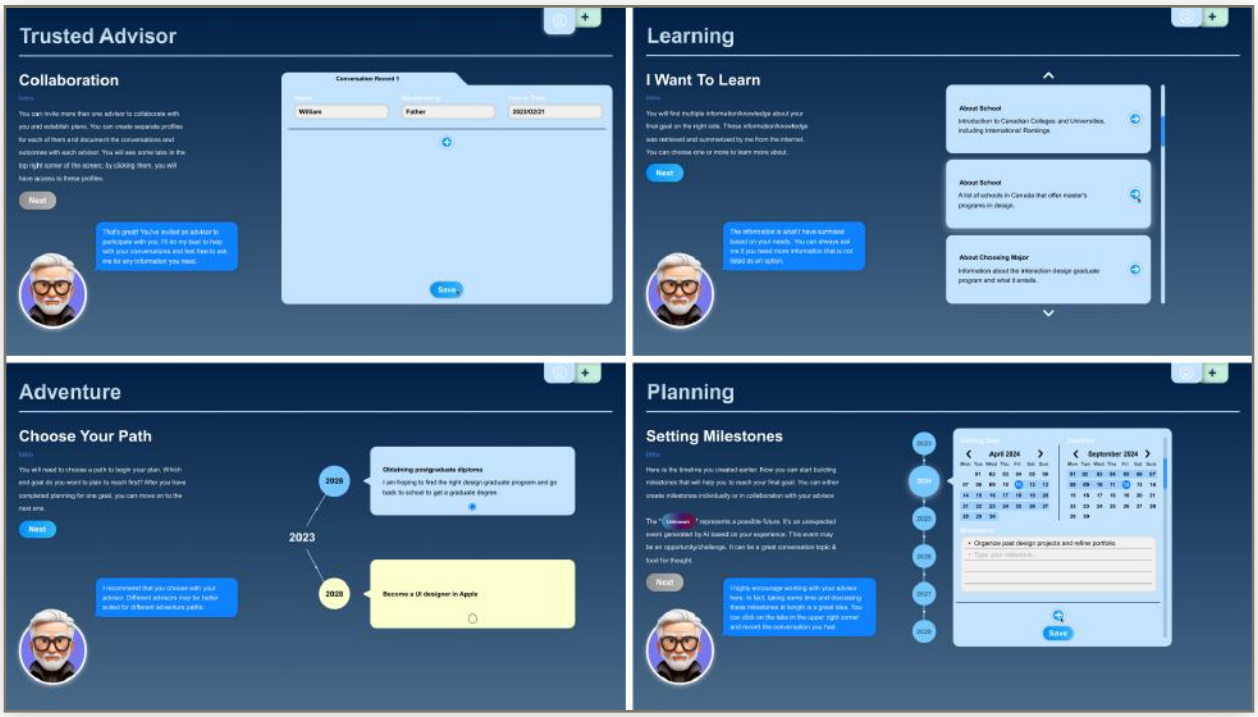


Figure 20: Step 3 of the toolkit, set milestones

Here Mark has the opportunity to have the AI automatically generate an unexpected event. These events can often be a challenge or an opportunity. They do not always happen, but they are generated based on what the AI knows about Mark. They may force Mark to change his end goal completely. Alternatively, at least, these disruptions cause Mark to consider the implications or possibilities of these events. Mark asks the AI to generate an unexpected event in 2025; the event is a job offer. Before Mark plans to return to school, he got an offer from an American advertising agency to lead a design team and set up a branch office in Los Angeles. This is an excellent job opportunity for Mark. Although this job offer is fictional, it is something that could happen based on Mark's past experiences. This event could completely change Mark's current plans and his ultimate goal. At this point, the AI suggests that Mark have a conversation with his advisor and explore this possibility. At the end of the conversation, Mark records the content of that discussion and his thoughts in the "journal" interface provided by the AI, which can be used for future review (Figure 21). After the discussion, Mark decides that getting a master's degree is what he truly wants to pursue. After some discussions with his father, Mark felt that obtaining a higher education was not only about getting a better job but more about acquiring proficiency and in-depth knowledge through education. These benefits would serve Mark well in his future personal and professional life. Any job offer at this stage should not prevent him from realizing this goal. After more communication and reflection, Mark finally completes

one five-year plan leading him to this goal. Then, with the guidance of the AI, Mark chooses a separate goal he set earlier and begins to create a new five-year plan for that goal.

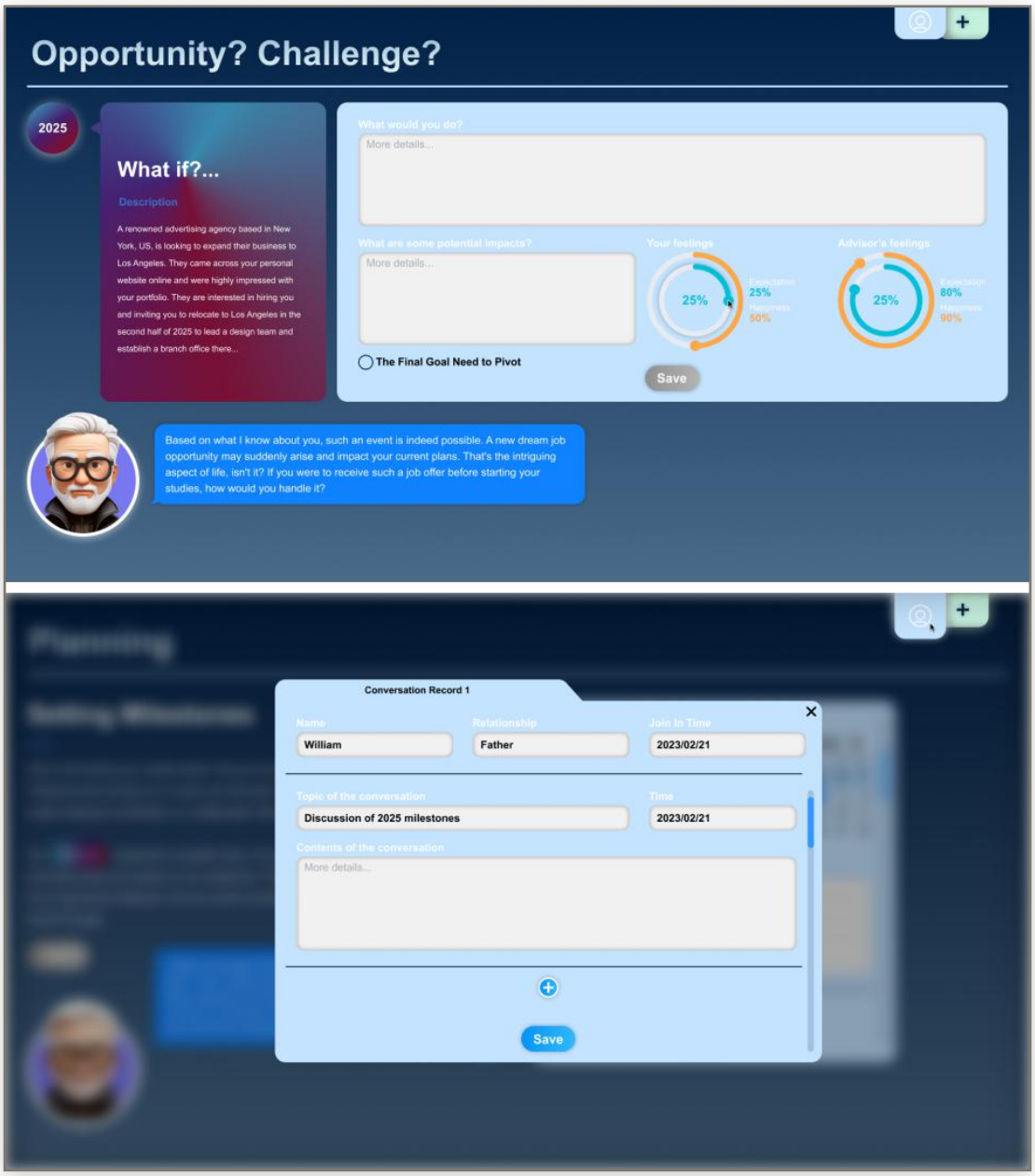


Figure 21: Step 3 of the toolkit, AI-generated event and record conversation

It took Mark a couple of weeks to complete all of his plans. He decided to review all the routes with another trusted advisor to evaluate and compare them from an additional perspective (Figure 22). This time Mark invited his brother to work with him.

Together they completed their own evaluation of the different goals and deeply discussed each route. During this process, Mark got to know his brother better, and he and his brother felt closer. On more than one occasion during their interaction, Mark used the built-in AI to help them quickly gain specific information. Through learning and talking with his brother, Mark gained new insights and made a few changes and additions to the planned milestones. Ultimately, Mark's brother could not help him pick a plan he was most comfortable with and willing to execute, so Mark invited more family, friends, and peers to participate in the discussions. Through these discussions, Mark realized that his desired future was to return to school and pursue higher education within the next five years. Based on this plan, Mark began to take action on his journey.

Figure 22: Step 4 of the toolkit, evaluate and build-in Chatbot

One year later, Mark revisits the toolkit and uses the "Archives" option to review his plans and check his progress (figure 23). Mark remains firm in his plans and goals, and in the third year of the plan, he enrolls in a design and art university in Toronto to pursue higher education. In the final year of his five-year plan, Mark graduates from school with a master's degree in design. Mark will again use "Time Machine" in this new phase of his life to plan for the future.

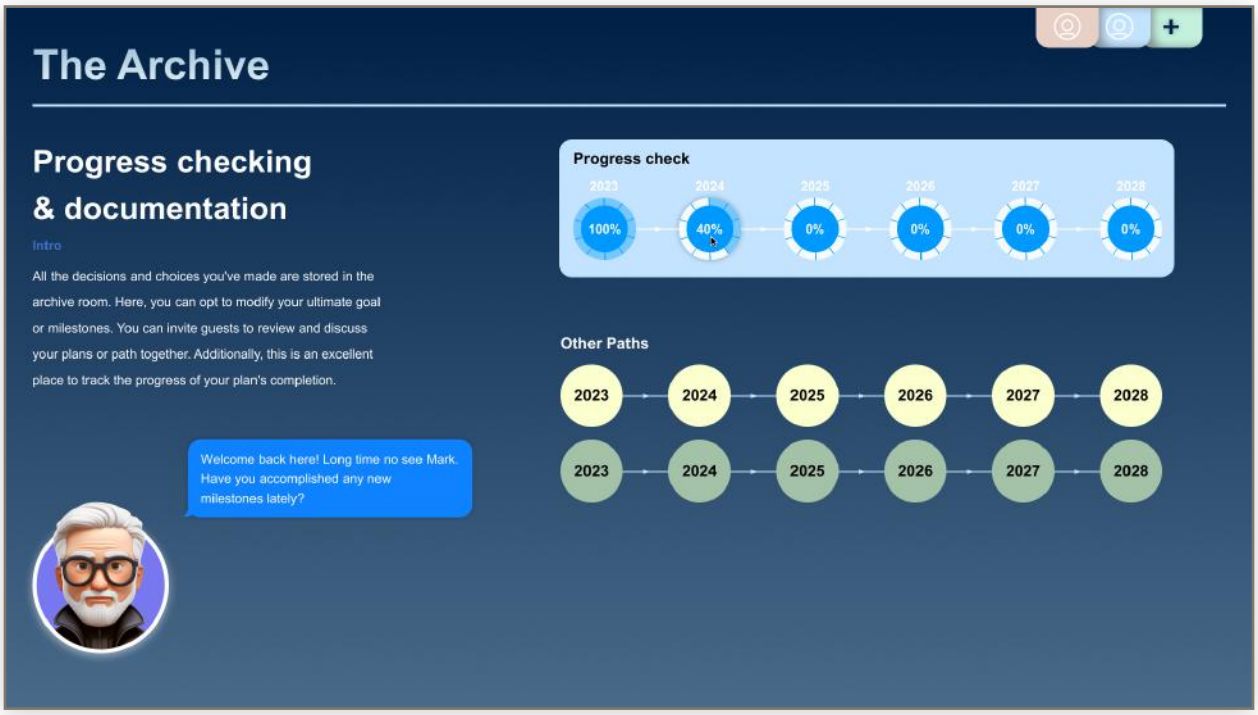


Figure 23: The “Archive” page for progress check

Reflections

Analysis and Reflections

The “Time Machine” prototype can effectively assist pathseekers in developing long-term plans and help them acquire sufficient abilities and knowledge to execute that plan through four steps. Communicating seamlessly with users through natural language processing techniques, it provides timely and personalized assistance through artificial intelligence technology, ensuring they have both support and freedom to customize their plans according to their needs.

However, I acknowledge that with the current state of technological development, AI has limitations and boundaries in understanding the human mind. When users express complex or ambiguous emotions, AI may struggle to comprehend and respond to subtle differences in these human emotions, as noted by Picard's (2000) study. Picard points out the complexity of human emotions and explores topics such as emotional expression, recognition, and interpretation. She emphasizes how understanding and responding to human emotions can enhance user experience and improve the effectiveness of using AI in interactions, proposing that identifying, responding to, and even evoking user emotions through technology is crucial for creating more understanding and responsive AI systems. Although AI does not yet fully understand and respond to all human emotions, it has grown rapidly in recent years. According to a more recent study by the McKinsey Global Institute (2018), a growing number of organizations are adopting AI technology. Corporations and designers are leveraging it to improve customer experience, optimize operations, improve decision-making and drive innovation, among other things. As the report notes, AI is becoming more widespread, and having an impact across industries as it evolves and improves. As such, I used AI as a tool in this second prototype, to guide pathseekers through a decision making process and support them by providing information and prompts. For the most part, though, pathseekers will be prompted to have in-depth conversations with family members, friends, and mentors - the types of conversations that AI is likely to struggle with. The prototype draws on AI's strengths, alleviating tasks like information seeking and guiding users in customized ways, while prompting pathseekers to find meaningful discussions with trusted advisors - an area that AI does not excel at.

It is important to note that AI will not, and should not, replace professional mental health practitioners. While this project, like others, uses AI well to help users begin, engage in, and sustain a meaningful, reflective, and deep conversation, the intention of this design project is not to enable AI to replace professional counsellors or help users with mental health issues. Because AI lacks interpersonal connections, AI-powered mental health tools may not provide the same level of interpersonal relationships and empathy as traditional mental health services. This may limit their effectiveness, especially when users are dealing with severe or complex mental health issues (Carr, 2020).

In this prototype, AI plays more of a guiding role than an active conversation participant. It encourages pathseekers to invite trusted advisors to participate and support them in the process of creating plans. While it is still challenging for AI to

engage in entire conversations or provide psychological assistance, AI can still help users improve their own lives. Once these limitations are recognized, designers can use AI as one tool among many, to ensure that people receive the best interactions and support possible.

The built-in AI assistant provides only necessary guiding instructions and information during use. Furthermore, the AI strives to minimize its influence during in-depth conversations between the user and the advisor. As shown in the user scenario, when the user decides to create a plan for a specific goal, the integrated AI assistant will only provide information to the user and the advisor. The user can accept or reject the information and materials provided. Even if the user chooses to retrieve information from the internet using the AI to avoid potential information overload, the user can still selectively access only the information of interest to them and the advisor, aiming to mitigate the potential information flood caused by the AI. During this process, the advisor can also offer additional information and feedback. Ultimately, the user and the advisor collaboratively make decisions.

“Time Machine” has other potential limitations and challenges. For example, the accuracy of AI predictions regarding future events may vary. As such, the toolkit must manage user expectations and emphasize that it is providing a simulated experience rather than precise predictions. The toolkit should balance gamification elements and the seriousness of creating life plans to ensure users maintain a realistic and practical approach to their goals. Finally, maintaining long-term engagement is crucial for a tool focused on helping users create and execute long-term plans. Designers should explore strategies to sustain users' long-term motivation and investment in the toolkit, providing continuous support and updates to adapt to users' evolving needs.

In conclusion, the "Time Machine" prototype has the potential to make a positive contribution in assisting pathseekers with communication, learning, and ultimately creating long-term life plans. With a human-centered design approach, design principles, and a focus on user needs, this digital toolkit can become a valuable tool dedicated to personal growth and goal achievement.

As mentioned at the beginning of this thesis, being a member of the Pathseeker community, I take pride in the process and concept of the "Time Machine." The "Time Machine" is a thoughtfully crafted and meticulously designed toolkit aimed at helping individuals create fulfilling life plans and providing ongoing support for plan execution. The structure of this toolkit integrates gamification features and AI guidance. It

effectively guides users through four stages, assisting them in self-reflection, goal setting, learning, and planning for unforeseen events. Each step in the toolkit is crucial.

As the inaugural user and primary designer of this toolkit, I believe that the design effectively achieves the initial goal of helping users develop satisfying life plans and supporting them in plan execution. Key aspects such as self-reflection and collaboration with trusted advisors are critical in making wise life decisions.

As I, a Pathseeker, will graduate from my post-graduate program and reenter the workforce in the coming months, this life milestone represents a challenging phase for me. The design principles and concepts incorporated into the "Time Machine" digital toolkit have helped address some of the challenges in my life. I have utilized the "Time Machine" and set multiple parallel timelines in Part 2. Towards the end of my usage, I began to believe that staying in Vancouver after graduation and gaining more work and life experience would lead to a more satisfying and contented life. Building upon this decision, I started planning my life in Canada more earnestly.

I look forward to re-utilizing the "Time Machine" for my next three-year plan. While I might feel lost in the "path-seeking" process, my predominant emotions are anticipation and excitement. I hope the "Time Machine" will guide me towards a more exciting future.

Future Design Directions

This digital tool has much room for improvement. As the field of artificial intelligence expands, AI is becoming commonplace in many areas of human life (Pannu & Student, 2015). NLP-based chatbots hold a lot of promise for the improvement of AI assistants, so that they might be able to provide users with more detailed and personalized interactions, creating more engaging and realistic conversations with pathseekers as they collect information to create life plans. Additional features, such as voice recognition, can enable users with visual impairments to use the “Time Machine” tool as well..

However, it is worth mentioning that there are still some controversies regarding the ethical aspects of AI development. According to Meek, Barham, Beltaif, Kaadoor, and Akhter (2016), managing ethical and risk implications in the face of rapid advances in AI is a concern. Moreover, in a study by Christoforaki and Beyan (2022), they also point

out the trust issues arising from the opacity of AI algorithms. These concerns have the potential to affect the development and use of AI in the future. However, this design project does not rely heavily on AI in key areas, and in particular does not expect AI to replace human communication and connections. In future iterations, though, the designer should pay more attention to ethical controversies arising in the development of AI.

Introducing virtual video conferencing functionality to the toolkit is entirely feasible in future iterations. In this version, pathseekers can invite trusted advisors for discussions and planning, however, pathseekers can only ask individuals physically present in the same city or region as them; the trusted advisors must be in the same physical space to use the toolkit. A video conferencing feature would allow pathseekers to collaborate with any trusted advisor they wish to invite without concerns about geographical location or distance. This would expand the range of advisors that pathseekers can invite and provide them with greater flexibility in how they use the toolkit.

Because the toolkit offers the creation of long-term plans for pathseekers, it is crucial to provide features that support long-term tracking and follow-up. This may involve regular check-ins, reminders, and notifications to help users stay on track with their plans. Additionally, the toolkit can provide mechanisms for pathseekers to regularly review their progress to ensure that the goals within the toolkit remain relevant to their actual lives. It would also be beneficial to develop a mobile application that makes the toolkit more accessible and convenient for users, in order to further encourage long-term engagement. A mobile version would enable pathseekers to quickly review and demonstrate their plans, check their progress at any time, and seamlessly integrate the toolkit into their daily lives. Moreover, the accessibility and convenience of smartphones can enhance user engagement and activity.

Beyond being a tool for individual planning, the app also should envision the transformation of pathseekers into trusted advisors for others. This transformation involves developing a comprehensive understanding of one's goals and aspirations and actively advising and assisting others in planning. The app promotes a dynamic interaction between pathseekers, encouraging mutual consultation and assistance, ultimately aiming to cultivate a community of empowered individuals who can navigate their paths while aiding others.

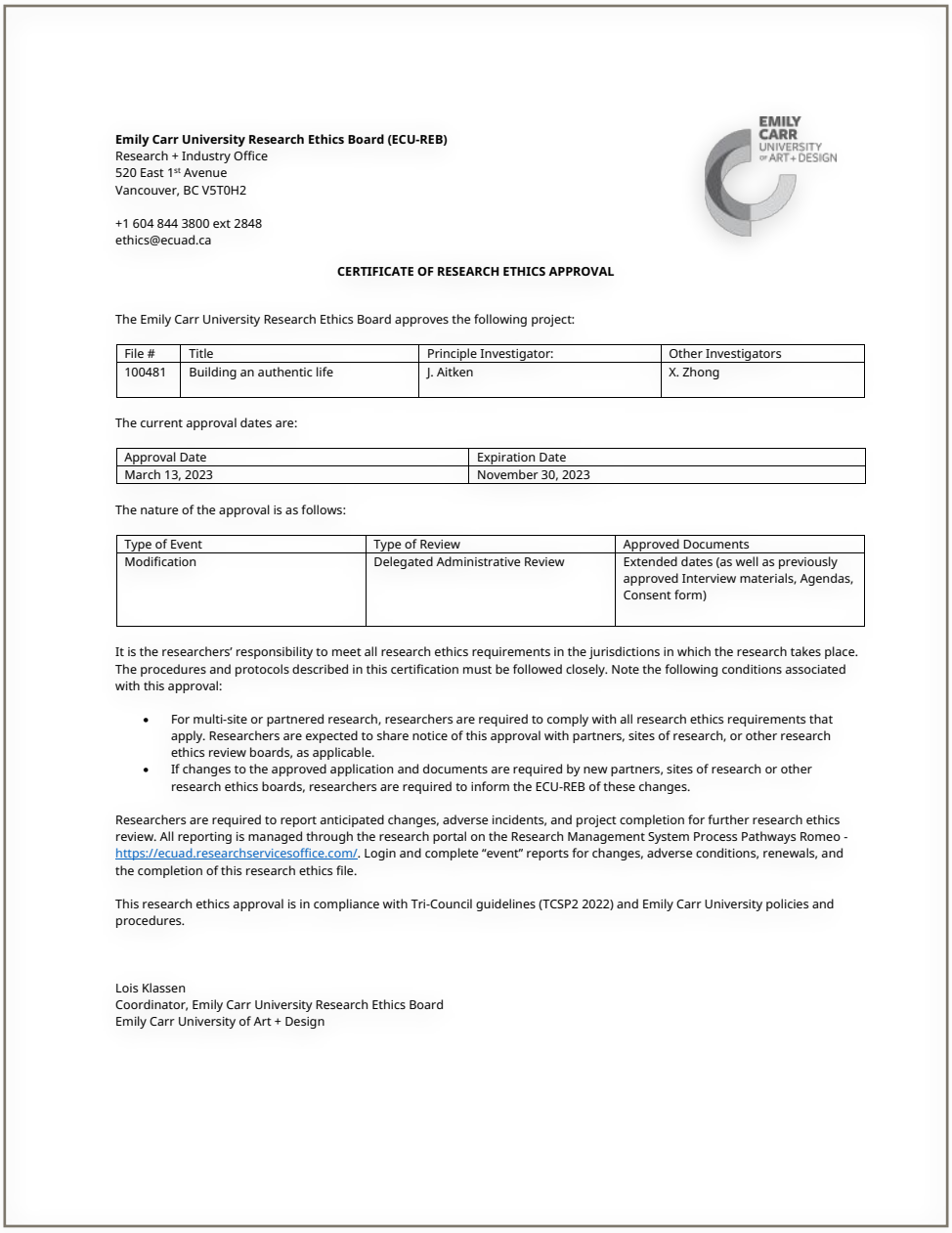
The "Time Machine" toolkit provides for two roles - Pathseekers and trusted advisors. This dual role empowers users to both seek guidance and provide valuable insights to other pathseekers. Future iterations of the "Time Machine" could provide resources and training modules for those individuals who wish to become trusted advisors. These resources could give them the knowledge and skills to effectively coach others and enhance their transition from pathseekers to trusted advisors. By fostering a collaborative community and promoting mutual support, the app could inspire users to evolve into mentors and advisors, envisioning a future where individuals can professionally guide others in achieving their life goals. This dual role paradigm contributes to a sense of shared growth and empowerment among the app users.

On top of that, the "Time Machine "app should also consider the repeating timeline layer. Designers should know that some users may seek a linear path to achieve their life goals, while others prefer a more flexible, skill-oriented approach. For example, if some users do not want a fixed, linear path to reach their goals, they may want to use "Time Machine" to learn and master a particular skill. The toolkit should allow users to define and master skills through repetition of timelines, allowing for a personalized and adaptive approach to life planning. The designer can add timelines for customized skill development within the app in iterations. Users can allocate time blocks to meet the need for mastery of different skills. Each time block represents a phase in the learning process of a specific skill. These stages can include learning, practicing, reaching milestones and reflecting on progress. Alternatively, the built-in AI can incorporate adaptive learning features. The toolkit can use AI to analyze a user's learning progress and suggest adaptive adjustments to the schedule based on their performance, preferences and advisor feedback. This will ensure a tailored learning experience and maximize skill acquisition. Lastly, there is the integration of continuous learning. The toolkit should provide the ability to repeat learning over a selected timeframe. Allow users to incorporate new insights, resources, and experiences through constant repetition of a particular skill, thereby improving the skill over time. Moreover, it shows the user's achievement in the non-stop repetition of a particular timeline layer.

Considering these future design directions, the "Time Machine" toolkit is primed to evolve into a more comprehensive, engaging, and effective tool for pathseekers to create and execute long-term life plans.

Appendix

REB Documents



Emily Carr University Research Ethics Board (ECU-REB)
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CERTIFICATE OF RESEARCH ETHICS APPROVAL

The Emily Carr University Research Ethics Board approves the following project:

File #	Title	Principle Investigator:	Other Investigators
100481	Building an authentic life	J. Aitken	X. Zhong

The current approval dates are:

Approval Date	Expiration Date
March 13, 2023	November 30, 2023

The nature of the approval is as follows:

Type of Event	Type of Review	Approved Documents
Modification	Delegated Administrative Review	Extended dates (as well as previously approved Interview materials, Agendas, Consent form)

It is the researchers' responsibility to meet all research ethics requirements in the jurisdictions in which the research takes place. The procedures and protocols described in this certification must be followed closely. Note the following conditions associated with this approval:

- For multi-site or partnered research, researchers are required to comply with all research ethics requirements that apply. Researchers are expected to share notice of this approval with partners, sites of research, or other research ethics review boards, as applicable.
- If changes to the approved application and documents are required by new partners, sites of research or other research ethics boards, researchers are required to inform the ECU-REB of these changes.

Researchers are required to report anticipated changes, adverse incidents, and project completion for further research ethics review. All reporting is managed through the research portal on the Research Management System Process Pathways Romeo - https://ecuad.researchservicesoffice.com/. Login and complete "event" reports for changes, adverse conditions, renewals, and the completion of this research ethics file.

This research ethics approval is in compliance with Tri-Council guidelines (TCSP2 2022) and Emily Carr University policies and procedures.

Lois Klassen
Coordinator, Emily Carr University Research Ethics Board
Emily Carr University of Art + Design

Research Ethics Approval Certificate

PANEL ON
RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE 2022

Certificate of Completion

This document certifies that

xuecheng zhong

successfully completed the Course on Research Ethics based on the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2: CORE 2022)

Certificate # 0000790872 **22 January, 2022**

Research Ethics Course Certificate

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