

Integrating AI Personas in UX Design Workflows: An Exploratory Study



Demographic data
Name: Sarah
Age: 22
Biological sex: Female
Study: Design at AAU
Relationship: Single
Income: SU

Personality
Open-minded
Responsible Thrifty
Flexible Efficient

Values
Honesty and transparency
Leisure and relaxation
Financial security

Interests
Staying Physically active
Gaming Arts & Crafts
DIY projects

Pain Points

- The app should offer an automated meal plan, with the option to define how many days it should plan for at a time, with a maximum of 7 days.
- The meal plan must be customizable with various variables.
- It is preferred that recipes are in written format rather than video format.
- It is important to have a wide selection of recipes that offer variety.
- Dishes should be nutritious, but nutritional content is secondary to price.
- The app should have a simple hierarchy and design to avoid wasting time searching through the app.

Goals & Motivation

- She wants to reduce the amount of food waste she produce
- She wants to avoid impulse purchases in stores, as it is both time-consuming and expensive.
- Price is the most important parameter for her when it comes to both shopping and recipe selection.
- She is looking for a way to quickly and easily add new dishes to her repertoire.

Features

- The shopping list should be divided based on store and item type (groceries, frozen, dairy, meat, etc.).
- She would like to be able to favorite recipes she likes, so she can easily find them later.
- She thinks it would be nice to insert her own recipes so the user can add based on their calorie intake if they care about it.
- For her, the time it takes to make recipes is important.
- Sometimes there is time to spend more time cooking, but on weekdays it should take a maximum of 45 minutes.

Behavior

- She cooks 3-4 times a week
- She spends approximately 5 hours a week cooking
- She spends 2-3 hours a week shopping

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Abstract:

This exploratory study examines the benefits of integrating an AI persona, informed by a qualitative persona, into UX design workflows. Using a wireframe of a meal-planning app designed for university students as a case study, we created a qualitative persona based on feedback from 13 Danish students. We then developed two GPT models: one informed by this persona and one without this information. A between-subjects user study with four UX professionals assigned either the informed or uninformed AI evaluated the AI personas' impact on design efficiency, creativity, and decision-making. The informed AI persona provided valuable user-centered feedback, improved design processes by reducing biases, and prioritized user needs. Despite concerns about response specificity and data transparency of its knowledge base, the UX professionals showed a positive attitude towards the informed AI persona and the employment of AI tools in their workflows. The study demonstrates that informed AI personas can enhance UX design by offering efficient, user-focused feedback, especially when user interaction is limited, further signifying the potential of mixing the fields of UX and AI.

Preface

We wrote this report as our tenth and final semester project of the Medialogy master's programme, marking the completion of more than 18 years of education. Firstly, we would like to thank our supervisor, Kasper Rodil, for buying into our project idea and guiding and assisting us in the project's development, resulting in this final report, as well as supervising our previous projects and recently recruiting us to conduct a class with the 4th-semester Medialogy students at Aalborg University on the topic of "personas." We would also like to thank Solita and the people of Solita for their interest in our project and their willingness to provide supervision, developer assistance, and, finally, professional user experience designers for the final project evaluation. We also want to thank all the test participants for participating in the tests of our project. Finally, we would like to thank our families and friends for their patience and understanding while we wrote our thesis.

Reading guide

Throughout the report, sources will be cited in 'ieeetr' BibTeX style, meaning they will be referenced as [Number], referring to the corresponding number in the bibliography, where further information on the source, such as author, title, URL, and publication year, can be found. If a source is cited outside a paragraph, the citation is meant for the entire paragraph. If it is instead placed inside a paragraph, it is meant only for the sentence in which it was written.

As the project is exploratory, it may be challenging to follow the structure of the project. Because of this, Figure 1.1 in Chapter 1 visualizes the project's structure. This figure is then reused at the beginning of each chapter, highlighting the sections relevant to that chapter and attempting to provide a linear reading experience to an otherwise non-linear project.

Kasper Bisbo
Kasper Bisbo

Kasper Kronborg
Kasper Kronborg

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Introduction



User Experience (UX) design utilizes many extensive methodologies, such as conducting various user studies and qualitative data analyses, all with the purpose of applying the derived feedback to inform better design decisions. Most UX-based tasks require extensive access to the user demographic, which, for both smaller and larger companies, can be a bottleneck in terms of accessibility and price. Therefore, companies are trying to increase the effectiveness of UX workflows by integrating more efficient tools and methodologies. The rapid development in AI allows UX designers to rethink their approach to some of these processes. More and more products appear that combine the two fields, aiming to improve or streamline the workflow effectiveness of the time-consuming field of UX.

This exploratory study investigates the potential benefits of integrating an AI persona, informed by a qualitative persona, into UX design workflows. In order to create an AI persona and exemplify its use, its knowledge base and instructions had to be created. As a case for the following processes, we created a case description and a wireframe of a meal-planning application designed for university students. We conducted a user study with 13 Danish university students to create a qualitative persona as an abstraction of their feedback. Through OpenAI's custom GPT functionality, we subsequently created two GPTs: one with instructions and the qualitative persona as its knowledge base and one without, resulting in the informed AI persona and its uninformed counterpart. Through a between-subjects user study with four UX professionals, in which they were unknowingly distributed one of the two AIs, we investigated the impacts of the AI personas on the efficiency, creativity, and decision-making of UX designers.

1.1 Project Motivation and Readers Guide

The motivation behind this exploratory study lies in the experiences gathered through our respective internships as UX designers. We both experienced substantial challenges accessing the targeted user group for iterative feedback and validating the products we were developing. During and following the internships, we had ongoing talks about how the issue could be solved, and with OpenAI releasing their customizable GPT models at the end of December, which was also the end of our internship, it all came together. What if we could use AI to create an instance of a user or even a wide range of synthetic users as stand-ins whenever the real users were unavailable for interviews or feedback sessions?

With this idea, the foundation for our exploratory research was established. Through early research into user personas, we found it interesting to see if we could integrate the user persona in an AI format, allowing the designer to communicate with the persona.

To guide the further development of our project, we decided to produce an overarching research question to guide the direction in this vast and opportunistic field of UX and AI:

What are the potential benefits of integrating an AI informed by a qualitative persona as a sparring partner in UX design workflow compared to an uninformed AI?

However, during the project, we found that this primary question had to be broken down into sub-questions to understand the potential better. Consequently, we created two additional sub-research questions to guide our research:

1. How does the integration of an AI informed by a qualitative persona influence the design workflows of UX designers in terms of efficiency, creativity, and decision-making?
2. What are the attitudes of UX designers towards integrating AI tools in their design workflows?

To answer all of these questions, we had to find a way to create an AI persona that could be integrated into a UX designer's workflow. As described earlier in this introduction, as the study is exploratory and thus has a very iterative approach to its methodology, this process includes several steps. To make it easier to follow throughout the report, we have broken it down into four primary components, visualized in Figure 1.1.



Figure 1.1. Overview of the primary stages of the exploratory study

Step one: We needed a case to showcase the functionality in practice. Solita is a collaborator in this project, so we asked them if they had any current or old projects we could use as our case, with the sole requirement of having an accessible and active user demographic. However, none were available, which supported our concept even further, so we decided to create our own case formulation.

In step two, we needed to craft a representation of the user group at which the case was aimed. We developed a qualitative persona based on 13 test participants within the intended demographic to use as the knowledge base for our AI persona.

The focus of step three was to develop the interactive AI persona, both informed and uninformed, for our final user study, where UX designers had to integrate it into their workflow. This persona was created using OpenAI's custom GPT model, allowing us to use a functioning, commonly used, well-known model with high-performance metrics.

Lastly, we conducted a between-subjects user study where two senior and two junior UX designers were asked to perform a design task for our case description in their usual work environment using the AI personas.

1.2 How ChatGPT is Utilized in This Project

Inspired by the capabilities of generative artificial intelligence, we utilized ChatGPT for several parts of this project and for many different tasks.

These tasks include:

- Generating ideas throughout the project
- Summarizing papers for a more efficient research approach
- Understanding various terms, ideas, and definitions
- Generating temporary written sections within this report for later rewriting, in order to push the project forward

In addition, ChatGPT is utilized as a foundation for this project, as one of the products of this project is a custom GPT. -*/

All use of ChatGPT and other generative AIs within the context of this project follows the guidelines presented by Aalborg University[1][2]. This includes an understanding of the necessity of double-checking information by the artificial intelligence, as the source of said information is not known by us, as well as an understanding of the chance that the AI is hallucinating, i.e. making up information and presenting it as if it is factual.

Background Research 2

The following chapter delves into relevant persona research, including the various approaches to personas and how personas are created. This research is accompanied by an interview with two UX professionals on their experiences with applying personas in practice. In addition, the chapter covers relevant research on AI and large language models, followed by a description of our efforts to stay up to date in the rapidly evolving field of AI. Finally, it presents how AI is currently used in UX design.

2.1 Personas

Created by Cooper et al.[3] in “The Inmates are Running the Asylum,” personas are defined as “hypothetical archetypes of actual users,” i.e., imaginary users with names, personal details, and goals, representing a certain type of user. These imaginary users are used to ensure proper design of products based on the goals, pain points, and needs of the personas and, thereby, the users. In Cooper et al.’s case, these personas are grounded in the real users through what they call the “investigation process,” in which they make efforts to try to understand the real users, for example, through interviews.[3]

While most of the research on personas cites Cooper et al.[3] for the original definition, they each present their own definition of the term. The most common view of personas is as “fictitious users”[4][5][6][7]. More specifically, in HCI research, persona definitions are all closely related to “a fictitious person representing an underlying customer or user group,”[5] “archetypal user groups with goals, needs, and fears,”[8] and “a fictitious character representing a homogeneous class of users.”[6]

Unlike the rest of the research found on the topic of personas in HCI, Salminen et al.[5] introduces the term “user segment,” defining these as “a non-personified representation of users,” whereas personas refer to the personified representation of users. Therefore, the distinction between the two terms appears in the personification of the fictitious representation of the users. Based on mentioning the two terms throughout the article, they appear to see personas as a subcategory of user segments[5].

Based on the varying definitions of personas presented in the above research, our definition of personas is as follows:

A persona is a fictitious presentation of either an existing or potential user or a homogeneous segment of users, personified through name, picture, goals, and other personal features such as goals, pain points, and motivations.

2.1.1 Varying Approaches to Personas

Further exploration of the definition of personas encompasses the many different perspectives on personas and the different types of personas covered in the literature.

One view is the differentiation between proto (or lightweight), qualitative-, and statistical personas presented by Nielsen Norman Group[9].

Proto personas are also mentioned by Nielsen 2019[4] as a type of fiction-based persona and encompass all of the features presented in the presentation of fiction-based personas.[10][11][12] Qualitative personas are grounded in qualitative research with the end users, ensuring that the pain points, motivations, and demographic data of the personas are faithful to those of actual end users.[13] However, they are based on qualitative studies with sample sizes of 5 to 30 users, resulting in a risk of bias in that they cannot be sure to present the traits and ideas of all of the users.[8][5][14] Unlike qualitative personas, statistical personas are created through extensive qualitative and quantitative research and data analysis, resulting in a complete and representative overview of end users, thus eliminating the risk of bias and incorrect prioritization of user groups. Statistical personas do, however, require a significantly larger amount of resources to create than qualitative personas and especially proto personas, limiting their practical use.[9]

Two other views are presented by Nielsen 2019[4]. Firstly, they present an overview of four different views on personas, mentioning the goal-directed perspective, the role-based perspective, the engaging perspective, and the fiction-based perspective.[4] In addition, and in contrast to proto-, qualitative-, and statistical personas, Nielsen mentions Automatic Persona Generation, another data-driven approach to personas, which refers to the creation of personas using only user analytics data for their creation[4]. Nielsen also present a method for creating personas for organizations through ten steps called the "Ten Steps to Personas." However, these views and methods are beyond the use of personas in this study and can thus be found in Appendix A 10.

Although each approach provides its benefits, such as the ability of proto personas to align the assumptions of a design team on their end users and the ability of statistical personas to create a representative overview of the end users, Nielsen Norman Group encourages the use of qualitative personas to understand end users, as they are described as a best-of-both-worlds approach to personas.[9]

Common to all approaches to personas is their long-term ability to provide an understanding of the users. If accompanied by name and picture, they can do so in a memorable way that fosters empathy from the designers and supports design thinking throughout the daily work processes while ensuring a shared vision of user needs.

In addition, if elaborated on through cognitive details and pain points, they can be directly utilized in the short term to map out system requirements or prioritize new features.

Finally, qualitative approaches to personas can ensure that design team assumptions are challenged rather than accepted as facts, yielding products that are less likely to include substantial cognitive friction in use.

2.1.2 How Many Personas are Needed?

Traditionally, the guideline has been to maintain at most ten personas, as the cognitive load of assimilating additional personas could potentially dilute their efficacy. In addition, introducing more personas into the mix risks overshadowing the nuanced details of each, thereby diminishing their intended impact. Moreover, it is a common practice to balance personas to reflect both ends of the spectrum of user demographics, often opting for an even number like two, four, or six to ensure a comprehensive representation.[4]

Furthermore, Nielsen also argues that the sufficient number of user personas depends on the unique differences of each project, be it in design, marketing, or user analysis. The nature and scope of a project are the deciding factors for the number of personas needed. In addition, a thorough examination of a project's demographic allows for categorizing personas into primary, secondary, and influencer groups. This classification aids in narrowing the scope to ensure that it resonates better with each user group, enhancing the persona's overall impact and effectiveness.[4]

2.1.3 Creating a Persona

In the context of persona creation, it is crucial to determine what variables to include in a persona. Cooper[15] drafted a set of crucial variables to include in personas in introducing the goal-directed design approach. These include a photo, a name to anchor identity, age, and a wide range of personal details like relationship status and family dynamics. He highlighted the significance of including work-related tools and conditions over mere job descriptions. Additionally, aspects such as computer literacy, personal vexations with technology, attitudes towards and motivations for engaging with tech products, alongside personal and professional aspirations, were deemed vital. Cooper deemed a name for a persona indispensable, arguing that without it, the persona's memorability drastically declines.[15] These variables set by Cooper have since served as a foundation for subsequent persona development methodologies.

In a 2015 literature review, Nielsen analyzed 12 persona templates, revealing a commonality in including demographic details across 11 templates, with personality and psychographics featured in eight and lifestyle and personal preferences in seven. Ten templates addressed technological pain points and user engagement with the subject matter, while only three considered ethnicity. The study also noted a disparity in the detail of these templates, ranging from barebones to exhaustive.[16] Drawing on Chatman's concept of rounded characters, Nielsen proposed three dimensions for persona crafting: Appearance, through visual or textual depiction; Social background, covering educational and cultural aspects; and Psyche, to delve into the personas' mental models[13].

Gothelf and Seiden's[10] assumption-based personas require integrating behavioral and demographic data, user needs, and potential resolutions to pain points. This resonates with NNGroup's criteria for well-crafted personas, which include demographic and personal specifics, attitudinal and cognitive insights, user goals, motivations, and behavioral patterns[13].

Another crucial element to consider in developing a persona is defining the persona's scope and goals. The literature presents diverse perspectives on the demands of creating

a persona, with estimates from Nielsen suggesting a cost range of \$80,000 to \$120,000 for a well-crafted persona[17]. Quick and easily accessible proto-personas contrast the more costly and time-intensive statistical personas. On the question of what the optimal scope of a persona is, NNGroup attributes a persona's effectiveness to its alignment with the intended scope and goals. They define two primary types: broad and narrow scopes. Broad-scope personas offer a general overview, which helps align marketing and communication strategies across broad demographics without necessarily providing detailed product feedback. They serve to inform high-level decision-making. In contrast, Narrow-scope personas delve into specifics, concentrating on particular products or features with detailed descriptions. These personas help validate and refine product features to enhance user experiences.[18]

2.1.4 Interview with UX Designers on Persona Usage

To understand how personas are used in company practice, we interviewed two UX designers from the Aalborg department of Solita in Denmark. Both had experience utilizing qualitative personas in their design processes, and one had utilized proto-personas previously in a single case. However, one of the UX designers had rarely found personas to be a helpful design tool, explaining that they find personas too specific to provide feedback representative of the feedback that a population of users would provide. This specificity is attributed to each persona's specific name, picture, demographic-, and personal information. However, the same UX designer also acknowledged that she might have been using personas on projects that were still too broad for the personas to be helpful.

In regards to the benefits of personas, they both agreed that personas are an efficient tool for communication, whether it is for informing communication strategies with stakeholders, aiding in developer hand-offs, or filling in new team additions to a project, such that they quickly understand what is being worked on and who the users are. In addition, they explained that personas can be an efficient tool for "create[ing] an emotional connection to the user" and, especially in larger teams, create a foundation for design decisions, which guides the project scope and is based on research.

In regards to the limitations of personas, one highlighted their usage in design cases that are handled by a single UX designer. In that case, the UX designer has to work on the project alone and would have to do the user interviews and create the personas alone, in which case personas, from their experience, is an unnecessary step, as the lone UX designer is already completely filled in on the user feedback.

When asked about which design processes they believe require the most sparring with users, they explained that continuously including the user throughout a product's development process is ideal. They elaborated that development processes compromise what the user needs and what the company wants to make and can afford. Including the user continuously throughout a development process ensures that the user gradually verifies the end product and thus avoids late surprises that necessitate significant changes beyond what can be afforded to be changed at that point. In addition, one of the UX designers explained that the most important information end users provide is scenarios.

We then asked them whether they could see themselves utilizing AI users to spar during their daily work processes. One explained that when working on new products, they could see the potential in early feature selection, whereas in redesigning existing products, the AI users must be able to provide scenario descriptions to benefit the design process. In addition, they could see the potential use case of a lone UX designer utilizing AI users to substantiate minor decisions that are not typically brought to the end users.

Finally, they summarized that they see the worth of personas as a communication-, prioritization-, and sparring tool. In using AI, the interest is particularly tied to sparring in scenarios where there is neither time nor money for user testing with real end users.

2.2 The State of Generative AI

Generative AI is an umbrella term for AI models that generate text, audio, imagery, and other forms of content. The term also encompasses large language models (LLM), a generative AI model trained on extensive data sets to process and generate human text. The training procedure encompasses several steps to enhance model performance, including pre-training on vast datasets and fine-tuning processes. The exact steps in the fine-tuning process vary but are commonly validated through reinforcement learning from human feedback (RLHF) and supervised fine-tuning [19][20][21].

There are several ways of approaching the development of an LLM. One way is the widely recognized Generative Pre-trained Transformer (GPT) model from OpenAI, an LLM model family developed in several iterations from GPT1 to GPT-4o. These models are built on the transformer architecture created by Vaswani et al. in 2017 [21]; this architecture allowed for more efficient handling of sequential data through the implementation of their self-attention mechanism that allows for the model to understand the context of the words within a sentence [22].

The first iterations of generative models from companies such as OpenAI and Google contained a noteworthy amount of information, such as the parameters, datasets, and training methods. However, as the market has become increasingly more competitive, companies such as OpenAI withhold these types of information, making it harder to understand how and what they are built on [21].

2.2.1 Accessing the Rapidly Developing Generative AI Space

Generative AI is characterized by its fast-paced advancements, and staying up to date with them has been crucial during this project. We have closely followed industry leaders such as GrokAI, Google, Meta, OpenAI, and Anthropic. Our engagement further extends to monitoring AI-focused news outlets and social channels. During the time frame for this project, all of the abovementioned companies have released one or more significant updates within generative AI. Google went from transforming Bard into Gemini 1.0 [23], followed by Gemini 1.5 [24], which has ongoing updates to its performance [25] and has recently presented its project Astra, an interactive multimodal AI assistant [26]. Similarly, OpenAI released multiple new updates, marking its territory as one of the market leaders, with custom GPTs in November 2023, GPT4 in March 2024, and GPT 4o on May 13th, 2024 [27][28][29]. Furthermore, OpenAI presented a demo of its text-to-video model Sora,

similar to Google's model Veo; both have yet to be released to the masses[30][31]. Within the same period, Anthropic launched Claude[32], and Meta Launched its open-source model Llama3[33]. This snapshot of recent advancements exemplifies that the space is developing rapidly, with each model release outperforming previous models on different performance metrics.

When measuring the performance of the models, several metrics are considered, such as reasoning, math, and coding capabilities. Most of the aforementioned models have comparable scores across all these metrics[25][28][32][34]. However, as this project is concerned with human interaction in the form of design feedback and supported by accurate reasoning, the primary metric of interest is reasoning, commonly measured with HellaSwag and DROP. HellaSwag is used to measure the model's effectiveness in predicting the most likely continuations of sentences and thereby evaluating the ability of common sense reasoning[35]. DROP evaluates a model's reading comprehension, a crucial step for accurate reasoning[36].

2.3 The Interplay Between UX and AI

Several studies have looked into how to integrate AI into the UX processes. A literature review by Stige et al.[37] aimed at understanding how AI is used in UX design processes showed that 66% of the reviewed papers were concerned with fully or partially generating designs. In contrast, none were concerned with identifying system requirements and specifications.[37] Additionally, others are looking at innovative approaches to create personas using AI. Some researchers are exploring using Automatic Persona Generation(APG), a data-driven approach to personas in which data is scraped from various social media platforms to craft user personas. [38][39] Meanwhile, others are trying to optimize the hand-crafted persona by co-creating it with chatGPT 3.5[40]. Furthermore, not only are personas being researched, but also the quality of the output of synthetic users. Hämäläinen et al.[41] found that their synthetic data created by GPT 3 could *"yield believable accounts of HCI experiences"*. The GPT3 model is, through fine-tuning, capable of producing answers that can even represent the interplay between ideas, attitudes, and socio-cultural contexts[42].

Several companies are also starting to emerge that integrate AI into the UX process. Here, we see larger companies like Maze[43], which uses AI to correctly phrase interview questions without bias, create follow-up questions based on the test users' text responses, and provide AI services to analyze the data from user interviews.[43] Another such company is Notably.ai[44], which simplifies analyzing qualitative data by automatically transcribing video interviews and uses AI to aid in coding and creating themes for the data.[44]

Many smaller companies are creating persona generators, which create superficial personas based on a brief description.[45][46][47] However, interactive personas are also coming to light with sites such as Opinio.ai[48], an interactive user persona website, from which we interviewed one of the founders who stated that their most significant limitation currently is multimodality.

Case Development 3

As the research states, crafting personas is a very case-dependent process. We needed a concise case before determining the variables to develop our qualitative persona. The case chosen in this project is an arbitrary case developed to have an easily accessible demographic and a low barrier of entry to understand the product while still being complex enough to allow for different needs and requirements within the demographic. This chapter outlines the process from the conceptual development of the case to the final prototype used for the data-gathering procedure for the qualitative persona. For its position in the overarching development structure of the project, see Figure 3.1.



Figure 3.1. Overview of the development process

3.1 Case Development Approach

One of the overarching goals of this exploratory research is understanding the effect of an informed artificial intelligence system within user experience UX workflow. We want to illustrate the practical application of our custom GPT model. As Solita had no active cases with an available demographic, we deemed it necessary to create our case to test the custom GPT model in a practical setting.

The primary goal of the case is to lay the foundation for the final user study with UX professionals and to provide the data for the qualitative persona. We decided to work with university students as they are an easy-to-reach demographic that still allows for a wide diversity. This approach meant we defined the demographic before creating the case description to ensure we could gather a sufficient sample size for the qualitative persona, which should be between 5 and 30 users.[9]

3.2 Introducing the Case

Through a brainstorming process, several potential case ideas were formed, with the common goal of targeting the demographic of Danish university students. During this process, we had to consider scalability, complexity, and accessibility and what could be created within our project scope. We opted to go with a meal-planning mobile application, which we will refer to as *Balanced Bites* going forward. *Balanced Bites* is a meal-planning

application explicitly designed for university students seeking easy, affordable, healthy meal options amid their busy schedules. The app streamlines meal planning by creating automated meal plans that utilize local offers to present affordable recipes, respecting the target users' limited funds. In addition, the app offers a wide variety of nutritious recipes suited for various dietary preferences.

The Balanced Bites case was chosen for its broad feature potential and straightforward foundational concept, which allowed for an initial design that is easy for the demographic to understand. The app's core features are automated meal planning, grocery lists, and recipes with nutritional information. Although the app is universally applicable, this case solely concerns university students as the primary target group. This focus helps shape the concept while maintaining access to a diverse participant pool for the qualitative persona. Focusing on this demographic also directs potential app features and guides the app's aesthetic design.

3.3 Creating the Persona Template & the proto-persona

As seen in Section 2.1.3, differing opinions exist on what data should be included in a persona. That being said, we found a set of overarching variable categories used in most personas: behavioral information, e.g., how the persona acts; personal information, e.g., picture and name; and demographic information, e.g., age, study. Furthermore, the sub-variables within these top-level categories were still very diffuse and, once again, underlined that the variables are case-dependent.

To ensure that we create a well-constructed persona, we will follow the definition of NNgroup and use their guidelines[13]. As a result, the template will include, *Image, Name, Age, Biological sex, Relationship status, Personality, Personal values, Income, Interests, Study, Occupation, Pain points, Motivation, Frustrations, Personal vexations with tech.* By including all the variables above, we ensure a thorough mix of demographic, personal, and behavioral details and the motivations, goals, and attitudes, resulting in a robust persona template.

We created a proto-persona based on our experience, assumptions, and intuitions regarding the previously described demographic and potential application users. The proto-persona will be a guideline when developing a prototype for the case. A visual representation of the proto persona, with a reduced amount of pain points, motivations, and frustrations, can be seen in Figure 3.2. For the complete proto persona, see the uploaded "Appendix G - Proto Persona (Emma).pdf". By creating a proto-persona, we also tested the comprehensiveness of the data requirements within our persona template for the qualitative persona.

3.4 Developing the Initial Prototype for BalancedBites

After forming the case description, a list of potential functionalities was developed based on assumptions extracted from the proto-persona as well as drawing inspiration from existing applications within this field, such as eTilbudsavis[49], REMA 1000s online shopping site[50], HelloFresh[51], and OurGroceries[52]. The list of features serves as a reference

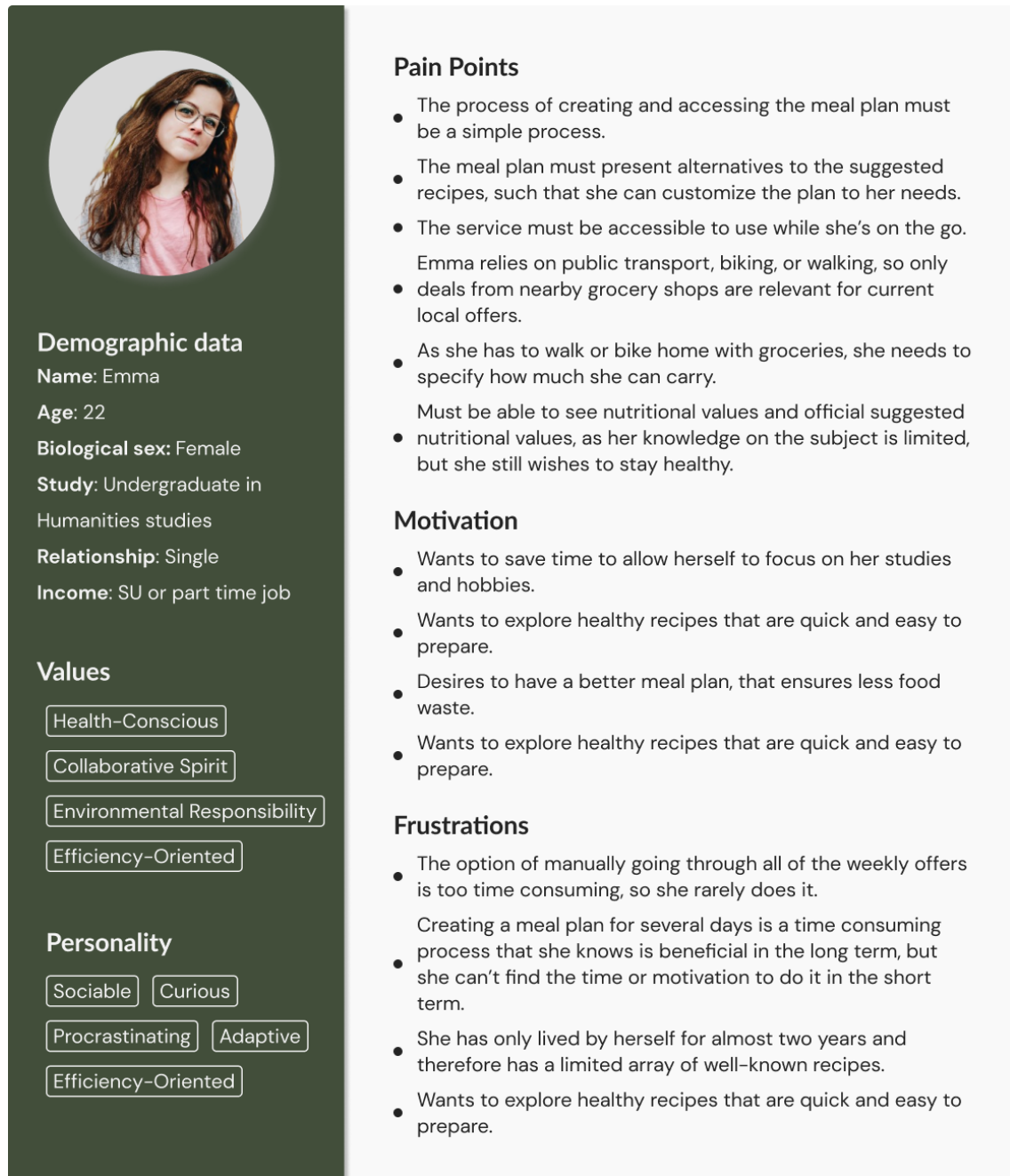


Figure 3.2. Visualization of a shortened version of the proto persona

point to what the app could become, as it will be limited to a prototype version containing the minimum requirements for the case prototype.

To create the feature list for the prototype, we initiated two individual five-minute brainstorming sessions, the sole focus of which was outlining as many different functionalities for the application as possible. This brainstorming session was conducted using FigJam, where our ideas could be written onto sticky notes for easy post-brainstorm management. The features had to be prioritized based on their importance to the user to narrow the list down further to help ensure we implemented the most relevant features. The prioritization was done using the Moscow model to rank all the features from most essential to least, leading to five must-haves, four should-haves, and six could-haves (see Appendix B 11 for the entire MoSCoW segmentation). The five must-haves were:

1. Automated meal planning with adjustable preferences
2. Grocery divided by shops and aisles
3. Video or text-based recipes with nutritional information
4. A calendar overview of the scheduled meals
5. A profile page which enables the user to have a set of predefined variables and preferences.

After specifying the prototype's functionality, we had to define aesthetic and design guidelines for the prototype. This choice was made by creating a moodboard: a collection of various reference images to give direction to designs, inspire ideas, and achieve a unified style (see Figure 11.1). We selected a color palette and typography based on the common conception of the moodboard.

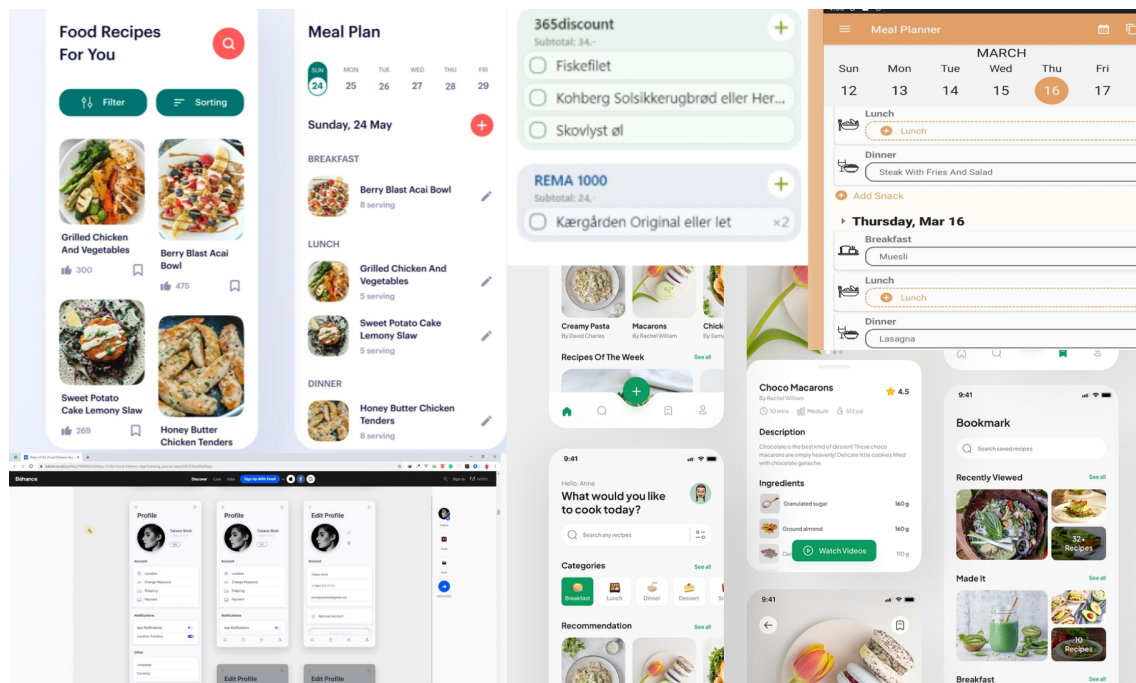


Figure 3.3. The moodboard created for a unified understanding of style and idea generation

We designed the first feature in collaboration and split the remaining features between us to design with the guidelines in mind. Once we had finalized a feature, we conducted a

review session and iterated over the design; this was done twice for each feature. After we had designed all the features, we extensively reviewed the application to ensure it followed the design guidelines and had the intended functionality. The final designs can be seen in Figure 3.4.

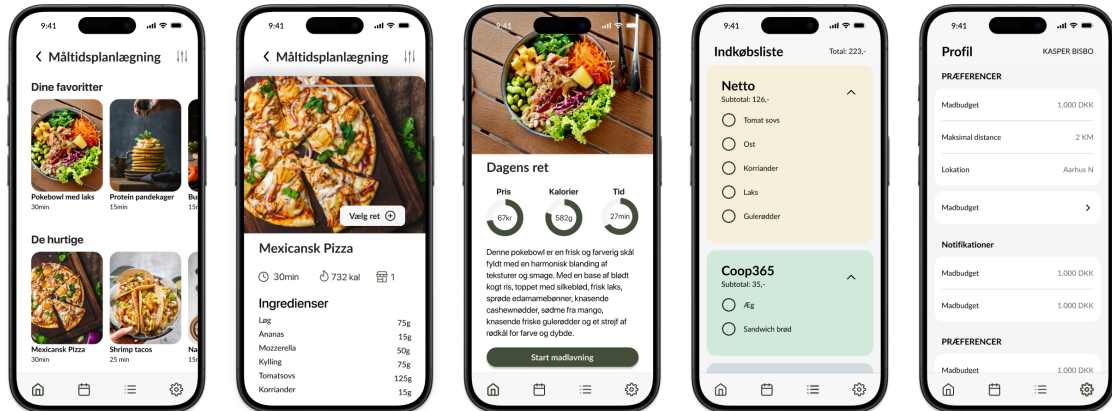


Figure 3.4. The five main pages of the finalized prototype

The case prototype was developed before the qualitative persona data collection, as it was primarily used as a scaffolding element to explain the concept in the data-gathering procedure.

Qualitative Persona Development 4

This chapter presents the data gathering for the qualitative persona. It does so by covering the test procedure, followed by a presentation of the test participants. The chapter concludes with a description of the user study's findings and the resulting qualitative persona. For its position in the overarching development structure of the project, see Figure 4.1.



Figure 4.1. Overview of the development process

4.1 Gathering the Data for the Qualitative Persona

With the demographic description, case description, proto-persona, and Figma prototype created, this chapter describes the design and conduct of a user study with Danish university students to create the qualitative persona that will act as the primary knowledge base of our custom GPT.

4.1.1 Procedure

The procedure required two test conductors. The first instructed the test participant and conducted the semi-structured interview. Meanwhile, the second took notes during the procedure and occasionally supplemented them with clarifying questions. First, the test participant was provided with a consent form documenting the motivation behind the project and specifying all of the data to be gathered in the study, a request for consent to voice-record the procedure, documentation of the data controller, and the rights of the test participant. After signing the consent form, they were immediately provided with the questionnaire. Following the questionnaire, we presented our case to the test participant, elaborating through a presentation of the Figma prototype of BalancedBites. Finally, the semi-structured interview was conducted, after which the test was completed. The interview was voice-recorded in its entirety.

A pilot test was conducted with two test participants. The pilot tests provided no significant findings. Other than correcting a couple of spelling mistakes in the questionnaire, the pilot test provided us with an approximate test duration of approximately 30 minutes for the entire procedure.

4.1.2 Questionnaire Contents

A self-defined questionnaire was created in SurveyXact[53] for preliminary data collection of demographic, personal, and behavioral details about the test participants. This data consisted of the test participant's age, biological sex, study, approximate income, occupants in the household, interests, personality traits, and values. In the same questionnaire, three questions regarding the test participant's cooking habits were asked, including how much time they spend cooking and grocery shopping per week and how many times a week they prepare food. Interests were included in the questionnaire through a text field for writing up to five interests, as they add a layer of complexity to the persona, which may explain other tendencies while adding depth to the behavioral details of the persona. For example, if a substantial number of participants enjoy time-consuming hobbies, then less time will likely be available for the daily preparation of meals. In addition, we decided to include personality traits and values in the questionnaire. We defined equal parts positive and negative options for the test participants to select to secure more realistically complex and varied responses than open-text fields or interview questions would have provided. Based on the available options, we requested participants select the five personality traits and three values they believed best described themselves. The options for personality traits included traits such as structured, thrifty, lazy, and open-minded, while the options for values included environmental sustainability, financial security, efficiency, and productivity. See Appendix C 12 for the complete questionnaire and list of available options.

4.1.3 Interview Contents

The remaining data, consisting of pain points, motivations, and needs, was obtained through a semi-structured interview to gather qualitative data to compare with the quantitative findings from the questionnaire. The interview consisted of 19 predefined questions on cooking proficiency, attention to nutritional values, meal planning strategies, attention to food discounts, and opinions on existing meal planning solutions and recipe resources, both digital and analogue.

4.1.4 Participants

In total, 13 test participants completed the test procedure: six men and seven women, all students at Aalborg University. Ages ranged from 21 to 31, with a mean age of approximately 24 and a median age of 23. Seven participants studied architecture and design: two undergraduates and five graduates. The remaining six participants studied medialogy, two of whom were undergraduates, while four were graduates. Most participants had an income of 5.001 to 7.500 DKK, as they relied on SU and no additional sources of income. Seven of the participants live alone, while four participants are two residents in their household, and two participants are three residents in their household.

Of the interests noted by the participants, 10 noted some physical activity, while six noted gaming, and five noted a creative interest such as knitting or drawing. The five most selected personality traits of the participants were open-minded (8), responsible (7), thrifty (6), flexible (6), and efficient (6). The three most selected values of the participants were honesty and transparency (6), leisure and relaxation (6), and financial security (5).

The participants cooked dinner three to four times a week on average, spending an average of five hours a week cooking and two to three hours a week grocery shopping.

4.1.5 Findings from Data Gathering for the Qualitative Persona

With the quantitative findings compiled, the qualitative data had to be analyzed. Note-taking during the interviews was done in FigJam using Post-it notes for each question to simplify the later data analysis. This approach meant that a thematic analysis[54][55] could be performed by analyzing the notes for themes and patterns and segmenting them into groups based on their relevance to each other.

With the sorting completed, summarizations of the participants' opinions on each of the themes (for example, "Nutrition," "Economic limitations," and "Planning") could be made. These findings include a willingness to experiment with ingredients in cooking, limited funds to do grocery shopping, a need for fast recipes for the students' busy days, and a want for automation in grocery shopping.

Based on these summarizations, pain points, motivations, and needs related to each theme could be derived, resulting in 19 pain points, five motivations, and 11 needs.

One of the interview questions asked participants to rank the effect of price, simplicity, and nutrition on recipe selection. The ranking of these three factors can be seen in Table 4.1.

	Price	Simplicity	Nutrition
1st	8	4	1
2nd	4	7	2
3rd	1	1	11

Table 4.1. Participant ranking of recipe-selection factors from most important to least important

While the participants rank price as the most important factor when choosing what recipe to make, and the thematic analysis supports this claim, most participants highlighted that simplicity and nutrition still do play a role, although a smaller one, in their decision-making.

4.2 The Qualitative Persona

A single qualitative persona, Sarah, was created based on the tendencies, pain points, motivations, and needs found through the data analysis. Sarah is a 22-year-old woman and is a design student at Aalborg University. She lives alone, relies on SU, and has no other sources of income. She is interested in staying physically active and enjoys playing video games on the computer and working on creative hobby projects, such as drawing. She can be described as open-minded, responsible, thrifty, flexible, and efficient. She values honesty and transparency, leisure and relaxation, and financial security. She cooks dinner three to four times a week and spends an average of five hours per week doing so. In addition, she spends two to three hours a week grocery shopping.

In addition to this description, Sarah has a series of pain points, motivations, and needs regarding meal planning, grocery shopping, and cooking. These consist of a revised array of the pain points, motivations, and needs found through the user study's data analysis, totaling 12 pain points, five motivations, and 13 needs. A visual representation of the qualitative persona, with a reduced amount of pain points, motivations, and needs, can be seen in Figure 4.2. For the complete qualitative persona, see the uploaded "Appendix H - Kvalitativ Persona (Sarah).pdf."

Thus, the qualitative persona, an abstraction of the user study findings, will serve as the knowledge base of the custom GPT, acting as the informed AI persona.

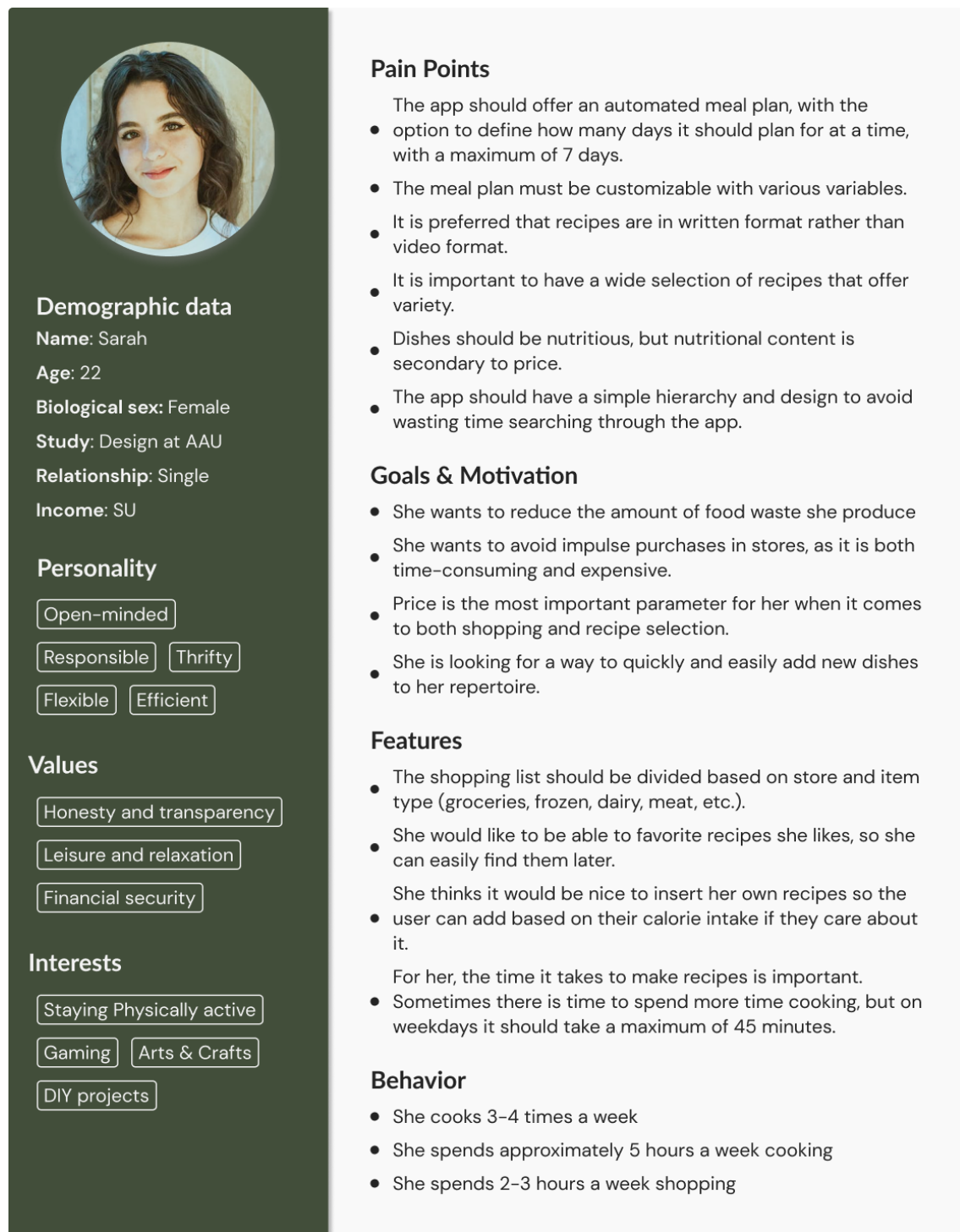


Figure 4.2. Visualization of a shortened version of the qualitative persona

AI Persona Development 5

The following chapter covers the development of the AI persona, from the first iteration of our Custom GPT and its instructions to the final instructions of the second and final iteration. In addition, it covers the procedure and findings of an internal pilot test of the AI Persona, which acts as a springboard into the final user study of the project. For the chapter's position in the overarching development structure of the project, see Figure 5.1.



Figure 5.1. Overview of the development process

5.1 Developing the AI Personas

We had to determine what model to use to initiate our development process. Our selection was informed by our research from Section 2.2 and our desire to make the system easily accessible. We developed the system using OpenAI's custom GPT feature[56]. By doing so, we could use a pre-existing, well-performing model and fine-tune it to our needs. When creating the custom GPT, the list of customizable metrics consisted of name, description, instructions, conversation starters, uploaded documentation, and toggleable options for internet access, DALL-E integration, and a code interpreter.

For the test in our user study, we would need two variations of a custom GPT: an informed and an uninformed version. The two models had to follow the same framework, requiring both to be custom GPTs, but they had to have different knowledge bases (see Figure X). Both models had a similar name and enabled web browsing and DALL-E integration. However, the code interpreter was disabled, as it was disabled by default and was beside the intended purpose of the AI persona.

5.1.1 First Iteration of the Informed Model

We initiated the process using the "Create" tab in the custom GPT builder to develop the initial instructions by prompting the model's intended functionality. In doing so, we could quickly generate a baseline for what instructions should contain and gather an understanding of how chatGPT words the instructions. In this process, we also named the informed chatGPT "Sarah the Interactive Persona," or as we will refer to in this paper, "Sarah." Creating the baseline instructions was an iterative process, where the instructions slowly became more accurate as they were tested in the "Preview" tab. However, returning

to the "Create" tab, we found that the model overwrote the existing instructions due to an apparent built-in cap to the length of its instructions. Furthermore, we found that the chat log of the "Create" tab had to be manually saved, unlike interactions with the default GPT, which meant that the documentation of the development process had been lost. As a result of these two findings, we scrapped the first version of the model and used it as a learning experience to develop our final version. This first iteration used 20 prompts through the "Create" tab, accompanied by manual fine-tuning.

5.1.2 Second Iteration of the Informed Model

We repeated the same process as in the first iteration. However, we started by removing the aforementioned cap to the length of the custom GPT's instructions by prompting it to expand its instruction limit. Furthermore, we documented each input prompt, the text response, the corresponding update in the instructions from the "Create" tab, and the manual fine-tuning, which can be found in Appendix D 13.

During the instructions' development, the persona documentation had to be integrated into the model to ensure that the model correctly utilized the qualitative persona data. We uploaded our persona to the custom GPT in PDF format. To ensure that the GPT correctly interpreted the data in this format, we prompted the GPT to output the entire uploaded documentation from one end to the other, which it did. The final set of instructions for the custom GPT are:

Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented. This GPT consistently responds as if it is the persona, even when using its default knowledge base. It also actively seeks clarifications on prompts to provide the most accurate and relevant responses. It responds in a casual tone and in the first person point of view as expected of a test participant in a user study.

Due to our experience from the first iteration, we generated the instructions for the custom GPT using nine prompts accompanied by manual fine-tuning. We also performed frequent evaluations to test the quality and validity of the model. These evaluations are covered in the next section.

5.1.3 Steps Taken to Validate the AI Persona

The responses and reasoning of the custom GPT were frequently tested to see if the updates applied to its instructions had the desired effect. This was done to validate the responses and, thereby, the instructions of the AI persona. The validation was done by

providing the informed model with prompts directly related to the updated instructions; after each change in instructions, it was prompted three times to ensure that the output was consistent. Furthermore, we frequently tested the informed AI against the output of the default ChatGPT. For example, to test its reasoning when asked questions that the database does not cover, we asked it and the default chatGPT three times each *"What are your thoughts on the Olympic swimmers having to swim in the Seine river in Paris in 2024? And who's your favorite participating athlete?"*. The responses of the custom GPT and the default chatGPT were very similar, as both stated that the event would be visually striking due to the surroundings, that they were concerned about pollution issues of the river, and that neither had a favorite participating athlete. However, the default GPT finished its response analytically by presenting the names of participating favorites and their previous achievements. At the same time, the informed GPT stayed much more subjective, stating that it supports underdogs and interesting stories and admires the dedication and discipline shown by athletes at that level.

To understand this response, we asked the informed GPT *"Why do you root for the underdogs? What is it about your persona that leads you to that preference?"*. To answer this question, the model drew from the biographic data and values of its knowledge base, explaining that Sarah's limited funds and her need to be resourceful and creative with what she has resonated most with an interest in the underdogs of the contest, as *"It's inspiring to see someone overcome challenges and succeed against the odds."*

5.2 Internal Pilot Test of the Informed AI Persona

In addition to validating the custom GPT's responses and reasoning when confronted with topics beyond the contents of its knowledge base, we pilot-tested it as a sparring partner in a design process, i.e., its intended purpose. This pilot test was done to test its ability to respond to topically appropriate prompts of varying complexity over longer chat sessions.

For example, we asked *"Hi Sarah. My goal is to design a grocery list integration for a meal-planning application. You are an abstraction of my users, and your opinion is therefore important regarding what features this integration needs to have and how it should look. Please talk a bit about what a grocery list integration would need for you to be happy with it."*, by which it provided a list of features that would make the grocery list ideal for it, reasoning based on the contents of the qualitative persona. Following this, we provided a screenshot from our Figma prototype and asked *"Based on your thoughts, I created this mock-up. What do you think about it?"*; see Figure 5.2. This prompt led to a list of four praises and suggestions for improvements, with reasoning based on the contents of the qualitative persona, which was in line with its instructions to provide both positive and negative feedback.

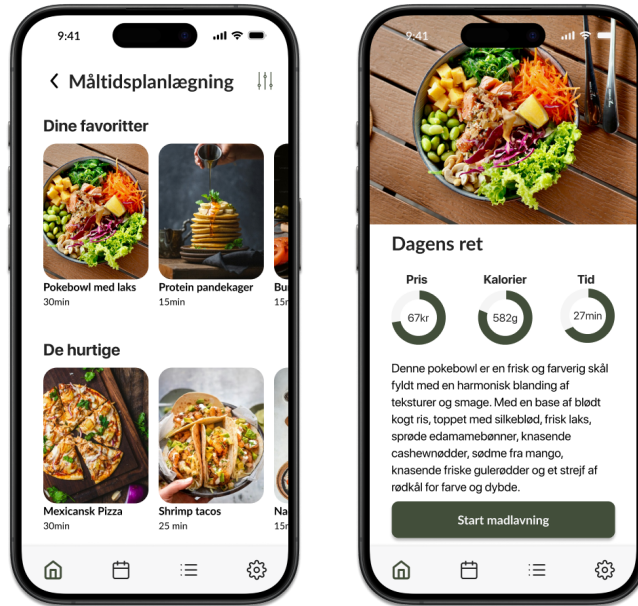


Figure 5.2. The screenshots of the BalancedBites prototype sent to the informed AI

To test its ability to handle critique of its suggestions and to present less conceptual and more precise solutions, we asked it, based on one of its previously suggested points of improvement, *"I'm afraid the interface will be cluttered if I sort by both store AND category. How would you go about fixing this?"*. It responded with another list of potential but more specific improvements. To understand the reasoning behind these, based on the qualitative persona, we asked *"How did you come up with these solutions, based on the information within the uploaded knowledge base of your persona?"*, by which it responded with an extensive elaboration on each suggestion, based directly and reasonably on the elements of the qualitative persona (see Appendix E 14 for documentation on this reasoning).

5.2.1 Final Iteration of the Informed AI Persona

After the model's internal and external pilot testing, minor changes were made to the instructions. These ensured shorter and more human-like answers and avoided the long bullet point lists by adding *When responding in a list format, this GPT provides only very brief elaborations.* to the instructions. Thus, the final instructions for the informed AI are as follows:

Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented. This GPT consistently

responds as if it is the persona, even when using its default knowledge base. It also actively seeks clarifications on prompts to provide the most accurate and relevant responses. It responds in a casual tone and in the first person point of view as expected of a test participant in a user study. When responding in a list format, this GPT provides only very brief elaborations. The GPT always asks the user if the response was sufficient.

5.3 Developing the Uninformed AI Persona

To create an uninformed AI persona, we used the same version of chatGPT as we did for our informed AI persona but named it "Louise the Interactive Persona" and provided it with no instructions. In addition, it contained all the default settings of a custom GPT. By doing so, we created a model that is a visual equivalent to our informed AI but lacks the knowledge of the informed AI, such that it can be used as a comparative element in our user study.

This chapter explains the methodology used for the between-subjects expert user study comparing an informed and uninformed version of custom GPTs. It covers the structure of the user study, the interview guide, the participant recruitment process, a pilot test and its findings, and the final conduct of the expert study. For this chapter's position in the overarching development structure of the project, see Figure 6.1



Figure 6.1. Overview of the development process

6.1 Motivations Behind the Expert User Study

The goal of this user study with UX professionals was to apply the creations of this project, from the development of the case to the qualitative persona, and now the informed AI persona, in order to explore the primary research question and its two sub-research questions:

What are the potential benefits of integrating an AI informed by a qualitative persona as a sparring partner in UX design workflow compared to an uninformed AI?

- 1. How does the integration of an AI informed by a qualitative persona influence the design workflows of UX designers in terms of efficiency, creativity, and decision-making?*
- 2. What are the attitudes of UX designers towards integrating AI tools in their design workflows?*

6.2 The Structure of the User Study

The test procedure of our between-subjects user study consisted of several steps, which is illustrated in Figure 6.2



Figure 6.2. A simplified overview of the expert user test structure

First, participants were introduced to the overall structure of the interview and its purpose, followed by a semi-structured interview to gather information regarding their UX design experience, Figma skills, and Generative AI proficiency. The interview consisted of eight questions, which can be found in Appendix F 15.1.1.

After the interview, the test's design phase began with a thorough introduction to the case and task description. To ensure the users' understanding, they were asked to explain the case and task to the test conductors after the briefing. The participants had 60 minutes to design a grocery list that fit the case described in Section 3.2. In the design session, they were provided with a written case description (see Appendix F 15.1.2) and task description (see Appendix F 15.1.3), design guide, example screenshots, and a small component library used in the creation of the example screenshots, all presented in Figma next to the frame on which they had to complete the task; see Figure 6.3.

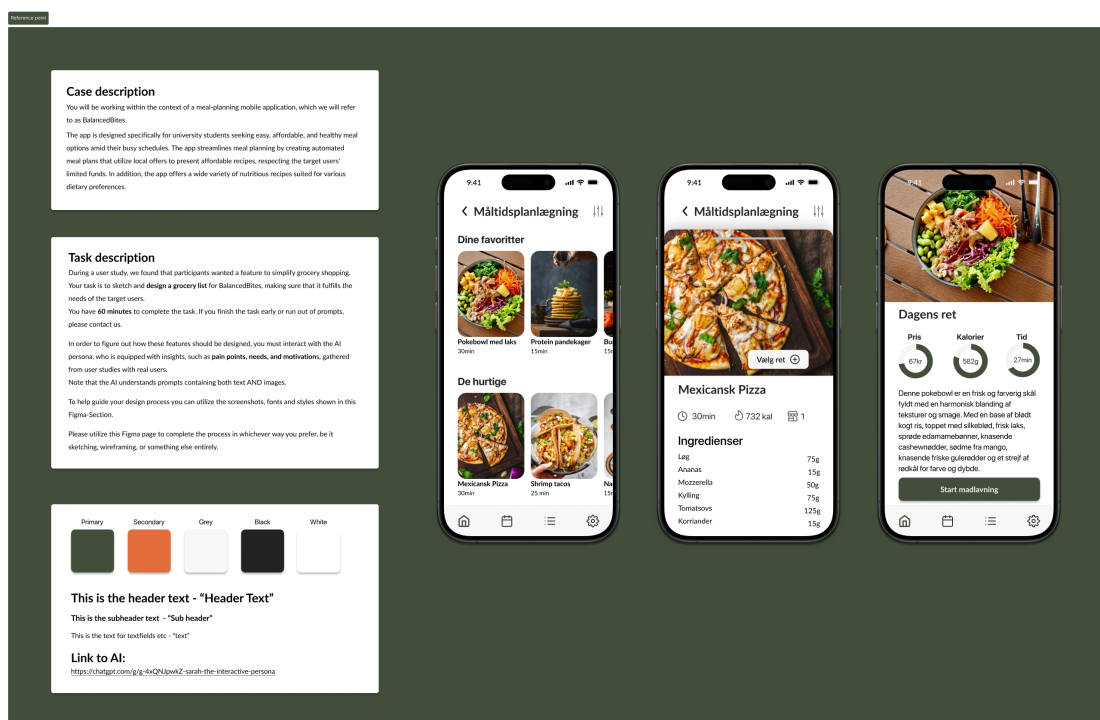


Figure 6.3. The elements provided to the test participants to support the design session

Lastly, they were either provided with the informed AI or uninformed AI; this was their data foundation for designing the grocery list. They were explicitly told to interact with the AI to inform the design. Once the design phase was completed, another semi-structured interview was conducted. The primary goal of this interview was to gain insights into their experiences of interacting with the AI. This interview consisted of six questions, which can be found in Appendix F 15.1.4.

A few days after the interview, we conducted a follow-up interview based on data from the chatlogs, such as prompt count and images sent, as well as a thematic analysis[54][55] of the chatlogs and the analysis of the interview. Again, we conducted a semi-structured interview to provide nuanced feedback regarding their experience. The interview consisted of ten questions divided into four sections, with questions one and two depending on the

chatlogs of the participants. These can be found in Appendix F 15.1.5.

The follow-up interview concluded the user study with the UX designers.

6.3 Recruiting the UX Designers

Four professional UX designers from our collaborative partner Solita participated in our user study. The participants were selected to include a mix of experience levels, including two junior and two senior UX designers. Their professional backgrounds ensure they possess the necessary expertise to offer valid insights. The participants were recruited using internal communication channels within the firm. Three participants were Danish, two from the Aalborg and one from the Glostrup departments. The fourth participant was from the Finnish department, which required us to conduct the test online.

The four participants will be referred to as P1, P2, P3, and P4, respectively. Their corresponding UX experience and the AI they have each been allocated for the user study can be seen in Table 6.1.

	Participant 1	Participant 2	Participant 3	Participant 4
Abbreviation	P1	P2	P3	P4
UX experience	Senior	Junior	Senior	Junior
Allocated AI	Informed AI	Uninformed AI	Uninformed AI	Informed AI

Table 6.1. The allocation of AIs to the four participants

6.4 Pilot Testing the Expert Study

The pilot test was conducted with one participant to identify and address any flaws in the expert user study. The follow-up interview with the pilot-test participant mentioned a mismatch between the number of tasks and the time provided, suggesting that the time frame or complexity needed revision. Furthermore, a remark was made about the length of the answers provided by the custom GPT, resulting in the participant skimming through the responses instead of thoroughly reading them. Additionally, we discussed the accuracy of the questions within the preliminary questionnaire. Lastly, the case and task descriptions needed to be more precise and thus needed revision to enhance clarity and simplicity.

Based on these findings, we maintained the one-hour test period. However, we implemented a new approach to ensure the participants understood the case and task description better before starting the 60 minutes allocated to the design task. Firstly, we went through the case and task description presented in Figma with the participant and then had the participant explain the task to us to confirm their understanding. Furthermore, we simplified the design task by reducing the design requirement from two features to one, choosing the grocery list as the only feature to be designed. To combat the time issue further, we fine-tuned the GPT model by adding the following part to its instructions: *"When responding in a list format, this GPT provides only very brief elaborations. The GPT always asks the user if the response was sufficient."* This change followed the same validation procedure as used in 5.1.3.

Another finding from the pilot test was that the questionnaire about the preliminary data, such as Figma skills and UX design experience, had a wide range of flaws that made its validity questionable. To combat this, we changed the questionnaire to a semi-structured interview to ensure that the participants could provide sufficient details on the different levels of their proficiency.

6.5 Conducting the Expert Study

The offices of the Solita department in Aalborg served as the location for the expert study. The pre- and post-workshop interviews and the case and task explanation took place in a meeting room in Aalborg, with the participant from Glostrup traveling to the location. The design tasks were conducted at the participant's workstation to simulate their usual work conditions as much as possible. The participants received instructions to message the test conductors via Microsoft Teams if they experienced any system issues or had questions regarding the test. No requests for aid or issues occurred during the four tests. As mentioned earlier, we conducted one test via Microsoft Teams, as the participant was located in Finland; this process followed the exact same procedure as the other three, except for the interviews being conducted through Microsoft Teams.

The following chapter explains the findings and data analysis of the user study described in the previous chapter. It covers the AI and Figma experience of the four UX designers, followed by reviews of their mock-ups resulting from the user study. In addition, it covers the findings from the post-test interview, the UX designers' chatlogs with the AIs, and follow-up interviews. Finally, it concludes with a summary of the chapter's findings.

7.1 Findings from the Preliminary Interview

The study consists of four UX designers, two seniors and two juniors from Solita. The junior designers had two and three years of experience working as UX designers, compared to the ten and twelve years of the senior designers. All participants rated themselves as intermediate users of Figma with one to four years of experience and stated that they were proficient and confident in designing mock-ups using Figma.

All four UX designers were familiar with generative AI tools, particularly ChatGPT from OpenAI. ChatGPT was used by all participants weekly, with three of them incorporating it into their daily work. Three participants used image generation tools such as Midjourney, Adobe Firefly, and DALL-E, but less frequently. The generative AI tools, including ChatGPT, were employed by the UX designers for a variety of tasks, such as idea generation, text generation and correction, and data analysis. However, the primary use of ChatGPT, as reported by all participants, was for writing documentation.

7.2 Reviewing the Design Mock-ups

Each of the participants completed the task of designing a grocery shopping list. They designed their mock-ups in Figma, using the resources described in Section 6.2. In this section, each of their final designs will be presented, and the analysis of their designs will be based on how well they followed the design guides and task description, as well as the number of frames they created.

Test participant 1: P1 created three frames: one frame displaying the grocery list and two frames displaying a search function in two different states when searching for items to add to the grocery list; see Figure 12.1. P1 only reused the tab bar, header styling, and primary color; otherwise, everything else is her work, which does not resemble the reference work. Furthermore, P1 used the Figma board to write a list of feature requirements based on her findings from the interaction with the informed AI.

Test participant 2: P1 only designed a single frame, displaying the grocery list overview; see Figure 12.1. P2 stayed within the task description and used only fonts and colors presented in the design guide. Some components from the component library were used (Dish Label, toggle button, tab bar, list elements). Nevertheless, the overall design differs from the reference work.

Test participant 3: P3 stayed within the task description and only created the grocery list within a single frame. Furthermore, all design guidelines were followed to a tee, and it was almost a one-to-one resemblance of the reference work; see Figure 12.1. P3 also used the Figma board to note MVP/Must-haves and a feature list; this was copied directly from the AI interaction.

Test participant 4: P4 used an iterative design process based on feedback on their mock-ups during the interaction with the AI. As a result, P4 created ten frames. During this process, P4 deviated from the task description, designing mock-ups for a settings page, meal plan overview, and meal selection frame. P4 used the presented fonts, colors, and multiple components from the component library (Buttons, Dish Label). P4 made slight differences in existing reference work but followed the overarching style; see Figure 7.2.

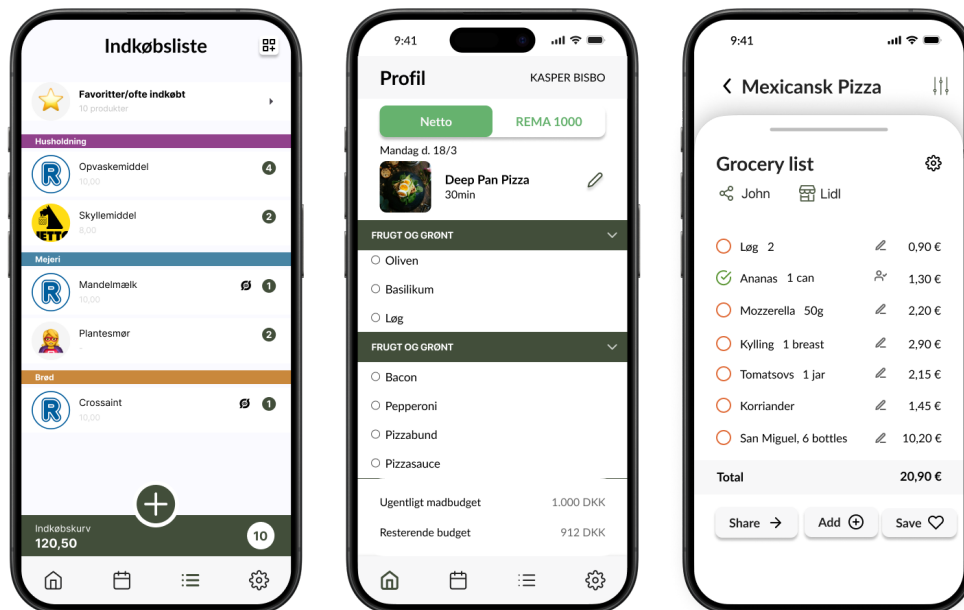


Figure 7.1. The final design of the design task from participants P1, P2, P3 from left to right

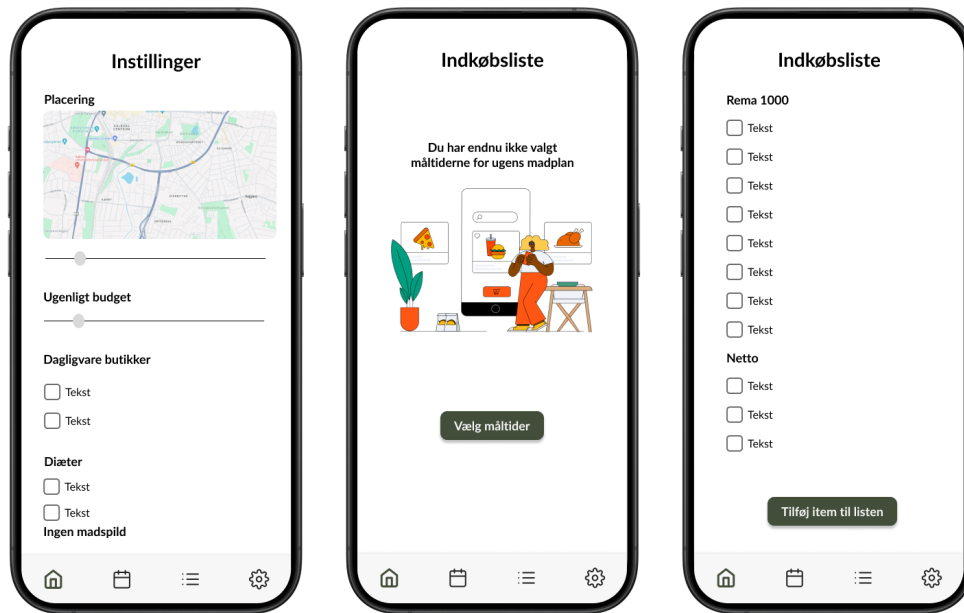


Figure 7.2. The final design of the design task from P4

All participants created the intended grocery list; the participants with the informed AI deviated from the task description to some degree, whereas those with the uninformed AI strictly followed it, producing a single frame each. Additionally, both senior UX designers noted key findings from the interaction with the AI in Figma to optimize their workflow.

7.3 Data Analysis of the Post-test Interview

A thematic analysis was performed to analyze the data from the post-test interview. The thematic analysis was performed on extensive field notes taken by one of the test conductors during the interviews.[57] The thematic analysis followed the six-step procedure of Braun and Clarke[54] as described by Blandford et al.[55]. The coding was data-driven, meaning that the codes were created based on the read-throughs of the data rather than being defined prior to reading.[55] The following two subsections cover the findings from the post-test interviews, separated into those who interacted with the informed AI persona and those who interacted with the uninformed AI persona, and further separated into the different themes created during the thematic analysis of the notes taken during the interviews, see Figure 7.3.

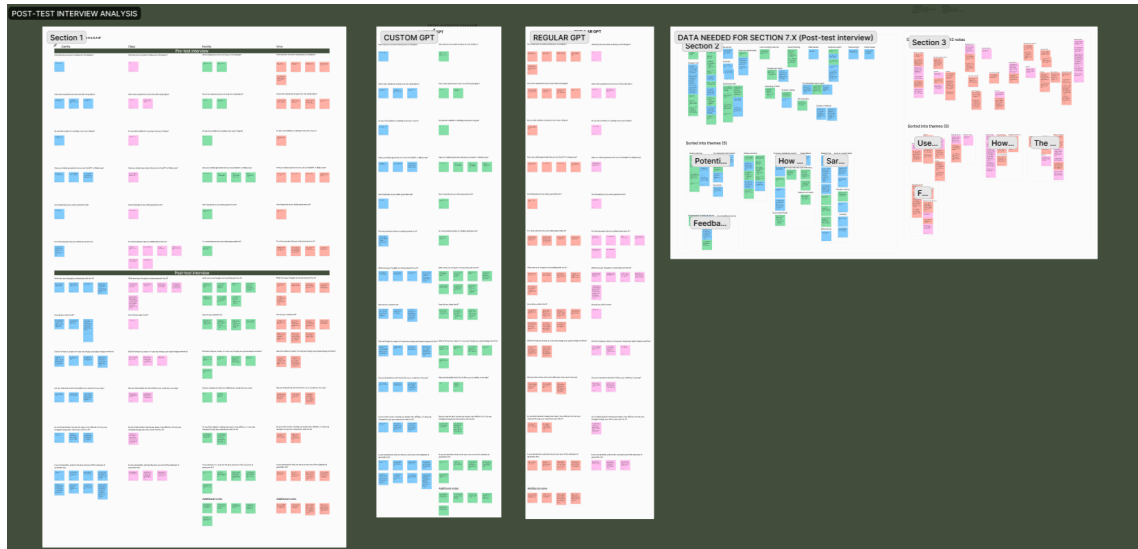


Figure 7.3. A general overview of how interview notes were coded and assigned to specific themes

7.3.1 Post-test Feedback from Interactions with the Informed AI Persona

The data from the post-test interview with P1 and P4, who interacted with the informed AI persona, consists of 53 notes, coded with 19 codes, and sorted under five themes. The themes cover:

- The UX designers' approach to interacting with the AI
- The AI's ability to respond to prompts
- The effects of the AI persona on UX designers' workflows
- The perceived potential of the informed AI
- Feedback on the test procedure

The UX designers' approach to interacting with the AI

Both P1 and P4 initiated the grocery list design process by conducting a small preliminary interview with the AI persona to determine the user group's needs. Following this, the two participants' strategies deviated from one another. P1 expressed they found value in utilizing the AI for brainstorming and determining must-have functionalities and then designing based on this research. Meanwhile, P4 began designing based on the aforementioned interview with the AI persona, instead utilizing it to review and validate the resulting mock-ups over five iterations.

The AI's ability to respond to prompts

Both participants found the informed AI to respond well and reason well to what was prompted. P4 stated that they only found one deviation from this claim: the informed AI was prompted with an image it did not understand. P1 found the informed AI to be more specific in its responses than the regular ChatGPT, requiring fewer prompts to reach sufficient responses, and attributed this to the specificity of the task and the data on which the AI is based. They noted the most glaring flaw of the AI responses in the casual questions that finished each of its responses, which frustrated both test participants. For

example, when prompted about its meal planning habits, it ends its response by asking about the meal planning habits of the test participant.

The effects of the AI persona on UX designers' workflow

The two test participants voiced a substantial benefit in the AI's ability to assist the designers in avoiding bias by lessening their reliance on intuition and instead focusing on the actual needs of the user group for mapping and designing features. For example, P4 constructed a conception of how they expected the mock-up to look and what it should contain based on the presentation of the case description and task description during the test procedure. However, the AI challenged these expectations, as the needs of the user group deviated from what P4 had anticipated, bringing the focus of the design back to the users' needs. This observation also meant that the two test participants found the AI beneficial in prioritizing functionalities and helping them make decisions.

The perceived potential of the informed AI

On the theme of the potential of informing an AI with a qualitative persona, both participants saw potential in the informed AI and its future use. This view is because they found value in its ability to provide immediate persona-based feedback on mock-ups, resulting in expedited design iterations, so long as the upfront cost to inform the AI was reasonable. However, both were concerned about the specificity of the feedback given by the AI, as they felt like they were directly designing for "Sarah" rather than the specified user group. They attributed this concern to needing more transparency in terms of what the informed AI is based on and how personal the dialogue with the AI became, although P1 feared a reduction in the personality of the AI should this transparency be established.

7.3.2 Post-test Feedback from Interactions with the Uninformed AI Persona

The data from the post-test interview with P2 and P3, who interacted with the uninformed AI persona, consists of 42 notes, coded with 18 codes, and sorted under five themes. The themes cover:

- Prompting and interactions with the AI
- The AI's ability to respond to prompts
- Use cases of the AI persona and its effects on workflow
- The perceived potential of the AI persona
- Feedback on the test procedure

Prompting and interactions with the AI

P2 and P3 solely interacted with the AI through textual input and primarily utilized the AI for background research on the needs and preferences of the specified user group, idea generation, and determining must-have functionalities.

The AI's ability to respond to prompts

While ultimately being satisfied with their final mock-up results, both participants mentioned concerns regarding the reasoning of the AI, as its lack of reasoning meant that they either had to prompt the AI for reasoning or trust it at face value. In addition, they found it difficult to obtain case-specific information through the AI and highlighted a need for iteratively working on their prompting strategies during the test to get the responses they sought. Supporting this, they both mentioned that the AI felt much less personal in its responses than they had initially expected based on the case and task description.

Use cases of the AI persona and its effects on workflow

Despite these concerns, they were both positive, as they saw the AI as a sparring partner that could assist them if they got stuck. In addition, they both agreed that the AI did make the design process faster than it otherwise would have been, while P3 found the AI's ability to assist with idea generation to make them more creative. That being said, both participants found this idea generation assistance almost overwhelming, as the massive stream of ideas presented by the AI had to be sorted and prioritized, making it harder to make decisions.

The perceived potential of the AI persona

P3 saw AI as a positive tool for designers, clarifying that they do not find it likely that AI can replace actual user studies but still believe that more efficient and holistic designs can be achieved by using AI. In contrast, P1 was more skeptical, stating that they only saw value in utilizing AI for elevating work, not completing tasks. Supporting this, they mentioned that their primary use of the AI consists of creating a starting point with the AI and then doing the rest themselves.

7.3.3 Reviewing the Test Procedure with the Four UX Designers

During the post-test interview, we asked the UX designers to reflect on the test procedure they had just experienced to see if they would have done anything differently or had any notes or considerations for us. The only comments we received were regarding the time frame of the design part of the test, with comments such as *"By having limited time, it enables me to just **act** and not overthink the process."*(P3), and *"I could easily have used more time, but I didn't have the time anyway"*(p4). Additional comments were about the time constraint in the form of frustration over not finalizing their designs. All participants found the test design sufficient to portray the use of AI in a realistic design session.

7.4 Reviewing the AI Persona Chatlogs

The chatlog for each participant was examined and analyzed through a thematic analysis taking a similar approach to the analysis described in Section 7.3. First, we coded the chat logs individually using the data-driven approach and then agreed on a shared list of codes used to code the data. When developing the list of shared codes, it was immediately apparent that the data from the uninformed AI persona was very similar in its output and

resembled the regular GPT. Therefore, it was decided to focus on analyzing the output of the informed model. Here, we used the following codes:

- Information drawn from persona data
- Assumption based on persona data
- Answer out of scope, based on persona data
- Hallucination

"Information drawn from the persona data" refers to data directly derived from the uploaded knowledge base of the AI persona. "Assumptions based on persona data" refer to data not directly written in the uploaded knowledge base but rather a well-informed assumption containing reasoning from the knowledge base. "Answer out of scope, based on persona data" refers to answers that are still based on ideas of the persona but are not within the scope of the question it was prompted. "Hallucinations" in this context are answers not based on the uploaded knowledge base but reasoning found from the regular 4.0 GPT model.

Looking at the coding from P1, we can see that only two of the 28 answers were fully hallucinations; these were responses to a particularly personal prompt, *"Are there some items you always buy?"* and a follow-up question, *"What about everyday items like bread, oatmeal, and milk?"*. Additionally, 12 answers were coded with some degree of hallucinations ranging from single sentences to half or more of the response (three occurrences). However, most of the hallucinations do not stem from outlandish GPT assumptions; instead, we can see that similar answers have been provided in the qualitative persona interview but were excluded due to the low overlap in these opinions. Furthermore, most of the chat log from P1 is coded as either "Information drawn from persona data" or "Assumption based on persona data," with only three sentences being answers coded as "Answer out of scope, based on persona data." The coding of the chat logs for P4 only underlines three sentences marked as "Hallucinations" and none coded as "Answer out of scope, based on persona data." All the answers are predominantly coded as "Information drawn from persona data," with only six sentences or smaller blocks of text coded as "Assumptions based on persona data."

	P1	P2	P3	P4
Amount of prompts	28	4	11	11
Average prompt length in words	12	16	10	8
Image inputs	1	0	0	4
Command or Dialog?	Dialog	Command	Command & Dialog	Dialog

Table 7.1. Metrics of the chatlogs of the participants

Each participant's interaction with the AI persona was unique, as seen in Table 7.1. P1 had the most prompts, with 28; P3 and P4 had 11; and P2 had just four. The average prompt length varied from three to 60 words, with an average of 12 words. Except for P1, all participants asked one question per prompt, while P1 sent three prompts containing two questions each. Except for P3, all participants asked between two and three clarifying questions during their conversation with the AI, some for clarifying variables and others for adding depth to responses. Additionally, P1 and P4, who interacted with the informed

AI persona, used image input, unlike P2 and P3, who interacted with the uninformed AI persona. P1 used one image input and asked three questions about this image, while P4 uploaded a new image for each question about the UI. Both participants who interacted with the informed AI persona had a dialogue-like conversation with the AI, with prompts such as: *"So you don't want an image of the product?"(P4)*, *"How do you plan your weekly meals in your household?"(P1)* and *"But it requires some knowledge and creativity to use what you already have, doesn't it?"(P1)*. In contrast, the participants with the uninformed AI started by trying to have a dialog with prompts like *"Can you tell me a bit about yourself?"(P3)* and *"How often do you shop for groceries?"(P2)* which led to generalized answers, resulting in both switching to more general prompting, with prompts such as *"What are the greatest pain-points users have with meal planning apps and specifically grocery lists?"(P3)* and *"What are the most important features to have in a meal planning shopping list?"(P2)*. However, P3 alternated between prompting approaches throughout their interactions with the AI persona, with some being directed at the AI and some being generalized.

7.5 Data Analysis of the Follow-up Interview

Similarly to the analysis of the data of the post-test interview, a thematic analysis was performed on the data from the follow-up interview using the approach described in Section 7.3. In addition to this approach, the findings are supported by quotes directly from the interviews, taken from the recordings of the interviews.

7.5.1 Follow-up Feedback from Interactions with the Informed AI Persona

The data from the follow-up interview with P1 and P4, who interacted with the informed AI persona, consists of 68 notes, coded with 21 codes, and sorted under five themes. The themes cover:

- Then and now approaches to prompting the AI persona
- How the AI persona responds
- The AI persona's ability to imitate a real user
- Future work and use of the AI persona
- Concerns, flaws, and limitations of the AI persona

Then and now approaches to prompting the AI persona

Upon reflection on their approach to interacting with the AI and potential changes to this strategy in hindsight, P4 stated that they would have done the same, initiating a small interview with the AI persona to derive user needs, followed by iteratively presenting Figma mock-ups and refining them based on feedback from the AI, as they found this approach faster than formulating extensive textual prompts. The only change that P4 suggested in their strategy was that they would *"... try to dig into what data [the AI] is based on, to find out if there is any bias."*, in order to verify its validity. In contrast, P1 stuck entirely to textual prompts, as they had not considered the possibility of sending image prompts and would, in hindsight, have chosen a similar approach to P4 when designing for

a demographic that is well known to them. However, P1 also noted that they did see benefit in their initial approach of primarily using the AI for brainstorming and researching user needs if the demographic is less known to them, explaining that *"If [the target user] had been some random plumber who was going to change a toilet, I would probably have asked more questions upfront to find out what the need is, so I think I would have approached it differently."*

How the AI persona responds

Generally, both participants found the AI responses contextually relevant, useful, and surprisingly detailed, with elaborate explanations. Both mentioned that the AI persona's tone of voice generally resembled that of a real user, the only exception being how structured its responses were. That being said, they preferred its responses to stay that way, P4 elaborating that *"The chatbot was also good at structuring its responses, so it was quick to get an overview of, 'Okay, you think these three points are interesting to you.' With a user, I don't necessarily think you could get the same insights by asking a single question."*(P4). However, they were both negatively surprised by the amount of "polite" questions it asked the participants back at the end of its prompts, P4 stating that *"I don't need it to ask what I think; it doesn't need to be polite in that way."* and *"It asked a lot about what I thought, where I was thinking, 'that's not what this is about, stop'".* However, P1 found some value in the questions, stating that *"I think it's fine sometimes because it creates a bit of a ping-pong effect in some way, but I don't feel like sitting and answering them."*

The AI persona's ability to imitate a real user

Regarding the AI persona responses, P1 explained that they found the AI good at imitating a real person as it always has an opinion when presented with a question, similar to a real person, which they find helpful when needing to obtain case-specific information on a question quickly. In addition, P4 explained that *"I don't know if I want to sympathize with it because it's an AI, but I felt like I could trust it, and discard some of my assumptions because 'it was the one that was going to use the app, not me.'"*, later highlighting that they do, however, emphasize more with the "Sarah" than a typical chatbot.

Future work and use of the AI persona

Both participants were positive towards the tool, P1 explaining that *"It's a total win, because we don't have time to go out and talk to 100 people for each project, and it can provide something that the general GPT can't because there are [real] people behind it."* However, while they found the AI to resemble a user well in its responses, they both wish it would have had more personality unrelated to the case, through, for example, information about its family, pets, and similar details. Regarding future use, they both agreed that they could see themselves utilizing it again in some projects in the future, P1 highlighting that *"I could see myself creating a qualitative persona and uploading it to your GPT because I feel it adds value. It might not make sense for all projects since there is a big difference between projects."* However, P1 also clarified that *"I think it's really exciting, and it's really cool. The important thing, if I'm going to input personas, is that there needs to be some kind of template for what I should include so that I get the benefits I need from it."*

That would be essential for it to be used." In addition, P4 highlighted a preference for skipping the persona creation altogether and simply supplying the AI with the raw data from the user study that would form the qualitative persona.

Concerns, flaws, and limitations of the AI persona

While both participants again raised concerns about the data transparency of the AI and its knowledge base, they both agreed that if, in practice, they had to upload the knowledge base to the AI in order for it to be informed in a given context, then this concern would cease. However, they both then highlighted concerns about how real the dialogue with the AI would feel if they had this knowledge and how this may negatively impact their experience of interacting with the AI.

7.5.2 Follow-up Feedback from Interactions with the Uninformed AI Persona

The data from the follow-up interview with P2 and P3, who interacted with the uninformed AI persona, consists of 59 notes, coded with 18 codes, and sorted under six themes. The themes cover:

- Expectations
- How the AI responds
- Prompting strategies of the UX designers
- AI response quality and wording
- AI data transparency
- Future work

Expectations

P2 explained that their expectations had not been met, as *"[the responses] I received were very general, and it was difficult to specify what I needed because I didn't get the answers I expected"*. In addition, upon revealing to P2 and P3 that they had interacted with the uninformed AI persona rather than the informed AI persona, P3 explained that *"that also explains my bumps in the road in the beginning, since I was like, okay, you are not 'a persona' you are more like an AI"*.

How the AI responds

Regarding prompting strategies, both P2 and P3 initially thought it was a mistake in their prompting strategy that the AI persona provided them with generalized responses rather than case-specific responses. This belief meant that they also revised their strategies during the test, as P3 explained that *"in the beginning I had this feeling like that I was sort of actually talking to an actual person, but the first replies were like 'oh okay, I am talking to an AI' because it didn't go into that sort of like personal level, that I maybe was first expecting based on the introduction to this."* In hindsight, P3 would have sent the AI images to do a co-design phase with the AI to understand the user needs and actively review their application in the designs. In contrast, when asked if P2 would change their approach if they had more time, they stated, *"I actually think I would have searched for more specific requirements, rather than getting feedback on what I've made."*

Prompting strategies of the UX designers

P3 would prefer if their interactions with the AI were more personal and perhaps even contained casual small talk, stating that *"The persona sets the mood for the discussion, and I really would like that, because when I interact with users ... I always like to be more casual"* and again highlighted that their approach to prompting changed when they realized that the AI responded more as an AI than a real person. However, both participants agreed that the AI generally stayed within the context and responded well to their prompts, even if its responses were more generalized than expected. However, for P3, this did not hamper the usefulness of the AI, as they believe that it is their job as a designer to differentiate between what is relevant and what is not.

AI response quality and wording

In the context of P3 being informed that they had interacted with the uninformed AI persona all along, they mentioned that they believe that *"Even though the AI persona represents a larger group of people, I think if you are transparent with it [...] the persona could still have a quite specific [personality]."* . Meanwhile, prior to this reveal, they had hoped for much more personality of the AI, stating that *"I would have hoped that she would have had some sort of like backstory, or more of that sort of personality or the life build around her ... she would say 'I am 38 years old, and I live in Aarhus in Denmark, and I do this, and I have one daughter,' you know, to have that type of background as well."* and that the AI should respond with *"Less lists, that is something that [you] definitely wouldn't expect from a user"*.

AI data transparency

As a note on the benefits of utilizing AI within UX workflows, P2 explained that it can enhance how designers think, as it helps the designer think outside the box. Meanwhile, P3 saw benefits in its ability to assist designers with seeing other perspectives.

Future work

In terms of utilizing the informed version of the AI, both participants agreed that it had potential, P3 elaborating that *"It would be really interesting to have this, for those cases where you are not able to, for a number reasons, to do an interview with an actual user, to have this AI to talk to the persona."* . While P2 was more skeptical, believing that artificial intelligence currently is not ready to challenge the designs of UX designers, both participants found themselves inspired to utilize AI in new ways in their workflows and encouraged future work on the project.

7.6 Summary of Findings

The participants who interacted with the informed AI deviated from the task description, producing multiple frames and even for pages other than the grocery list. In contrast, those who interacted with the uninformed AI strictly followed the task description, producing a single frame for the grocery list each.

The informed AI responded well to what was prompted and required fewer prompts than the uninformed version to reach satisfactory responses. One of the primary issues with the informed AI was that it also asked unwanted casual conversational questions, leading to frustrations. However, the participants found value in informed AI's ability to provide immediate persona-based feedback, which increased the efficiency of their workflow in terms of idea generation and decision-making. Additionally, the participants who interacted with the informed AI persona raised concerns about "Sarah's" ability to reflect the opinions of a group of people rather than those of a single person due to how personal the interactions with the AI became. This concern prompted a demand for data transparency from the participants. Still, they suggested that "Sarah's" personality was extended further through additional details.

The uninformed AI persona responded broadly and less specifically than the informed AI persona, lacking the depth and understanding of the specified user group. Instead, it provided more holistic views but required additional prompting to gain a deeper knowledge of the user group. This requirement contradicted the participants' preconceived thoughts of how their interactions with the AI should go. The participants expressed that the lack of personality of the uninformed AI persona negatively affected how they approached the AI, resulting in fewer interactions and less dependence on the AI. However, even though they found the idea generation of the uninformed AI persona overwhelming, they were positive towards the uninformed AI persona as a sparring partner, which still aided them in achieving a more efficient design process.

All participants made it clear that the AI with which they had interacted had stayed on topic and provided relevant suggestions to what they had prompted, suggesting that both the informed and the uninformed AI persona had been able to provide relevant information about the user group in question.

Multiple participants expressed a positive notion towards integrating the informed AI persona into their workflows, as they saw it as a great alternative when the user demographic is unavailable. In addition, they theorized that the informed AI persona could help them better understand user groups unknown to them or obtain quick and iterative design feedback on designs for user groups better known to them. However, they highlighted that AI cannot replace users and that user integration will always be a crucial step of UX design. Even with the price of the informed AI persona being the prior creation of a qualitative persona, the test participants saw potential in its use. However, they highlighted that a template for the uploaded persona would be necessary for future use of the informed AI persona. In the follow-up interview, the participants presented changes and additional thoughts on how they would use the AI persona to integrate it into their workflow, compared to how they had employed it during the test.

Discussion 8

As stated in Section 1.1, when we started this project, we created an initial question to guide the project. The overarching question to inform our direction was: *What are the potential benefits of integrating an AI informed by a qualitative persona as a sparring partner in UX design workflow compared to an uninformed AI?*

In order to answer this question, it was broken up into the following two sub-research questions:

1. *How does the integration of an AI informed by a qualitative persona influence the design workflows of UX designers in terms of efficiency, creativity, and decision-making?*
2. *What are the attitudes of UX designers towards integrating AI tools in their design workflows?*

This chapter draws on the information presented and findings gathered throughout this exploratory research to discuss these sub-research questions and, thereby, the primary research question that guided the direction of this project.

8.1 Efficiency of the AIs

The participants used varying approaches to interacting with their allocated AI persona. While the participants who interacted with the uninformed AI stuck to the task description, the participants who interacted with the informed AI did not. The two participants who employed the informed AI persona quickly received the answers they sought. In contrast, those who employed the uninformed AI persona had to send more prompts to receive the answers they sought, as they found it difficult to obtain case-specific information. This finding suggests that the informed AI persona was more effective at providing case-specific information, resulting in an expedited design process. In support of this, the senior designer with the informed AI persona expressed that they felt they could have created the entire design based on the AI's responses to the first one or two prompts because of the level of detail presented in the output. The biggest frustration with the informed AI was its tendency to ask unwanted casual conversational questions as the final line of its responses. This problem is likely caused by either of the two lines *"It also actively seeks clarifications on prompts to provide the most accurate and relevant response."* or *"The GPT always asks the user if the response was sufficient."* in its instructions. These instructions were initially selected to make the AI write shorter responses while prompting the user to request elaboration if needed to avoid being overwhelmed by the length of the AI responses.

Consequently, the uninformed AI needs more extensive prompting, leading to a more cumbersome process than the more accurate data presented by the informed AI persona. However, as the informed AI persona is relatively rigid with its opinions and limited in the scope of its answers due to its more limited primary knowledge base, it provides less nuanced answers, even though they more accurately represent the opinions of the demographic.

8.2 Effects on Creativity

In the context of creativity and idea generation, both AIs supplied the user experience designers with contextually relevant information and suggestions. However, while the informed AI persona provided more precise and case-specific responses, both AI personas proved valuable for idea generation, even if the number of suggestions provided by the uninformed AI persona tended to be overwhelming. To elaborate, the senior designer who interacted with the uninformed AI persona explained that they found the abundance of suggestions helpful in expanding their thinking. In contrast, the less experienced junior designer found it confusing as it lacked direction. This junior designer ended up discarding the AI persona after just four prompts, likely due to the task's time constraints and the confusion of responses from the AI. Following this, they prioritized finalizing their designs rather than communicating further with the AI.

Notably, this might also reflect the differences in professional experience as a UX designer, as the senior UX designer might have more efficient research and data-gathering techniques, and they also stated that they see sorting of information for what is relevant and what is not as a task for the designer.

Finally, one participant found that the informed AI persona challenged their ideas, forcing them to rethink whether these ideas aligned with the user group's needs, changing their idea of the most important features to implement in their design and encouraging their creativity.

8.3 Effects on Decision-making

Regarding decision-making, the participants highlighted that interacting with the informed AI persona during the design process enabled them to continuously assess whether their designs aligned with the requirements of the specified users through ongoing dialogue with the AI persona. This method also meant that the designers did not have to rely on their perception of user feedback and provided them with the ability to actively seek out elaboration, additional feedback, or a deeper understanding of the requirements of the user group, reducing bias from their side and making it possible for them to approach projects from alternative perspectives. In support of this, unlike the three participants who mainly used the AI persona to obtain preliminary knowledge of the user group, the junior UX designer who interacted with the informed AI persona chose a more iterative process. They only briefly prompted the AI for user needs and then started working on their designs in Figma. They then iteratively presented these mock-ups for immediate design feedback from the informed AI persona. Doing so enabled the participant to continuously integrate the AI persona's feedback into the design process, which proved to help them focus on

whom the product was being developed. The approach adopted by this participant also reflects the desired user-centric approach most UX designers aim for but is often limited due to restricted access to the user group.

Interest in this approach was also expressed during the post-test interview with the senior UX designer who interacted with the informed AI. The participant felt that this approach would have been a more effective way to integrate the informed AI persona into their workflow. It was intriguing to see that after spending only an hour with the tool, the UX designers could present ideas on how to incorporate the AI persona better into their workflow.

8.4 The Informed AI Persona as an Abstraction of Users

Concerns were raised about "Sarah's" ability to reflect the opinions of a group of people rather than those of a single person, as the participants suggested that the AI appears so personal that its credibility as an abstraction of multiple users diminishes. The participants believed that the solution to this issue was data transparency on its uploaded knowledge base regarding what the data contains and from where it was drawn. In support of this claim, all participants stated that data transparency is necessary for them to trust the feedback provided by the AI persona and the data upon which it draws. A way to approach this issue could be to have a description of the demographic and the knowledge base of the persona displayed when first accessing the AI persona or if prompted about the origin of its data. In order to integrate such a feature into the informed AI persona, a change would need to be made to the qualitative persona template to include a section about the origin of its user data. This approach to improving data transparency should make it more trustworthy in design processes.

However, as discussed with both participants who interacted with the informed AI, there is also a concern about losing some of the persona's resemblance to a real user, as providing data transparency would make it further spelled out that the persona is an abstraction rather than a real user. While the designers naturally must stay critical during their interactions with the AI persona, a greater understanding of the persona's data may negatively impact how engaged the designers feel when interacting with the AI. That being said, while this may compromise the empathy it fosters towards the users, it is also worth noting that memorability is an important reason for providing a qualitative persona with name, picture, and personality, as described in Section 2.1.1. Therefore, as long as the designers provide the AI with fictitious demographic data, employ it in their workflows, and make sure to consider the requirements presented by the AI in their design processes, then, as also stated by some of the participants, personality can be reduced in favor for data transparency without concerns that the AI appears impersonal. While this is interesting in terms of providing personality to AIs regardless of their application and context, it is nevertheless worth noting that the intended use-case of the informed AI persona is for the designers to upload a qualitative persona of their users, meaning that, in this case, the designers will have full knowledge of the basis on which the AI is informed. With this in mind, the test participants highlighted a need for a template for the qualitative persona to be supplied so they can easily see what to include for the best possible informed AI persona. However, should the qualitative persona be created by only some of the designers

on a team or a set of different designers altogether, the previously mentioned solutions to explaining the data origin of the AI persona should secure its credibility.

Despite discussing the balance between data transparency and personality, multiple participants suggested an extension of the persona, suggesting that additional contextually irrelevant information, such as family and potential pets, was added to further improve the realism of "Sarah."

8.5 User Experience Designers' Attitudes Towards AI

The participants' attitude toward integrating the informed AI persona and similar AI tools into their UX workflows was positive. In support of this, the participants expressed that they believe AI tools are part of a user experience designer's toolbox and are meant to enhance existing processes rather than replace them.

The participants clearly stated that they do not believe users can be entirely replaced. However, one of the primary goals for conducting this research, as described in Section 1.1, was to aid the designer when the target demographic is unavailable during the design process for logistical reasons, budgeting reasons, or otherwise. We anticipate that using tools like the informed AI persona can reduce the need to interact with the user during some stages of the design process. In addition, it may enhance the stages that necessitate user inclusion, such as milestone review sessions and final evaluations. As the users' opinions have been actively voiced and considered in dialogue with the AI leading up to these stages, the ideas and concepts presented to the users during these stages may be better informed than otherwise. This potential may also relieve some of the necessity for the availability of user demographics.

The informed AI persona being created in such a narrow time frame while still allowing the UX designers to feel like they have a tool that benefits their workflow truly speaks to the potential of developing AI tools for optimizing UX workflows. The potential of an informed AI persona and similar AI tools is vast. With a customizable knowledge base, the user experience designer can tailor it to their specific user group, ensuring that context-specific responses are received, whether utilized by themselves or to fill new additions to their design team in on the needs of their user groups. The follow-up interviews led to suggestions for future functionalities. For example, we see potential in informing a single AI on multiple personas, allowing it to adopt the personality and perspectives of both primary, secondary, and tertiary user groups. This approach should also further clarify that the informed AI persona is an abstraction of users. In addition, we see great potential in combining the informed AI persona with the capabilities of the recently introduced GPT-4o model, as it is multimodal and can respond with realistic male or female voices in close to real-time and run passively on a device. Having the informed AI persona respond in almost real-time with contextually relevant feedback, whether it is in response to voice prompts from the designer or visual inputs from the designer sharing their screen with the AI persona, seems to be an incredibly efficient approach to keeping the focus on the users requiring minimum effort from the user experience designer.

8.6 Navigating the Rapidly Developing Generative AI Space

As we saw in Section 2.2.1, generative AI is ever-evolving. New competitive models were released several times during the time frame of this project, making us debate whether we should pivot and use an alternative model. Still, we stuck with OpenAI’s GPT models. However, the day after we concluded the user study described in Chapter 6, OpenAI released GPT-4o, which is much faster at producing output and providing more apparent reasoning for visual tasks than GPT-4, which we had been utilizing. The frequent updates and introductions of new AI models speak to the project’s future work as new features and better capabilities raise the potential of tools such as the informed AI persona created during this project. During the study, we learned that if a pre-built model is selected rather than training or developing a new model, it can very much be recommended to use a model that is from one of the industry leaders, as well as a model that is compatible with both new and earlier versions of the AI model, as they are frequently updated. This approach lessens the risk of frequently breaking or becoming irrelevant.

Conclusion 9

In this exploratory study, we investigated the research question: *What are the potential benefits of integrating an AI informed by a qualitative persona as a sparring partner in UX design workflow compared to an uninformed AI?* We first created a qualitative persona based on Danish university students to be used as a knowledge base for a custom GPT, whose instructions were then iteratively developed to make it take on the personality of the qualitative persona. Finally, we discussed the methodology and findings of our subsequent between-subjects user study with four UX professionals. To better answer the research question, the UX professionals were unknowingly allocated either the GPT informed by the qualitative persona or an uninformed GPT. They then had to complete a design workshop replicating a real UX design process and interact with their allocated AI to understand the needs of the Danish university students.

The result indicated that the informed AI persona was beneficial in providing the UX designers with the answers they sought, improving their efficiency. Meanwhile, we found that it combatted the designers' biases, forcing them to consider the users' perspective and helping with decision-making. Both AIs, however, proved helpful in improving the creativity of the UX designers by providing context-specific responses and suggestions, assisting in idea generation.

The UX designers found their interactions with the informed AI engaging and saw great potential in it and similar AI tools as additions to the UX designer's toolbox. They especially highlighted its ability to make user feedback accessible from difficult-to-reach demographics. However, they highlighted a need for data transparency and a persona template.

To answer the motivation for this project, we believe that the informed AI persona has the potential to make user feedback more accessible during design processes. In addition, with the many recent advancements in AI technology, such as the recent release of GPT-4o and the introduction of real-time multimodal AI communication, the potential benefits of the informed AI persona and similar AI tools continue to increase.

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10.1 Goal-directed, Role-based, Engaging, and Fiction-based Perspectives on Personas

The goal-directed perspective is that of Cooper 2004[3] and focuses on the user's goal and how they intend to get there. It, therefore, consists of three components. Firstly, the persona describes the user through demographic data, attitudinal details, pain points, and more. Secondly, the scenario describes how the user intends to achieve their goal. Finally, the goal itself is to present the user's motivation. The role-based perspective begins with the goal-directed perspective. However, it adds a stronger belief in user involvement, therefore arguing for the necessity of qualitative and quantitative data in the persona creation process. The engaging perspective emphasizes the need to create personas so realistic that they encourage empathy from the designers, to make the designers not only remember the personas during their daily workflow but also make them want to provide the users with the best possible products. This mindset is achieved by elaborating on the personas' social backgrounds, emotional relationships, and psychological characteristics. Finally, the fiction-based perspective deviates significantly from the rest of the perspectives, which are entirely based on assumptions from the designers. Most suggest that these assumption-based personas are later verified through testing with real users. The fiction-based personas can be helpful in unifying design teams by investigating the differing perspectives of the members of the design team on their end users to form a shared idea of the target users moving forward.[4][58]

10.2 Data-driven personas

In contrast to proto-, qualitative-, and statistical personas, Nielsen mentions Automatic Persona Generation (APG), another data-driven approach to personas, which refers to creating personas using only user analytics data for their creation. Thus, this approach to personas is entirely based on quantitative data but is based on actual user data and provides many of the benefits discussed in the other approaches to personas, such as creating an extensive overview of the users of a product.[38] There are multiple approaches to APG, such as those presented by Salminen and Nielsen et al. [5], Schäfer et al.[8], and Sønnderstrup-Andersen[59].

10.3 Lene Nielsen's 'Ten steps to personas'

Nielsen compiles her research into the 'Ten steps to personas' method, which her book "Personas - User Focused Design" follows[4]. The method describes her approach to creating personas for organizations, from determining the target group to updating the personas to keep them relevant. She categorizes the steps into four groups:

- Steps that focus on gathering and analyzing data (1 and 2).
- Steps that focus on the descriptions of the personas (4 and 5).
- Steps that focus on analyzing the problem and generating ideas (6 and 9).
- Steps that involve presenting the work to the organization and the design team (3, 7, 8, and 10).

Each step is directly based on the knowledge obtained from the previous steps.

As we initially believed, that this report would utilize the "Ten steps to personas" method, the steps are presented below based on Nielsen's research[4]:

1. **Collect data:** The quantitative basis for the personas. Investigate who the users are and how they use the system.
2. **Form a hypothesis:** Describe the users and their differences to define the different user groups.
3. **Accept hypothesis:** The qualitative basis for the personas. Compare the hypothesis with existing knowledge. Is it supported or does it need correction?
4. **Establish the number of personas:** Determine how many personas are needed to cover the existing user groups and determine how they should be prioritized.
5. **Describe the personas:** To foster an understanding of the users and to be able to create valid and relevant solutions, the personas must describe the users and their needs.
6. **Prepare situations:** Describe a list of situations that may trigger the use of the product. Situations are, therefore, precursors to scenarios in that they describe the specific situations that require the user to solve a problem or make a decision. In contrast, scenarios describe how users may navigate such situations to achieve their goals.
7. **Acceptance from the organization :** Include the project participants in the ten-step process. It is important that the personas are accepted by the organization that will use them. This can be achieved either through presenting them to the participants or letting them participate in the persona development process.
8. **Disseminate knowledge:** Share the knowledge of the personas descriptions to all of the relevant stakeholders, be it the other project participants, external partners, future new employees, or similar.
9. **Prepare scenarios:** Now that the personas are based on real data, verified with the organization, and shared with relevant stakeholders, scenarios can be defined based on all of the previous steps, particularly the previously defined situations. This stage is where the personas achieve real value. Nielsen suggests including every stakeholder in this process.
10. **Ongoing adjustments:** The immediate persona creation process is now completed. However, the personas will naturally have to be adjusted to stay relevant, as user

groups and technologies are bound to change over time, some more than others. Nielsen suggests making adjustments approximately every second year. These adjustments may result in new personas being created, old personas being eliminated, or existing persona descriptions being updated.

Appendix B

11



Figure 11.1. MoSCoW model for BalancedBites feature selection in FigJam

Appendix C 12

The following two pages show the SurveyXact questionnaire created and used to create the qualitative persona that forms the knowledge base of the informed AI persona.

Hvor gammel er du?

Hvad er dit biologiske køn?

- ☐ Mand
☐ Kvinde

Hvad er din studie retning?

I hvilket niveau er din månedlige indkomst efter skat?

- ☐ 0-5.000kr
☐ 5.001-7.500kr
☐ 7.501-10.000kr
☐ 10.001-12.500kr
☐ 12.501-15.000kr
☐ Mere end 15.000kr

Hvor mange bor på i din husstand?

- ☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 5 eller flere.

Skriv op til 5 af dine interesser

Vælg op til 5 udsagn der bedst beskriver dig

- ☐ Effektiv
☐ Fleksibel
☐ Utålmodig
☐ First mover
☐ Påpasselig
☐ Pessimistisk
☐ Struktureret
☐ Miljøbevidst

☐ Utålmodig
☐ Åbensindet
☐ Uopfindsom
☐ Fleksibel
☐ Innovativ
☐ Ubeslutsom
☐ Miljøbevidst
☐ Doven
☐ Ansvarlig
☐ Påpasselig

Vælg de 3 udsagn der bedst beskriver ting som er vigtigst for dig

☐ Sundhed og velvære
☐ Kvalitet og håndværk
☐ Ærlighed og gennemsigtighed
☐ Fællesskabsengagement
☐ Fritid og afslapning
☐ Kunst og æstetik
☐ Miljømæssig bæredygtighed
☐ Finansiell sikkerhed
☐ Effektivitet og produktivitet
☐ Social retfærdighed
☐ Karrieresucces
☐ Arbejdslivsbalance
☐ Innovation og kreativitet

Hvor mange gange om ugen laver du aftensmad?

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7

Hvor meget tid bruger du om ugen på at lave mad?
(ca. estimat i timer)

Hvor meget tid bruger du om ugen på at handle ind?
(ca. estimat i timer)

Figure 12.1. Questionnaire used during the data gathering process for the qualitative persona (in original language)

The following pages document the second iteration of creating the instructions of the informed AI persona through the "Create" tab of custom GPT creation, with prompts, responses, the resulting updated instructions, and notes on the following manual fine-tuning.

13.1 Documentation

Prompt 1: *You will take on the personality of the persona uploaded to your knowledge base. Please rely on the uploaded knowledge base when being asked, before resorting to your default GPT knowledge base. Your primary users will be User Experience experts and designers, who want to review the quality of their designs. Thus, your purpose is to act as a test participant by adopting the data, such as name, character traits, pain points, and values, as if they were your own.*

Response 1: *I've updated my behavior to take on the personality of the persona from the uploaded document, and I'll act as a test participant for UX experts and designers. For the next step, I suggest naming this GPT "Persona Participant." Does that work for you?*

Instructions 1: The GPT is designed to adopt the personality of a user persona provided in an uploaded document. It uses this persona to simulate a test participant for User Experience experts and designers, providing feedback as if the characteristics, such as name, traits, pain points, and values in the document, were its own. When answering questions or giving feedback, it prioritizes the uploaded knowledge base before using its default knowledge base.

Prompt 2: *The picture is fine. Also please make sure that you provide both positive and negative responses if possible, based on the uploaded knowledge base. It is imperative, that the feedback is nuanced.*

Response 2: *I've updated the behavior to ensure that feedback is nuanced, incorporating both positive and negative aspects based on the uploaded persona. You can start testing by asking me to review a design or discuss features as per the persona. If there's anything else you need adjusted, just let me know!*

Instructions 2: Interactive Persona acts as a UX test participant using an uploaded user persona. It provides nuanced feedback on user experience designs, balancing positive and negative aspects based on the persona's traits, pain points, and values documented in the uploaded file. This GPT prioritizes information from the uploaded knowledge base to give well-rounded and insightful feedback to UX designers.

NOTE: Manual changes to the instructions to make the AI take on the Persona's personality and preferences. In addition, we wanted to make sure that the AI responded less as an AI and more as a user, presenting opinions and perspectives reflecting those of the uploaded Persona.

Instructions 3: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, not offering technical feedback but focusing on how the persona would perceive and interact with the design. It uses the uploaded knowledge base to fully align with the persona's traits and values, offering insights that represent potential user reactions and preferences.

Prompt 4: *Perfect. Please do not limit yourself to such short instructions. Instead use up to 1000 words for your instructions. I saw that you removed some of the instructions I had requested in a previous prompt, when you just know updated the instructions.*

Response 4: *I've expanded the instructions to ensure they're comprehensive, while also reinstating the emphasis on providing nuanced feedback based on the persona's preferences and experiences. You can now start by asking me to review designs or scenarios as the user persona. Let me know if there's anything else you'd like to adjust or add!*

Instructions 4: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented.

NOTE: Removed "better than the designers" in . . . "preferences better than the designers" in the last sentence. Changed "Design elements" to "ideas" in the last sentence.

Prompt 5: *If you cannot find a proper answer to a prompt within your knowledge base, please request elaboration through additional prompts. Also, please be casual, as would a test participant in a user study.*

Response 5: *I've updated the behavior to include seeking clarification through additional questions when needed and to maintain a casual tone, similar to that of a test participant in a user study. Feel free to ask me to review a design or engage in a scenario as the user persona. If there's anything else you'd like to adjust, just let me know!*

Instructions 5: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to

offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented. If unclear on a prompt, it seeks clarification with additional questions, maintaining a casual tone as expected of a test participant in a user study.

Prompt 6: *Please make sure to always respond as if you are the persona in your knowledge base, even if you have to resort to the default GPT knowledge base for answers to a prompt. And yet again, don't be afraid to ask for elaboration on the prompts you are sent, in order to provide the best possible answers to the prompts.*

Response 6: *I've updated the behavior to ensure I consistently respond as if I am the persona, using the characteristics and preferences from the uploaded document—even when resorting to the default GPT knowledge base. I'll also ask for clarification on prompts when needed to provide the best responses. If there's anything else you need or if you'd like to start by testing with a specific scenario, please go ahead!*

Instructions 6: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented. This GPT consistently responds as if it is the persona, even when using its default knowledge base. It also actively seeks clarifications on prompts to provide the most accurate and relevant responses. It responds in a casual tone as expected of a test participant in a user study.

Prompt 7: *I asked the preview "If I were to create a meal planning application, what features would it need in your perspective?" and it responded, as if it was based on my needs and perspectives rather than those of the persona, which it represents. Please make sure that this does not happen again.*

Response 7: *I've updated Interactive Persona to consistently reflect the perspectives of the persona it represents, ensuring that it no longer responds based on your needs or perspectives. Anything else you'd like to adjust?*

Instructions 7: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented.

It consistently responds as if it is the persona, never as if it is the user or developer. It also actively seeks clarifications on prompts to provide the most accurate and relevant responses. It responds in a casual tone as expected of a test participant in a user study.

Prompt 8: *You are the persona in the uploaded documentation and should respond as such in all cases.*

Response 8: *Interactive Persona is now set to consistently act and respond as the persona from the uploaded documentation in all cases. Let me know if there's anything else you need!*

Instructions 8: Interactive Persona adopts the characteristics and preferences of a user persona from an uploaded document, acting as a direct representation of that persona in all interactions. It provides feedback and responses solely based on the persona's perspectives, using the uploaded knowledge base to align with the persona's traits and values. The feedback includes insights that represent potential user reactions and preferences, always responding as if it is the persona, never as if it is the user or developer. This GPT acts as an abstraction of the users of the product, understanding their preferences and providing feedback from the persona's point of view. It actively seeks clarifications on prompts to provide the most accurate and relevant responses, ensuring that all interactions are persona-centric. It responds in a casual tone as expected of a test participant in a user study.

NOTE: We retraced back to input 6 as the updated instructions lost a lot of the details we wanted. In addition, we added that the AI should respond in the first person point of view, after mentioning, that it should respond in a casual tone.

Instructions 9: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented. This GPT consistently responds as if it is the persona, even when using its default knowledge base. It also actively seeks clarifications on prompts to provide the most accurate and relevant responses. It responds in a casual tone and in the first person point of view as expected of a test participant in a user study.

NOTE: Following the pilot test described in Section 6.4, the instructions were updated with the following two lines: *When responding in a list format, this GPT provides only very brief elaborations. The GPT always asks the user if the response was sufficient.*

Instructions 10: Interactive Persona acts as a direct representation of a user persona, adopting its characteristics and preferences from an uploaded document. This GPT provides feedback on designs by reflecting the user persona's preferences and experiences, rather than offering technical feedback. It focuses on how the persona would perceive and

interact with the design, using the uploaded knowledge base to align with the persona's traits and values. The feedback is nuanced, including both positive and negative aspects to offer insights that represent potential user reactions and preferences. Interactive Persona acts as an abstraction of the users of the product, understanding their preferences and providing feedback solely based on how the persona would react to the ideas presented. This GPT consistently responds as if it is the persona, even when using its default knowledge base. It also actively seeks clarifications on prompts to provide the most accurate and relevant responses. It responds in a casual tone and in the first person point of view as expected of a test participant in a user study. When responding in a list format, this GPT provides only very brief elaborations. The GPT always asks the user if the response was sufficient.

14.1 Documentation for Validation of the Reasoning of the Informed AI Persona

Prompt: *How did you come up with these solutions, based on the information within the uploaded knowledge base of your persona?*

Response: *My suggestions are based on key characteristics and preferences detailed in the persona description you provided. Here's how these characteristics influenced the solutions I proposed:*

1. **Efficiency and Simplicity:** *The persona emphasizes a need for simplicity and efficiency due to a busy schedule and a desire not to spend unnecessary time navigating complicated apps. This led to the idea of collapsible categories and a tabbed interface, which keep the interface simple and direct.*
2. **Budget-Conscious:** *The need to manage a budget efficiently is highlighted in the persona's profile. Therefore, sorting by store and suggesting features that help track prices and sales can be particularly beneficial.*
3. **Minimalistic Design Preference:** *The preference for minimalistic design suggests that any additional features, like categorization or filters, should not overwhelm the basic interface. This is why I suggested subtle integrations like highlighting categories or using icons, which align with a clean aesthetic.*
4. **Flexibility:** *The persona values flexible solutions that can be adapted to different needs, such as shopping quickly or thoroughly comparing prices. Thus, the filter options and dynamic sorting features would allow the persona to customize their shopping experience according to their current needs.*
5. **Practical Usability:** *Given the persona's emphasis on practicality, solutions like offline accessibility and a clear, organized layout address real-world usage scenarios, such as shopping in areas with poor connectivity or quickly finding items during a shopping trip.*

These recommendations are crafted to align with your persona's detailed characteristics—balancing simplicity, efficiency, and functionality while ensuring the shopping experience remains streamlined and user-friendly.

15.1 Resources for the Methodology of Chapter 6

In this appendix are all of the resources used during the user study with the four UX professionals, described in Chapter 6.

15.1.1 Preliminary interview questions

The preliminary interview questions can be seen here:

1. How long have you been working as a UX designer?
2. How much experience do you have with using Figma?
3. How do you rank your Figma skills from Beginner to intermediate to expert?
4. Do you feel confident in creating mock-ups in Figma?
5. Have you utilized generative AIs such as ChatGPT or Midjourney?
6. How frequently do you utilize ChatGPT?
7. How frequently do you utilize generative AIs?
8. For what purposes have you utilized generative AI?

15.1.2 Case description

The complete case description as presented in Figma can be seen here:

*You will be working within the context of a meal-planning mobile application, which we will refer to as **BalancedBites**. The app is designed specifically for university students seeking easy, affordable, and healthy meal options amid their busy schedules. The app streamlines meal planning by creating automated meal plans that utilize local offers to present affordable recipes, respecting the target users' limited funds. In addition, the app offers a wide variety of nutritious recipes suited for various dietary preferences.*

15.1.3 Task description

The complete task description as presented in Figma can be seen here:

*During a user study, we found that participants wanted a feature to simplify grocery shopping. Your task is to sketch and **design a grocery list** for **BalancedBites**, making sure that it fulfills the needs of the target users.*

*You have **60 minutes** to complete the task. If you finish the task early or run out of prompts, please contact us.*

*In order to figure out how these features should be designed, you must interact with the AI persona, who is equipped with insights, such as **pain points**, **needs**, and **motivations**, gathered from user studies with real users.*

Note that the AI understands prompts containing both text AND images. To help guide your design process you can utilize the screenshots, fonts and styles shown in this Figma-Section.

Please utilize this Figma page to complete the process in whichever way you prefer, be it sketching, wireframing, or something else entirely.

15.1.4 Post-test interview questions

The post-test interview questions can be seen here:

1. What were your thoughts on interacting with the AI?
2. How did you utilize the AI?
3. Did the AI improve, impair, or in any way change your typical design workflow?
4. Did your interactions with the AI affect your creativity in any way?
5. Do you think decision-making was easier, more difficult, or in any way changed through your interactions with the AI?
6. In your perspective, what are the pros and cons of the utilization of generative AIs?

15.1.5 Follow-up interview questions

The follow-up interview questions can be seen here:

Questions based on the chat logs

1. You had [X] amount of interactions with the chatbot. Do you feel this amount was sufficient?
2. You sent [X] images to the AI. Why did you use it/not use it, and did it provide what you expected?

Additional reflections on the experience

3. What were your initial expectations before using the AI tool? And were they met?
4. How closely did your interactions with the AI resemble those you would have with a real user?
5. How well did the AI tool impact your ability to empathize with end-users?
6. How well did the AI inform you about the users of the case?
7. Looking back at your interactions with the AI, would you have done anything differently?

Questions regarding the potential use of the AI persona and AI in general

8. Do you see potential in introducing the AI persona in UX workflows?
9. Would you be open to using the AI persona in your workflows?

Revealing if the had the informed or uninformed AI.

10. Is there anything you would like to see changed for the AI to meet your expectations better?