Section 1: Heuristic Evaluation

Product: Virtual Pet-Inspired Journaling for Mental Wellness - High-fi, Low-fi High-fi[test tasks: 1. add a friend; 2. add a photo memory], Low-fi[test tasks: 1. feed the cat; 2. add a journal]		
	Issues	Recommendations
Visibility of System Status	- High-fi[add a friend]: photo icon is clickable only when editing the journal - Low-fi[add a journal]: add icon is not explicit	- convert the “add photo” to a universal button - make state change animation for hover events - center & resize the add journal button
Match Between System and the Real World	- Low-fi[feed the cat]: Pet paws does not imply its relation to the cat in the “room display” panel; the yarn ball does not look real; cat is not playing	- Replace the paw with a cat head to reinforce the relation - Add cat play animation and playback right after user click the yarn item
User Control and Freedom	- Low-fi[add a journal]: If the user did not select the image, he/she will return to the homepage directly	- Add a “back to last page” button and remove the “back to home” button
Consistency and Standards	- Low-fi[add a journal]: User can recognize the “cancel” and “check” button, but require more explanation on what is canceled - Low-fi[feed the cat]: user cannot recognize whether the cat is feeded and whether there is a feeding capacity range	- Use different button for cancel and delete - Add cat reaction after feeding - Add pop-up notice when the capacity is reached - Add a tutorial explaining what the heart is for
Error Prevention	- Low-fi[feed the cat]: User cannot clearly view the hint message; User is clicking all the button to test all the possibilities	- Edit the message display time duration - Add a hint visual effect
Recognition Rather than Recall	- Low-fi[feed the cat]: User cannot recognize the function of the tools on the shelf, and cannot recognize the reward for feeding the cat	- Add reward animation to notify what is added from the previous operation
Flexibility and Efficiency of Use	- Low-fi[feed the cat]: The tool in the pet interaction page is overlapping with the play section in the bottom control panel	- Organize the items to the “play” section
Aesthetic and Minimalist Design	- The text notice on the bottom is not necessary for most time	- Remove the text note and add it to the hover activated element.

Help Users Recognize, Diagnose, and Recover from Errors	- User will return to the home page directly, but their intention may only back to the last page	- Differentiate the button for “back” and “back home”
Help and Documentation	- User need the feature on the social log[what requests were sent] -	- Add a section for social log

Section 2: Heuristic Violation

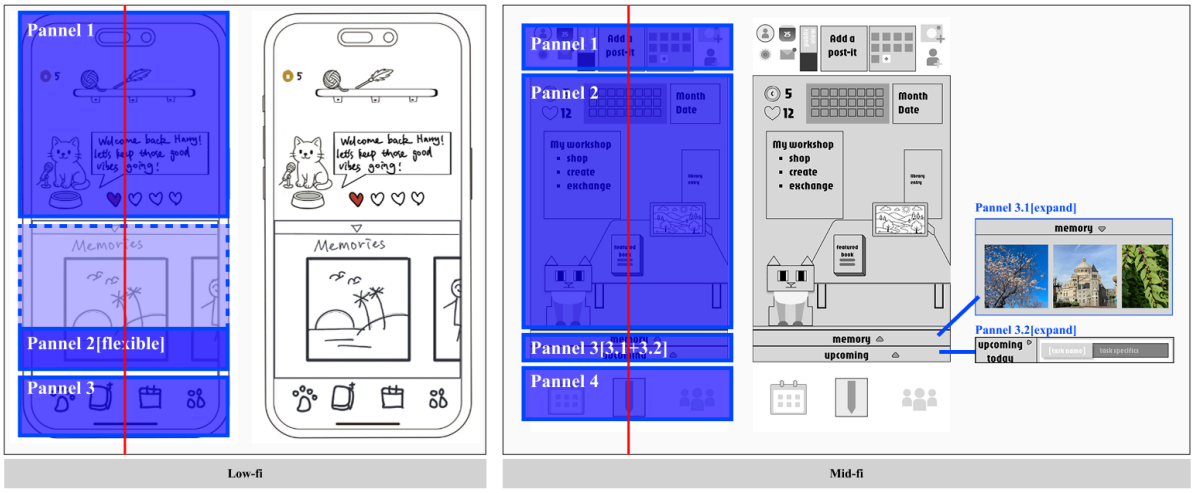


Image: Low-fi and Mid-fi layout developments
Red line: symmetry line; Solid line: panel partition; Dashed line: toggled/expand sessions

In the initial interface design, we partition the screen into three parts from top to the bottom:

- Panel 1: static view for pet space; users can see the cat and the state changes;
- Panel 2: dynamic panel with toggle/expand states; demonstrates users favorite memory and will expand when anxiety states are logged in journal
- Panel 3: static panel to organize the function buttons: interact with pet, log a journal, see previous journals based on the logged dates, enter social/community page

The low-fi layout establishes a logical and unambiguous division. Nevertheless, the initial round of usability testing reveals that users are unable to identify the app's functionality. They are uncertain about the motivations behind companion interactions and their connection to the addition of a journal. They were capable of completing the duties; however, they lacked fundamental interaction motivations.

In the developing stage, we decided to focus on journal logging with a pet assistant. Moreover, inspired from the design companion feature in figma, we discover the potential of making this pet as a responsive personal assistant. From the layout perspective, we separated the screen into four sections:

- Panel 1: display profile page button, housekeeping messages, and quick access function
- Panel 2: display social features such as my assets exchange space, favourite journals or images; cats is at the edge of this panel to reacts and display app usage notifications
- Panel 3.1: dynamic panel display recent 7 days memory log, images will change dynamically based on the anxiety level. For instance, joyful memory will be on the top when users’ most recent journal demonstrates high anxiety level

- Panel 3.2: dynamic panel display recurrent habits, including habits that is collaborating with friends
- Panel 4: container for function buttons: check and edit journals by dates, add a new journal, and enter social features

In addition, we remove the pet interaction button and place the adding journal button on the central line to reinforce the key function. Pet interactions are replaced by directly clicking on the pet because the pet is a more recognizable button than a separate button.
With the updated layout, test users can finish the tasks with higher efficiency and accuracy.

Section 3: User Study Protocol

3.1 Consent Script

Users are invited to interact with the interface and complete the tasks as much as they can with their natural reaction without a time limit. Users consent to complete the survey with their true reactions. Users can also refuse to participate for any parts that they hesitate to engage. Researchers will take notes on the users' reactions. We sincerely appreciate the users' participation and truthfulness.

3.2 User Briefing

There are two parts in this user study:

- Part 1:
    - Task 1: Feed the cat and unlock the fish can
    - Task 2: Add a journal with an image
- Part 2:
    - Task 1: Use the quick photo entry to log a memory card (with/without note)
    - Task 2: Send a friend request to Alice

Researchers will provide the context for each task, and confirm which information was given. Participants are assumed to have no knowledge on the total number of the interactive components.

3.3 Research Statement(s) describing what you aim to learn and your hypothesis

Our objective in this investigation is to identify:

- The objective of the first segment is to investigate a system that is both effective and motivating for pet interaction. From the initial iteration of the usability test, we observed that the users were unmotivated and their understanding of pet motivation was ambiguous. To be more precise. Consequently, we implemented textual guidance in companion interactions. In this section, we aimed to determine whether the instructions are reducing the cognitive burden of users during the learning process from random explorations.
- In the second section, we intend to investigate whether we are developing interfaces that are visually exciting. To be more precise. The initial objective is to determine whether the animated visual effects are detecting the users' actions, thereby improving recognition or decreasing the number of error inputs. The second task is to evaluate the interface's compatibility with actual images and its ease of operation.

Our hypothesis is that the efficacy of the interface will be enhanced by the reduction of the users' clicking decision time, which will be facilitated by the use of interactive and responsive interface design. Users will be less likely to make error actions and wander around with more intuitive guidance.

3.4 Any training materials you provided the users

Virtual Pet-Inspired Journaling for Mental Wellness is an application that enables users to maintain their journaling behaviours. This application is equipped with a pet campaign that offers users active

feedback. It is anticipated that users will comprehend the application's functionality. In addition, the application is not yet fully polished. The objective of the two components is to determine whether the graphics serve as an effective guide and whether the interactive elements are causing confusion, which in turn increases the cognitive burden.

For virtual participation, each part will be performed with zoom's screen share function. Researchers can view the participant's figma screen and mouse events. For in-person participation, participants will be provided with one device that operates the figma's "present" function with "show hint" function off.

3.5 A description of how you will test your research statements.

We will record the time to measure the efficiency. Precision will be measured with the number of error clicks. For the usage motivation or the cognitive load, we will observe and record notable facial expressions such as frown, smile, or verbal reactions.

3.6 Quantiative and Qualitative data from each session of your user study

Quantitative

Content		Participant 1	Participant 2	Participant 3
Total Completion time		3 min	4 min	6 min
Error Clicks, including testing around [Part 1]		3	2	15
Calm Level [Part 2, 5 for Calm, 0 for not Calm]		5	5	4
Button Clarity	Part 1	5	5	5
	Part 2	3	5	5
Part 1 Task 1	Success	Yes	No, fail on adding the image	Yes, but went back to the homepage before successfully adding the photo
	Confidence level [5 for High, 0 for low]	3	3	3
Part 1 Task 2 Success	Success	Yes	No, fail on unlocking the fish can	Yes
	Confidence level [5 for High, 0 for low]	4	5	4
Part 2 Task 1 Success	Success	Yes	Yes	Yes
	Confidence level [5 for High, 0 for	4	5	4

	low]			
Part 2 Task 2 Success	Success	Yes	Yes	Yes
	Confidence level [5 for High, 0 for low]	5	5	5

Qualitative

Content	Participant 1	Participant 2	Participant 3
For the first part, what do you think about the procedure?	easy and clear to understand; friendly for first time users with easy to navigation to pet interaction	It is fluid in general, but the below icons are not clear.	The procedure is fluid in general. I am unclear about the interaction with pets, specifically unlocking the fish can.
Do you think there are repetitive buttons / features that can be simplified?	unclear about the interactive elements; difficult time to figure out the ball and the cat(repetitive and confusing visual elements); clear section divisions	Not really, but vibrant colors are preferred	I think the friend-add button can merge into the friend list area. It can be a second tier function in a friend list.
What do you think about the animation? Do you think it lowers your cognitive load and makes you feel more relaxed?	engaging, and clear (photo memory sliding bar)	More relaxed and fun to react	The animation looks simple with clear instructions. It makes me feel comfortable.
What background sound do you think of when seeing this interface?	a little bit of melody in piano & violin without vocals	fun & chill music (humourous and vibrant), smooth melody with vibrant drums, more rewarding sound effects	Cozy and warm music like playing a Pokemon game.

3.7 Result Analysis

Learnability Participant 1 provides fluid operations in finishing all the tasks. Both participants are capable of comprehending visual components. Both participants demonstrate identical comprehension of each button's design.
Intuitiveness The icons are perceived as providing clear guidance on the functions by both participants. The animated buttons induce a sense of amusement, which in turn encourages users to interact with and investigate all of the buttons. Additionally, the functions of the icon are elucidated by the hovering animation.
Cognitive Load The animations are not distracting or causing cognitive burden, as both participants concur. The application is rendered more dynamic by the gradually changing elements, including the blinking cat, the shining rainbow, and the dropping water droplets.
Interface Design We have chosen participants from a variety of age groups and application usage characteristics for this round of testing. Our objective is to evaluate the visual design's suitability for a wide range of users. Additionally, both individuals demonstrate enthusiasm for employing playful music with a precise musical sound. We associate these feedbacks with rhythm patterns, including rumba clave and Charleston. These studies are beneficial for the organisation of the hierarchy of visual assets and task procedures. For example, we may differentiate between sound timber and companion interaction and enhance the rewarding visual with corresponding audible feedback. The memories from different times can be identified by employing a descending pitch while browsing through the timeline. Additionally, the degree of engagement willingness was influenced by diverse color saturations. Participants exhibited a greater degree of interest in buttons with increased saturation levels.
Training More context designs are required for individuals who are 50 years of age or greater. If we are testing specific tasks, it may be necessary to provide additional contextual information prior to each task. Contextual information may include the rationale behind their current placement in the interface. Additionally, when silence is encountered, we draft notes. Participants frequently query investigators for clarification when the interfaces fail to offer sufficient interaction cues. Consequently, it is imperative that we consider the enquiries posed and establish a quantifiable criterion for delineating between an interface design error and a testing procedural error.

Section 4: Iterations

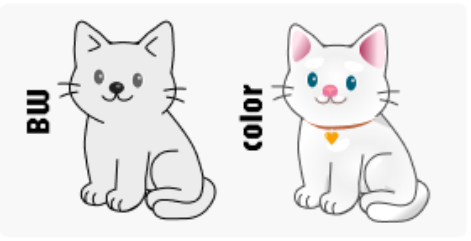
Following up with our first version test result, we improved the icon design, and modified the workflow for adding a new photo. We also developed a color palette with the purpose to lower the cognitive load. Specifically, we worked on:

- Redesign icons and interactive elements to clearly indicate clickability (e.g., shading, hover states).
- Simplify the shopping process and add confirmation feedback.
- Enhance social features by allowing likes, comments, or virtual gifts.
- Add onboarding tooltips for first-time users to reduce early confusion.

Section 5: Design Considerations

5.1 Character Design

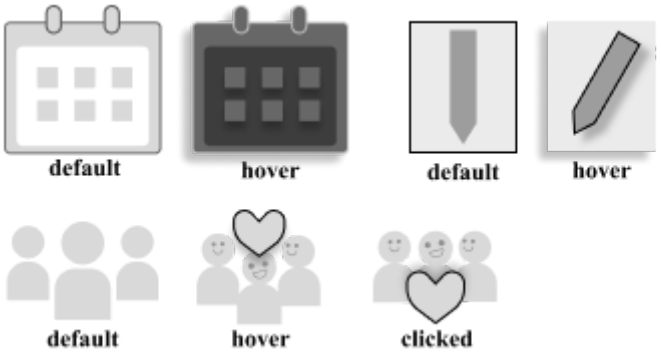
The design source is Turkish Angora, a cat breed which is intelligent and playful. They bond with humans, but often select a particular member of a family to be their constant companion. [1]



5.2 Color and Colorimetry

Human colour perception is subject to a wide range of variations and is influenced by the angle of observation, illumination, sample size, and ambient colour, as determined by colorimetry. [2] Additionally, the emotional state of individuals can fluctuate as a result of their varying levels of colour tolerance. [3] We hope to discover how these theories can apply to the interface design. We employ colours with varying greyscales for the low-fidelity prototypes. We employ colours with a lower contrast for display information that does not involve any interactions. For the clickable part, we increase the color contrast between the text information and its container to hint interaction. In high-fidelity prototypes, we discovered that users' attention was readily captured by colours with a higher saturation level. These observations are applied to visual designs as navigation guidance or engaging rewarding effects.

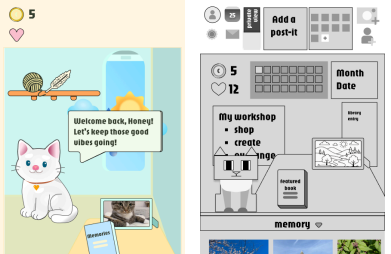
5.4 Icon/Button Designs



For the icon, we employ the real-world object and implement it with minimal geometry. We ensured that each icon was symmetrical to maintain aesthetic appeal and consistency. Additionally, we employ contrast colours to differentiate between the various phases of the button. For example, when a button is hovered, it will emit an illumination effect that informs the user of their interaction. Upon their return to their default state, the visuals will be in a flattened 2D format, which will more seamlessly integrate with the interface and avoid an excessive visual burden due to the quantity of buttons and text information.

5.5 Shapes, lines, and Emotions

For the high-fi prototypes, we aim to design interfaces that make people happy and create a casual feeling. Therefore, we look into



the shape language and its psychological effects. For instance, round shapes may arouse more positive feelings than edgy shapes. [4] We added rounded shapes such as fluffy clouds and round windows for the looping animation.

Since this is also a journal app that deals with texts, we look into the Bouba Kiki effect and apply rounded edges or san-serif typefaces to balance the sharp edges' visual loads. [5]

Appendix

Design log

Category	Content	Purpose	Hierachy [Base: 0, High: 2]		
			0 [graphics]	1 [graphics in motion]	2 [graphical elements with response]
Visual - Color	Use different saturation / grayscale	- lower cognitive load - indicate the interactivity			
Visual - Icon	Use symmetry and rounded edge for consistency	- visual consistency			
	Add animated graphics	- create guidance and improve inclusiveness			
Visual - Display[inactive panels]	use less saturated color scheme	- reduce the interactivity			

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