

Game design based on the urban heat island effect of Swansea and the concern for animal thermal comfort

Project Focus and Context

In 2026, global warming intensified the summer heat island effect in Swansea. The heat stress index for small animals was significantly higher than that for humans, and they were more prone to heat stress symptoms (Curtis et al., 2025). The RSPCA in the area issued multiple high-temperature pet walking bans, but the young pet-owning population generally lacked awareness of protection (see Figure 1).

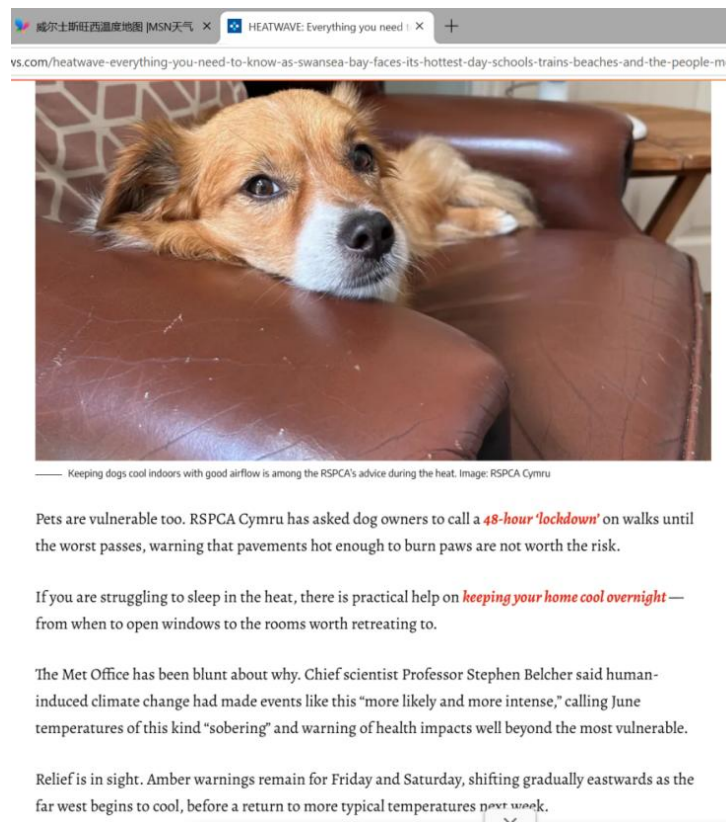


Figure 1. RSPCA's heatwave alert screenshot. (RSPCA Cymru, n.d.)

Large areas of green plants and water bodies could form cold islands, alleviating high temperatures and improving the micro-environment for the survival of animals (Yang et al., 2025; Dos Santos Neto et al., 2022). Currently, there is no leisure science and education mobile game about Swansea and local animals, thus creating a design gap.

This project explores how to integrate the visual elements of Swansea into mobile games, through scenes and animal interaction gameplay to build a flow immersion experience, evoke empathy for animals among the audience, and raise the awareness of local young pet owners and residents about the thermal comfort issues of animals.

This project completed a set of game visual design. The game background is Swansea, Wales. Players will create a city "cool island" area by placing vegetation, water bodies and shading facilities in the high-temperature areas, in order to alleviate the harm caused by high temperatures to animals. The entire visual design includes 9 game interface designs and 3 game scene designs. The supporting design materials include local animal image designs, button designs, and a set of visual elements of Swansea.

There are three design goals: emotionally, establish empathy between the audience and the animals. Visually, visually distinguish the high-temperature areas through color. In terms of player experience, it is adapted to the fragmented leisure time of young people and solves the problem of the dullness of scientific popularization content. This project is based on the theories of non-human narrative and flow. The non-human narrative evokes players' empathy through the perspective of animals. The flow theory optimizes the game mechanism, allowing players to have a relaxing and immersive experience.

The design value of the game: produce a set of visual templates for science popularization mobile games that are suitable for coastal cities and have cross-city reusability. As well as fill the research gap in the application of the combination of these two theories.

Research and Design Development

The non-human narrative approach advocates breaking away from the human-centered thinking pattern, taking the animals' perceptions as the starting point of the narrative, prompting the audience to think from another perspective and

establishing emotional resonance across species (Shang, 2022). This project did not fully adopt this narrative method but instead applied it specifically to the opening story of the game and the randomly triggered animal dialogues during gameplay, allowing the subjective feelings of the animals to run through parts of the game process.

According to the theory of flow, when a game has clear goals, immediate feedback on operations, and no pressure mechanisms, players can achieve a relaxed immersive experience and naturally absorb scientific popularization knowledge during play (Wang et al., 2019). The majority of young pet owners in Swansea have only fragmented playtime, so this visual design does not include pressure visual elements. The interface buttons distinguish different operation states through color, contours, and changes in light and shade, convert operation results into visual signals, alleviate the fatigue caused by repeated operations, and combine the value of the love currency and the numerical changes of the real-time temperature panel to achieve multi-layer internal incentives, which conforms to the experience characteristics of leisure popular science games.

Narrative and interaction design need to work together. To evoke players' empathy, it is necessary to utilize the visual language of the game to convey the audience's understanding of the impact of high-temperature environments on animals. Storylines and character dialogues are very suitable means to convey such information. Each player's life experiences are different, and when faced with the same visual presentation, the emotional experiences they ultimately have will also vary individually.

To refine this visual concept, this study analyzed two animal-themed casual games, drew on the beneficial design ideas from them, and clarified its own creative positioning. "Animal Crossing: New Horizons" has a gentle style and simple interface text, which reduces the understanding burden for players (see Figure 2).



Figure 2. Island map and resident-list user interface from “Animal Crossing: New Horizons”

(Nintendo, 2020)

However, the highly anthropomorphic animal communities within the game are not suitable for depicting the real situation where wild animals are threatened by high temperatures as presented in this project (see Figure 3).

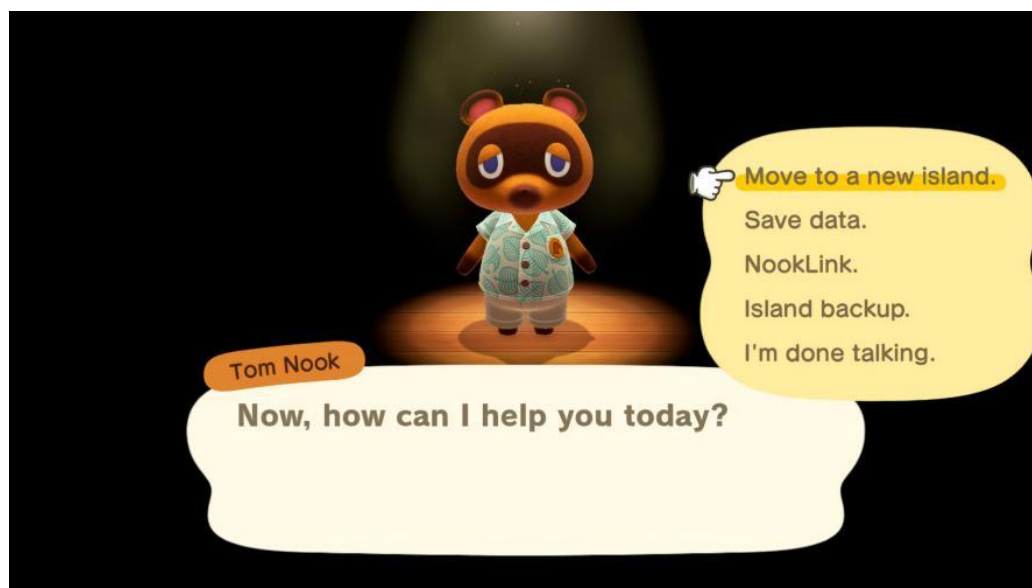


Figure 3.Character dialogue box from “Animal Crossing: New Horizons” (Nintendo, 2020)

"Alba: A Wildlife Adventure" has an extremely simple and adorable overall visual presentation, with a style similar to children's picture books (see Figure 4).

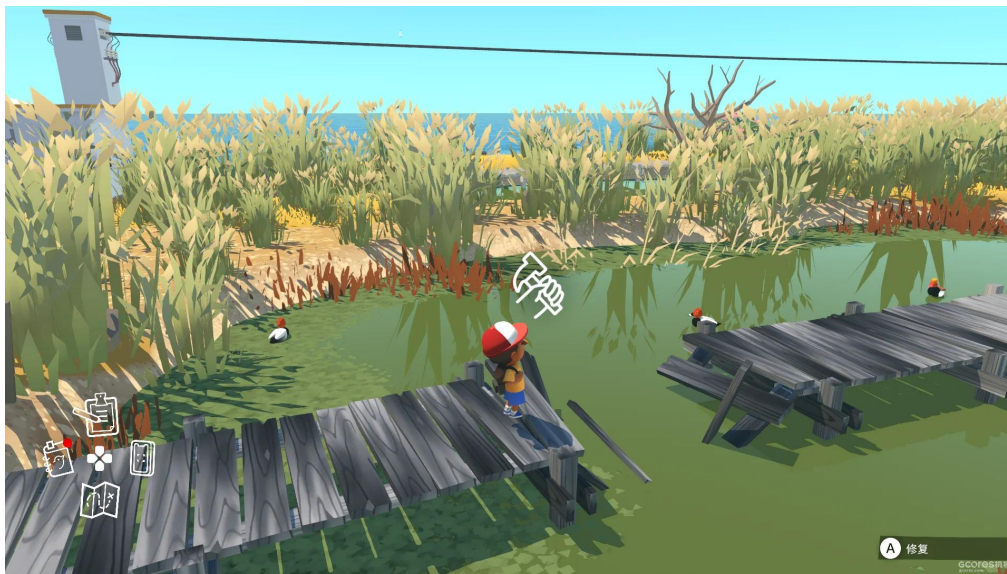


Figure 4. Wetland exploration scene in “Alba: A Wildlife Adventure” (ustwo games, 2020)

It relies on a guidebook to record biological information, but lacks visual representations corresponding to environmental modification (see Figure 5).



Figure 5. Wildlife Details Interface in “Alba: A Wildlife Adventure” (ustwo games, 2020)

However, this game has an extremely high potential to enhance public awareness of environmental protection (Larreina- Morales and Gunella, 2025). This project incorporates the lightweight interface and guidebook recording format of the two, controls the scale of the animals' anthropomorphism, and uses creating a "cold island" in the city as the core narrative thread.

Critical Analysis of Process and Outcome

The determination of the game's artistic style requires achieving a balance between the player's experience and the game's intent. For the young pet-owning audience, the relaxed atmosphere of casual games is not suitable for pairing with overly impactful realistic graphics; however, if the character designs are too childish and simple, it will weaken the cognitive communication intent of the work.

The hand-drawn illustration format can well balance this contradiction. The soft lines and color schemes can fully express the emotions of the animals without causing excessive psychological pressure on the players.

Based to the theory of urban spatial identity, Milošević- Pantović and Stevanović (2025) stated that a distinctive space should possess characteristics such as uniqueness, familiarity, and cultural symbols. Unremarkable standardized spaces can cause a sense of alienation. When players in Swansea recognize the familiar urban landscape, they will establish a sense of local belonging and spatial identity, which can help them immerse themselves more deeply in the game. This helps them immerse themselves more profoundly and enables them to enter a state of flow immersion. Based on the field research in Swansea, the design selected representative local landmarks and landscape features (see Figure 6).

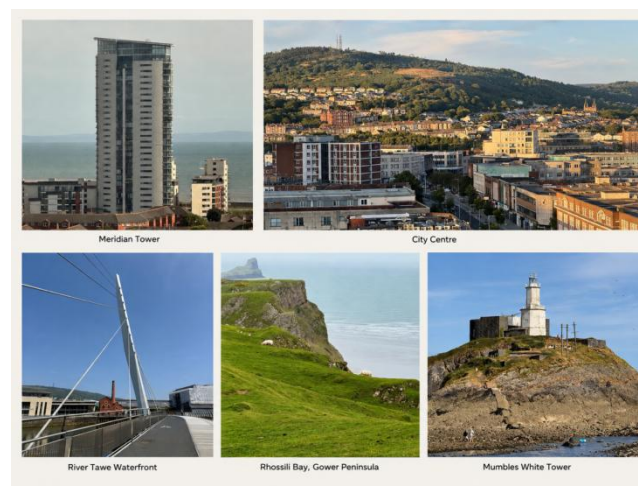


Figure 6. Collage of Swansea field-research landmarks. Photographs taken by the author.

At the same time, a set of low-saturation color system is refined, extracting basic tones from bays, coastal rocks, red brick buildings, and vegetation, to restore the unique coastal atmosphere of Swansea (see Figure 7).

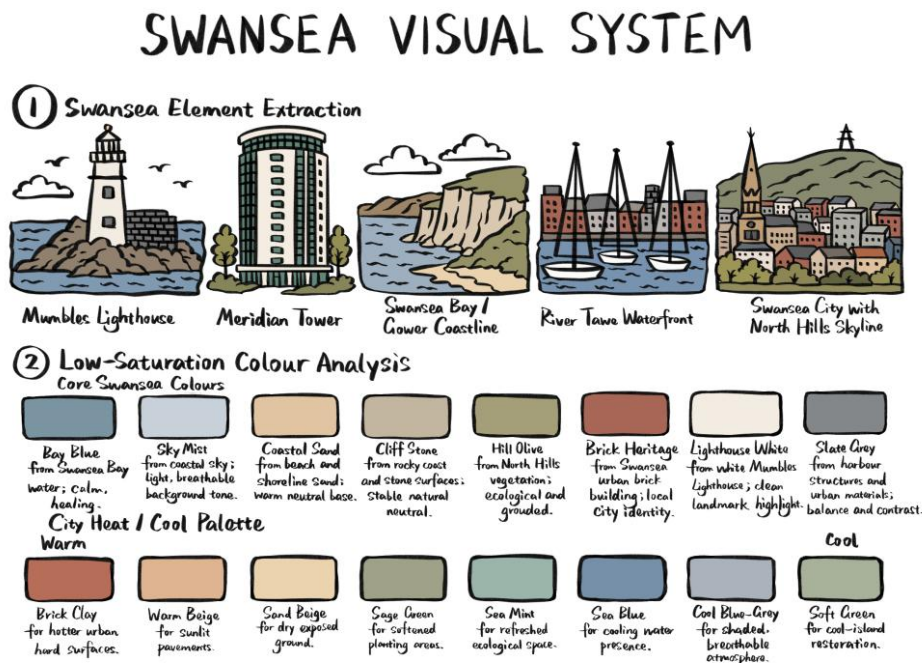


Figure 7. Hand-drawn extract of visual elements of Swansea. Source: Author's own creation.

These real materials will be simplified and processed according to the hand-drawn artistic style of the project, and transformed into game scenes and interface decorations (see Figure 8).

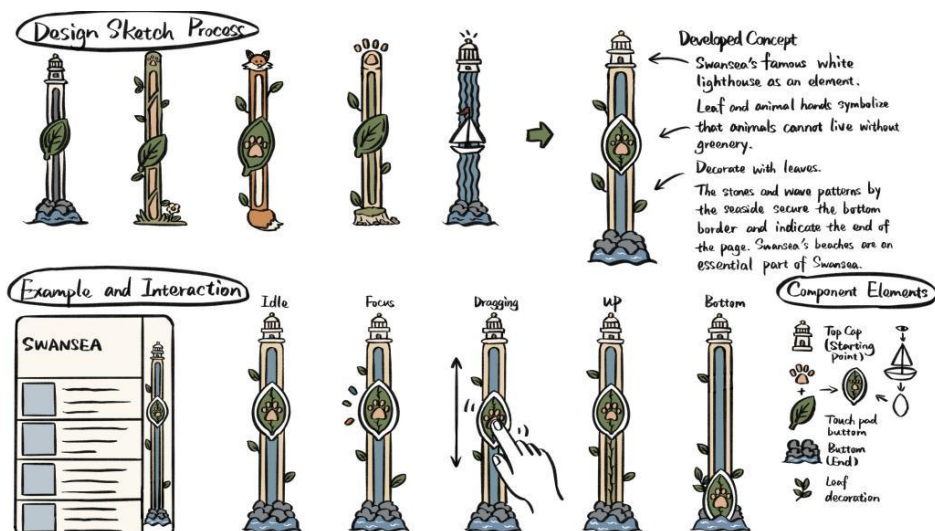


Figure 8. Swansea element page scroll bar UI design.. Source: Author's own creation.

The design of animal images begins with a survey of local animals, from which representative animals such as badgers, red foxes, brown rabbits, otters, hedgehogs and robins are selected. This covers the common local wild animals and the companion animals that the audience keeps. The design is based on the real appearance and habits of the species, and is then cartoonised while retaining the distinctive features (see Figure 9). Moreover, the simplification of the design effectively avoids the horror valley effect of virtual animals, but sacrifices some realistic details (Sierra Rativa et al., 2022).

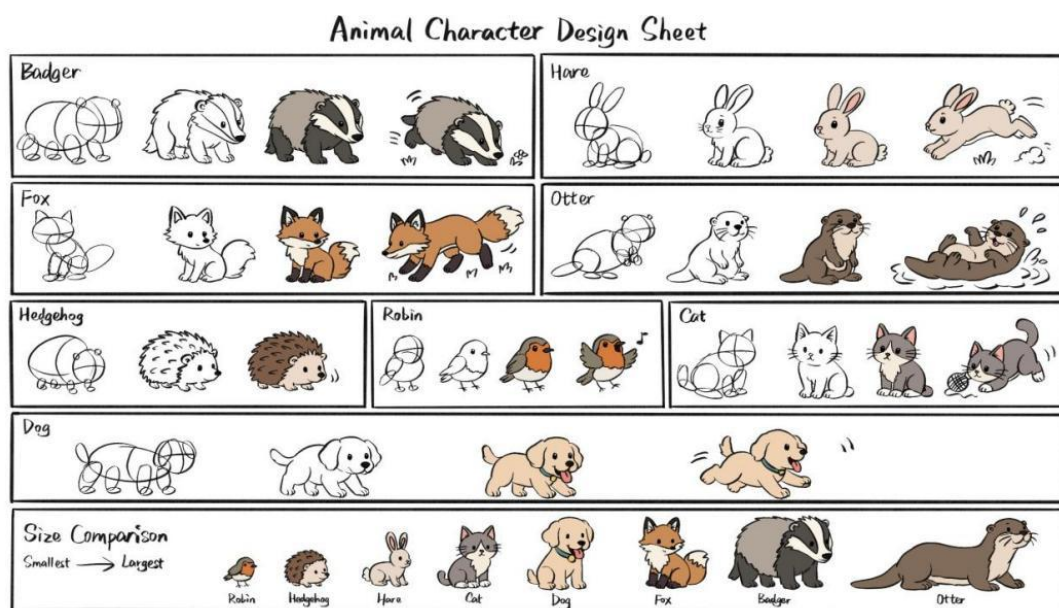


Figure 9. Animal character concept designs for the game project. Source: Author's own creation.

The interface size of mobile games has certain limitations, so we should minimize the visual expression of text. Text can elaborate on ideas, while sans-word comics rely on image graphics to convey information. Therefore, my design mainly uses the body states and facial expressions of animals to depict the heat. Considering the characteristics of casual mobile games, the opening story should be brief, aiming to evoke the players' empathy rather than presenting all the scientific knowledge.

The opening of the game features an eight-panel comic without text, with the red fox from Swansea as the main character. It uses the experiences of animals to illustrate the impact of the heat island effect (see Figure 10). However, the opening narrative also

has limitations. It is the prelude to the game, and players can skip it directly. Once skipped, the emotional setup created by this scene will be missing.



Figure 10. Game opening-story interface showing a fox seeking cool refuges in Swansea's heat-island urban environment. Source: Author's own creation.

To solve this problem, the game sets up animal dialogue boxes, which pop up when players enter the game scene and complete the stage tasks. Even if players skip the opening comic, they can still perceive the survival pressure on wild animals caused by high temperatures through the animal's states during gameplay and exploration.

The game map is mainly used for area selection. It uses a color gradient of red, orange, yellow, and green to represent temperature, relying on the perceptual rules related to memory colors to visualize the abstract heat island environmental information and reduce the cognitive burden of the audience (Witzel and Hansen, 2015).

The UI button planning includes default, pressed, selected, disabled, successful operation, etc. multiple interaction states (see Figure 11). It outputs operation feedback through color and border changes, adapts to the touch logic of mobile terminals, and the button proportion needs to be controlled within a reasonable range to avoid being too small and unclear or too large and blocking the game screen (Zagata and Medyńska-Gulij, 2023).

GAME UI DESIGN

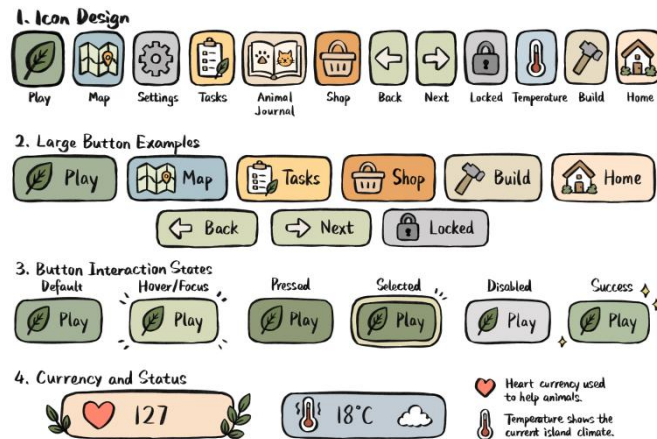


Figure 11. UI design sketch. Source: Author's own creation.

The experience process is hierarchically built: the sans-serif comic strip completes the emotional preparation, choosing a pet companion enhances the bond, then entering the map to carry out the cooling task, obtaining achievement rewards through the task, and the rewards are used for interacting with animals (see Figure 12). The cooling proficiency growth system is designed as a companion, using progressive incentives to maintain participation (Adewojo, 2025).

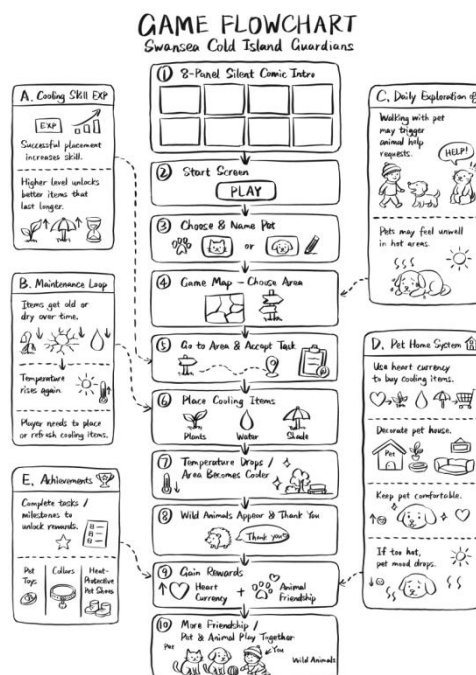


Figure 12. Flow-chart of game play-through. Source: Author's own creation.

The interface elements adopt a unified hand-drawn artistic style. The game features three mechanisms: achievement rewards (see Figure 13), changes in animal affection, and pet emotions (see Figure 14). These are in line with the design goals of this project for the local young pet-owning population.

Drawing on the research conclusions of educational games, this game's reward feedback system places more emphasis on showing the actual changes brought about by the player's actions, allowing the player's actions to directly affect the animal's emotions, rather than merely providing simple numerical rewards (Bui et al., 2020).



Figure 13. Achievement-reward interface. Source: Author’s own creation.

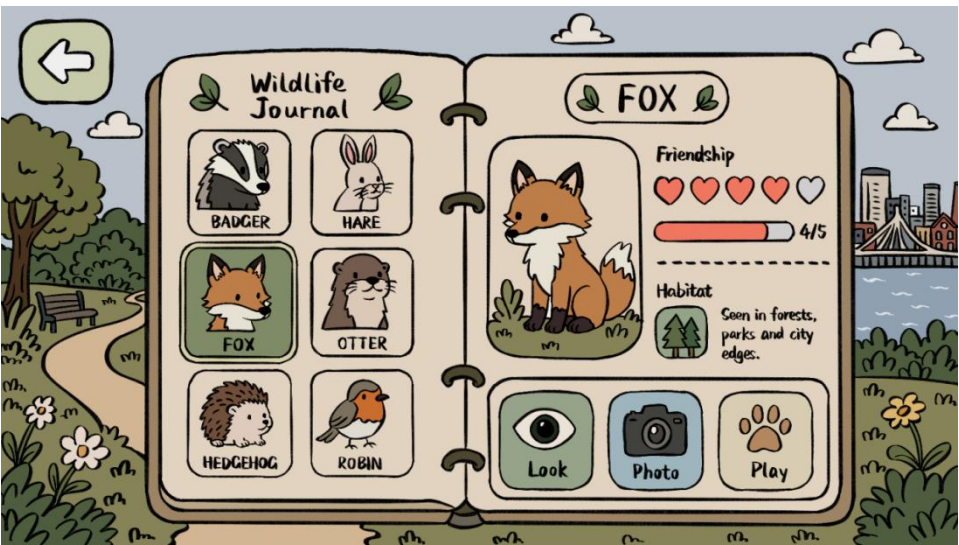


Figure 14. Animal-affection bestiary interface. Source: Author’s own creation.

Reflection and Future Development

This project produced a complete set of static visual solutions for the Swansea Science and Leisure mobile game, integrating non-human narratives and the concept of flow theory into the game's visual design. The design drew on the local coastal city's characteristic elements, used colors to vividly present the abstract phenomenon of heat islands, and through the perspective of animals, evoked players' empathy, avoiding the problem of dry and didactic science content. It adapted to the fragmented entertainment habits of young people and the visual templates produced can also be applied to other coastal cities.

The project involves a visual exploration of the theme of animal protection in a hot island environment. Subsequently, real user feedback can be collected for further optimization, or cooperation with local animal protection organizations can be pursued to expand offline education and enhance the practical dissemination effect of the work.

As the current design only covers the static aspects, there are no corresponding dynamic images for equipment wear and tear or animal mood fluctuations. Only relying on dialogue text to convey information and feelings will reduce the immersive experience of players. In the future, image prompts can be set to guide players' operations, reducing the problem of losing the immersive experience due to players' unfamiliarity with the operations; at the same time, real user feedback can be collected for continuous optimization, and cooperation with local animal protection organizations can be established to extend offline scientific popularization, thereby enhancing the actual dissemination effect of the work.

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Picture

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