# Heuristic Evaluation of TechWise

1. Problem

We reviewed the medium-fi prototype of TechWise (iPad Pro 12.9) on Figma which is a gamified app that allows older adult users to gain more technical knowledge through a virtual chat system.

2. Violations Found

1. **H1: Visibility of System Status / Severity 3 / Found by: B**
   Problem: When the TechIQ score is at 3, the status bar is about ¾ filled in. After you go through inventory flow, the score goes to 4 and the status bar goes back to 0. It may not be clear to users why this is.
   Fix: I would either get rid of that status bar at the bottom or explain that it went back to 0 for a reason.
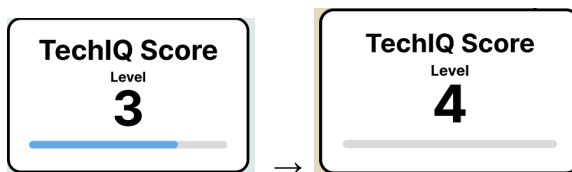
2. **H1: Visibility of System Status / Severity 1 / Found by: A**
   Problem: As a user is placing a new technology in their home, the technology appears beside them before placing it down in the highlighted area. This may confuse some users to make them believe the technology is already placed down without their input, which doesn't reflect the actual status of the technology's placement.
   Fix: subtract the technology from this screen, or show the player character holding the technology in their hands to indicate that it hasn't been placed yet.

3. **H1: Visibility of System Status / Severity 2 / Found by: A**
   Problem: When the user has to complete a 'learning task' to let themselves buy a technology, they first have to read about the technology before knowing the nature of the assessment they must complete. Knowing the format of this assessment may motivate some users to read the information more closely since they have a more tangible expectation that they'll be tested on the material.
   Fix: make the quiz requirement more visible to the user by renaming 'learning task' to 'learning quiz' or something similar.

4. **H1: Visibility of System Status / Severity 2 / Found by: B, C**
   Problem: The first screen text introduction sequence lacks indication of user progress or any indication of what to click (no next button). Users may be unsure of how far along they are in the process and how many more steps they need to go through until they can join.
   Fix: Add a progress status bar to the flow or a menu bar especially as you continue to ask questions. Add "Next" and "Back" buttons

5. **H1: Visibility of System Status / Severity 1 / Found by: A**
   Problem: On the summary screen after completing a game for the user to earn money, the text says "Today you've earned: [amount]," but this text may not literally match the money amount the user has earned that day, instead displaying the money they've earned in their most recent game session.
   Fix: intentionally choose to display all money earned that day along with the amount earned that session, or rephrase the text to reflect that the money amount is only earnings from the most recent session.

6. **H2: Match between System and World / Severity 1 / Found by: B**
   Problem: After you choose a theme, nothing happens. There is no indication of that theme. This problem persists for every onboarding form. I think it would be helpful
   Fix: Maybe change the wording on the screens after choosing a button to reflect their choice? Like "Oh awesome, we use iPads all the time too!"

7. **H2: Match between System and World / Severity 2 / Found by: C**
   Problem: The inventory lists a desktop computer as a "Desktop." Users with little technological background might not know this is shorthand for "Desktop Computer."
   Additionally, the image of the desktop has what appears to be a scripting tag on the monitor. The target users will probably not be familiar with this.
   Fix: Use images and text with content older adults will more likely know.

8. **H2: Match between System and World / Severity 2 / Found by: C**
   Problem: The smart TV in my home looks like an older TV. To effectively teach people about the technology, it should look like it does in real life.
   Fix: Edit the smart TV image to look like a real smart TV.

9. **H2: Match between System and World / Severity 3 / Found by: A, B**
   Problem: The word "IQ" usually means a test of someone's knowledge and in this case, it's technology knowledge. This word may not match what happens in the app and how you gain IQ. There is a risk that users may find it demeaning.
   Fix: Change the word IQ to something different

10. **H2: Match between System and World / Severity 2 / Found by: A**
    Problem: At the end of the onboarding tutorial, there is only one block of text dedicated to showing the user the function of all the buttons (Go to Work, Go to Store, Inventory, and TechIQ score). This doesn't match the way people learn to make new associations between buttons and their functions, since each association must be made one at a time.
    Fix: introduce each button and its function individually to make stronger mental connections.

11. **H2: Match between System and World / Severity 2 / Found by: A**
    Problem: In the shopping task, TechWise introduces themselves as a virtual assistant to the user,

but there is a character behind the shop counter that looks very similar to the player character, which might implicitly indicate to the user that the agent they're communicating with is a real human like them. This would create a very critical mismatch between the user's mental model and the system itself.

Fix: change the appearance of the TechWise character to more clearly indicate that it is an AI chat technology, or make that much more clear when the user starts chatting with them at first.

12. **H3: User Control and Freedom / Severity 1 / Found by: A, C**
Problem: In the final screen of onboarding, the user is told that they can access their wallet from the home screen, when the wallet is only accessible when at the store. This gives users the illusion that they have more control over their wallet than they do, and may create confusion for some users that the TechIQ score may be their wallet. Also, this text says the user can go to "the market," but "store" is used throughout the rest of the app.
Fix: show the wallet on the home screen, or remove that final part of the text prompt. Change "market" to "store."

13. **H3: User Control and Freedom / Severity 1 / Found by: B**
Problem: Users cannot choose a different theme after they have initially gone through onboarding. Maybe they want to change the theme?
Fix: Add in button or settings to change theme or learning goals

14. **H3: User Control / Severity 3 / Found by: A, B**
Problem: After a user selects that they 'already know what they're looking for' in the shopping task, it takes them to a screen with a few technologies. However, if the user made a mistake or just wants to navigate back to the chat, the only option to undo that decision is to exit the shop completely and re-enter the chat. This extra navigation isn't necessary and can create even greater problems with more complex flows.
Fix: Give users the option to go back to the chat/ask the virtual assistant for more help without exiting the shopping flow.

15. **H3: User Control and Freedom / Severity 4 / Found by: A, B, C**
Problem: There is no way to go back all throughout the shopping or inventory flow.
Fix: Add in back '←' arrow on modal to all of the screens shopping or inventory flow.

16. **H3: User Control and Freedom / Severity 4 / Found by: B**
Problem: There isn't an option right now to help users understand how to properly install or get help with a current technology. The only time to chat with a virtual assistant is when you are in the app
Fix: Add a help button that pops open a chat.

17. **H4: Consistency and Standards / Severity 1 / Found by: B**
Problem: Sometimes the buttons say Go Home instead of Go to Home. Choose one and keep it

consistent.

Fix: Ensure that all buttons or CTAs are the same style.

[Go Home] [Go to Home]

18. **H4: Consistency and Standards / Severity 2 / Found by: B, C**

Problem: There isn't an immediate connection between Go to Work and playing a game. Users may have understood it after they realized that playing the game led to more money, but it is confusing.

Fix: You could consider a pop-up chat or change the icons to be more familiar to the user.

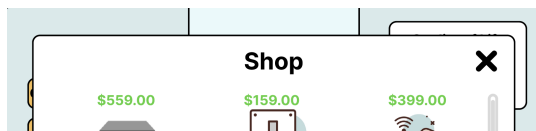19. **H4. Consistency and standards / Severity 2 / Found by: B**

Problem: The techIQ score square is inconsistent across multiple screens. It sometimes appears at the left of the screen, the right of the screen or sometimes doesn't appear at all, distracting the user.

Fix: Keep that design consistent on certain screens. I would put it to the left of each screen or remove it entirely. You could switch the door in the shop screen to the right side and switch the TechIQ score back to the left side.

20. **H4. Consistency and standards / Severity 2 / Found by: B**

Problem: The background is sometimes grayed out with modals and sometimes not.

Fix: Gray out the background every time a modal shows up

21. **H4. Consistency and standards/ Severity 1 / Found by: B**

Problem: Choosing to buy the game console on the shop modal selects SmartTV.

Fix: Change either the SmartTv screen or the game console icon.

22. **H4: Consistency and Standards / Severity 1 / Found by: B, C**

Problem: In the Inventory (in the inventory placement flow), the image sizes are inconsistent.

Fix: Adjust the image sizes to match.

23. **H4: Consistency and Standards / Severity 1 / Found by: A**

Problem: On the main home screen, the buttons to go to the store and to go to work are near a door that indicates how the player would interact with physical space to go to these places. The button to access the player's inventory is attached to nothing, just staying in the bottom left. For internal consistency, and to help construct a solid user mental model of the game features using physical space, there should be some physical analogue to represent the inventory.

Fix: a closet, storage box, or something similar to sit in the room next to the inventory button.

24. **H4 Consistency / Severity 2 / Found by: A, B, C**
Problem/Fix: Choose to either use "Score" or "Level" descriptor on TechIQ display.

25. **H6: Recognition and Recall/ Severity 2 / Found by: A, C**

Problem: In the onboarding flow, splitting up sentences between screens feels a bit choppy and there's no way to go back to recall.

Fix: Keep sentences on the same screen in onboarding.

26. **H6: Recognition and Recall / Severity 2 / Found by: B, C**
Problem: While it may seem obvious that you are at work, shop, or home, there should be a title at the top.
Fix: Add titles to all screens

27. **H6: Recognition and Recall/ Severity 2 / Found by: A, B, C**
Problem: I expect to be able to click TechIQ score so I can understand what that means and where the score is coming from. Also, if I'm a competitive user I may want to know how to increase that score.
Fix: Add a tooltip or popup that shows up when TechIQ is clicked.

28. **H6: Recognition and Recall/ Severity 2 / Found by: C**

Problem: On the puzzle page, the user sees how much money they have earned but not how much money they currently have. If they were saving up for a specific item, they would need to remember how much money they had to earn to afford it.

Fix: Add a count of the user's current amount of money on the puzzle page.

29. **H7: Flexibility and Efficiency of Use / Severity 3 / Found by: B**
Problem: It seems like every time you want to shop, users have to interact with the virtual assistant. What if users already know what they want or want to continue a chat from last time?

Problem: It is not standard to click a chat box to go somewhere or skip a flow. If users don't want to chat with the virtual assistant, there should be a yellow button for it instead of clicking in the chat screen.
Fix: Consider changing the wording or button color/size of the "Tap here to directly browse" flow or add in a separate introduction screen that saves previous chats and allow users to skip this interaction if they want

30. **H7: Flexibility and Efficiency of Use / Severity 2 / Found by: A**
Problem: When the virtual assistant asks the user whether they'd like to purchase the new technology, the only option they have to pursue that option is to manually type 'YES' in the chat. There are more efficient ways to have users confirm their interest and navigate through the game with more fluency. For example, the prototype already includes a clickable button in the text chat to take the user to the shopping page, so a similar idea could be implemented here.

Fix: let users simply press a button to navigate to the confirmation page instead of typing something out manually.

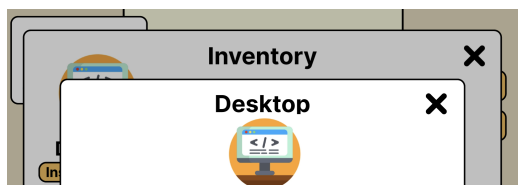31. **H8: Aesthetic & Minimalist Design / Severity 1 / Found by: A**
Problem: On the page that displays an individual product that the user may buy from the store, the page layout is completely vertical with no deviation from the simple arrangement of text, images, and buttons. To make this page easier to understand at first glance, using references from typical online shopping pages that the target user base may be familiar with could increase the legibility of the text and buttons.
Fix: use a more horizontal layout that draws upon design choices from other real online shopping platforms.

32. **H8: Aesthetic & Minimalist Design / Severity 2 / Found by: B**
Problem: This visual hierarchy when info is clicked on the inventory screen is distracting for the user.
Fix: I would maybe consider just taking the user to a different section on the first modal instead of doing a modal within a modal or add a higher contrast.

33. **H8. Aesthetic and minimalist design / Severity 1 / Found by: B**
Problem: Unclear why the background changes to this tie-dye background on the work screen. It's a tad inconsistent with the rest of the app and distracts the users with the different more neon-like colors.
Fix: Change the background screen to be more aesthetically pleasing
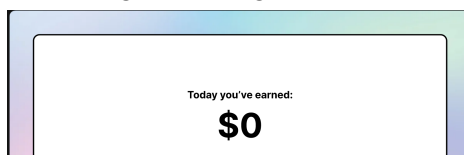
34. **H11: Accessible / Severity 4 / Found by: A, B, C**
Problem: There are no indications of accessibility throughout the app. Will you be able to talk into the app if you are visually impaired? What if users want to change the colors of the font etc?
Fix: Add audio (text to speech, speech to text) or additional personalized settings

35. **H12: Value Alignment & Inclusion / Severity 2 / Found by: A, B**
Problem: There is no option to change your avatar or the person who the user expects represents them

Fix: Add an option to choose a different avatar or allow users to create their own avatar.

36. **H12: Value Alignment & Inclusion / Severity 2 / Found by: B, C**
Problem: Have you thought about monetary inclusion? It looks like most of the technology on the app right now is minimum $400. Not all users will have that much disposable money.
Fix: Add an option to add in their own technology and use generative AI to get information about that piece of technology. Add in cheaper options or create your own digital currency.

37. **H12: Value Alignment & Inclusion / Severity 1 / Found by: C**

Problem: In the onboarding process, saying this game will improve users' quality of life may be seen as insulting their current life.

Fix: Remove the references to improving the users' quality of life. Find a way to rephrase the idea.

38. **H10: Help and Documentation/ Severity 1 / Found by: C**

Problem: In the onboarding process, the question about the user's favorite theme or style is confusing. It is not clear what the question is referring to.

Fix: Add context to the question that the user is picking a theme for their virtual house.

39. **H10: Help and Documentation / Severity 1 / Found by: A**
Problem: While the room that the user begins in is explained to be their home in the game, there is no clear explanation that the character on-screen is in fact controlled by the character. As the user boots up the game and undergoes onboarding, it appears as if the character is speaking to the user directly to introduce them to the game, when in fact there is no clear narrator, and the character represents the user. For an older audience, this may not be clear right away, and could lead to some confusion.
Fix: add an introduction to the player character in onboarding to help document what can be controlled on-screen.

40. **H11: Accessible / Severity 1 / Found by: A**
Problem: The info description for the Smart TV features a block of text with very close spacing. While the font is large and legible, the spacing makes it more difficult to read and could especially pose a problem for the prototype's intended user base of older adults who may have low vision.
Fix: keep the font large, but make the text either scrollable (with clear indication of its scrollability) or make the pop-up window larger to accommodate a wider spacing.

41. **H12: Value Alignment & Inclusion / Severity 1 / Found by: C**
Problem: In the smart TV learning task, asking users if a smart TV has a built-in microwave may

feel as though the app is talking down to them.

Fix: Change the option to something more believable.

3. Summary of Violations

Category	# Viol. (sev 0)	# Viol. (sev 1)	# Viol. (sev 2)	# Viol. (sev 3)	# Viol. (sev 4)	# Viol. (total)
H1: Visibility of Status		2	2	1		**5**
H2: Match Sys & World		1	4	1		**6**
H3: User Control		2		1	2	**5**
H4: Consistency		4	4			**8**
H5: Error Prevention						**0**
H6: Recognition not Recall			4			**4**
H7: Efficiency of Use			1	1		**2**
H8: Minimalist Design		2	1			**3**
H9: Help Users with Errors						**0**
H10: Documentation		2				**2**
H11: Accessible Design		1			1	**2**
H12. Value Alignment & Inclusion		2	2			**4**
Total Violations by Severity	**0**	**16**	**18**	**4**	**3**	**41**

4. Evaluation Statistics

ex) If Evaluator A found 1 of the 4 total severity 1 violations, they would put down 25%

Severity / Evaluator	Evaluator A	Evaluator B	Evaluator C
sev. 0	0%	0%	0%
sev. 1	44%	37.5%	31.25%
sev. 2	44%	55.5%	55.55%
sev. 3	50%	100%	0%
sev. 4	66%	100%	66.67%
total (sev. 3 & 4)	57%	100%	28.57%
total (all severity levels)	46%	56%	41.46%

*Note that the bottom rows are *not* calculated by adding the numbers above it.

5. Summary Recommendations

Overall, we really enjoyed exploring your medium fidelity prototype and have appreciated witnessing the evolution of your ideas throughout the quarter, especially since our grandparents need this app :) . The task flows for adding something from inventory, onboarding and purchasing a new item are straightforward. We have some high-level feedback related to certain violations and task flows. It looks like your biggest areas of improvement lie in H2: Match between System & World, H3: User Control & Freedom, H4: Consistency & Standards and H8: Aesthetic & Minimalist Design. When it comes to task flows and violations, it seems that users can go through each task, but that there are some inconsistencies and obscurity.

We would recommend working on the onboarding flow more. The UI could use a few tweaks, such as including forward and back buttons and keeping sentences on the same screen, as noted above. Additionally, we suggest including a bit more information about the concrete goals of the game, such as what the TechIQ score is and how to increase it.

Generally, many of the violations found and the recommendations made for future iterations of this prototype revolve around the need for more sensitivity to the target user base. While great care has already been taken to make the interface design quite accessible, further tweaks in font size, spacing, and text formatting could increase the legibility and comprehension of users that potentially could have low vision, short-term working memory, or impaired motor coordination. Additional sensitivity could extend to the inclusion of more accessible modes of information input and output, possibly through speech-to-text functionality or even text-to-speech for the variety of complex explanations about technology that are the core of the game. Since this game prototype draws upon a visual style and interaction system that is mostly unfamiliar to a user base of this age and tech experience, more care should be taken to individually introduce the various functions and interaction options for each aspect of the prototype. Just as much as the game is trying to educate about technologies of increasing complexity,

it should take even greater consideration that the user is learning the technology of the game simultaneously, and should provide both high-level and low-level documentation about the purpose and minute functionality of the game.

When designing for adult education, one must also find a balance between being informative and talking down to them. While they may not be experienced in the world of technology, the target audience can still think critically. Asking if a TV "has a built-in microwave" and similar questions may feel like an insult to their intelligence. We also recommend removing references to users' "quality of life" in the onboarding process, as the app should avoid the possibility of making users feel bad about their current life situation. In a similar vein, the use of real currency in the game may cause feelings of insecurity if a user did not have that amount of disposable money in the real world. As you design a simulation to help users with their life in the real world, consider how the simulation might affect users' feelings toward the real world, and vice versa.

Finally, there seems to be a disconnect between going to work and playing puzzle games. Much of the user base is probably retired, so going to work may not feel relevant to them. We recommend considering reframing the way users earn virtual income.

Severity Ratings

0 - don't agree that this is a usability problem
1 - cosmetic problem
2 - minor usability problem
3 - major usability problem; important to fix
4 - usability catastrophe; imperative to fix

Heuristics

H1: Visibility of System Status
- Keep users informed about what is going on

H2: Match Between System & Real World
- Speak the users' language
- Follow real world conventions

H3: User Control & Freedom
- "Exits" for mistaken choices, undo, redo
- Don't force down fixed paths

H4: Consistency & Standards

H5: Error Prevention

H6: Recognition Rather Than Recall
- Make objects, actions, options, & directions visible or easily retrievable

H7: Flexibility & Efficiency of Use
- Accelerators for experts (e.g., gestures, kb shortcuts)
- Allow users to tailor frequent actions (e.g., macros)

H8: Aesthetic & Minimalist Design
- No irrelevant information in dialogues

H9: Help Users Recognize, Diagnose, & Recover from Errors
- Error messages in plain language
- Precisely indicate the problem
- Constructively suggest a solution

H10: Help & Documentation
- Easy to search
- Focused on the user's task
- List concrete steps to carry out
- Not too large