Title: Guidelines for Unique Vulnerable Communities

ID	Guideline: Description

Elderly Communities

ID	Guideline: Description
E1	**Reduce short-term memory load:** Reducing the cognitive load is particularly important for the elderly, who may have decreased working memory, and for individuals with low digital literacy, who may not be as familiar with digital navigation patterns. [1]
E2	**Maintain focus on current action:** Older users have more trouble concentrating. [2]
E3	**Reduce options and available elements:** Older users have a better user experience with simpler layouts.
E4	**Introduce features in an incremental fashion:** Studies found older adults are more willing to use computers if the system is simple, features are added incrementally, and a supportive environment is provided.
E5	**Readable – easier to understand text content:** Different age groups have different reading levels and understanding of jargon.
E6	**Accuracy and precision:** Elderly users may find it difficult to see the buttons or text on the screen.
E7	**Adaptable – content presented in different ways:** Enables users to access information in multiple ways (spoken aloud, simpler layout, etc.) without losing structure or information.
E8	**Contextualised help:** Contextual help avoids requiring search or complex navigation, which may be difficult or inaccurate for older users. Instructions should be step-by-step.
E9	**Provide a safe exit on any screen:** Older adults may feel anxious when unsure what to do and need an easy way to return to familiar screens.
E10	**Don't assume knowledge of symbols:** Symbols often rely on tech-literate knowledge that elderly users might not understand.
E11	**Prefer tapping over gestures:** Older users may have motor skill challenges that make gestures difficult, which is compounded by a lack of familiarity.

Low-Digital-Literacy Communities

ID	Guideline: Description
D1	**Include short, simple instructions in Help menu:** Ensure help menus are short and easy-to-understand without jargon and are quick to action.
D2	**Enable customisation:** Allow users to customise the content, layout, and other settings for the application.
D3	**Consistency:** Use a consistent colour scheme and typography throughout the app; maintain the same navigation patterns across different sections.
D4	**Predictable:** Ensure the app behaves in ways that users would expect, avoiding mixed or conflicting signals.
D5	**Use multiple modes of interaction:** Allow users to interact with content in multiple ways, such as text, audio, video, etc., for better comprehension.
D6	**Use distinct audio output:** Make sounds distinctive and customisable so users can control the volume and recognise what each sound means.
D7	**Avoid unfamiliar visuals – use things that users understand:** Either be more universal in symbolism or use different symbols for different cultures or regions (or both).
D8	**Avoid abstract and detailed imagery:** Show real-life actions via semi-abstract visuals; avoid unnecessary detail that distracts.
D9	**Conceptual models – help build mental models:** Use affordances, signifiers, etc., in a way that shows how the design functions and maintains a consistent mental model for users.
D10	**Affordances – indicate applicable actions:** Buttons, links, and menu items should clearly indicate that they can be interacted with, especially in contrast to other elements on screen.
D11	**Constraints – reduce cognitive load and distraction:** Keep interfaces and content short and concise; set limits on user interaction to focus on what's relevant.
D12	**Signifiers – indicate results of actions:** Communicate through design (e.g., labels or icons) what outcome is expected from interacting with elements.
D13	**Adopt culturally responsive design:** Use localised symbols (e.g., currency), adapt graphics & colour schemes to local preferences.

ID	Guideline: Description (continued)
D14	**Error-free operation:** Apps should be as error-free as possible and, when they fail, should fail "gracefully" instead of crashing.

🌲 Rural Communities

R1	**Split content into pages:** Pagination enables partial loading to help in areas with poor Internet access.
R2	**Promote your app/website – make it easy to find:** Rural-facing content is easily overwhelmed in search results due to poor SEO or being out-competed by generalised content.
R3	**Learnability:** Rural users may have lower digital literacy and need more learnable apps.
R4	**Memorability:** More memorable apps get higher adoption and are more effective.
R5	**Rely on telecommunication rather than Internet:** Internet access can be poor, but other connectivity methods like direct sharing are often available.

🕶 Color-Blind Communities

C1	**Test against tools:** Use existing accessibility assessment tools such as WCAG tool suites & colour-blindness simulators.
C2	**Use more than just colour to distinguish things:** Don't rely solely on colour to inform users; add other indicators like symbols or shapes.
C3	**Use thicker lines or bigger elements:** Some users can still see colours but need stronger contrast or larger elements to perceive them.
C4	**There are no colour-blind-friendly colours:** All chromatic colour palettes will cause issues for some colour-blind users, so use non-colour cues.
C5	**Underline links:** Avoid relying only on colour to denote links; add an underline or another visual indicator.
C6	**Supplement colour coding with text:** Use labels in addition to colour codes so users have a fallback option.
C7	**Use patterns:** Apply patterns to colour-coded elements to help distinguish between categories or states.
C8	**Alter designs to avoid colour conflicts:** Modify the interface to prevent problematic colour combinations at the design level.
C9	**Keep it simple:** Use a limited colour palette with fewer variations to reduce confusion.
C10	**Colour-blind users have different preferences:** Colours such as red and green have common meanings for most users, but colour-blind users may interpret them differently.

References

[1] B. Shneiderman, C. Plaisant, S. M. Jacobs, M. S. Cohen, N. Diakopoulos, N. Elmqvist, Designing the User Interface: Strategies for Effective Human-Computer Interaction (6th Edition), 6 ed., Pearson, 2017. URL: `https://www.cs.umd.edu/hcil/DTUI6`.

[2] M. Gomez-Hernandez, X. Ferre, C. Moral, E. Villalba-Mora, Design guidelines of mobile apps for older adults: systematic review and thematic analysis, JMIR mHealth and uHealth 11 (2023) e43186.