





Title: Guidelines for Unique Vulnerable Communities

ID	Guideline: Description
	Elderly Communities
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 [2]
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 [3]
E5	Readable – easier to understand text content: Different age groups have different reading levels and understanding of jargon [4]
E6	Accuracy and precision: Elderly users may find it difficult to see the buttons or text on the screen [5]
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 [4]
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 [2]
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 [2]
E10	Don't assume knowledge of symbols: Symbols often rely on tech-literate knowledge that elderly users might not understand [2]
E11	Prefer tapping over gestures: Older users may have motor skill challenges that make gestures difficult, which is compounded by a lack of familiarity [2]
	Low-Digital-Literacy Communities
D1	Include short, simple instructions in Help menu: Ensure help menus are short and easy-to-understand without jargon and are quick to action [6]
D2	Enable customisation: Allow users to customise content, layout, and other settings for the application [6]
D3	Consistency: Use a consistent colour scheme and typography throughout the app; maintain the same navigation patterns across different sections [7]
D4	Predictable: Ensure systems behave in ways users expect, avoiding mixed or conflicting signals [4]
D5	Use multiple modes of interaction: Allow users to interact with content in multiple ways, such as text, audio, video, etc., for better comprehension [6]
D6	Use distinct audio output: Make sounds distinctive and customisable so users can control the volume and recognise what each sound means [8]
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) [9]
D8	Avoid abstract and detailed imagery: Show real-life actions via semi-abstract visuals; avoid unnecessary detail that distracts [9]
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 [7]
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 [7]
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 [7]
D12	Signifiers – indicate results of actions: Communicate through design (e.g., labels or icons) what outcome is expected from interacting with elements [7]
D13	Natural mapping: Controls, interfaces, etc. should reflect their relationship with their effects and the real world [7]

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ID	Guideline: Description (continued)
D14	Adopt culturally responsive design: Use localised symbols (e.g., currency), adapt graphics & colour schemes to local preferences [6]
D15	Error-free operation: Apps should be as error-free as possible and, when they fail, should fail “gracefully” instead of crashing [8]
 Rural Communities	
R1	Split content into pages: Pagination enables partial loading to help in areas with poor Internet access [10]
R2	Promote your app/website – make it easy to find: Rural-facing content is easily overwhelmed in search results due to poor Search Engine Optimisation or being out-competed by generalised content [11]
R3	Learnability: Rural users may have lower digital literacy and need more learnable apps [12]
R4	Memorability: More memorable apps get higher adoption and are more effective [12]
R5	Rely on telecommunication rather than Internet: Internet access can be poor, but other connectivity methods like direct sharing are often available [13]
 Color-Blind Communities	
C1	Test against tools: Use existing accessibility assessment tools such as WCAG tool suites & colour-blindness simulators [14]
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 [15]
C3	Use thicker lines or bigger elements: Some users can still see colours but need stronger contrast or larger elements to perceive them [14]
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 [15]
C5	Underline links: Avoid relying only on colour for links: add an underline or another visual indicator [14]
C6	Supplement colour coding with text: Use labels + colour codes allowing users have a fallback option [16]
C7	Use patterns: Apply patterns to colour-coded elements to help distinguish between categories or states [15]
C8	Alter designs to avoid colour conflicts: Modify the interface to prevent problematic colour combinations at the design level [17]
C9	Keep it simple: Use a limited colour palette with fewer variations to reduce confusion [15]
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 [14]

References

- [1] B. Shneiderman, C. Plaisant, S. M. Jacobs, M. S. Cohen, N. Diakopoulos, N. Elmquist, 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.
- [3] S. J. Czaja, M. C. Clark, R. A. Weber, D. Nachbar, Computer communication among older adults, in: Proceedings of the Human Factors Society Annual Meeting, volume 34, SAGE Publications Sage CA: Los Angeles, CA, 1990, pp. 146–148.
- [4] Web content accessibility guidelines (wcag) 2.2, 2024. URL: <https://www.w3.org/TR/WCAG22>, [Online].
- [5] L. Ruzic, C. Harrington, J. Sanford, Universal design mobile interface guidelines for mobile health and wellness apps for an aging population including people aging with disabilities, Int J Adv Softw 10 (2017) 372–84.
- [6] A. Srivastava, S. Kapania, A. Tuli, P. Singh, Actionable ui design guidelines for smartphone applications inclusive of low-literate users, Proceedings of the ACM on Human-Computer Interaction 5 (2021) 1–30.
- [7] D. Norman, The design of everyday things: Revised and expanded edition, Basic books, 2013.
- [8] M. L. Tan, R. Prasanna, K. Stock, E. E. Doyle, G. Leonard, D. Johnston, Modified usability framework for disaster apps: a qualitative thematic analysis of user reviews, International Journal of Disaster Risk Science 11 (2020) 615–629.
- [9] L. M. Money, Designing for digital confidence, 2024. URL: <https://digitalconfidence.design/opportunities>, [Online].
- [10] L. A. Zaina, R. P. Fortes, V. Casadei, L. S. Nozaki, D. M. B. Paiva, Preventing accessibility barriers: Guidelines for using user interface design patterns in mobile applications, Journal of Systems and Software 186 (2022) 111213.
- [11] J. Groves, Web sites for rural australia: designing for accessibility, Barton (ACT): Rural Industries Research and Development Corporation (2000).
- [12] V. Maphosa, Covid-19 and the digital ecosystem: Using a mobile app to connect a rural community, Aquademia: Veritas Publications LTD 5 (2021) 1–9.

- [13] E. Roberts, B. A. Anderson, S. Skerratt, J. Farrington, A review of the rural-digital policy agenda from a community resilience perspective, *Journal of Rural Studies* 54 (2017) 372–385.
- [14] A. Kosari, How to design for colorblind users, 2020. URL: <https://www.colorblindguide.com/post/colorblind-friendly-design/>, [Online].
- [15] J. Gaskin, Color blind design guidelines: A comprehensive guide - venngage, 2023. URL: <https://venngage.com/blog/color-blind-design/>, [Online].
- [16] M. Tak, Guidelines for Designing Inclusive User Interfaces For People with Visual Impairments, Master's thesis, OCAD University, Graduate Studies – Inclusive Design, 2022. URL: <https://openresearch.ocadu.ca/id/eprint/3743>, MRP (Major Research Project).
- [17] J. Bhati, User experience: Design guidelines for color blind users, 2023. URL: <https://www.galaxyux.studio/design-guidelines-for-color-blind-users/>, [Online].