WHITE PAPER

Gerontechnology: UX design principles for practical and engaging agetech solutions

Designing for visual, auditory and cognitive age-related changes

By Susanna Guzman, Lea Martin, Anna Balk and Kaye Turner

Who can solve for the problem of aging? News flash: age is not a problem to solve. When we design digital healthcare tools with end users in mind, we support "health and happiness up to the highest possible age." At the same time, we know from our own research and from the wider healthcare landscape that digital solutions for aging populations are lagging in their designs. Ageism is partially to blame. According to a 2021 United Nations report, one in every two people worldwide holds ageist attitudes. From these data, we can draw two broad inferences:

1. Some digital health tools reflect the makers' age-related biases.

2. These biases influence which tools get made.

Beware age-related stereotypes

Age, it turns out, isn't the strongest predictor of digital technology acceptance. Johanna Birkland, Ph.D., in Information and Communication Tools (ICT) Typology, explains that experiences in childhood and young adulthood exert a stronger effect on a person's use of innovative technologies. Birkland's typology is a research-based tool that can be used to describe and segment five user types according to how they view ICTs:

1. Enthusiasts: Early positive experiences with new technologies; they are "technology evangelists."

2. Practicalists: Formative technology experiences began at work; technologies are simply tools to get the job done.

3. Socializers: Relationships come first; technologies connect them to and grow their social networks.

4. Traditionalists: Favor technologies of their youth; not closed to new ideas but anchor their understanding in references to what's familiar.

5. Guardians: The individual should tightly control technology use; when they don't, moral and social values are at risk.

In her research, Birkland found that these types persisted across generations, from those born during the Great Depression and World War II to millennials. A less obvious implication of this research, and a straightforward finding of other studies, is that older adults are quite a heterogenous group.

Apart from being exclusionary, treating the older adult user group as a homogenous block just isn't good business. Not only does it send a message that the brand doesn't know or doesn't care about inclusion, but it also leaves value on the table. So how can we ensure we're designing digital experiences that serve the widest audience possible? And how can we understand and plan for the realities in which client delivery teams will manage those experiences and interactions over time? Our practical experiences, and a growing evidence base in UX research, form the basis for the following recommendations.

Respect validated age-related physical considerations

A person's capabilities change over time. Visual, auditory and cognitive age-related changes are real and can affect how a user engages with digital solutions. As UX professionals, we

know that successful designs depend on understanding and being able to respond to our user's realities. From our own research, we know that usability improves when we:

- Break text into small, discrete units
- Allow more time and more space for users to engage with interactive elements
- Use text to support imagery and vice versa

For example, in one digital therapeutic prescription app focused on mental health, less tech-savvy users revealed that they needed more time to complete tasks and requested additional onboarding and training materials.

These and other evidence-based standards for digital information experiences can be found through the following resources:

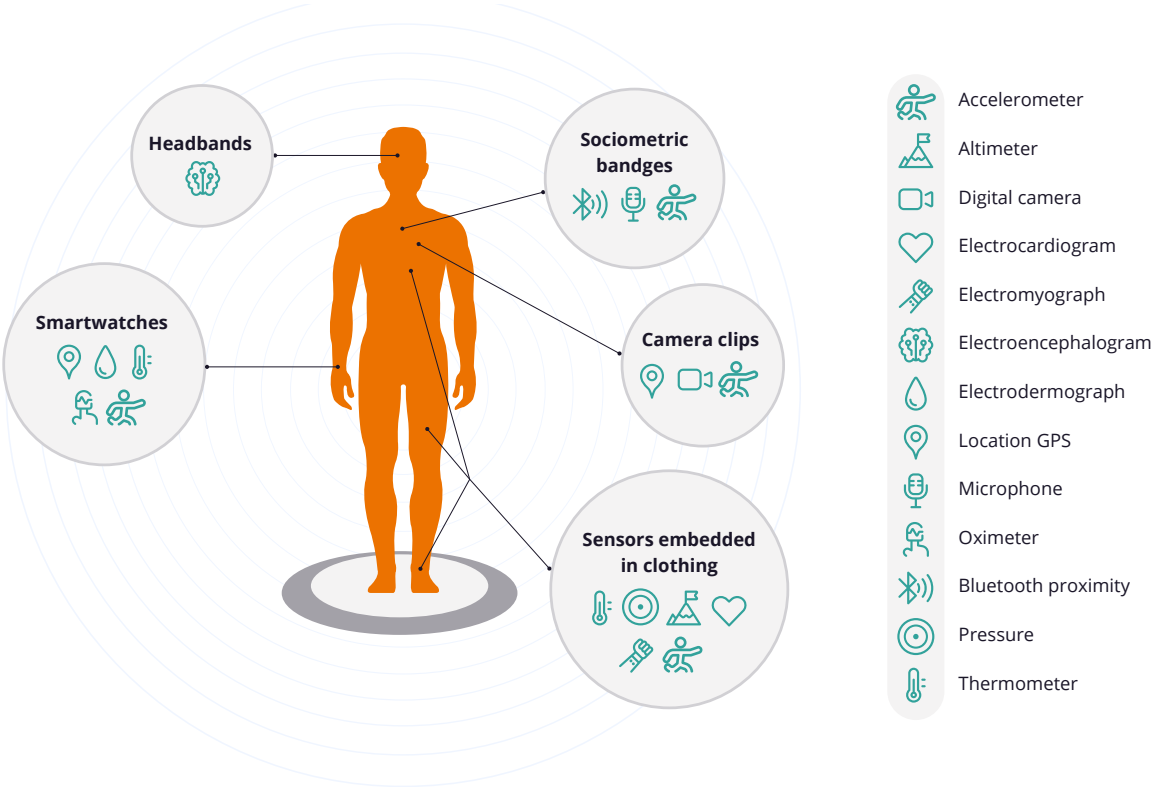
- W3C's web content accessibility guidelines
- Xcertia mHealth app guidelines
- Health On the Net code

Structure content and design for portability and consistency

While they may not be making or watching TikTok videos, older adults aren't necessarily out of touch with digital technologies. Adults 65 and older are more likely than other groups to have a nonsmart phone; for these users, text-based interventions for behaviors such as medication adherence and exercise have proven successful. Best practice in developing digital health solutions is to build for multiple communication channels and content types and show up consistently—in voice and visual design—to all of them. To ensure that your content is ready to go where it's needed, it must be portable, flexible and reusable across multiple communication channels (see the figure below). Build a content model and a pattern library and use them to structure your content and interaction designs for these diverse delivery mechanisms.

FIGURE 1:

What can consumer wearables do?



Source: Piwek, et al., "The Rise of Consumer Health Wearables: Promises and Barriers," PLOS Medicine 13, No. 2 (2016): e1001953, https://doi.org/10.1371/journal.pmed.1001953.

Build beyond the user interface to support health literacy

The U.S. Health Resources and Services Administration (HRSA) defines health literacy as a person's ability to **obtain, process, understand** and **act upon** information to make informed health decisions for themselves or others. It varies by individual, and while age is an independent risk factor for lower health literacy, everyone is vulnerable to diminished health

literacy in acute or stressful situations.

In our experience, there are both micro- and macro-level considerations when building digital experiences to support health literacy. At the level of the page or screen interaction, we do that by following a "keep it simple" strategy for copy and design. Tactically, that means we:

- Avoid technical medical terms and acronyms
- Use plain language rather than relying on clichés or colloquialisms
- Write at a fifth- to eighth-grade reading level
- Put the most important messages at the top and use bulleted and numbered lists
- Support text with iconography or appropriate illustrations and support imagery with descriptive text

At a macro level, where the user encounters not just the digital solution but also related information and environmental triggers and outcomes, it is necessary to think about how "digitizing" some parts of the experience might influence the user's ability to navigate the entire journey effectively. For example, many older people are accustomed to understanding their out-of-pocket medical expenses by reading a printed explanation of benefits (EOB). For these users, merely receiving an email that the EOB is available in PDF form through the insurance company's website may not make it easier for them to act on the information. In fact, the email-to-PDF process can even result in missed payments to providers because the user's original trigger for understanding their current deductible status has moved to a channel they don't consult as often.

In such cases, we use primary and secondary research to build a wider understanding of:

- The user's entire journey, including what happens before and after the part of the process that the digital solution will address
- The user's "jobs-to-be-done"
- How we can build digital solutions that users "hire" to do those jobs
- How an engagement model, which supports the user across multiple channels with content and communications, might improve on the richness of the original analog experience

Signal respect through transparency

For good reason, some users will be suspicious of trusting a digital solution with their personal and private health information. Acknowledging that suspicion and aligning content and design choices to user values can help build trust and confidence (Table 1).

TABLE 1:

Aligning language and experience patterns to user values and concerns

Because users may	Use language that	And experience patterns that
Value politeness over directness	Sounds more friendly, such as "Let's choose a time" instead of "Choose a time"	Avoid automatic assumptive presentation such as autoplay, spontaneous animations or unprompted pop-ups Facilitate clarity of intent through multiple channels (for instance, text and iconography) and clear visual presentation (including readable text without fine print and good contrast for color elements) Facilitate timely and upfront updates about state changes (for instance, announcing upcoming expiration of the logged-in session with an actionable time window to allow the user to choose their desired outcome)
Suspect digital tools pose inherent risks to privacy	Increases transparency, such as assistive and explainer text and imagery (for instance, "Why we're asking this question")	
Have reduced cognitive, perceptual or motor skills	Aligns to voice-enabled functionality	Allow multiple interaction methods (mouse, touch, keyboard only, voice and more)

Strike the right tone

Of course, content and design affect how a user views your product. Older adults are more likely to be facing chronic conditions or juggling care for multiple illnesses, each of which can be stressful. To show empathy and respect for your users' time and energy, and the potential gravity of their situation, use lighthearted or informal language and imagery with caution. Too much levity can convey a lack of seriousness, which may not be appreciated with users at a higher age brackets, causing use to decline.

Move carefully from persona to personal

The best relationships "work" because partners invest time into caring for one another and responding in ways that demonstrate awareness and sensitivity. Digital ICTs and the persona-driven customization capabilities that enable these tools to "talk" with users hold the potential for more intentional and tailored user experiences. But a tool that enables personalized experiences still can't make decisions about which personal characteristics should drive content and design choices. That work still belongs to humans, and we must pay attention to the right things and be careful about the assumptions we're making.

Systems that combine human actors with digital tools include contact centers that support brick-and-mortar businesses and digital channels, such as companion apps. These systems collect information about customers in multiple venues. If you're working in this type of system, you might study customer call content and sentiment to understand ICT typology among callers and use that information to create more tailored digital experiences through content and design (Table 2). For example, in a remote patient monitoring app that supports primarily older adults who fit the "practicalist" and "guardian" profiles, we enabled users to change previously established settings and included language such as "you can always change this later" and "if you change your mind…" to address two fears they shared during testing:

1. That they might "break" the app during normal use
2. That the app might be monitoring more than they had agreed to

TABLE 2:

Suggested language and imagery for aligning to ICT user type

User Type	Use content and design to evoke	By using language and imagery that's	Example: next step prompt
Enthusiast	Novelty, innovation, creativity	Fresh, modern, original	Ready for your next great leap?
Practicalist	Utility, helpfulness, possibility	Instructional, actionable	Take the next step
Socializer	Community, connection, support	Protective, advocatory	Join the <next module's> group
Traditionalist	Nostalgia, youth, comfort	Classic, referential	Begin <next module>
Guardian	Security, safety, privacy	Careful, thoughtful	Ready to take the next step?

Stay open to new insights

People change over time, and so should the digital health experiences that serve them. Constantly updating our understandings and designing new ways for our digital health tools to respond is demanding but also a gift. Serving the widest range of users enables us to accomplish two important goals:

1. Provide real value and support to often-overlooked people
2. Understand our users on even deeper levels, which can reveal new opportunities

About the authors

Susanna Guzman is a lead content strategist within ZS's digital and connected health practice. She has launched the American Academy of Family Physicians' content strategy practice and led development of CFA Institute's first digital governance model. Susanna has more than 25 years of experience in content strategy, operations and engineering across the scholarly publishing, health IT, finance and nonprofit fields. She has led multidisciplinary teams in transforming content, business processes, staff skills and technologies from analog to digital, shifting the paradigm from document management to customer experience delivery.

Lea Martin is a ZS alum. During her tenure in ZS her primary area of focus was on behavioral design and end-to-end research in ZS's digital and connected health practice. Lea has 10-plus years of experience of psychology research and design experience. She has applied her expertise in behavioral economics and behavioral science to a number of topic areas including cigarette craving, the neural underpinnings of language learning, data sharing behavior and digital health facilitated behavior change. Lea has had the opportunity to work across industries, including time spent in academia, healthcare, nonprofit and consulting.

Anna Balk is a lead UX designer at ZS working on projects from discovery to delivery, bringing a data-driven perspective to UX design. A scientist at heart and by training, Anna has been designing efficient and effective experiences in healthcare for 15 years. From academia to for-profit companies to consulting, Anna's approach is to begin with the question and the need. She has worked in B2B and B2C settings, solving complex business and design problems and improving foundational UX processes. Anna understands how complex, adaptive systems work—an especially helpful ability when building technology and experiences that support humans in healthcare.

Kaye Turner is a senior UX content strategist at ZS. With 15-plus years of experience in population health content strategy, engineering and operations across the healthcare landscape, Kaye's focal areas include employee wellness, food security, chronic disease, emotional health and wellbeing, meditation and shamanics, and digital healthcare as the scaled conversation between patient and clinician. Her passion is a lifelong pursuit of what helps folks heal, and her purpose is the team-fueled development of data-driven, digital voices that create genuinely better health outcomes.

About ZS

ZS is a management consulting and technology firm focused on transforming global healthcare and beyond. We leverage our leading-edge analytics, plus the power of data, science and products, to help our clients make more intelligent decisions, deliver innovative solutions and improve outcomes for all. Founded in 1983, ZS has more than 12,000 employees in 35 offices worldwide.

Learn more: ZS.com