



User Centred Design for Age Friendly Environments - the NET4Age-Friendly Experience

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Citizens and older adults are asking for more inclusive and innovative solutions to enhance their quality of life and well-being. Their role is increasingly crucial in driving cultural shifts towards inclusive design and active involvement in evidence-based policy-making that supports healthy ageing during the life course. Health systems, urban planners, and service providers should actively engage this demographic challenge synergically as vital collaborators in the digital transformation to create age-friendly environments. Creating age-friendly environments involves integrating key principles of user-centred design—such as inclusion, accessibility, usability, and engagement—with additional considerations for sustainability, scalability, and, most importantly, a profound impact on individuals' lives and health across all age groups. This collaboration informs the design of inclusive, smart, and healthy environments. By learning from successful global practices and adapting them to local contexts, we can create environments that support the health, well-being, and social participation of all citizens.

The ageing population presents unique challenges and opportunities for communities worldwide. **Creating age-friendly environments is not just essential for local communities, but it has a global impact on the health, participation, and security of older adults.** The World Health Organization (WHO) ¹ defines an age-friendly city or community as one that adapts its structures and services to be accessible and inclusive to older people with varying needs and capacities. It enables people to be and do what they value.

Age-friendly environments are designed to promote healthy and active ageing by addressing the physical, social, and economic determinants of health. These environments enable older adults to remain active and independent for as long as possible, reducing the burden on healthcare systems and enhancing their quality of life. Age-friendly cities and communities are not only beneficial to older adults but all age groups, fostering inclusivity and accessibility.

The **NET4Age-Friendly** project addresses the growing need for age-friendly environments to accommodate the consequences of demographic change: an age-friendly community benefits all ages, and this policy brief outlines key strategies and recommendations for developing and implementing age-friendly communities. The focus is on leveraging smart technologies,

fostering social innovation, and enhancing multi-sectoral collaboration to improve the quality of life for older adults and ultimately all citizens. The insights and recommendations are derived from comprehensive research and case studies presented in the [NET4Age WG1 D6 report](#).

The design of age-friendly environments and communities incorporates **user-centred and inclusive design principles** to create welcoming and accessible spaces for people of all ages.

User centred design (UCD) focuses on the needs, wants, and limitations of end-users to create useful, usable, and enjoyable products or services. In the context of age-friendly environments and communities, user-centred design focuses on ensuring that **the physical environment, infrastructure, and technology are designed with the needs and preferences of older adults in mind.**

Inclusive design of age-friendly environments and communities takes this approach further. It involves four key principles: **inclusion, accessibility, usability, and engagement.**

¹ WHO 19 APRIL 2023 National programmes for age-friendly cities and communities: a guide

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The document "Matrix to Synthesize Existing Knowledge and Critically Assess Practices of Inclusive Design of Innovative Solutions for SHAFE" by Working Group 1 establishes a benchmark for good practices and innovative solutions in Smart Healthy Age-Friendly Environments (SHAFE). It evaluates 112 innovative solutions in SHAFE domains, such as architecture, urban planning, interior design, healthcare, and social care, using eight criteria aligned with User-Centered Design (UCD) principles and the SHAFE Framework, scoring each on a Likert scale from 1 to 5. Solutions scoring over 25 points were included in the analysis, **resulting in 60 out** of 112 solutions being selected.

Practices

There are several existing knowledge and practices in user-centered inclusive design of age-friendly environments and communities.

Evaluation Process

- Solutions are assessed based on key principles of user-centered design (UCD): usability, engagement, inclusion, and accessibility.
- Additional criteria from the SHAFE Framework include impact, scale, sustainability, and affordability, ensuring a holistic evaluation of each solution.

The practices analyzed target physical and digital age-friendly environments.

Physical environments encompassing **social activity organizations, user dissemination projects, and co-design methods**. Notable organizations include Covilhã Senior Academy, Age Friendly Ireland, and Dreamlike Neighborhood, which address various user needs through activities that promote learning, social engagement, and accessibility. Dissemination projects like Heryasta and

Akdeniz University focus on user education and cognitive renewal, offering programs that enhance mental and physical health. These initiatives significantly impact social life, reducing loneliness and improving the quality of life for older adults.

Digital environments include digital solutions such as serious games, online courses, various platforms, virtual reality implementation, and wearable devices. 25 practices were assessed, with several scoring between 35 and 40, indicating high relevance. Notable examples include the Ageing in Place Challenge program² which improves older adults' quality of life through innovation, focusing on preventive home and community-based care, and involving older adults and caregivers as evaluators. The mobiliSIG project³ addresses social participation challenges for people with disabilities by mapping accessibility information for mobile devices, enhancing mobility and engagement. Additionally, the MOOC on dementia care⁴, notable for its inclusive, multimedia approach, and the "Bridge the Gap⁵!" project, which aims to empower older citizens in digital environments, were highly regarded. The project Hands-on SHAFE⁶ promotes health through the adaptation of physical environments, the AFECO⁷ project engages older individuals, and the BIG Game⁸ provides an inclusive serious game experience. These initiatives collectively emphasize training, accessibility, and innovation, aligning with broader goals of improving quality of life and social inclusion.

Key Principles

- ❖ **Inclusive design** aims to **create environments, products, and tools that are usable by everyone, ensuring effective movement, communication, and**

² Cfr: <https://nrc.canada.ca/en/research-development/research-collaboration/programs/aging-place-challenge-program>

³ Cfr: <http://mobilisig.scg.ulaval.ca/>

⁴ Cfr.: <https://www.udemy.com/course/training-direct-care-workers-dealing-with-stroke-survivors/>

⁵ Cfr: <https://bridgethegap-project.eu/>

⁶ Cfr. <https://hands-on-shafe.eu/en/healthy>

⁷ Cfr: <https://afeco.eu/>

⁸ Cfr: <https://www.big-game.eu/>

understanding without undue effort or separation. Universal design⁹, a broader concept, extends this principle by making products and environments as usable as possible by all people without specialized adaptations. Examples such as curb cuts in sidewalks and automatic doors illustrate universal design's benefits for diverse groups, including people with disabilities and parents with strollers. This approach also applies to information technology, making products accessible and reducing the need for assistive technologies while maintaining compatibility with them. Universal design has been a research focus for over two decades, especially concerning successful aging, highlighting key principles across various product areas like buildings, furniture, and software

can be applied to a wide range of products, including software, websites, tools, and vehicles, and involves various professionals such as analysts, designers, and potential users. Key principles include focusing on end users and their tasks, empirical measurement through quantitative and qualitative means, and iterative design, which involves continuous improvement based on user feedback. **Usability standards like ISO/TR 16982:2002 and ISO 9241** ensure human-centered design and ergonomic interaction, while **IEC 62366-1:2015** provides specific guidance for medical devices. Ultimately, usability aims to create systems that are easy to use, learn, and remember, enhancing overall user satisfaction and performance.

- ❖ While Universal design aims to create products usable by the widest range of people in various situations, **accessibility design** focuses on removing barriers for people with disabilities, ensuring inclusivity.. For older adults, accessibility is crucial for healthy ageing and societal participation, yet barriers to urban infrastructure, technology, and transportation persist. Legislation, like the European Accessibility Act and the ADA, sets standards for accessibility, while organizations like ISO and W3C develop guidelines. Personalized design is essential to accommodate the unique needs of aging individuals, moving beyond one-size-fits-all solutions.
- ❖ **Usability**, as defined by ISO¹⁰, **refers to the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specific context.** It encompasses the capacity of a system to enable users to perform tasks safely, effectively, and efficiently. Usability testing

- ❖ The dictionary defines **engagement** as 'being involved with or taking an interest in something'. Engagement is often intuitively recognized through observable enthusiasm and interest in an activity, such as in exhibitions or lectures. De Vreede et al. define a three-part phenomenon: **affective/emotional engagement (positive psychological reactions), behavioral engagement (observable effort and persistence), and cognitive engagement (absorption in a task).** In information technologies, engagement refers to user interactions with interfaces, measured through metrics like page views and time spent on a site. Often, user or customer engagement is used to define responses to digital offerings, while employee engagement measures workers' enthusiasm and dedication to their jobs, impacting their performance and commitment to the company.

⁹Carr, K., Weir, P. L., Azar, D., & Azar, N. R. (2013). Universal design: Principles and models. In N. P. Olstad (Ed.), *Advances in universal design*. Springer.

¹⁰ISO 9241-11:2018 (2018) Ergonomics of human-system interaction – Part 11: Usability: Definitions and concepts. Available from: <https://www.iso.org/standard/63500.html>

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Examples of user-centered inclusive design in age-friendly environments and communities can be found in various industries, including architecture, urban planning, and healthcare. For instance, architects can design buildings that are accessible and welcoming to people of all ages and abilities, incorporating features such as wide doorways, ramps, and clear signage. Urban planners can design communities that are walkable and accessible, incorporating features such as sidewalks, crosswalks, and public transportation systems. Healthcare providers can design facilities that are welcoming and accommodating to patients of all ages and abilities, incorporating features such as accessible exam rooms, clear signage, and wayfinding systems.

In addition, **evaluating impact, scale, and affordability** helps identify effective practices with the potential for widespread adoption.

- ❖ **Evaluating impact** involves assessing the tangible and measurable benefits of practices for older individuals, such as improved mental and physical well-being, enhanced social connectivity, and overall quality of life. This in-depth analysis identifies which initiatives create meaningful and lasting changes for the targeted demographic.
- ❖ **Scaling and diversifying** successful practices are essential for widespread impact, requiring meticulous planning to adapt models to diverse regions and contexts. This process involves forming partnerships with various stakeholders, facilitating seamless integration into existing frameworks and organizational models. Robust collaborations enable knowledge exchange, enhancing the adaptability and applicability of practices. The goal is to create a scalable model that transcends

boundaries, ensuring culturally sensitive adaptations. Embracing diversity in foundational principles enhances inclusivity, amplifying the impact of practices across varied communities.

- ❖ **Financial accessibility** is crucial for solutions to benefit a broad demographic group. Affordability assessments include long-term sustainability, ensuring economic viability, and widespread adoption for

Recommendations

- **Holistic Integration:** Effective age-friendly environments must integrate physical, digital, and social dimensions to address diverse user needs comprehensively.
- **Individual Dimension Exploration:** Engage citizens and end-users in co-design to gain deeper insights into specific needs and preferences, ensuring tailored SHAFE solutions.
- **Data-Driven Design:** Overcome the lag in using big data and enhance data analysis to better understand user behaviors and develop responsive SHAFE solutions.
- **Affordability:** Create cost-effective and culturally adaptable SHAFE technologies to ensure widespread adoption and sustainability, benefiting a broader demographic and improving quality of life for the ageing population.

lasting community impacts. Exploring funding mechanisms, grants, and ecosystem collaborations enhances accessibility, balancing effectiveness with economic feasibility. Sustainable funding through strategic planning and partnerships with governmental, private, and philanthropic entities ensures the longevity and availability of impactful practices.