Aged Care Research & Industry Innovation Australia

Evidence Theme

Technology Needs Assessment

TECHNOLOGY IN AGED CARE

This evidence theme on technology needs assessment is a summary of one of the key topics identified by a literature review on testing frameworks for technology in aged care.

Key points

- Technologies can be simple, small purchases or large, expensive ones requiring a change to how an aged care service conducts its business. Many come with a range of ongoing costs such as staff training time, technical support, and data storage.
- In the resource-constrained environment of aged care, it is important that technologies deliver anticipated benefits by being fit for purpose. A needs assessment can lay the foundation for good decision-making, ensuring technology meets the needs of those who will be using it or affected by it.
- The needs assessment includes an examination of the nature of the problem, its relative importance, and whom it is affecting and how. This assessment helps determine if a technology solution is necessary or if a reassessment of workflows will suffice.
- Finding the most appropriate technology solution for a problem requires a thorough investigation of the products on offer and their vendors, research into the evidence of the product's effectiveness (does it do what it claims to do?), and an initial estimate of the costs associated with its implementation. These costs may be direct, indirect, and ongoing.
- The needs of everyone who will use or be affected by the technology are important factors in a purchase decision. The product will not be used or may be used ineffectively if it does not meet these needs.
- The culture, values, and practices of an organisation will also impact the success or failure of a new technology acquisition. Time invested in understanding the organisation, its goals, priorities, and workflows will provide valuable insights that can form the basis of a business case and implementation plan.

Background

Technology products will deliver different benefits to different aged care settings as their value depends on the specific context in which they are used. [1] Starting with a clear understanding of the context can help ensure any technology solution will be a good fit with intended users and how they live and work.

Technologies that are fit for purpose are more likely to engage users and be trusted by them. They are also more likely to be used in a way that delivers on promised benefits. [1] Every technology purchase should, therefore, begin with a needs assessment.

This evidence theme focuses on the early groundwork required when considering implementing new technology into an aged care service. This needs assessment is a systematic look at the nature of the problem and the alternative solutions on offer, their relative merits, and risks.

Central to this assessment is understanding the priorities of the organisation and the needs and values of the people who will be affected by the introduction of the technology. While these tasks might sound like additional pressure on time, budgets, and staff resources, trying to make a major purchase or development decision without a framework of this kind, can be counterproductive. [2]

Successfully introducing a transformative technology into an aged care setting is unlikely to be a straightforward, prescriptive, step-by-step process. It is more likely to be a continuous, flexible endeavour as the organisation works towards getting the best alignment between the design of the product and the needs, values, and goals of the organisation, its people, and those it serves. [3]

Defining the problem

Fiscally responsible organisations are unlikely to purchase technology for technology's sake. Recognition of a problem should drive the search for a solution, which may not necessarily be technological in nature.

What is the nature of the problem?

The problem might stem from an organisation's need to do things better by increasing efficiency, reducing costs, meeting regulatory requirements, or improving the health and wellbeing of its consumers. The problem might be imposed on the organisation by policymakers in control of the fiscal resources and regulatory requirements of the sector. As the sector knows, unforeseen circumstances such as a pandemic can create problems requiring a different approach to doing business.

Before leaping to any solution, the nature and extent of the problem that requires solving should be analysed and documented. These deliberations serve to safeguard against rushing to purchase a state-of-the-art product which is poorly suited to the problem. [4, 5] They also make it possible to draw up project goals and targets for remedying the problem and, at a later stage, demonstrate how any solution has contributed to improvements.

This process could be led by a project team made up of representatives from all groups affected by the problem. [6] The team would work to seek agreement on:

- The nature of the problem (e.g., lack of resources for meeting new mandatory care time standards in a residential facility)
- The impact of the problem on individuals and the organisation (e.g., risk of sanctions, reputational damage, staff stress and burnout, not providing adequate direct care time to residents)
- The cause of the problem (e.g., inadequate staffing levels, high staff turnover, staff duplication of effort when accessing or inputting individual resident data across siloed systems, reducing time spent with residents).
- The findings of the problem analysis might indicate:
- Inefficient internal structures, policies, or processes that might be modified without imposing costs
- An ineffective individual process that affects an entire workflow (e.g., bottlenecks at computers for staff data input)
- A problem too difficult to resolve within the existing environment without a novel, innovative approach.

How important is the problem?

If an organisation needs to address several problems, the project team might use this opportunity to consult with the leadership team to set priorities against each problem. How problems are ranked will differ across organisations and perhaps even sites of care within the one organisation. First tier problems are likely those that impact quality and safety of care, staff retention, and the ability to meet mandated standards. If a problem has multiple components, certain components might be prioritised over others in the short term. [7]

If these priorities are being met, an organisation might choose to invest in solutions considered 'nice-to-haves' rather than 'must-haves'. [8] These might include a subscription to a streaming entertainment service such as Netflix, or technological alternatives to existing and well operating services (e.g., music or pet therapies).

Mapping technology features to problems

The project team may recommend a technology solution as the best course of action. To help gain decision maker support, the team might map specific technology features and functions (e.g., interoperability, data entry at the point of care) against the specific problems they address. This helps illustrate why the technology is required and what it might deliver. [8] Without a clear 'why' it can be hard to put forward a case for an innovation likely to consume considerable organisational resources. [9] This purpose statement will also help those charged with selecting a technology product with communicating requirements to vendors or product developers. [7]

Investigating the technology options

Once the 'why' is answered, technology options can be explored. [8] Increasingly, technologies developed outside of aged care are adapted or applied in this context such as smart homes and artificial intelligence. [10]

Sources of information on technologies

The sheer number and range of technologies available and increasingly coming into the market can make it difficult for aged care providers to keep up with the options available and the possibilities they offer. [11] Therefore, finding the best-suited product is likely to take time and require a period of research and consultation with a wide range of people with a stake in the decision. [8]

The technology landscape assessment might start with a long list of potentially suitable technologies. From here, items can be systematically excluded based on research and consultations with stakeholders. [12] Engaging an information technology specialist as a consultant in this process may help with communicating technical requirements to vendors/developers and asking less obvious questions around ongoing or additional costs or product limitations. [13]

Potentially reliable sources of information on the products available include:

- Testimonials from other service providers or organisations already using a product [7]
- Articles published in special technology sections of aged care industry newsletters. Examples include: Australian Ageing Agenda, Aged Care Insite, and the media/blog section of innovAGEING. Pulse+IT News and Hospital and Healthcare, amongst others, provide information on Australian digital health innovations more broadly.
- Research evidence (including findings from trials) which can be found using the PubMed database. One-click PubMed searches on technology topics are available throughout the Technology in Aged Care section of the ARIIA Knowledge and Implementation Hub.

Buy or develop?

Although aged care providers reportedly prefer to adopt existing technologies that show applicability to their needs, [14] other options may provide a better fit between the product and its intended purpose and context. These options include:

- A standardised commercial 'off-the-shelf' product such as a Wii Fit, a generic payroll or accounting system, or a multisensory projection system
- A customised version of an existing product that may or may not be designed for aged care (e.g., customer relationship management systems)
- A 'home-grown' solution tailored to local needs and specifications, [8] for example, an integrated care management system.

There are pros and cons to each of these options. Custom-designed products may be better accepted by end-users and reflect real-world practices, but they are costly to create, increase reliance on the vendor/developer to adjust or fix glitches, and may lack interoperability with other systems. [7, 8] While some degree of adaptability built into the product might be desirable, there is a risk excessive tailoring to meet local needs have affect the product's core purpose and functionality. [13] From the vendor's perspective, customisation may be a less attractive business option than investing time in developing more commercially viable generic systems. [15]

Alternatively, commercial systems may be less expensive and more likely to conform to common data standards and architectures, increasing their interoperability. [7] However, they may lack personalisation and be unsuited for the needs of special populations in aged care such as people living with dementia and their informal carers. [16]

Evidence of benefits

Commercial technology vendors and developers will make claims about their products. If these claims are assumed to be true without the backing of evidence from testing, the costs associated with a technology purchase may outweigh the benefits.

A recent Australian aged care workforce survey found that although nearly half (47%) of respondents had adopted a new technology in the past year, only 54% of them thought the addition had improved the quality and efficiency of their work. [17] Product claims should also be specific rather than vague (e.g., 'this will improve quality of care'). [7] Ideally, vendors will detail the expected outcomes associated with each of the product's features and functions, basing assertions on user feedback or efficacy or effectiveness trials. While evidence of technical feasibility and effectiveness is important, so too is evidence of user acceptance and satisfaction with the product. [18]

Evidence of product benefits can focus the search on more reliable products and help the selector put together a clear business case for the purchase project. However, the information should come from a credible and trusted source. [14]

Questions of the vendor/developer

Whether purchasing an off-the-shelf product or engaging a technology developer to design a solution, a productive, ongoing customer-supplier partnership will be important. Finding out more about the companies and individuals you are considering working with can provide important information to help with decision making. For example:

- Does the business have a track record of expertise in the sector that shows it understands its unique needs?
- What is its reputation or potential for providing ongoing support for the product? [2]
- Do staff communicate well with stakeholders in terms that non-technical people can understand? This will be crucial in any design projects involving aged care staff and care recipients.

- Are they responsive to customer feedback on usability, accessibility, and customer experience issues?
- Are they able to customise their product or refine it over time to meet changing needs [15]
- Will they let the client pilot test their product with end-users before purchasing to see if it is a good fit?

Vendor or developer information might come from online forums, technology review sites, testimonials, company reports, an independent technical consultant, or other aged care providers. Close working relationships between vendors and aged care customers can also serve to help the vendor learn more about the sector and its needs which could actively shape future product designs and markets. [15]

Questions of the technology

A few fundamental questions about the technologies on offer may also guide decisions. For example:

- Is it mature and well tested in aged care settings or at the prototype stage?
- Is it likely to be superseded by newer products soon?
- How well will it integrate with existing systems?
- Does it comply with current Australian and international standards for data security and privacy?
- Will it require a large amount of staff training time?
- Will it run on existing infrastructure and hardware?

Estimating costs

Costs and their relationship to benefits are an important consideration. Currently Australian aged care services and those who use them deem technology costs as prohibitively high which can disadvantage certain organisations and individuals. [11]

Technology costs are also easily underestimated, particularly those relating to infrastructure, licensing costs, support and maintenance. [7] Some cost considerations may include:

- Available resources in terms of money, time, and staffing
- Requirements for new software, hardware, or infrastructure (e.g., wi-fi and broadband), particularly if needed to safeguard the security and confidentiality of data or the smooth operation of teleconferences [19]
- Other vendor charges in addition to the initial outlay such as after sales service and support costs, maintenance and repair costs, costs for data storage. [20]
- More indirect costs such as administration burden or time required to train staff.

Costs will be an important consideration when developing a business case.

Understanding the context

A careful analysis of the environment in which the technology will be used, and the wider social and political environment, is essential for ensuring a product will be useful to individuals and the organisation. [3, 21]

The stakeholders

Stakeholders are all the individuals or organisations with a right, claim, or interest in the product and how it will meet their needs. [22] It is important to Identify, consult, and communicate with all stakeholders likely to have an interest in the technology purchase decision to understand their perspectives, values, priorities, and preferences. This includes people or organisations who will be directly or indirectly using or affected by its addition and who therefore have a right to be consulted. [23]

There are many different stakeholder groups in aged care. They include people receiving care and their support network, staff, policy makers, decision makers, vendors, and health care providers working into aged care. Some groups may be harder to reach or communicate with than others such as people living with dementia or older people from culturally diverse backgrounds. [24]

Seeking to understand the needs of all groups however, including the more diverse amongst them, can do more than inform purchase decisions. It can anticipate problems to ease the implementation phase. [3, 11]

Questions to ask of stakeholders may include:

- What are their frustrations with a current system (or lack of one)? What would an ideal workflow look like?
- What would end-users want from any new technology? A list of their priorities might form a 'wish list' against which the features of the available technology options could be mapped. [25]
- What values, goals and preferences must it align with to be acceptable? [6] These will be different for different people. Staff might value technologies that slot easily into existing routines wherever possible so that their use becomes routine. Residential care recipients might value products that facilitate more contact with family and loved ones. Home care recipients living with dementia may value the ability to move freely but safely within their own homes for as long as possible. [14]
- What might cause them to reject a technology solution? Reasons might include poor expectations around benefits, concerns for safety and privacy, lack of knowledge about the product, or confidence in their ability to engage with it.
- What additional incentives might be required to help people embrace the solution?

The views and experiences of stakeholders could be elicited through a range of methods including informal conversations, workshops, or brainstorming sessions, or more formal interviews, focus groups, or surveys. Some needs might be best assessed by observing people directly. This might determine:

- The physical, mental, or cognitive abilities that need to be considered when specifying technical requirements and design features. Residents in aged care facilities, especially those living with dementia, frequently have decisions about care technologies made on their behalf.

[11] However, this can lead to simple products such as iPads being rejected if visual impairments or problems using touchscreens with arthritic fingers are not considered. [11]

- Do staff, people receiving care, or other stakeholders have the digital literacy skills to use a new technology? Will pre-implementation digital literacy training help? If not, how extensive will product training need to be? There are tools available, such as the Digital Skills Checker, that can help determine individuals' digital literacy and readiness.

The organisation

The organisational culture and structure, its leadership, and ways of doing business will also influence if and how well a technology is adopted into routine care or other organisational processes. The organisation has obligations to meet and, therefore, sets its own values and priorities. Using the needs assessment process to understand these may help build a better case for technology that will promote and support the organisation to reach its objectives. [8]

Organisational considerations may include:

- An assessment of the organisation's digital readiness. Just as individuals may not be digitally ready for the introduction of new technology, organisations may lack sufficient readiness for adopting and sustaining change. A recent report found that the digital maturity of aged care providers is not on par with that of older Australians. Only 58% of providers have a digital strategic plan and 75% have no digital literacy criteria in recruiting new staff. [5] Tools such as the Digital Readiness Tool can help assess the digital strengths and weaknesses of an organisation and suggest ways to improve.
- Is there organisational willingness and motivation to innovate? Staff struggling to complete core tasks are less likely to be enthusiastic about new ones or changes to their roles and responsibilities.
- Will leadership work to drive the change?
- Can change be sustained over time with staff turnover and the need to implement a range of new sector reforms?

The wider environment

The needs assessment is also an opportunity to look to the wider context beyond the organisation and its people to consider current or looming social, legal, regulatory, or political changes that might impact on the decision to purchase or design a technology. Social and political forces in Australia and internationally can also impact the success of a technology implementation project and the longer-term viability of the product. Australian aged care services are currently facing a raft of reforms that will result in new regulations, policies, and funding models. [5, 14] Technological innovation is part of the reform agenda. [26] The Government may, therefore, decide to invest in a national approach to digital infrastructure, mandate interoperability standards, [15] or introduce a minimum level of digital literacy requirement for aged care staff. These hypothetical changes will affect how care services approach technology projects. Looking at the environment in which the aged care sector operates can help plan for future eventualities, chief amongst them the increasing demand on services with the ageing of the population. [14]

Conclusion

This theme has outlined some of the key considerations in assessing the needs of individuals and organisations to inform the purchase or creation of a technology solution to a problem in aged care. The next step is to use all the information gathered to develop a business case. The business case is a document that argues the case for technology purchase. It carefully communicates to those who will make the decision the reasons why the purchase is needed, the anticipated costs and the potential benefits.

References

1. van Gemert-Pijnen JE, Kip H, Kelders SM, Sanderman R. Introducing ehealth. In: van Gemert-Pijnen JE, Kelders SM, Kip H, Sanderman R, editors. Ehealth research, theory and development: A multi-disciplinary approach. New York: Routledge; 2018. p. 3-26.
2. Adler KG. How to successfully navigate your EHR implementation. Fam Pract Manag. 2007;14(2):33-39.
3. Cresswell K, Sheikh A. Organizational issues in the implementation and adoption of health information technology innovations: An interpretative review. Int J Med Inform. 2013;82(5):e73-86.
4. van Limburg M, van Gemert-Pijnen JEWC, Nijland N, Ossebaard HC, Hendrix RMG, Seydel ER. Why business modeling is crucial in the development of ehealth technologies. J Med Internet Res. 2011;13(4):e124.
5. Royal Melbourne Institute of Technology; CISCO. Transforming aged care: Towards a future in which digitisation clasps hands with respect, and connection drives improvement [Internet]. RMIT University, CISCO; 2022. Available from https://www.cisco.com/c/dam/global/en_au/solutions/industries/healthcare/transforming-aged-care.pdf.
6. van Velsen L, Wentzel J, Van Gemert-Pijnen JE. Designing eHealth that matters via a multidisciplinary requirements development approach. JMIR Res Protoc. 2013;2(1):e21.
7. Cresswell KM, Bates DW, Sheikh A. Ten key considerations for the successful implementation and adoption of large-scale health information technology. J Am Med Inform Assoc. 2013;20(e1):e9-e13.
8. Mettler T, Vimarlund V. All that glitters is not gold: Six steps before selecting and prioritizing e-Health services. J Med Syst. 2017;41(10):154.
9. Taylor D. Sustaining innovation requires strong links to core business. Fusion: The voice of aged care [Internet]. 2018 [cited 2023 Feb 24]; (Autumn):39-40. Available from: https://issuu.com/adbourne/docs/lasa_autumn_18_issuu_opt.

10. Aged Care Industry Information Technology Council. Aged and community sector technology and innovative practice: A report on what the research and evidence is indicating. ACIITC; 2019.
11. Moyle W, Pu L, Murfield J, Sung B, Sriram D, Liddle J, et al. Consumer and provider perspectives on technologies used within aged care: An Australian qualitative needs assessment survey. J Appl Gerontol. 2022;41(12):2557-2565.
12. Polhemus AM, Novák J, Ferrao J, Simblett S, Radaelli M, Locatelli P, et al. Human-centered design strategies for device selection in mHealth programs: Development of a novel framework and case study. JMIR mHealth uHealth. 2020;8(5):e16043.
13. Nieuwenhuis B. Value proposition design and business modelling. In: van Gemert-Pijnen L, Kelders SM, Kip H, Sanderman R, editors. Ehealth research, theory and development: A multidisciplinary approach. London: Routledge; 2018. p. 187-206.
14. Aged Care Industry Information Technology Council. A technology roadmap for the Australian aged care sector [Internet]. 2017. [cited 2023 Feb 21]. Available from: http://aciitc.com.au/wp-content/uploads/2017/06/ACIITC_TechnologyRoadmap_2017.pdf.
15. Cresswell K, Williams R, Sheikh A. Developing and applying a formative evaluation framework for health information technology implementations: Qualitative investigation. J Med Internet Res. 2020;22(6):e15068.
16. Bastoni S, Wrede C, da Silva MC, Sanderman R, Gaggioli A, Braakman-Jansen A, et al. Factors influencing implementation of eHealth technologies to support informal dementia care: Umbrella review. JMIR Aging. 2021;4(4):e30841.
17. CompliSpace. CompliSpace aged care: Workforce report [Internet]. 2022. [cited 2023 Feb 21]. Available from: https://www.complispace.com.au/workforce-report-2022
18. Barnett K, Livingstone A, Margelis G, Tomlinson G, Young R. Technology ageing and aged care: Literature review. Updated from the original literature review that informed the design of the technology roadmap for the aged care sector. Aged Care Industry IT Council (ACIITC); 2019.
19. Gélinas-Bronsard D, Mortenson WB, Ahmed S, Guay C, Auger C. Co-construction of an internet-based intervention for older assistive technology users and their family caregivers: Stakeholders' perceptions. Disabil Rehabil Assist Technol. 2019;14(6):602-611.
20. SA Health. The use of surveillance and monitoring technology in aged care: Discussion paper. 2022.
21. van Gemert-Pijnen JE, Nijland N, van Limburg M, Ossebaard HC, Kelders SM, Eysenbach G, et al. A holistic framework to improve the uptake and impact of eHealth technologies. J Med Internet Res. 2011;13(4):e111.
22. International Organization for Standardization: SO/IEC/IEEE 15288:2015. Systems and software engineering: System life cycle processes. Geneva.
23. Hendry DG. Designing tech policy: Instructional case studies for technologists and policymakers [Internet]. Seattle, WA: University of Washington, Tech Policy Lab; 2020. [cited 2023 Feb 25]. Available from: https://techpolicylab.uw.edu/wp-content/uploads/2020/08/TPL-Instructional-Case-Studies-08-05-2020a.pdf.
24. Holthe T, Halvorsrud L, Karterud D, Hoel KA, A. L. Usability and acceptability of technology for community-dwelling older adults with mild cognitive impairment and dementia: A systematic literature review. Clin Interv Aging. 2018;13:863-886.
25. Rai HK, Cavalcanti Barroso A, Yates L, Schneider J, Orrell M. Involvement of people with dementia in the development of technology-based interventions: Narrative synthesis review and best practice guidelines. J Med Internet Res. 2020;22(12):e17531.
26. Australian Digital Health Agency. Safe, seamless and secure: Evolving health and care to meet the needs of modern Australia. Australia's national digital health strategy [Internet]. Canberra: ADHA; 2017. [cited 2023 Feb 25]. Available from: https://www.digitalhealth.gov.au/sites/default/files/2020-11/Australia%27s%20National%20Digital%20Health%20Strategy%20-%20Safe%2C%20seamless%20and%20secure.pdf.

Cite as: ARIIA Knowledge & Implementation Hub. Technology Needs Assessment: Technology in Aged Care. Evidence Theme. Adelaide, SA: ARIIA; 2023.

www.ariia.org.au

For more information email ariia@ariia.org.au or call 08 7421 9134

ARIIA - Level 2, Tonsley Hub, South Rd, Tonsley SA 5042