Aged Care Research & Industry Innovation Australia

A review summary:

Testing Frameworks: Technology in Aged Care

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Key Points

- Aged care is a complex setting. Therefore, successfully introducing more transformative types of technology into the workplace requires careful planning and clear processes.
- We found two frameworks for developing, testing, and implementing technologies that may be useful in guiding decisions when introducing new technology into aged care.
- The domains of these frameworks were integrated to create five themes covering a holistic set of considerations. These themes are technology needs assessment, creating a business case, developing new products, implementing technology, and monitoring use over time.

Background

The aged care sector is considered a complex environment with its different settings of care, financing arrangements, and the numerous policies and standards under which it operates. [1] It also involves a complex web of people (or 'stakeholders') including multidisciplinary teams, a variously- skilled workforce, and older care recipients with a range of health and social needs, many requiring high-level care. [1] Aged care also encompasses the families of people receiving care and their wider social networks.

While introducing new technology into this environment often requires little more than plugging in a device, those technologies with the potential to transform how this sector delivers care or manages its business functions, require careful planning if the organisation and people receiving care are to reap their promised benefits. Understanding the product and what it can do is only one part of the equation. Technologies often make ongoing demands on human and fiscal resources which are not always immediately obvious. For a new technology to be useful, usable and valuable to an organisation, it helps to select a product, or work with designers to develop one, armed with the knowledge of what those likely to be affected want and need from it. Successful implementation and optimal technology use occur when there is a good fit between:

- the product, its design, and what it can do
- the needs of the intended users and their ability to engage well with the product
- the goals, values, and priorities of the organisation. [2]

Objectives of this review

We conducted a rapid literature review to identify and synthesise guidance on best practices in selecting/developing and implementing technological solutions to aged care problems. The findings of this review are presented as 'themes.' Each theme describes a process or phase within the selection, design, and implementation of technology, and provides practical considerations to guide decision making.

Methods

The review involved three distinct phases.

Phase 1. Finding frameworks for integrating technology into health and aged care

We first looked for well-established frameworks for developing, testing, and implementing technologies in health and aged care settings. This involved conducting basic and iterative searches for English language peer-reviewed journal articles and grey literature using PubMed, Google Scholar, and Google Advanced with no year and publication type limits applied. Eligible frameworks needed to be broad and flexible enough to accommodate different types of technologies and not just focused on a single type, e.g., telehealth. They also had to be adaptable or applicable to the aged care context.

Phase 2. Mapping domains across frameworks

Once we had identified eligible frameworks, we extracted the domains from each and mapped them against each other to identify areas of overlap and uniqueness. We assigned new names to common domains to ensure they were inclusive of all framework content and relevant to the aged care sector. These overarching domains became our themes.

Phase 3. Mapping research findings to domains

We then conducted iterative database and grey literature searches for aged care or healthcare research studies or reports addressing our themes. This process included a search across all articles on technology set in aged care published by the Journal of Medical Internet Research (JMIR) and its sister journals. Using NVivo software, we coded relevant content within each included report against our predefined themes.

Results

We identified two frameworks that provide a structured approach to introducing technology to the healthcare or aged care workplace:

- The NASSS (non-adoption, abandonment, scale-up, spread, and sustainability) Framework. [3] This framework can be used to anticipate and plan for challenges in implementing new technologies in health or care programs.
- The CeHRes Roadmap. [2] The Centre for eHealth Research (CeHRes) roadmap is a holistic technology implementation framework of five overlapping phases.

Since their introduction, these frameworks have guided the development and implementation of a range of different types of technologies across varied settings. Although their individual domains mapped reasonably well to each other, they remain distinct with their own terminologies and approaches to addressing what are essentially the same issues. Table 1 lists these themes and shows how each was informed by the individual framework domains.

These five themes were identified by integrating the two frameworks:

- Technology needs assessment
- Creating a business case
- Developing new products
- Implementing technology, and
- Monitoring use over time.

Table 1. Frameworks and their domains

Theme name	CeHRes framework domains [2]	NASSS framework domains [3]
Technology needs assessment	**Contextual inquiry** The contextual inquiry is a thorough assessment of the context in which the technology is to be introduced. This includes the problem to be addressed by the innovation, the prospective users of the technology and anyone else who might be affected by it (stakeholder analysis), and the physical, social, and cultural environment of the workplace.	Four of the seven NASSS domains address components of an initial needs assessment. **The condition** The needs assessment begins with an analysis of the problem (termed 'condition' in the framework) for which new technology may provide a solution. Is the problem simple, complicated, or complex? What characteristics of the potential end-users (e.g., health status or sociocultural factors) might impact technology use? **Adopters (staff, care recipients, informal carers)** Who will be expected to use the technology? How will impact them? Will staff roles and tasks change? Will the technology threaten professional scope of practice or job security? What will the technology require of care recipients and their network of informal carers? Will it be achievable? **The organisation(s)** Is the organisational culture conducive to innovation? Is it digitally ready? Will the existing infrastructure support the implementation? What additional resources will be needed to implement and maintain a new technology? Will the technology be implemented within a single organisation (or facility) or across multiple? **The wider context** What are the wider contextual factors that may influence the success of the project? Are there any policy, fiscal, legal, or regulatory drivers in play or on the horizon?

Theme name	CeHRes framework domains [2]	NASSS framework domains [3]
Creating a business case	**Value specification** This is a precise description of the added value the technology is expected to bring and what the various stakeholders want from it. This involves conducting a cost-benefit analysis and anticipating and planning for implementation issues that might prevent the technology from achieving its (prioritised) goals. This information can be used to create a business case for the technology and to specify the design requirements.	**Value proposition** Is the technology worth developing or purchasing based on an understanding of its desirability, effectiveness, safety, and cost-effectiveness? Will it align with the values held by the various stakeholder groups? (I.e., will it do what the stakeholder groups want it to do?) Are the benefits likely to outweigh the costs?
Developing new products	**Design** The iterative design phase is based on the blueprint provided by both the contextual inquiry and the value specification. Ideally, it should include representatives of all stakeholder groups in co-designing and testing product prototypes. Co-design and prototype testing will identify any issues likely to reduce the technology's useability and acceptance by the users. Feedback from stakeholders is used to make changes to the product (formative evaluation).	**The technology** If developing the technology, what are the technical specifications based on the value proposition? Will it be a standalone 'plug and play' product? Or will it need to be integrated with existing systems? What level of training will be required to use it? What level of support can be expected from the developer?
Implementing technology	**Operationalisation** Creating a realistic and fully funded action plan based on knowledge of the context that details how the technology will be implemented. This includes activities and resources for communicating with and incentivising stakeholders and providing training and education for those who need it. At this point, the experiences of the end-users can still be used to adapt the technology to make it a better fit for its context and purpose (further formative evaluation).	**The organisation(s)** What work is involved in the implementation and who will do it? What changes will be needed in teams and routines?
Monitoring use over time	**Evaluation (summative and formative)** This involves assessing to see if the technology is achieving its stated goals, adding value, and creating impact. Again, formative evaluation can be used between stages of development and implementation to refine the product or processes around its use. This means further consulting with stakeholders to get their perspectives. It may also involve collecting outcomes data to demonstrate cost-effectiveness in terms of efficiency or improved human health and wellbeing.	**Interaction between domains and adaptation over time** This domain explains why ongoing monitoring of technology use is important if it is to reap promised benefits. With the passage of time, there will be changes to the sector's policies and fiscal context to consider as well as staff turnover and newer versions of a technology entering the market. The ways in which people engage with a particular technology are also likely to have evolved over time. This might reflect successful implementation or useability problems leading to work-around solutions or ineffectual use.

Literature searches on each domain topic identified a total of 127 research reports, websites, blogs, ebooks, and articles of relevance. Coding the content of these documents against our themes enabled us to round out the more conceptual guidance within each domain with more pragmatic considerations based on real-world testing and implementation projects.

Summary

The evidence themes developed here, based on the presented framework, form a package of generalised guidance for the aged care sector. However, many of the considerations covered are intertwined and overlapping, suggesting the different domains should be treated as steps in a flexible, but integrated process. It is hoped that this guidance will help individuals and organisations involved in technology decisions to develop a culture of continuous improvement and innovation in aged care.

References

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ARIIA was established as an independent, not-for-profit organisation, set up to lead the advancement of the aged care workforce capability by promoting and facilitating innovation and research to improve the quality of aged care for all Australians.

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