The environmental conditions within a home, can have a significant impact on a person's physical and mental wellbeing. The effect of temperature, lighting, colour temperature, air quality and humidity levels for example, can more strongly impact the health and function of older people, people with disabilities and those with other health problems. It may also be more challenging for these people to control indoor environmental conditions independently.

For example, if someone with physical limitations is not able to reach the thermostat or press the buttons to adjust the temperature in their home, they might experience thermal discomfort and would rely on their carers to assist them. Apart from the environmental discomfort, older people and people with disability might feel vulnerable and discriminated against under these circumstances.

Since the 1990s, various technologies and systems have been developed that enable maximum control of the indoor environment, easy adjustment of settings and "intelligent" adaptation to the users' needs. This factsheet aims to present the main categories of "home automations" or "smart controls" for the home, which can be particularly useful for older people and people with disabilities and describe some considerations for their installation, in new or existing homes.

What can home automation assist with

The most popular home automations, designed for all users regardless of age and ability, are those controlling electric systems, appliances and devices in the home. Most of the "smart" home controls can operate lighting, heating, cooling and humidity levels within the home, operate locks, water fixtures, alarms, motorised blinds, benches and cupboards, operate fans, etc.

Interaction with the smart home appliances is done through a centralised touchscreen device mounted on the wall (either removable or fixed) and/or from a smartphone/tablet via app. The operation of the software is designed to be simple, however, some training or support might be required.

Useful features of many smart home systems, include:

- Notifications sent to the users about the systems' status or operation. For example, if a garage door has been left open for a long period, the user will receive a message and can choose whether to leave open or shut the door from their smartphone. This function could also be useful for carers, wishing to check the safety of their loved ones or of their clients.

- Automation of events based on geo-location, saved scenarios and schedules. For example, when the room temperature falls under a specific threshold, and/or the occupant is on their way home within a geo-fence, i.e., within a pre-determined radius to home, a scenario where the air-condition is switched on to increase the temperature can be saved and set automatically to restore thermal comfort.

- Many smart home systems provide energy saving settings, where appliances and devices operate in optimum mode to save energy, while maintaining environmental comfort.

Technical requirements

Assistive technology for the control of the home environment can be installed as a home modification, i.e., in an existing dwelling, or as a special installation within a new house. For hardwired systems, it is much easier to enable full control of numerous systems in the home when the smart controls are considered early in the building design process. In that case, being proactive means that hardwired connections can be set up between the controls and the appliances/systems and that compatible devices and fixtures can be incorporated when designing the system.

However, with the recent increased availability of wireless and battery-operated smart devices, installing smart controls in an existing house is now much easier. Sensors are fitted to appliances, devices or fittings and report their status, e.g., the levels of environmental parameters, such as temperature and humidity or the status of a door/lock. Messages from the sensors go to a gateway or controller, which communicates with controls/modules to apply the preferred settings to the devices in the home. In existing houses where hardwiring is not an option, the "communication" of all the elements can either be performed via Wi-Fi, wireless Bluetooth, Z-Wave or Zigbee mesh.

Activation of smart controls

Home automations are traditionally controlled by a centrally positioned touch screen or monitor placed on the wall inside the home or from an app through a smartphone/tablet. However, there are other ways that might better suit the needs of older people and people with disability. Remotes are useful for people who cannot use a mobile phone. People with a disability may access home automation via voice activation, or through existing devices such as their powered wheelchair controller, which is especially important for people who do not have full control of their body. It is important to ensure chosen devices and control systems are compatible.

Security risks

Wireless smart home systems run the same security risks as all devices that are connected to the internet. Although rare and mostly limited to extremely high-end homes, cybercriminals can potentially access personal information and engage in identity theft, access databases of smart-device companies to breach the data of multiple users, control home systems and appliances and access/burgle a home. Three main steps are necessary to ensure the maximum possible security when choosing and setting up home automations:

1. Consumers and providers should only buy home automation systems from reputable companies with a strong security record. Setting up devices to update software automatically is also important, as new software minimize the risk of viruses and treat older security issues.

2. Consumers and their carers should ensure that any app or software used to control their appliances can only be unlocked by themselves or by trusted family members. Robust user authentication, using complex, unique passwords and two-level-authentication, should be set up to access smart home systems and smart devices.

3. Consumers should share minimum personal information with smart devices and regularly monitor their credit cards and accounts' charges.

Power outages can also have an impact on the users of smart home controls. Smart devices, such as TVs, speakers, etc, without built-in battery will not work without power. Since there would be no internet connection, controlling the appliances and systems through a smart device might also be difficult. However, devices that are important for people's safety, such as locks, garage doors, alarms and cameras usually have battery back-up and can be controlled via a smartphone. Also, when smart controls are connected to systems vital to someone's safety or health, a UPS (Uninterrupted Power Supply) can be used to power the router until normal power is restored. Solar battery systems can also be installed to maintain power to critical systems and home automation during short to medium term power outages.

Funding for purchasing and installing home automations

Home automations can be included in a participant's NDIS Home Modification funding package if these are deemed necessary and serve specific needs of participants, based on clinical assessment. To ensure the right type and level of assistive technology matching the abilities of the user, a specialist NDIS SDA approved provider should be consulted alongside the OT to discuss any concerns or special requirements prior to requesting or obtaining funding from the NDIS.

Where can I find more information?

NDIS. Home Modifications: Guidance for Builders and Designers. Available for download here.

Assistive Technology Australia website.

Nicholls L., Strengers Y. & Tirado S., 2017, Smart home control: exploring the potential for enabling technologies in vulnerable, disengaged and regular households, Centre for Urban Research, RMIT University, Melbourne.

Wallock, K.E. and Cerny, S. L., 2021, Benefits of Smart Home Technology for Individuals Living with Amyotrophic Lateral Sclerosis. Assistive Technology Outcomes and Benefits, Volume 15, Winter 2021, pp. 132-138. Available online: www.atia.org/atob

Rebecca Jamwal, Hannah K. Jarman, Eve Roseingrave, Jacinta Douglas & Dianne Winkler (2020): Smart home and communication technology for people with disability: A scoping review. Disability and Rehabilitation: Assistive Technology, DOI: 10.1080/17483107.2020.1818138

Chapman, K., McCartney, K., 2002, Smart homes for people with restricted mobility. Property management, Vol 20, No 2, pp 153-166.

What Are the Different Operating Standards for Home Automation Tech?

Geofencing can level up your smart home if you set it up properly

Does A Smart Home Work Without The Internet?

**This information was correct at time of printing.

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Industry Factsheet: Home automations for older people and people with mobility limitations
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