Improving independence by using environmental control systems

Hannah Gillies, Graham Henderson & Michael Dolan
SMART Centre, NHS Lothian, Astley Ainslie Hospital, Edinburgh

Alexa… why would I need an environmental control system when I've got you?

First, let me define what an Environmental Control System (ECS) is for you. These enable disabled people to control electronic equipment such as alarms, telephones and home entertainment equipment.

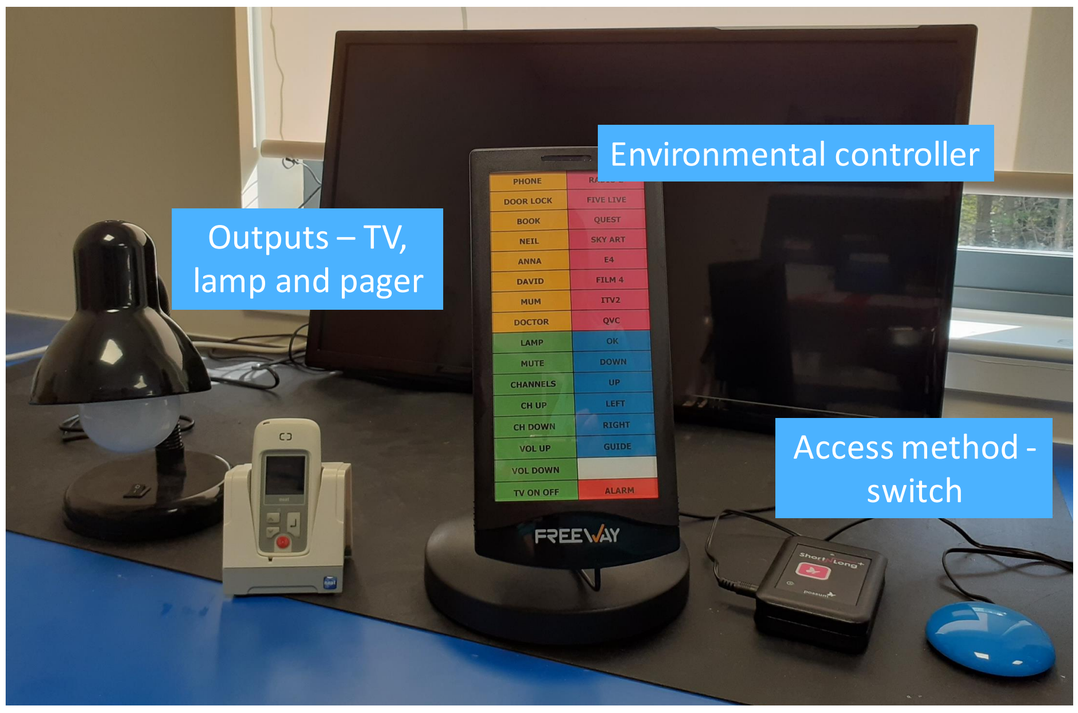
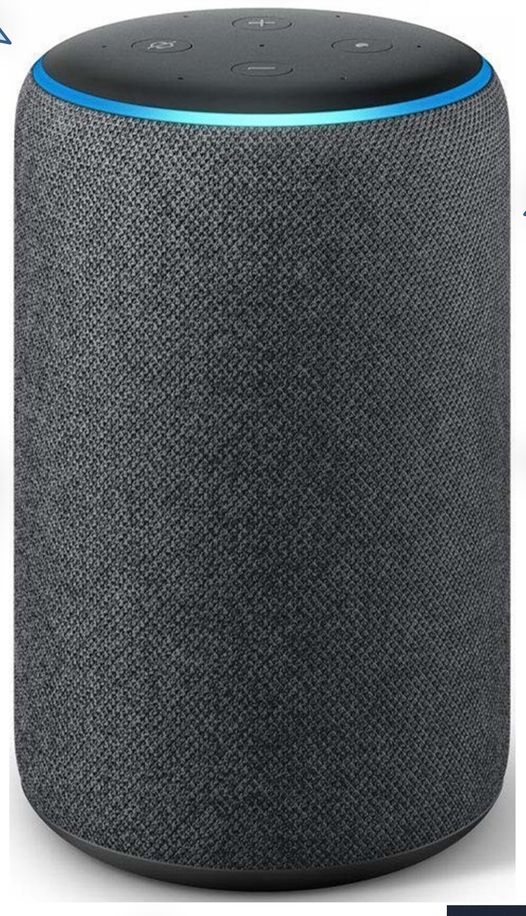


Figure 1. A typical Environmental Control System setup.

ECSs consist of 3 main parts (Figure 1):
1. Access method (e.g. switch or touch screen).
2. Controller, this contain the electronics that send signals to control different devices and usually also has a display.
3. Outputs (the devices to be controlled).



Environmental control systems are different from mainstream Smart Home Technologies, such as voice-activated smart speakers (e.g. Amazon Echo). These consist of a hub that usually uses Wi-Fi to communicate with various devices in the home (Figure 2). They can be controlled either with voice commands or via an app on a phone or tablet.

The advantages of ECSs include:
- Controllers and their access methods are customisable to suit the individual user and are not reliant on a clear, audible voice.
- Most devices are classified as medical devices and have increased reliability including battery back-up protection if there is a mains failure.
- There is no reliance on Wi-Fi and they provide a reliable way of calling for help either via a telecare call centre or via a pager.

Smart Home Technology can have their plus points too:
- Compatible with a wide range of third-party peripherals e.g. light bulbs, thermostats, sockets and security cameras.
- Low cost.

Research has indicated that ECSs can provide benefits such as increased autonomy and improved quality of life. Further work is required to improve the evidence to support the positive effects of ECSs. Future work may also include how ECSs can reduce reliance on caregivers.

Smart Home Technologies have a variety of built-in capabilities and are widely used in homes throughout the world, however, they are not the perfect solution for everybody and for some individuals ECS can be a more appropriate solution. Clinical environmental control services can provide assessments to determine if this is the case. Services can loan ECSs to users, provide training and support, and maintenance of the device. For more information please contact a health care professional who would be able to refer on your behalf e.g. an Occupational Therapist.

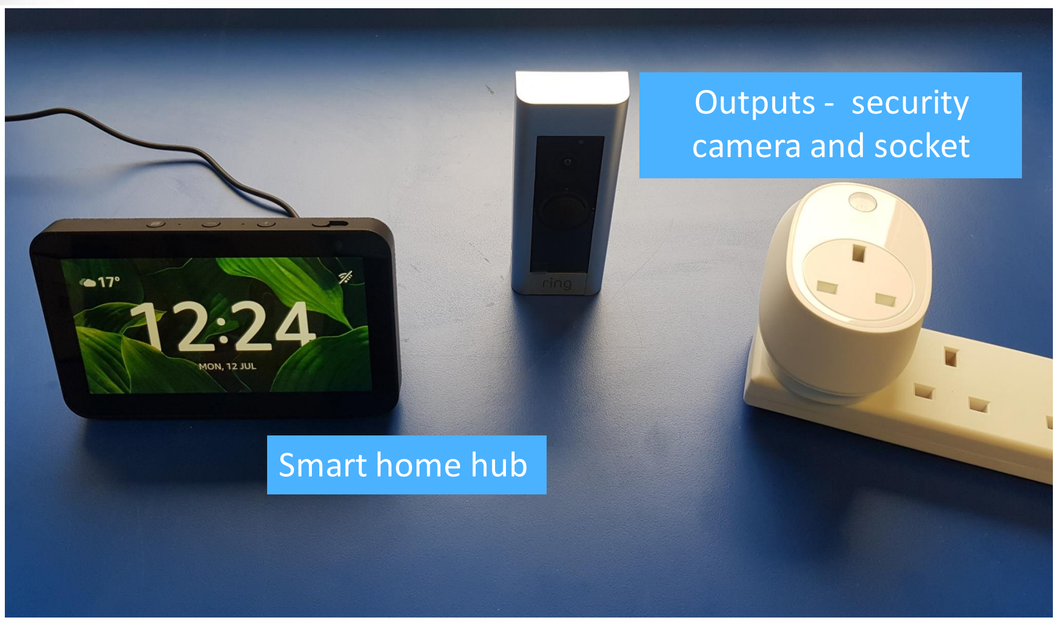


Figure 2. A typical Smart Home Technology setup.