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Opinion

Occupational therapists need to embrace the use of mainstream technology in their quest to ensure that therapy remains current and meaningful to their clients. Technology can be useful to improve both functional independence and occupational performance. This opinion piece introduces how occupational therapists can apply mainstream technologies, including information and communications technologies such as the internet, computer software, portable devices and computer gaming, in their everyday interventions.

Mainstream Technology as an Occupational Therapy Tool: Technophobe or Technogeek?

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Introduction

Information and communication technologies, such as online shopping, instant messaging, digital photography, computer games and mobile phones, are becoming everyday meaningful occupations for occupational therapy clients. They are thus potential therapy tools. They are also useful in practice environments, such as using reminders on mobile phones as memory aids. This opinion piece asserts that occupational therapists can, and should, capitalise on the opportunities offered by mainstream technology and, while not exhaustive, it focuses on some therapeutic applications.

Technology can be used within occupational therapy in two ways. The first application is to improve a person's functional independence, and the second is as a therapeutic tool to improve occupational performance and its related components (Petty 2003). It is hoped that this opinion piece will generate interest and encourage creativity both for those who consider themselves to be technophobes and for the technogeeks.

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Meaningful occupation and functional independence

Occupational therapy relies on the therapeutic use of purposeful and meaningful activities, which are aimed at achieving a person's functional independence (Creek 1998, Pedretti and Pasquinelli 2001). However, gone are the days when basket weaving was considered valuable to many clients. Technology offers therapists new types of handiwork and enabling devices, which are being drawn from a virtual environment. Accordingly, occupational therapists need to acknowledge the opportunities afforded by modern developments, and occupational therapy departments should reflect these changes and consider exchanging therapeutic cones for computers and video game consoles (Verdonck et al 2007).

Occupational therapists' role

Occupational therapists' core skills of problem solving and lateral thinking can be used for applying technology as a treatment tool or as an enabling agent, in much the same way as they are used in activities such as one-handed dressing.

Mainstream technology, as discussed in this opinion piece, includes the internet, computer software, computer hardware, portable devices and computer games. The opportunities are endless and increase every day. The successful use of mainstream technology lies with the occupational therapist's ability to select and structure technologies to meet his or her client's therapeutic needs and, according to Cook and Hussey (2002), does not necessarily rely on the inherent qualities of the technology chosen. Furthermore, many devices have functions that often remain unused but could be empowering for a particular client, and thus therapists are encouraged to explore these (Emiliani 2006).

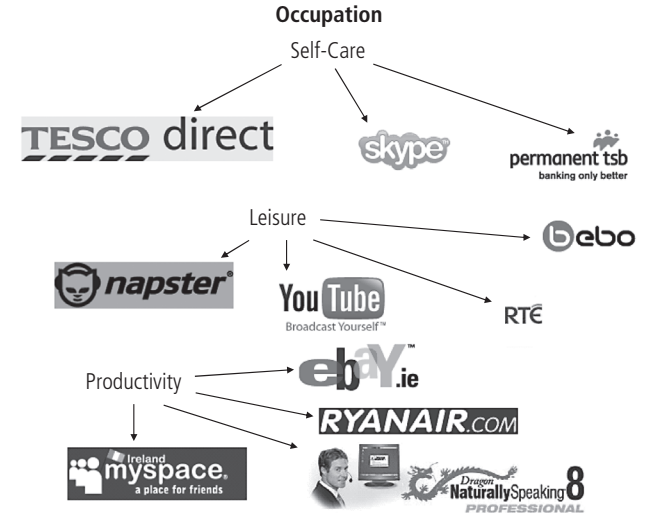
Using mainstream technology in occupational therapy

The internet

The Canadian Model of Occupational Performance can be applied to the internet, which can be considered a virtual *environment* in which the *person* can engage in *occupation* (Law 1998). Some opportunities for occupational performance are illustrated in Fig. 1 and include:

- Self-care – online shopping, internet telephone and banking
- Leisure and occupational pasttimes – music downloads, internet television, internet videos and virtual communities
- Productivity – buying and selling, making travel bookings and for advertising.

Fig. 1. Using the internet, an interpretation of the Canadian Model of Occupational Performance.



Other internet applications include internet telephony, web messaging and video streaming. There is a variety of virtual internet communities, with chat rooms, message boards, online gaming, instant messaging and blogs (Petty 2003). These can provide social contacts, educational resources and peer support for people who are socially and/or physically isolated. According to Griffiths et al (2003), such internet applications can be useful during therapy sessions or, later, as tools for enhancing functional independence.

Computer software and hardware

A computer can be used alongside traditional pen and paper for perceptual and cognitive tasks, ranging from letter writing to bookkeeping. In addition, music, art and photographic programmes can be used to create 'virtual' end products during therapy.

Computer operating systems incorporate accessibility options, including speech recognition, on-screen keyboards and screen readers, thus limiting physical access barriers and increasing the opportunities for use with clients. Alternative computer peripherals, such as specialised impute devices including keyboards, computer mice and microphones, must also be considered.

Portable devices

Mobile phones, personal digital assistants (PDAs), digital audio players and *hand-held game consoles* have multimedia functions, personal organisers and alarms. These devices can include photographs of contacts and auditory reminders, which can be useful memory aids. They can also be used as audio players for music and recorded books or podcasts.

Many devices have multimedia functionality; for example, mobile phones and digital audio players can record and play videos. Therefore, quick videos of therapy sessions could be used for family education, for home programmes and to record progress, and can then be shared between devices. However, obvious ethical considerations exist when using multimedia applications.

Hand-held game consoles are becoming popular for all ages and are relatively inexpensive. Therapeutic applications are increasing with recently developed games, including cognitive exercises such as the Nintendo® DS™ Dr Kawashima's Brain Training©, which are used for individual occupational therapy sessions, ward therapy and home programmes.

The development of *home automation* has improved *environmental control systems*. Some environmental control systems are now mainstream products, with the development of modern, programmable touch-screen universal remote controls or large 5-in-1 remote controls that can send infrared, radio-frequency and X10 signals. Other simple solutions are available in hardware stores, including infrared remote-controlled switch interfaces, which allow an electricity socket to be switched on and off with a remote control, and wireless doorbells, which can be used as home-based attendant alarms.

Computer games

Computer games can be useful tools for the treatment of physical, cognitive and behavioural occupational performance components (Griffiths and Gray 2005). Mainstream computer games are familiar to, and thus meaningful to, some clients (Fitzgerald et al 2004). Games are enticing, stimulating and fun for people of all ages. Group therapy sessions are possible using multiplayer games, including popular quiz games. Competition can be an intrinsic motivator or it can be a pain distracter and increase tolerance for occupational therapy sessions. Some games allow people with different physical abilities to compete against each other.

Computer games have been used clinically for strengthening grip, facilitating exercise, teaching self-care behaviours, improving motivation, increasing energy expenditure and cognitive stimulation. They have been applied to a variety of conditions, including burns, hand injuries, Erb's palsy, traumatic brain injury, diabetes, obesity, muscular dystrophy, stroke and spinal cord injury (King 1993, Sietsema et al 1993, Krichevets et al 1995,

Brown et al 1997, O'Connor et al 2000, Weiss et al 2004, Haik et al 2006, Widman et al 2006, Goude et al 2007, O'Connell 2007, Verdonck et al 2007).

Computer games can be played on dedicated consoles, personal computers and portable devices, all of which are becoming more affordable. Games have also become more varied with an increase in plug-in accessories, such as motion capture systems, dance mats, quiz game buzzers and steering wheels. The increasing popularity of the new Nintendo® Wii™ console and games has led to therapeutic use and planned research applications.

Driving games using a steering wheel and foot pedals can simulate driving for assessment and training, and can provide motivation for reluctant clients to encourage active participation in therapy sessions. Nintendo® video games can be used with the commercially available GameCycle™, which uses an arm ergometer to propel and steer in computer driving games (Fitzgerald et al 2004, Widman et al 2006)

Computer games can be useful in home programmes and can include other family members. In addition, software developers are releasing the same game for different devices, thus increasing the scope for therapists to use the same game in different environments.

Game consoles can attach to video projectors and large lightweight liquid crystal display (LCD) screens, which can increase the visual field and physical demands. This also creates a motivating therapeutic atmosphere and can stimulate social interaction from observing patients.

Limitations and precautions

Occupational therapists need to use their clinical reasoning and judgement to assess the possible risks associated with each technology. The dangers of the internet are highly publicised and there is a need to be aware of these, especially when dealing with vulnerable clients. Negative effects, such as aggression and addiction, have been associated with computer *gaming* (Griffiths et al 2003). In these circumstances, technology should be used in moderation.

Future research

Occupational therapists have a role to play in the research of the application of these technologies, and in their future development, because they deal with clients of various functional abilities and can offer unique insights.

Technophobe or technogeek?

It is easier to claim to be a technophobe and to praise those who are technogeeks; however, this opinion piece was written to encourage the innate creativity in all occupational therapists. With the use of these types of technology in contemporary society, occupational therapists need to move with the times and to exploit every opportunity to preserve the meaningfulness of therapeutic activities and occupations for their clients.

Conclusion

Meaningful occupations are historically and culturally dependent. What was meaningful during the 1950s is not necessarily meaningful today. As a profession, occupational therapists strive to ensure that the activities that they use in therapy are meaningful, and thus they are compelled to explore the technology that is part of their environment. Mainstream technology can also facilitate functional independence for many clients. There is a need to embrace technology and to move with the times because occupational therapists can no longer afford to be technophobes.

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Glossary (The definitions marked * are reproduced with kind permission from *Computer Desktop Encyclopedia*, ©1981-2008 The Computer Language Company Inc.)

Instant messaging*: 'Exchanging text messages in real time between two or more people logged into a particular instant messaging (IM) service. Instant messaging is more interactive than e-mail because messages are sent immediately, whereas e-mail messages can be queued up in a mail server for seconds or minutes. However, there are no elaborate page layout options in instant messaging as there are with e-mail. The IM text box is short, and pressing the enter key often sends the text. IM is designed for fast text interaction.'

Video game console*: 'A specialized desktop computer used to play video games. The three most popular game consoles are Sony's PlayStation 3 (PS3), Nintendo's GameCube and Microsoft's Xbox. Game software is available on CDs or DVDs, although earlier game machines used cartridges containing read only memory (ROM) chips. Video game consoles require a TV for display.'

Software*: 'Instructions for the computer. A series of instructions that performs a particular task is called a "program". The two major categories of software are "system software" and "application software". System software is made up of control programs, such as the operating system and database management system (DBMS). Application software is any program that processes data for the user (inventory, payroll, spreadsheet, word processor, etc.)'

Download*: 'To receive a file transmitted over a network. In any communications session, "download" means receive, and "upload" means send. The download/upload often implies a big/little scenario, in which data is being downloaded from the "big" server into the "little" user's computer. Uploading implies sending data from the little computer to the big computer.'

Virtual community*: 'A group of individuals who share a common interest via e-mail, blogs, instant messages, chat rooms or newsgroups. Members of a virtual community are self-subscribing. Contrast with virtual workgroup. See social networking site.'

Internet telephony: The routing of voice conversations over the internet.

Streaming†: 'A method of relaying data (especially video and audio material) over a computer network as a steady continuous stream'. (†*Oxford Dictionary, http://www.askoxford.com*)

Internet forum or message boards: Internet-based discussion, which allows users to post questions, answers and comments to topics called **threads**.

Online gaming: The use of the internet to allow users, to play computer games against other users irrespective of geographical location but linked by hyperspace, for example Xbox Live, PlayStation III and World of Warcraft.

Blog*: 'A Web site that contains dated text entries in reverse chronological order (most recent first) about a particular topic. Blogs serve many purposes from online newsletters to personal journals to "ranting and raving". They can be written by one person or a group of contributors. Entries contain commentary and links to other Web sites, and images as well as a search facility may be included. Blogs may also contain video.'

Speech recognition: Software that converts spoken words into computer text or computer commands.

Digital music player*: 'Hardware or software that plays audio files encoded in MP3, AAC, WMA or other audio formats. There are several software-based music players that play audio files in a desktop or laptop computer, including iTunes, RealPlayer and Windows Media Player. Software players may also support streaming audio and Internet radio stations. See digital jukebox and media player.

'On the hardware side, countless handheld players use flash memory or a hard disk to hold songs downloaded from the user's computer via a USB or FireWire connection. Apple's iPod is clearly the industry leader.'

Handheld games*: 'Handheld video games are miniature versions of game consoles and less elaborate. They are entirely portable, self-contained, battery-operated devices with their own small screens. Examples are the PlayStation Portable, Nintendo GameBoy and earlier Sega GameGear and Atari Lynx machines.'

Podcast* (iPOD broadCAST): 'An audio broadcast that has been converted to an MP3 file or other audio file format for playback in a digital music player or computer. The "pod" in podcast was coined from "iPod", the predominant portable, digital music player, and although podcasts are mostly verbal, they may contain music.'

Nintendo DS is a handheld game console. The console features a clamshell design, with two LCD screens inside, one of which is a touch-sensitive screen. It features a built-in microphone and supports wireless standards, allowing players to interact with each other within short range or online.

Home automation or Domotics*: 'Information technology in the home (domus is Latin for home). Although remote lighting and appliance control have been used for years, domotics is another term for the digital home, including the networks and devices that add comfort and convenience as well as security. Controlling heating, air conditioning, food preparation, TVs, stereos, lights, appliances, entrance gates and security systems all fall under the domotics umbrella.'

Universal remote is a remote control that can be programmed to operate various brands of one or more types of consumer electronics device.

X10 is an environmental control system (ECS) transmission method that uses standard household electrical wiring. A control unit is plugged into a standard power socket and transmits codes over the wires. Each appliance is plugged into a module, which is in turn plugged into a socket that contains a receiver to interpret these X-10 codes (Cook and Hussey 2002).

The **Wii©** (pronounced as the pronoun *we*) is a video game console released by Nintendo®. A distinguishing feature of the console is its wireless controller, the Wii Remote, which can be used as a hand-held pointing device and can detect motion and rotation in three dimensions.