# Inclusive fitness equipment for people with a visual impairment

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This publication summarises findings from research commissioned by Thomas Pocklington Trust to investigate the development and provision of inclusive fitness equipment, with a specific focus on screen based consoles. The research was conducted by Rica, who specialise in consumer research with older and disabled people. Fitness equipment tested included: treadmills, cross trainers, exercise bikes and rowing machines. Two types of console were tested: LED consoles and touchscreen consoles.

Summary findings

- Equipment, facilities and services for visually impaired gym users are largely inconsistent.
- LED consoles are moderately more accessible than touchscreen consoles.
- Consoles are slightly more accessible if they feature tactile buttons, audio output, colour contrast and block colours.
- However, all the consoles tested were relatively inaccessible for visually impaired users, including fitness equipment accredited by the Inclusive Fitness Initiative (IFI).
- Participants reported that use of cardio fitness equipment led to an improvement in their everyday fitness and mental health.
- There is an urgent need for voice-over technology to ensure fitness equipment is accessible for visually impaired users.
- Accessing fitness equipment is challenging for visually impaired users due to the built environment and issues with customer service and communication.
- Barriers to the development of inclusive fitness equipment include: cost, industry culture, a lack of awareness of visually impaired users' experiences and an over-reliance on IFI standards to ensure products are accessible.
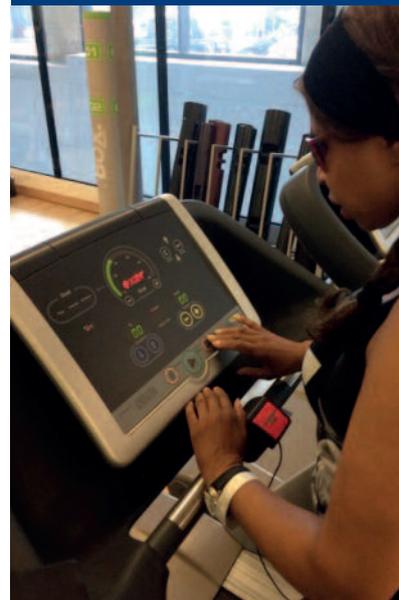
Background

RNIB research has shown that 64% of visually impaired people would like to be more physically active and 57% felt that their sight loss was a barrier to being physically active. The majority of fitness equipment currently available is felt to be inaccessible to people with sight loss. This excludes many visually impaired people from accessing popular types of fitness equipment.

Over two million people in the UK are living with sight loss that significantly impacts on their lives, with a substantial number of people potentially denied the ability to maintain or improve their health. This research focuses on the accessibility and inclusivity of screen based consoles. It investigates and supports the development and provision of inclusive fitness equipment which is easier for people with sight loss to use.

Research aims

The aims of the research were to:

- Identify equipment, facilities and services specifically available to visually impaired gym users;
- Explore existing products and technology trends and users' opinions of them;
- Assess the usability and inclusivity of screen base consoles;
- Identify functions and design features which help or hinder the ease of use of fitness equipment;
- Investigate the experiences and needs of visually impaired people who are current or potential users of fitness equipment;
- Encourage industry to develop and provide electronic fitness equipment that is inclusively designed.

Research methods

There were three main elements to our research:

1. **Market research** – Consisting of desk research and four showroom and exhibitions visits.
2. **User experience research** – Three usability workshops and focus groups (carried out in three leisure centres across London) with 20 visually impaired participants and a further 20 telephone interviews.
3. **Industry liaison** – Four industry interviews with experts from the fitness sector. Interviewees were knowledgeable in the areas of product design, public affairs, business development and customer needs.

Findings

1. Equipment, facilities and services

Facilities and services for visually impaired users vary greatly and are largely dependent on location. Most operators offer an online search tool which indicates the services and facilities available to disabled users at each centre. The fitness sector has sought to address the inconsistency by adopting the Inclusive Fitness Initiative (IFI). The IFI is managed by the English Federation of Disability Sport (EFDS) and provides inclusivity standards for fitness equipment and facilities.

Manufacturers offer fitness equipment that is Wi-Fi connected and allows users to connect with their phone or wearable fitness accessory. Using Apps and online websites, users can view their fitness data and track their workout progress. As of yet, there is no trend toward voice-over technology. However, Concept2, a rowing machine manufacturer, has introduced 'ErgChatter', a free software tool which provides audio output whilst the user is rowing.

2. Usability of fitness equipment

During the usability workshops participants were asked to complete five basic tasks that were seen as the minimum a person would need to use equipment independently. This involved:

1. Step on to the machine and locate the user interface
2. Start the machine
3. Increase the speed or resistance
4. Decrease the speed or resistance
5. Stop the machine

Products tested were mainly from two manufacturers, Technogym and Life Fitness. The overall average pass rate across all types of fitness equipment was 63%, with the highest pass rate achieved by any piece of fitness equipment being 77%. Tasks were sequential, meaning that a failure in any one task would effectively stop the user from using the equipment. LED consoles were found to be more accessible, with an overall average pass rate of 67% compared to the overall average pass rate for touchscreen consoles of 56%. Again, this is low considering the basic nature of the tasks. Pass rates were also low across all types of equipment, including those with IFI accreditation. We can identify a number of features which helped or hindered the usability of consoles.

LED consoles

The most useful product feature for LED consoles was raised tactile buttons, as they gave the user a fixed navigation point to refer

back to. Audio output and sounds were also helpful for all participants. The 'bleep' sound made when participants pressed a button allowed them to count the number of intervals they were increasing or decreasing by. This gave them a reference point for managing the intensity of exercise.

Buttons positioned too close together were an unhelpful feature, leading to confusion when trying to locate different functions. Colour highlighting around the edges of buttons was also considered largely redundant, as users with partial vison didn't find it distinctive enough. Participants suggested that all fitness equipment should use block colours. Font size also hindered the usability of equipment. Although users with partial vision could distinguish the large digits on the console, they didn't know what the measurements referred to. Not being able to identify the text limited the information participants could obtain from the console.

All participants felt that they were unable to access the same information as users with full vision. The inability to access information and outputs that fitness machines provide was a source of great frustration.

Touchscreen consoles

Participants found touchscreen consoles highly inaccessible. However, there were helpful features. Consoles generally had clear contrasting colours, which made it easier to distinguish between shapes and fonts. Users also preferred the large font size used for measurement outputs, such as workout time, calories burned and heart rate. Participants found these outputs easier to identify and read compared to LED consoles.

Overall though, participants found touchscreen consoles very difficult to use. The biggest difficulty, irrespective of the user's level of vision, was the lack of tactile reference points on the console to aid navigation. Participants with no light perception found the consoles almost impossible to use, and those with partial vision struggled.

The user interface menus were felt to be complicated and used colours which could confuse the user. For example, a large and coloured user identification marker confused participants as they mistook it for the pause button. Consoles also lacked feedback features, such as 'bleeps' or 'clicks' which let the user know a button had been pressed.

Future design features

Focus group participants were asked to choose product features that would improve the accessibility of fitness equipment consoles.

The most popular product feature was voice-over technology. Participants felt this was the one feature which would enable fitness equipment to be truly accessible to all visually impaired users.

Other product features included: screen magnification for touchscreen consoles; standardised console layout across different types of fitness equipment; and the ability to connect your phone to the equipment and control the machines using accessible software.

3. Use of fitness equipment

Participants were highly aware of the positive impact the use of cardio fitness equipment could have on health and fitness. The most common benefit cited was improvement in mental health. Participants felt that regular use of cardio fitness equipment contributed to an improvement in their mood and energy levels. Using fitness equipment and completing a workout gave them a sense of independence and achievement. Many felt that the psychological benefits were as beneficial, if not more so, than the physical benefits. Although participants had a keen appreciation of the benefits of the gym, being able to access and use the equipment could be problematic. The difficulties can be attributed to two main factors: the built environment; and customer service and communication.

Built environment

The interior colours of leisure centres often presented a challenge. Participants found that centres which had been refurbished sometimes became less accessible. The colours used were often very similar, for example black fitness equipment with a grey wall. Participants felt that contrasting colour between the walls, floor and exercise equipment would help users with some partial vison to navigate around the space. Lighting was also an issue; participants found spot lighting difficult as it created areas in the gym that were better lit than others, making it hard for users to navigate. The layout was another hurdle; fitness equipment in centres tends to be arranged in a compact way, leaving little room between machines. The close proximity creates trip hazards and can present a significant risk to the safety of visually impaired users.

Customer service and communication

The ability of visually impaired users to access fitness equipment was also dependent on the customer service they received. Participants' experience varied widely, with some giving very positive feedback and others being highly critical.

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Due to the difficulties with the environment, participants often needed assistance in moving between machines and programming equipment. In most cases, leisure centres were unable to provide this assistance. This was due to a number of factors, including: a lack of staff members, staff not knowing how to meet the needs of visually impaired users and what some participants viewed as a general unwillingness to help. Due to high turnover in the fitness sector, participants felt that staff were not well trained and this could lead to difficulty and confusion when trying to access fitness facilities.

4. Industry liaison

Interviews with industry focused on two themes: barriers to the development of inclusive fitness equipment; and future industry trends.

Barriers

Cost was given as the most common barrier, both in terms of the initial cost of adapting machines but also in the long term investment required to ensure that equipment is inclusive. Industry experts felt the costs barrier may be overcome as operators and manufacturers become more aware of the potential market that older and disabled people represent.

It was also argued that until companies are able to implement inclusive design principles within the culture of their research and development teams and consider inclusivity at the beginning of the process, there will always be issues with accessibility. Experts also commented on the culture of short term deadlines. The urgency placed on the design process creates a perception that there isn't enough time for inclusive design, as it is seen as slowing down product development.

A further barrier is lack of awareness among design teams about the experiences of visually impaired users. Although manufacturers have substantial testing procedures to ensure the quality and reliability of their products, there is no standard testing with disabled users. Manufacturers mainly gain their understanding about the needs of disabled people by engaging with specialist charities, such as RNIB.

Manufacturers largely rely on IFI standards provided by the EFDS to offer guidance on what product features are appropriate. However, as this research has shown, IFI approved equipment is not always accessible. Manufacturers' reliance on IFI standards was also an issue when the standards didn't keep pace with technology or provided no guidance on certain features. For instance, the IFI has

"Cost was given as the most common barrier to the development of accessible fitness equipment".

no standards for touchscreen consoles, making it difficult for design teams to know what features would be useful for visually impaired users or what type of audio output is required.

Future industry trends

Future industry trends over the next ten years were expected to be driven by innovations such as simpler console design, with smartphones and tablets functioning as the main console. This move toward smartphones and tablet integration will lead to greater emphasis being placed on entertainment and engagement in the gym.

When asked about audio output as a potential product feature, industry experts were largely positive and thought it was feasible. However, there was some ambiguity as different types of audio output would be required for different types of consoles.

Industry experts had mixed views on the impact of future trends. Some thought that increased use of smartphones and tablets would improve accessibility as gym users could harness the accessible settings on their smart devices. However, others believed that it would have little impact as some industry experts viewed LED consoles as being accessible. It was also argued that to ensure new products and technology had a positive impact, manufacturers needed clear guidelines. Technology companies and other equipment manufacturers also needed to develop more collaborative relationships to ensure that users aren't left waiting for the latest accessible technology.

Conclusion and recommendations

In conclusion, the research has shown that LED consoles are moderately more accessible than touchscreen consoles. However, pass rates were low across all types of fitness equipment consoles, including equipment with IFI accreditation. Based on feedback from participants, there is a need for voice-over and audio output technology in order to improve accessibility. The findings also indicate a need for good practice guidance outlining the best product features for visually impaired users.

Although cardio fitness equipment had a positive impact on users' health and fitness, participants found accessing fitness equipment and wider facilities difficult. This was due to the inaccessible built environment and the customer service they received. Better training and communication procedures would help address some of these issues. A voluntary buddy scheme at all public sector gyms to assist disabled users could also help solve the problem of assistance.

Barriers to the development of accessible fitness equipment included: cost, industry culture, a lack of awareness of visually impaired users' experiences and an over-reliance on IFI standards. Future trends were predicted to be driven by innovations in technology, including simpler console design and smartphone integration. The barriers to development of inclusive fitness equipment can potentially be tackled by updating the IFI scheme to reinforce the case for inclusive design.

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How to obtain further information

This paper summarises the full research report by Rica, which is available on the Pocklington website at:
www.pocklington-trust.org.uk and on the Rica website at:
http://www.rica.org.uk/content/research-reports

Copies of the full research report and this summary paper are available in both braille and audio-cd from Thomas Pocklington Trust.

Email: **research@pocklington-trust.org.uk**
Telephone: **020 8996 1937**

In this publication, the terms 'people with visual impairment', 'people with sight loss' and 'visually impaired people' all refer to people who are blind or partially sighted.

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