Case Study 5.1: Accessibility for Visitors to Sporting Events: How Technology Can Help

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Increasingly visitors to sporting events include people with disabilities since they want to fully participate in all aspects of society. However the challenges include:

- Finding information about event or venue;
- Planning the journey;
- Purchasing a ticket;
- Undertaking the journey (with possible service disruption);
- Finding the venue;
- Getting around the venue and locating facilities.

For many international sporting events the visitor will be unfamiliar with the transport system and the venue and may not be fluent in the local language. At the same time there may be a large number of people which can exacerbate

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the visitor's difficulties. Therefore good design of systems and services is essential to minimize the problems for these visitors.

The Consumers

The number of people with disabilities is gradually increasing since more people are living to an older age and many disabilities are correlated with age.

Approximate proportion of the population who experience difficulties in using public terminals (NB Do not aggregate the figures since multiple impairments are common)			
0.4 per cent	Wheelchair users	1 per cent	Dyslexic
5 per cent	Cannot walk without an aid	3 per cent	Intellectually impaired
2.8 per cent	Reduced strength	0.1 per cent	Deaf
1.4 per cent	Reduced coordination	6 per cent	Hard of hearing
0.25 per cent	Speech impaired	0.4 per cent	Blind
0.6 per cent	Language impaired	1.5 per cent	Low vision

Just to group people by the impairment can be misleading since each impairment can take many different forms. To give an example, about 1.5 per cent of the population in the UK have vision such that they could be registered as "blind" or "partially sighted". However, the effect depends on a number of factors including medical condition for example, macular degeneration), environment illumination), and contrast.

The more common conditions are:

a) Macular degeneration

Age-related macular degeneration accounts for about half of all registrable visual impairments in the UK. It typically results in loss of central vision (see Figure CS5.1). Since most of the colour receptors are in the macula (the central area of the retina), those with macular degeneration see colours less vividly.

Frequently enlarging text will improve legibility and readability, but it is important that there is high contrast between the text and the background.

b) Diabetic retinopathy

This is the single most common cause of registrable visual impairment amongst those of working age in the UK. It is more likely to occur if the control of the diabetes is poor. Typically it results in haemorrhages in the back of the eye (see Figure CS5.2); laser treatment can reduce the spread of the haemorrhages by sealing the edges.

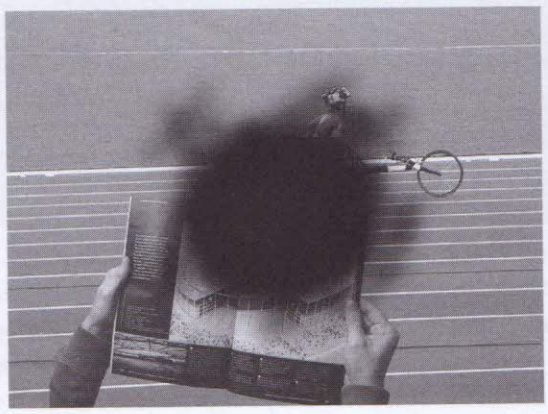

Figure CS5.1 How someone with macular degeneration might see their television screen

Source: Photo by John Gill

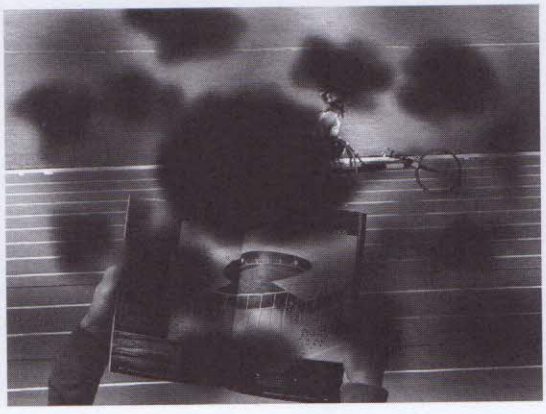

Figure CS5.2 How someone with diabetic retinopathy might see their television screen

Source: Photo by John Gill

People with diabetes often have poor circulation which can result in problems with their feet. However, it frequently adversely affects their sense of touch, so the ability to read Braille is rare.

c) Cataracts

A cataract is an opaqueness of the lens at the front of the eye. The effect is not dissimilar to driving a car with a dirty windscreen; if the sun is behind you, visibility is reasonably good, but if the sun is in front of you, visibility may be severely impaired.

Surgically it is possible to remove the cataract and replace it with a plastic lens. However, it is not uncommon to then find macular degeneration which has not been diagnosed because it was obscured by the cataract.

d) Tunnel vision

Tunnel vision (Figure CS5.4) is associated with a late stage of glaucoma and some forms of retinitis pigmentosa. Glaucoma is caused by an increase in pressure in the fluid in the eye; at an early stage it can be treated with tablets, but surgical intervention may be necessary if it has not been treated at a sufficiently stage.

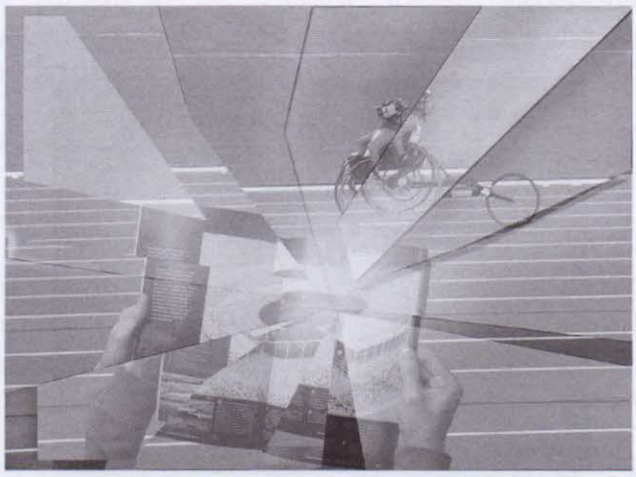

Figure CS5.3 How someone with cataracts might see their television screen
Source: Photo by John Gill

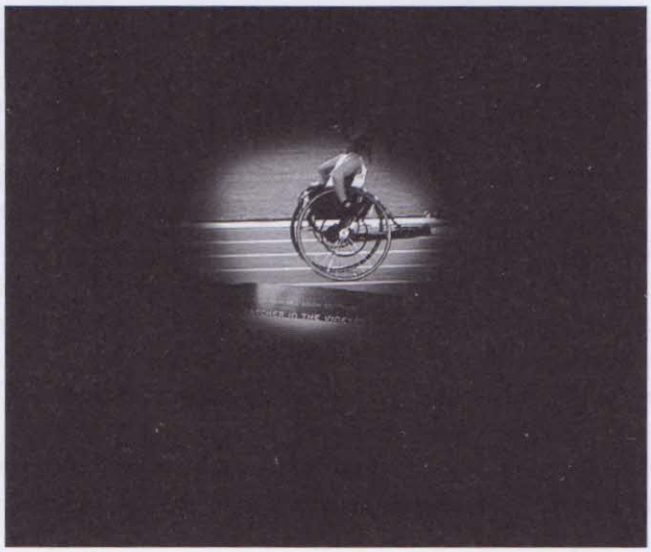

Figure CS5.4 How someone with tunnel vision might see their television screen

Source: Photo by John Gill

Retinitis pigmentosa (RP) is a name for a group of conditions whose common factors are that they are genetic and result in night blindness. In the classic form, the onset is typically between the age of 30 and 40 and results in reduced peripheral vision.

People with tunnel vision may have difficulties in not walking into objects even though they can read road signs. Often they will find it easier print which is smaller such that a whole word fits into their visual field.

e) Dyslexia

This is a cognitive impairment which can result in difficulty in reading or writing textual characters. It can also result in problems in remembering a series of digits (for example, a PIN at a cash dispenser) in the correct order.

The design of the typeface can make a significant difference to the readability of text which is also affected by foreground and background colours.