This presentation is part of the COGAIN Deliverable D3.4

Eye Control Hints and Tips

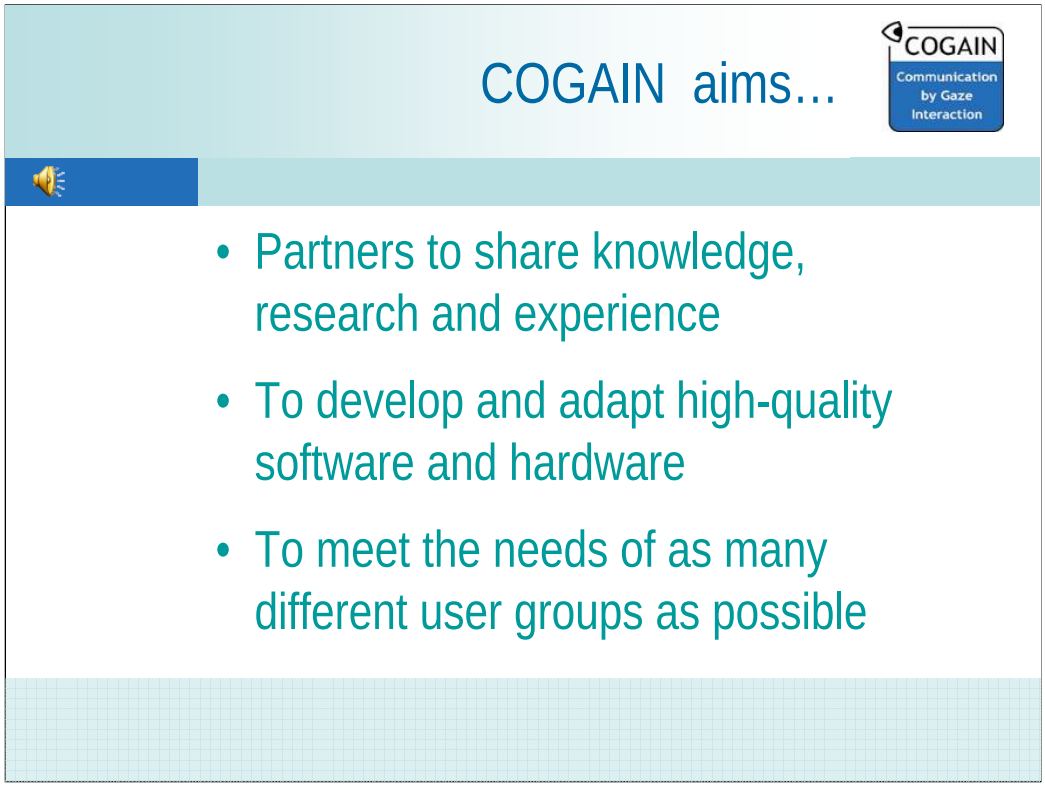
by

the Network of Excellence on

Communication by Gaze Interaction

www.cogain.org

Who can benefit from eye control and how?



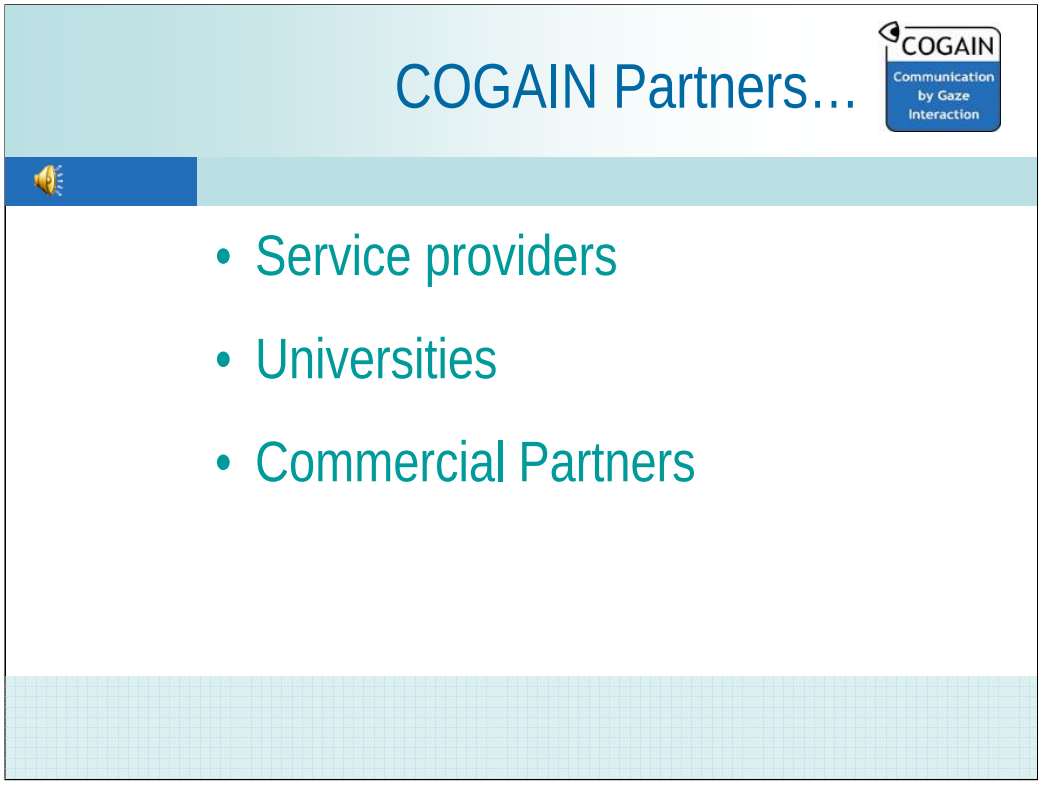
COGAIN is a European Network of Excellence. Its partners include people from universities, manufacturers and developers as well as service providers who work with people who have a range of disabilities.

Amongst COGAIN's aims are the following:

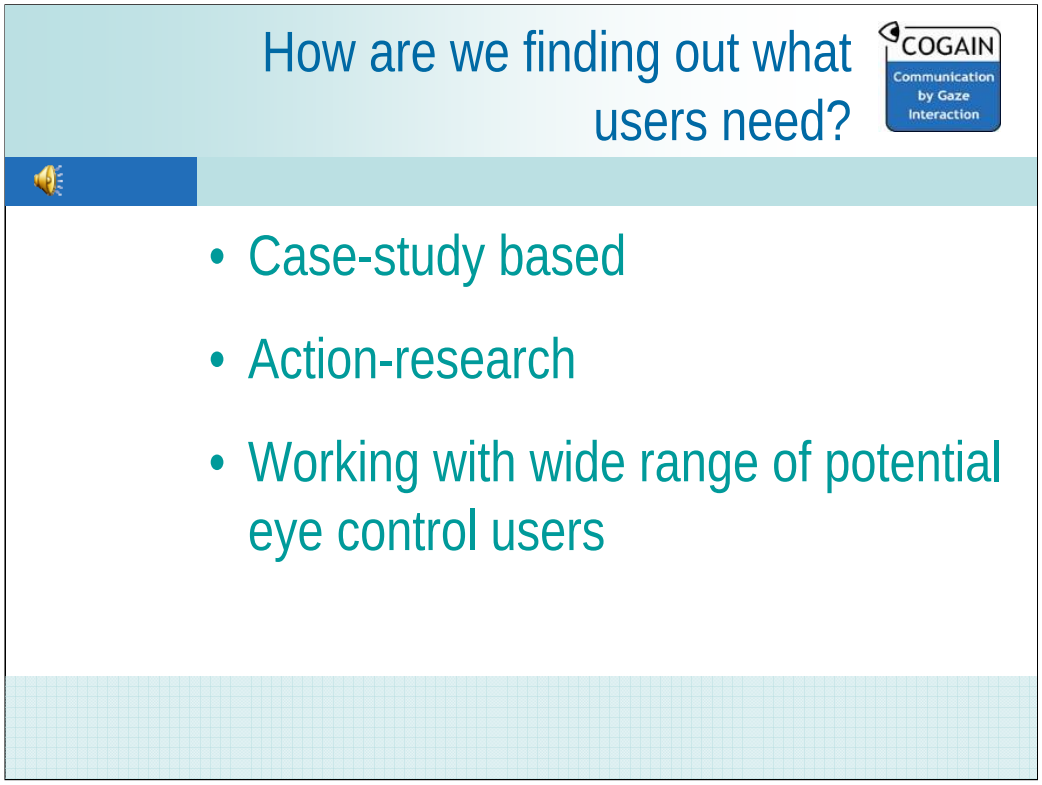
To provide an opportunity for its partners to share knowledge, research and experience in order to take the whole field of eye control technology forward across Europe.

To develop and adapt high-quality software and hardware so that it may be used successfully for eye control.

To meet the needs of as many different user groups as possible. By COGAIN partners to collaborate, the project is providing an opportunity to increase the range of people who can be helped as well as the range of activities that they can do using eye control.



COGAIN Partners include Service Providers, Universities and Commercial Partners.



A range of research is being carried out, including case study based approaches and action research. An essential element of COGAIN is to work in partnership with people who have complex disabilities and the professionals who support them. One of the COGAIN's key aims is to increase the number of people who can use this technology. To achieve this, we are constantly modifying the software that we are using and collaborating with manufacturers to modify their systems in order to enable an ever increasing range of people to use this technology.

Wide range of potential users…

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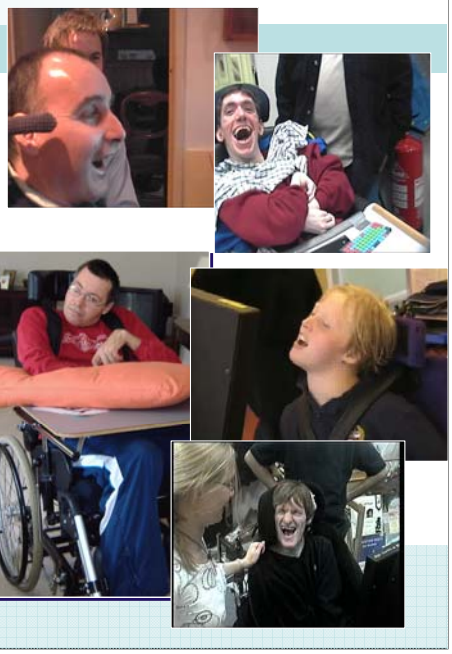
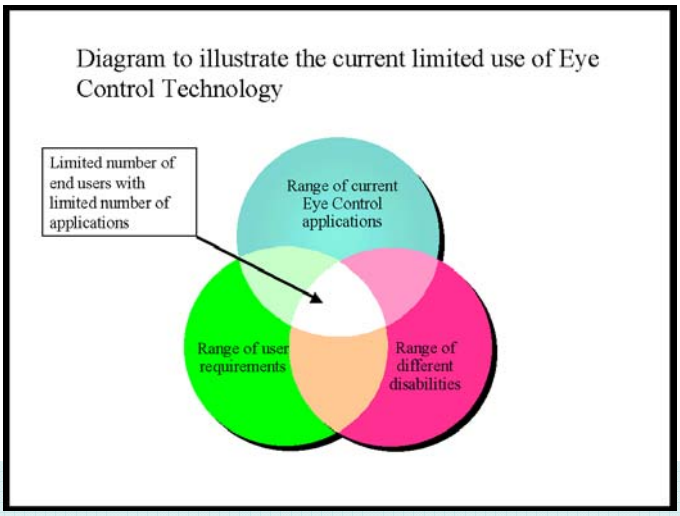
- Degenerative conditions
- Stroke
- Cerebral palsy
- Spinal Lesion
- Locked-in syndrome
- etc…



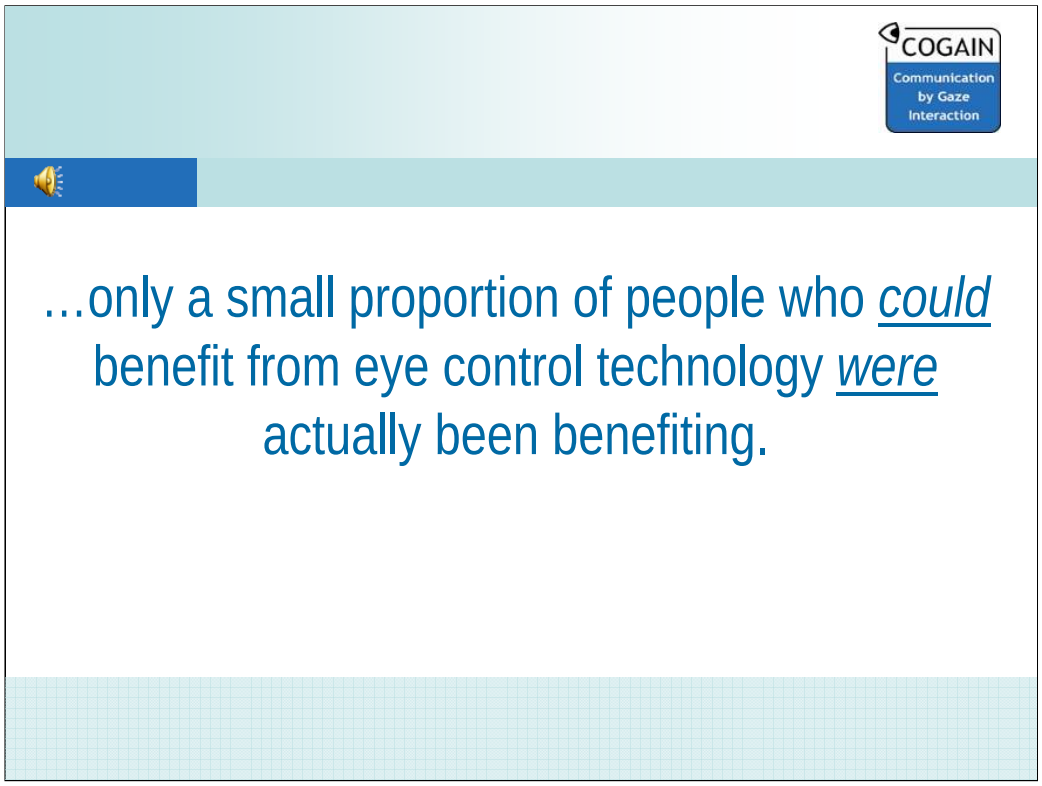
This wide range of potential eye control users includes those with degenerative conditions, those who have had a stroke, people with cerebral palsy, spinal lesion, locked-in syndrome, etc

What are we finding out…?

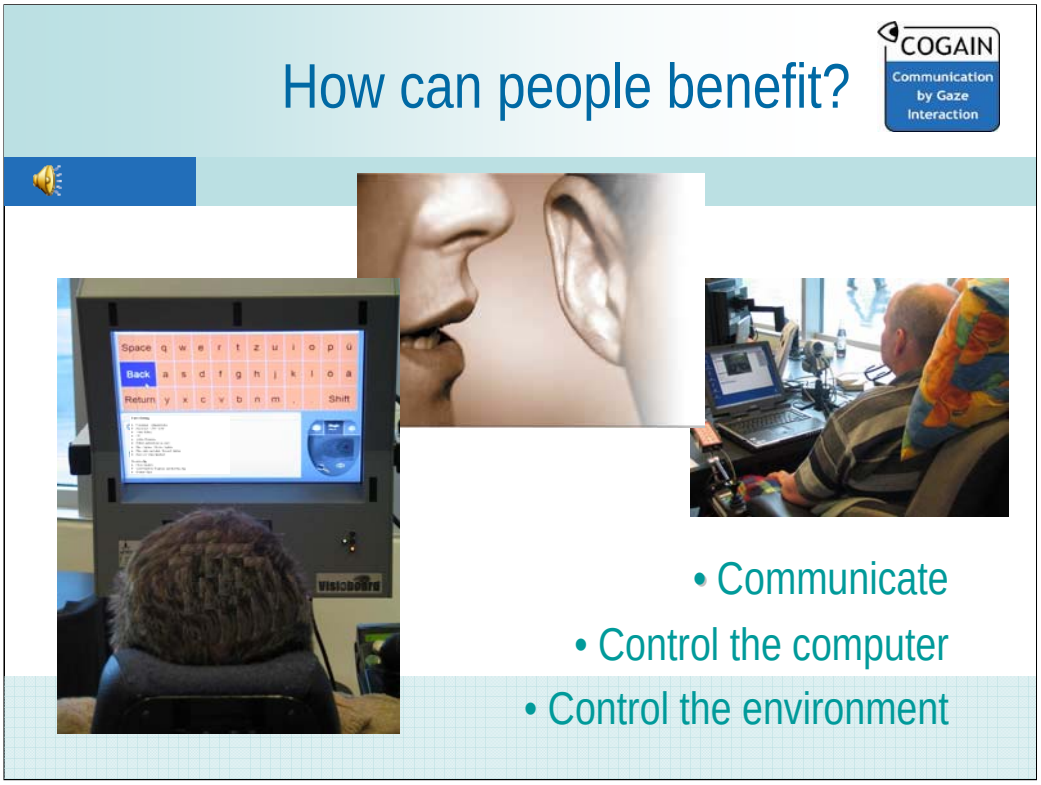


What are we finding out from working with a wide range of potential eye control users…?

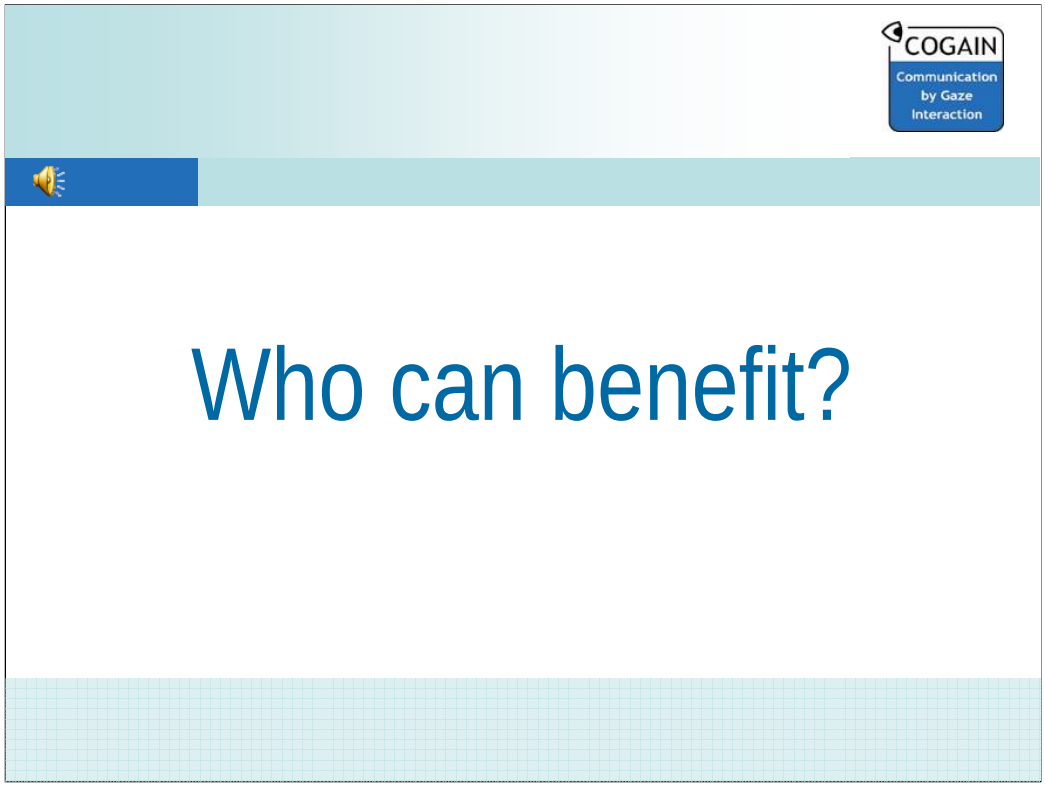
In general terms, this is how many professionals and end-users regarded the situation when COGAIN started. For many people who wished to use eye control the range of applications available to them was very limited and many of them simply could not find a way of using this technology at all.



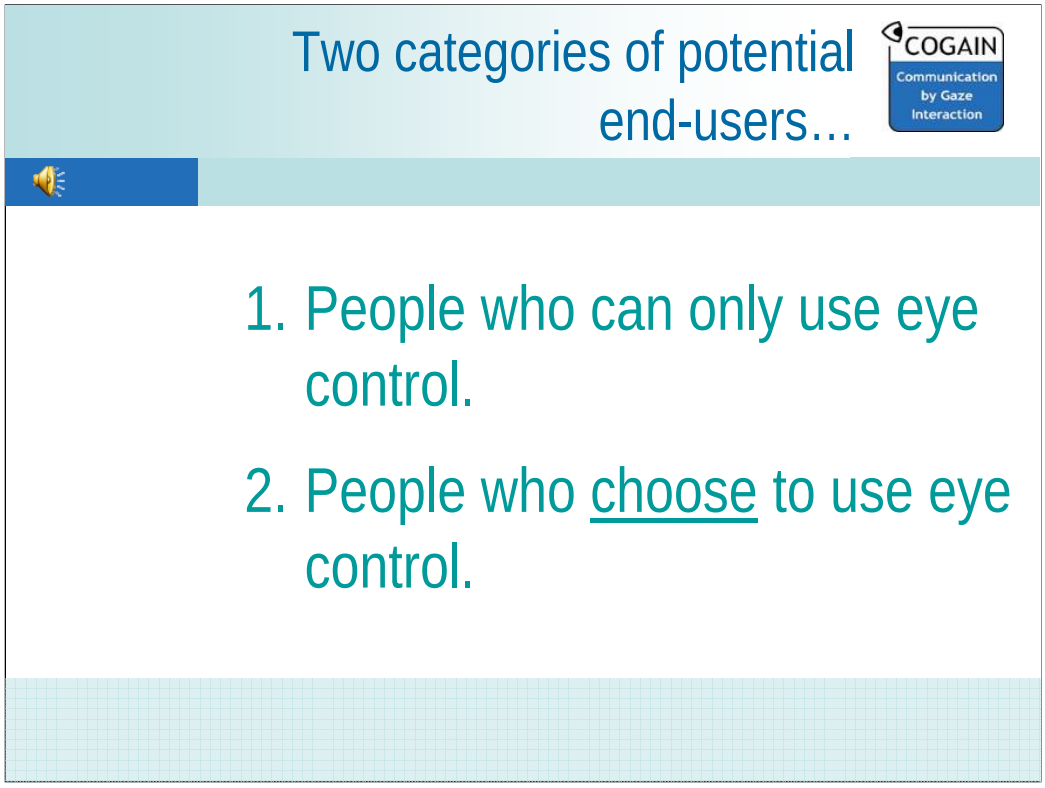
As a result, only a small proportion of people who could benefit from eye control technology were actually benefiting.



How can people benefit? Potentially, eye control technology can be used to enable people with disabilities to communicate, control the computer and control the environment.



Who can benefit from eye control?



There are basically two categories of people who are potential users of eye control systems.

Firstly, there are those people who can only use eye control. For example, someone with a degenerative condition such as ALS/MND might reach a stage when they can no longer easily or reliably control any part of their body other than their eyes.

In addition to this group, partly as a result of the work of COGAIN, an increasing number of potential users are now having the opportunity to try this technology and compare it with other ways of controlling the computer. While these people might already be able to control the computer successfully by using, for example, a switch, head mouse, trackerball, etc they are now having the chance to try eye-control. As a result, they are able to compare eye control with other access methods in terms of on speed, fatigue, posture or, indeed, whatever usability issues are most important to them.

1. People who can only use eye control…

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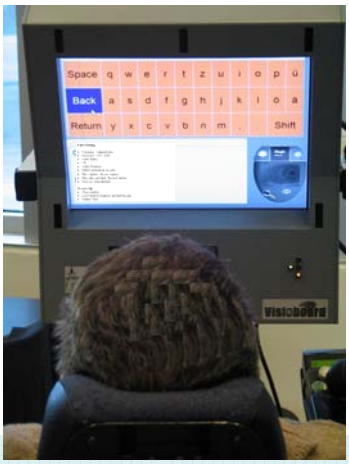
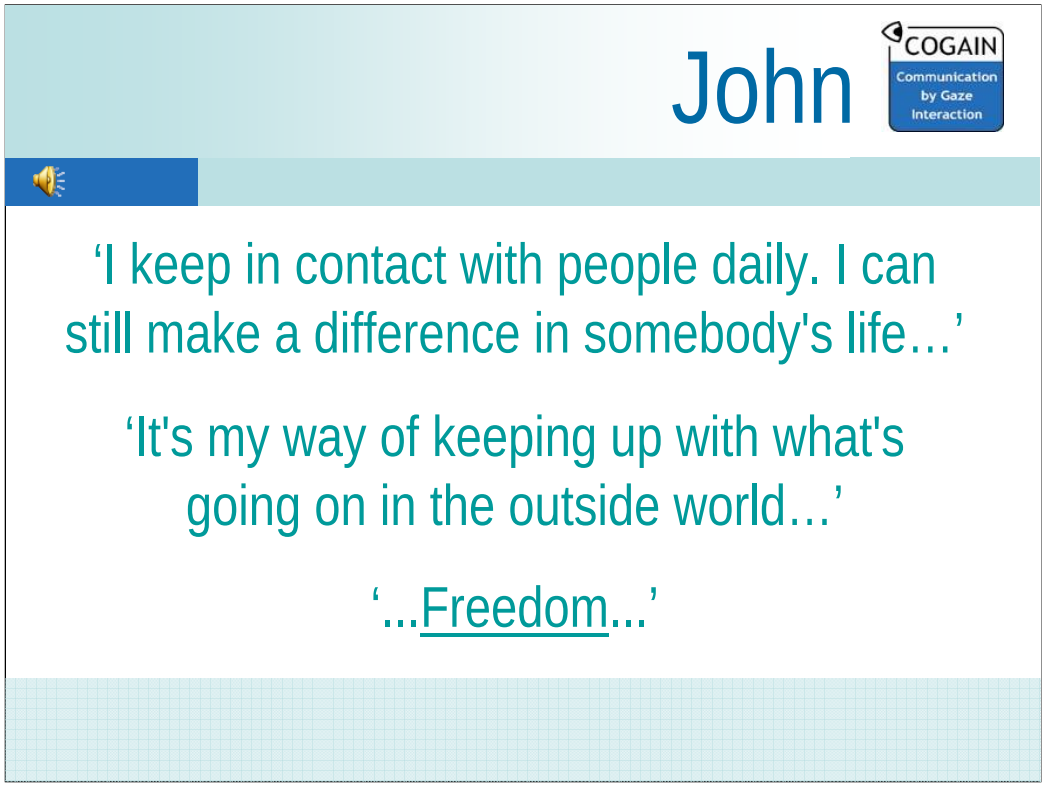
John

- 12 hours a day
- Communication
- Internet access
- E-mail



Let's look first at an example of someone who can only use eye control.

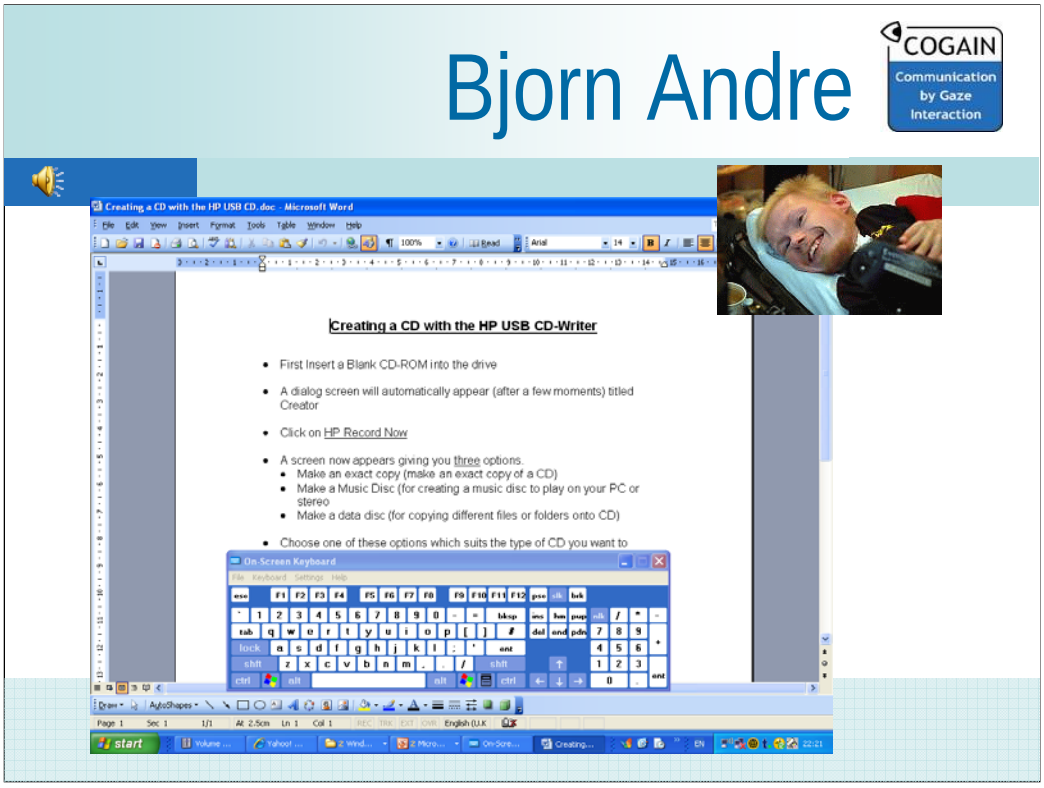
John, a family man with ALS/MND, is only able to move his eyes. However, using eye control technology he is able to use his computer for 12 hours a day. He uses the computer for a range of activities, including communication (with the help of synthetic speech), Internet access, e-mail, etc.



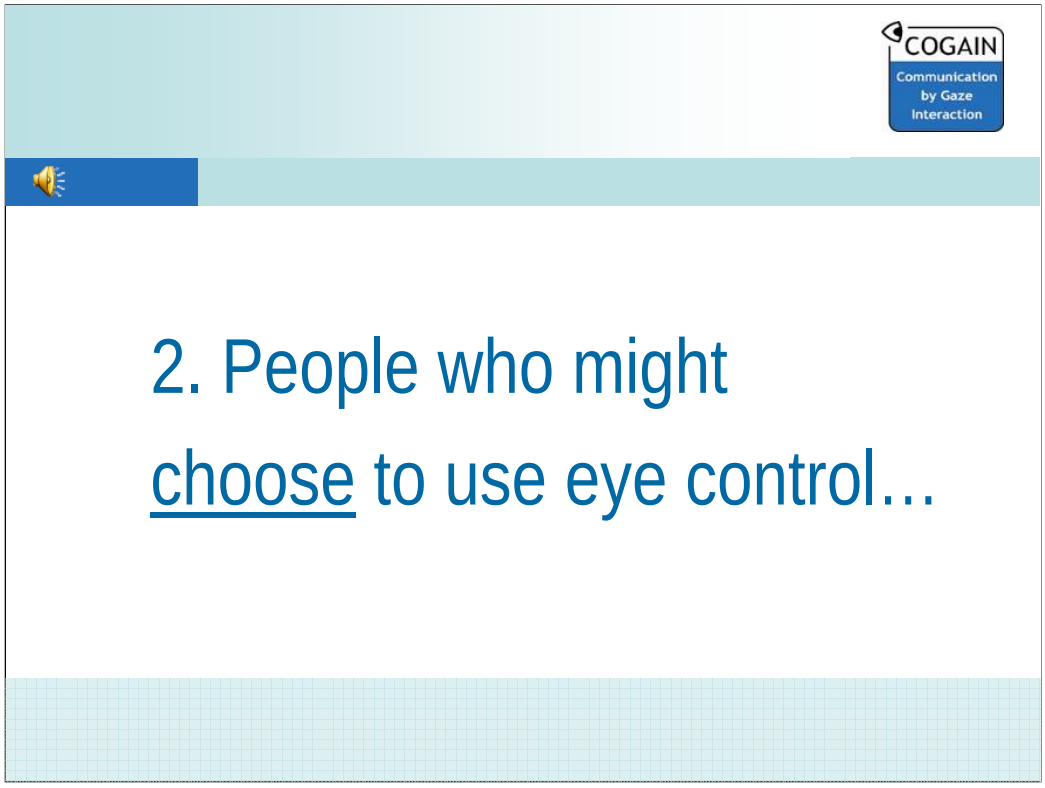
When commenting on the benefits of this technology for communication, both face-to-face and by e-mail, John says: "I keep in contact with people daily. I can still make a difference in someone's life…"

Through access to the Internet, John is able to keep up to date with global developments independently. He says " it's my way of keeping up with what's going on in the outside world."

John sums up the benefits of this technology in one word…"Freedom".



Bjorn Andre is someone else for whom eye control is the only realistic option. Bjorn Andre needs to lie down on his side when using eye control. However, if the screen is positioned at the right angle, he is able to fully access and control the Windows environment, by controlling the on-screen pointer with his eyes and by selecting letters from an on-screen keyboard when he wants to write something. His eye control is so good that he can even use the Windows Accessibility on-screen keyboard which is very small and cannot be re-sized.



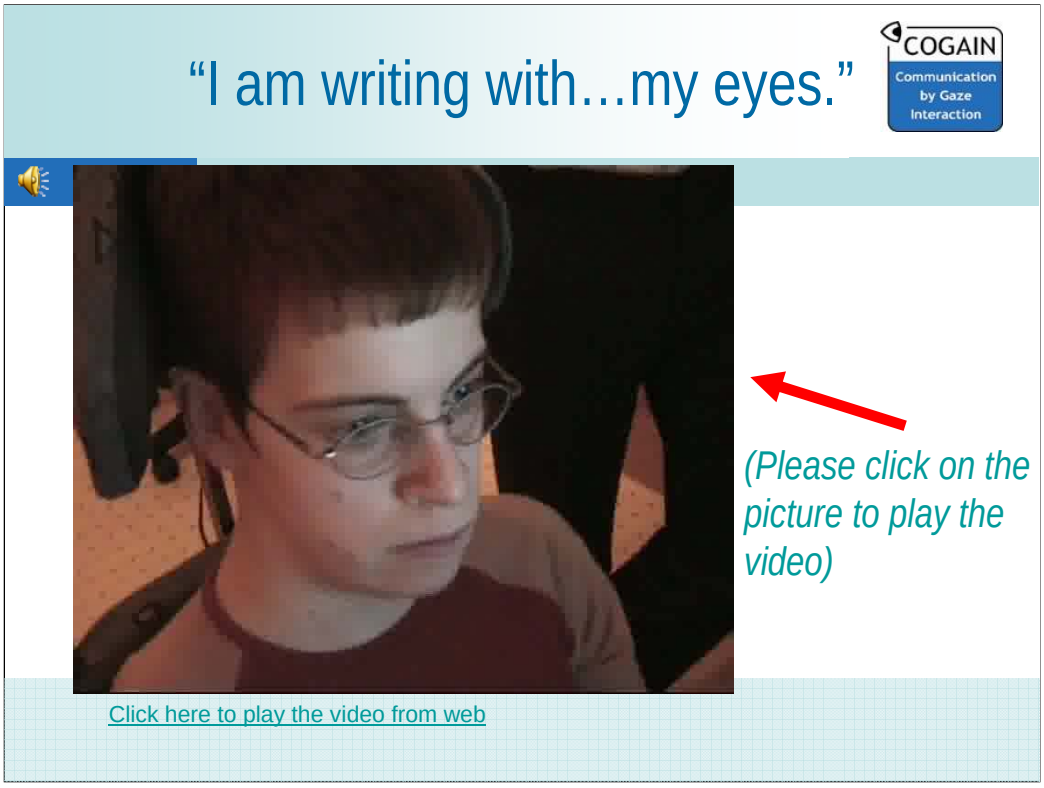
The second group of people that COGAIN is focusing on is the group of people who might choose to use eye control.

Kathrin

- Aged early 20's
- Athetoid cerebral palsy
- One of the first non-speaking students to go to a German University.

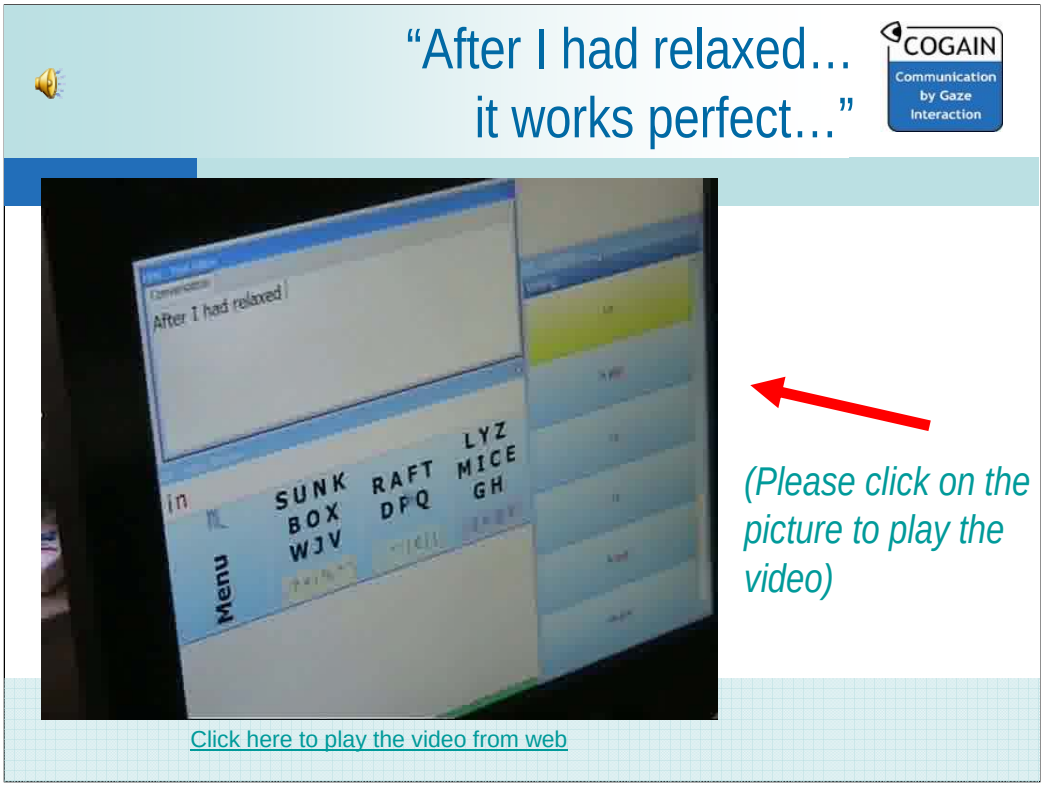
Whilst, for Keith and Bjorn Andre, eye control is the only realistic way for them to control the computer, for other people, like Kathrin, eye control is one of several options open to them.

Kathrin is in her 20s and cannot speak. When she is away from the computer, she uses eye-pointing to communicate. At the computer, she uses special text-based software to communicate. She has athetoid cerebral palsy which, for her, means that she has a certain amount of involuntary movement. Because of this constant movement, it can be difficult for eye-control systems to interpret her eye movement accurately. For this reason, she cannot control a pointer directly in the way that Keith and Bjorn Andre can so she needs special software.



Here is Kathrin using eye control to write on the computer, using the specially developed software. She is writing "I am writing with my eyes." Please click on the picture to see the video clip.

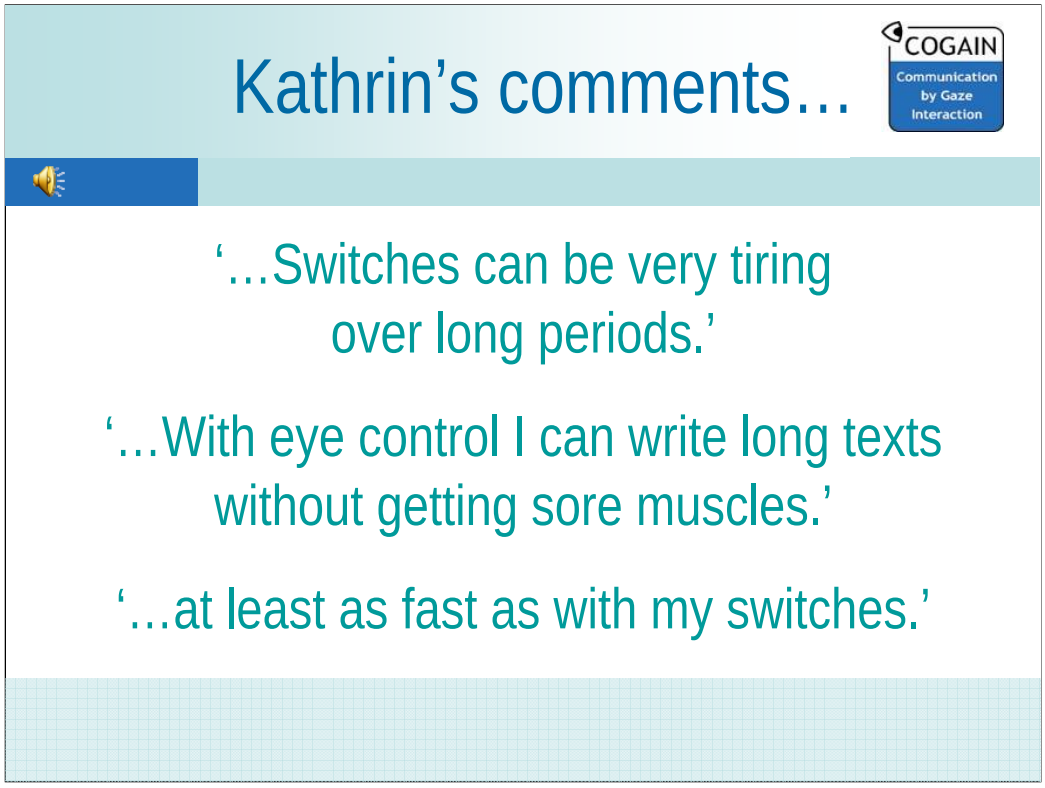
The video clip is available online at http://www.cogain.org/user_involvement/eye-control-hints-and-tips/benefits/Kathrin_Clip1_01.mpg



Under the COGAIN project, Kathryn had the opportunity to loan and trial an eye-control system for a period of time and used it both for her written work and social communication. After a short while, she found that she became more and more relaxed. Not only this, but she also became increasingly accurate. Please click on the picture to see the video clip.

The video clip is available online at

http://www.cogain.org/user_involvement/eye-control-hints-and-tips/benefits/Kathrin_Clip2_01.mpg

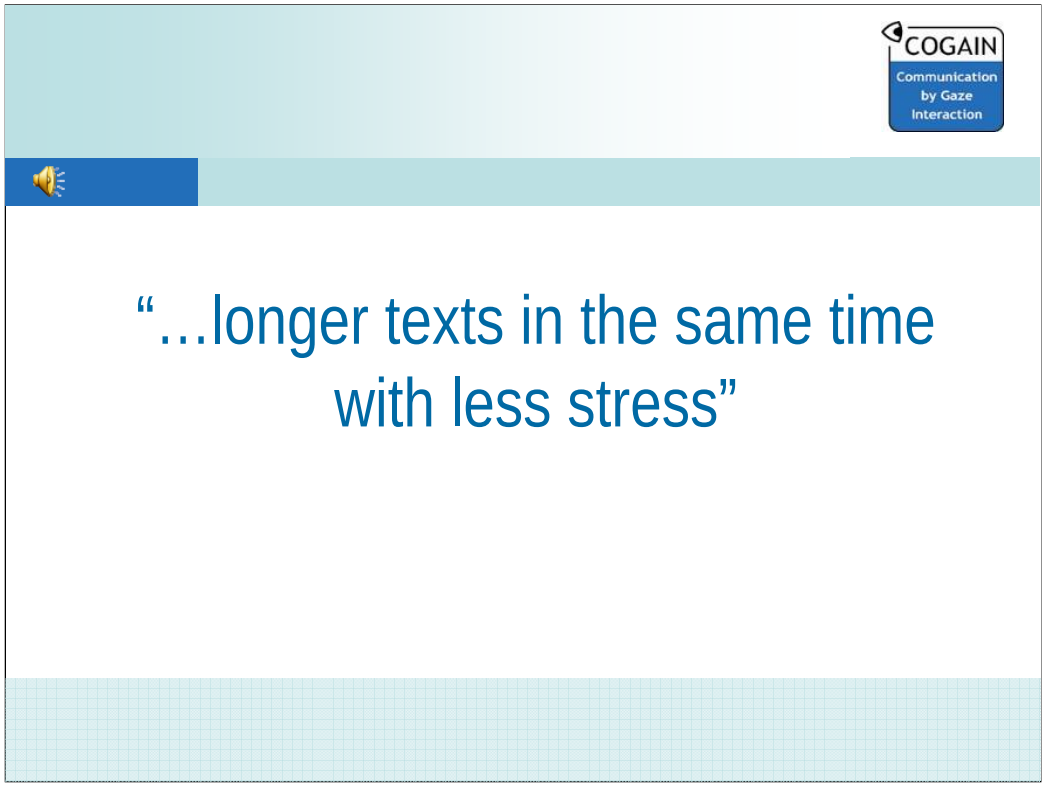


After a month of trialling her eye control system and special software, Kathrin was able to compare eye-control with her usual way of controlling the computer, via switches.

She said: '...Switches can be very tiring over long periods'. In comparison with switches, she found eye control less demanding and said:

'...With eye control I can write long texts without getting sore muscles'.

Overall, Kathrin found that eye-control was less tiring and painful. By comparison with the physical benefits of using eye control, Kathryn did not consider any potential difference in speed to be as important. Nonetheless, even after only one month, she felt that, with eye control, she was able to write at least as quickly as with her switches.

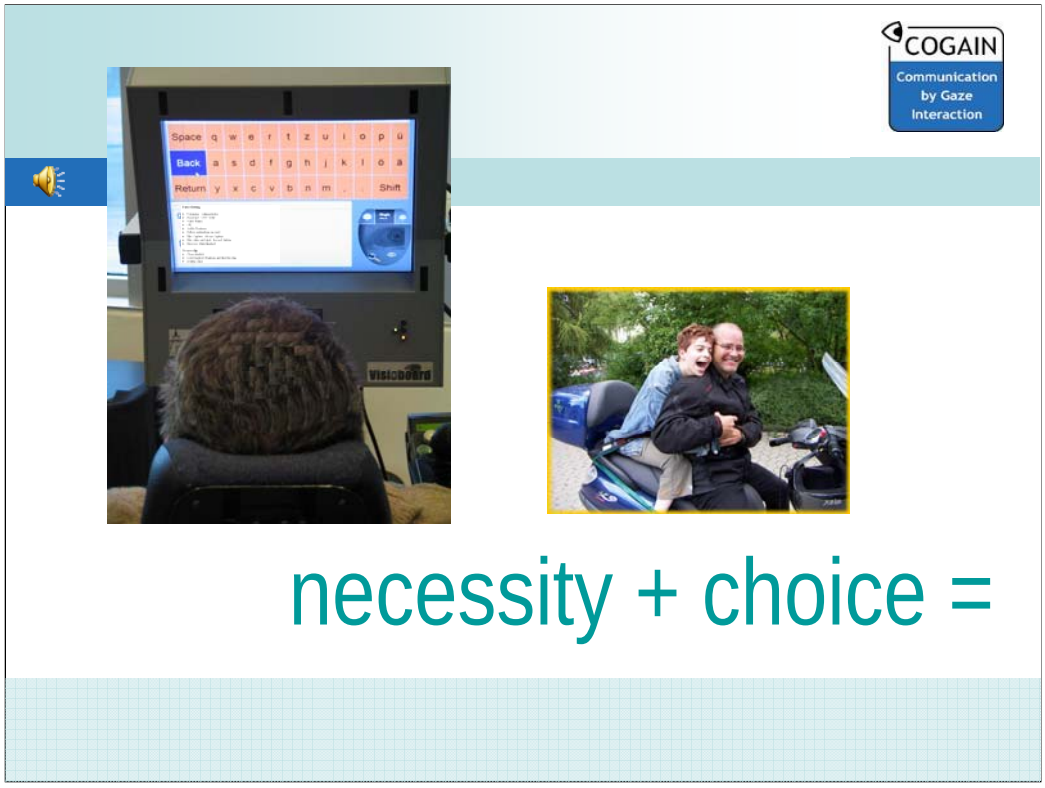


Kathrin summarised by saying that she felt that she was able to write longer text in the same amount of time with less physical stress.

Look at the difference between headmouse and eye control …

Which do you think Kathrin would choose ?

These two pictures provide an opportunity to see the difference that two alternative ways of controlling the computer can have on the posture of someone who has involuntary movement. On the left, for example, Kathrin is using a Headmouse to control the computer. On the right, Kathrin is using eye control. Even though she is using the same piece of software, Dasher, she is significantly more relaxed when using eye control.



As described earlier, there are some people like John who can, in effect, only move their eyes so an eye controlled computer is the only option for them. It is an eye-control or nothing. Other people, such as Kathrin and Helen [*], are able to control the computer in other ways and even though this is difficult for them, until recently, they might not have had the opportunity to even try eye control.

However, from the evidence that we have gathered so far under COGAIN, it appears that, if people with certain physical disabilities were given a choice, then they might choose to use eye control for at least part of the time.

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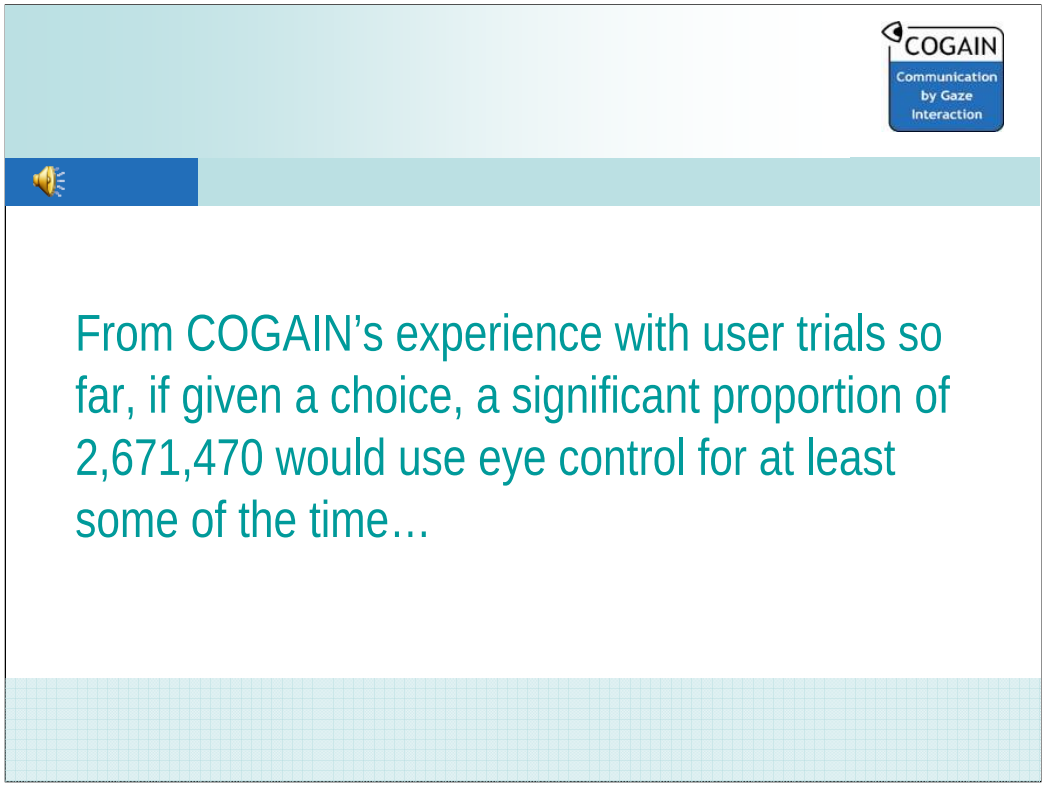
[*] Helen's case study has been removed from the version publicly available on web (permission only covers presentations by ACE / COGAIN but not public distribution of the videos etc.)

Out of 450 million people in the European Union…

CONDITION	NUMBERS
ALS / MND	27,000
Multiple Sclerosis	135,000
Cerebral Palsy	900,000
Spinal Cord Injury	36,000
Spinal Muscular Atrophy	54,000
Retts Syndrome	29,970
Muscular Dystrophy	126,000
Brainstem Stroke	688,500
Traumatic Brain Injury	675,000
TOTAL	**2,671,470**

Here are some examples of the types of disabilities that have relevance to eye control. It must be acknowledged that not all of the 2 and a half million would choose to use eye control, of course because many of them are using other methods very successfully already. Nonetheless, if given a choice, it seems likely that many more than the current handful of eye-control users would, indeed, opt for this technology.



In conclusion, then, from COGAIN's experience with user trials so far, if given a choice, a significant proportion of people from across Europe with certain disabilities might well use eye control for at least some of the time…

To find out more, go to www.cogain.org and download Deliverables 3.1, 3.2 and 3.3. More information will be available in the future.

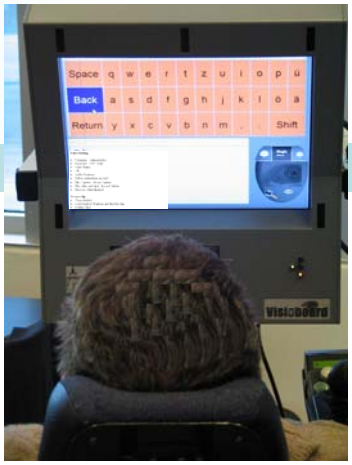
To achieve the opportunity for more people to have this option, the key issues that COGAIN must emphasise and the conditions it must help to bring about are as follows:

Eye-controlled technology is not science fiction. It has arrived. It's here, now.

Eye controlled technology can be as reliable as any other Windows control method.

Eye-controlled technology is well supported by a significant and increasing number of suppliers.

Eye control technology is not just for those who can only use their eyes but it should also be available for those who might choose to use it, if only they had the opportunity.

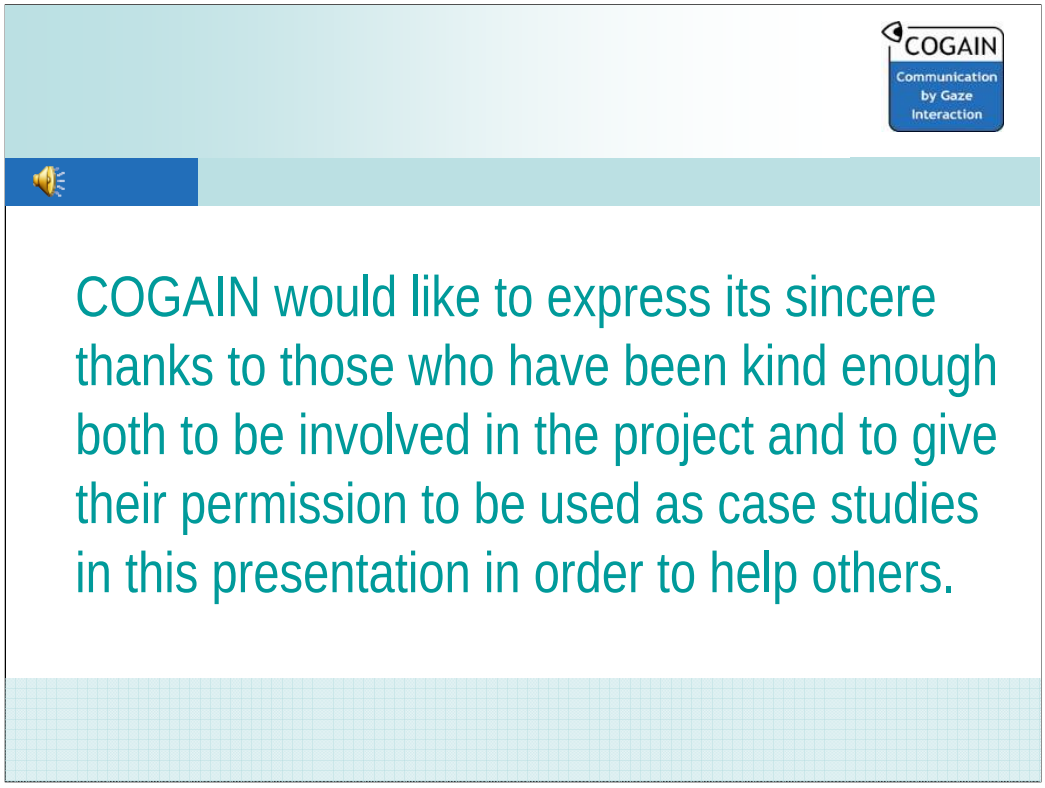


...meaning less stress…

…and more freedom…

…for many, many more
people with disabilities.

If a choice of whether to use eye control or not were available right across Europe, then the number of people currently using eye control might increase from a few thousands to many tens of thousands, meaningless stress and more freedom for many, many more people with disabilities



COGAIN would like to express its sincere thanks to the members of the user community and those supporting them. They have been kind enough both to be involved in the project and to give their permission to be used as case studies in this presentation in order to help others.

For more information…

www.cogain.org