



Assistive technology against social exclusion



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## Introduction

THE SUBTITLE OF THIS BOOKLET sounds like the slogan of a political or social campaign! Although as professionals working in the field of European Assistive Technology we are not born campaigners, the BRIDGE project has been carried out with the enthusiasm of those who have important issues to raise.

The authors hope that this booklet will make a useful contribution to the current, European-wide discussion on disability and social exclusion. In particular, we are interested in the role that Assistive Technology (AT) can play on the road to social inclusion. As the reader will learn from the content of the booklet, social, educational, and professional inclusion are fundamentally about human and democratic rights. Inclusion means becoming a full and valued member of society, not an associate. Inclusion means equality. Inclusion means quality of life. Inclusion means the real entitlement to *opportunities*, and not just AT tools.



... a delicate process that demands teamwork and professionalism ...

The BRIDGE project and this booklet aim to move Assistive Technology up the policy agenda of health, education and social service providers at all levels of activity - local, regional, national and European. It informs policy makers and policy implementers about how AT services can be improved and extended. The author's target audience also includes the end users of AT services, their facilitators, their representative organisations, and professionals, including those working in the public sector, non-governmental organisations, foundations and charities. This booklet's wide range of human

stories may also be of interest to that part of the media concerned with the rights and issues of people with disability.

Those readers who hope to discover that Assistive Technology is somehow the latest post-industrial panacea will be disappointed. There is room for optimism that "things are getting better" but only within the realistic parameters that are determined by the nature of the disability, the personal motivation and drive of the individual, the social and political context, and the availability of financial and human resources. This booklet shows some of the possibilities offered by AT and describes aspects of its evolution towards today's "state of the art".

The booklet also offers insight into the difficulties encountered in striving to ensure that Assistive Technologies become effective tools for inclusion and the conditions that have to be met for successful service delivery outcomes. One thing is for sure AT devices are not aspirins that take effect as soon as they are swallowed! The introduction of AT devices into the lives of people is for the most part a long-term and delicate process that demands teamwork and professionalism, time and experience. In presenting real stories and explicating underlying processes this work will contribute to bridging the wide gap between end user expectations and most AT service delivery systems in Europe.

BRIDGE is a European project, funded by the European Commission in the framework of the Programme against Social Exclusion. European projects often run the risk of merely providing comparisons between situations in the different member states. While it is true that Assistive Technology service delivery varies across European countries, BRIDGE highlights the *common* issues currently engaging consumers and providers of Assistive Technology services in Italy, Germany, Spain (Catalonia) and England. Recognising the right of European citizens to full participation and equal opportunities, the BRIDGE project demonstrates that at *all* levels of decision-making, including the European level, there is a need for some common approach and policy towards Assistive Technology. This conclusion is based on the recognition of the opportunities provided through Assistive Technology for social inclusion - opportunities for improving the quality of life of people with disability, and, in some cases, for saving or rationalising precious public resources. Furthermore, where Assistive Technology models of good practice are sensitive to social and cultural diversity, successful outcomes often follow.

The authors, representing five non-commercial, European Assistive Technology centres (for their names and a brief description, please see the final page), have pooled their experience and philosophies in Assistive Technology service delivery to form the basis of this booklet. For those interested in obtaining a copy of the full BRIDGE report, please visit the website of any of the participating partners.

*THE FIELD OF Assistive Technology is very broad and embraces a wide variety of professionals and equipment. This booklet is concerned with four specific aspects in AT provision: Augmentative and Alternative Communication, Computer Assisted Access, Environmental Control and Powered Wheelchair Mobility. They represent new and important responses to the needs and expectations of people with disabilities in which the impact of developments in information technology and electronics is felt strongly. The authors are well aware that these particular components of Assistive Technology are not fully representative of the breadth of work in the field; however, the issues raised here are pertinent to other branches of Assistive Technology.*

## ASSISTIVE TECHNOLOGY IN THIS BOOKLET



# Europe - towards an inclusive society

THE BRIDGE REPORT IS being published at a time when the European Commission is implementing EU policies against social exclusion. The development of new policy initiatives is based on the recognition that the inclusion of people with disabilities is no longer a question of their empowerment only, but a challenge for society as a whole, in all realms of life: school, work, home, leisure, transport, sports, design and so on.

The development of policy instruments aimed at building an "Inclusive Europe" has been enriched by the contribution of **The Madrid Declaration**. In this important document, representatives of organisations of people with disabilities in Europe and the European Commission set down their vision for the European Year of People with Disabilities (2003) including the development of a framework for action. The document, then, promotes many core principles, among which the following are particularly relevant to the field of assistive technology:

- Disabled people do not want charity but equal opportunities.
- One of the conditions for equal opportunities is having access to resources, services and opportunities in education, work and leisure.
- Disabled people have the right to inclusive services and services promoting the highest level of independence possible.

Importantly, the declaration explicitly highlights the demand for accessible quality services promoting independent living based on the needs of disabled people.

The population of people with disabilities is not an insignificant group. Although it is difficult to find reliable statistics, some figures are available. For example, according to The Madrid Declaration 50 million Europeans have a disability. In a recent report issued by the Italian Institute of Statistics (ISTAT) there are 3 million disabled citizens in Italy, while the

German counterpart (Statistisches Bundesamt) in Wiesbaden reports more than 6 million people with registered disabilities in Germany. This represents more than 8% of the total German population.

Experiences of exclusion by people with disabilities are overwhelming. As reported by European Commissioner Anna Diamantopoulou in September 2000, more than 50% of people with disabilities are excluded from the labour force compared with less than 25% of the remainder of the population. Of those in the labour force, people with disabilities are 50% more likely to be unemployed, and to remain unemployed for longer periods, than the working population as a whole. Exclusion from the labour force is an economic disadvantage not only for people with disabilities but also for the whole European society.

People with disabilities do enjoy support for positive action and improved policies. For example, in a recent survey 97% of the European population acknowledged that more has to be done to include disabled people in mainstream society (Eurobarometer Survey 2001).

Assistive Technology can make a significant contribution to building an Inclusive Europe. However, Assistive Technology is not a straightforward or undemanding collaborator in the fight against social exclusion. Technological aids can be powerful tools in promoting inclusion but they cannot provide the sole solution to any one set of problems; rather, their successful use relies on the merger of many varied factors, and it is for this reason in particular that qualified independent Assistive Technology centres play an essential role in ensuring that technology is put to the best use.

In the following chapters we will discuss changing opportunities for people with disabilities following technological progress, and explore how people with disabilities, and those with whom they live and work, can benefit best from these technological solutions.

*THE CHALLENGE IS NOT only to provide a better assistance to those excluded (or at risk of exclusion), but also to actively address the structural barriers to social inclusion thus reducing the incidences of social exclusion.*

EC Communication: Building an Inclusive Europe



# Assistive Technology and social inclusion

## Assistive Technology promoting independence

### The benefits of technological progress

HUMAN BEINGS HAVE always been inventive in developing tools and devices to improve the efficiency and ease with which everyday tasks are accomplished – from the humble bicycle and light bulb to the cell phone and the electronic notebook. We all enjoy the opportunities that tools like these offer, not least in their ability to improve the flexibility and autonomy of our modern lifestyles.

The last decade saw an enormous increase in the application of advanced electronic technology to general consumer goods. Today, for example, microprocessors can be found in most household appliances, cars, telephones and, of course, computers. They are the outstanding example of the technological revolution in daily living, often performing multiple tasks within integrated environments.

Many people with disabilities are able to take full advantage of the opportunities presented by mainstream technologies.

*THE CELL PHONE IS one of the best examples of versatile mainstream technology from which people with disabilities can benefit. Cell phones provide:*

*Greater freedom -allowing people to call and to be called everywhere and at any time of the day or night;*

*New opportunities -allowing people to receive text messages and news updates on any subject; Integration with other tools -allowing people to use the same tool for various functions (personal organiser, answer phone, fax machine, email, pocket calculator, alarm clock).*

*Moreover, there are many other instances of mainstream technologies that have proved useful for people with disabilities - for example, the voice recognition software used in access to computer technology or simple telephone inquiry services.*

CELL  
PHONE





... many hours of skilled rehabilitation engineering ...

Yet, there remain many hidden technological barriers within mainstream consumer products. Many of these could be avoided if the principle of "design for all" was respected and implemented across the board – a minor design change here, an extra electronic component there. Designers that keep the special needs of disabled people in mind will also produce better products for the general public, while at the same time addressing their social and moral obligations.

## Assistive devices

MANY PEOPLE WITH DISABILITIES are denied the benefits that such tools provide: depending on their physical or cognitive abilities and needs, they might use different devices, adapted products or mainstream products, but in unique ways, to improve their autonomy and to fully exploit their personal resources.

It is important for consumers, producers, funding agencies and service providers to define clearly the concept of technologies supporting independence for people with disabilities. If all stakeholders in assistive technology could agree on a common language, communication and the exchange of ideas would be enhanced and the rights of people with disabilities better safeguarded.

According to the international standard ISO 9999, "aids" for people with disabilities are defined as tools for individual use in daily life that are designed to enhance independent living. That is: "...any product, instrument, equipment or technical system used by a disabled person, especially produced or generally available, preventing, compensating, relieving or neutralizing the impairment, disability or handicap...". So, some aids are designed and manufactured specifically for people with disabilities, such as powered wheelchairs, while other mainstream technologies may also prove useful and effective for people with disabilities. For instance, many people with hearing and speech impairments benefit from the use of cell phone "text messaging".

Where a lack of *design for all* excludes people with disabilities from many technologies, mainstream microtechnology can be made available to users with special needs by finding creative and imaginative solutions. For example, a standard trackerball normally manipulated with the hand, can be mounted in such a way that it can be operated with the user's chin or a single toe.

In other cases, more complex adaptations have to be made, requiring many hours of skilled rehabilitation engineering. Most European AT Centres, where they exist with sufficient resources, have experience and competence in meeting the challenges of adapting standard products to individual requirements.

## E-BOOK

*THE ICT INDUSTRY has been investing huge resources in the development of the "e-book". Its impressive storage capacity, the possibility of downloading new texts from the Internet, its portability and its voice output potential are likely to be valued by many people with disabilities. BUT.... can an e-book be easily fixed to a wheelchair? Can people without good hand control scroll down pages? Can the font size be enlarged to acceptable standards for low vision needs? At the moment the answer to these questions, typically, is "No". Yet, the solutions to meet these needs have been available for a long*



*time, and are easy to implement and cost-effective if integrated into the industrial design process at an early stage. To secure the e-book to a wheelchair, for example, would require no more than a simple universal thread mount!*

## TRACKER BALL

*FOR SOMEONE WITH fine motor difficulties, the button functions on a trackerball may need to be externally accessible to avoid involuntarily presses whenever the "ball" is rotated. The simple solution of soldering an input socket to the trackball's electronic circuit board addresses this need. An external switch can then be connected to the trackball but physically mounted in an optimal position for the user, for example to be activated with a foot, head, arm, etc.*





## Assistive technologies designed for people with disabilities

WHILE THE "DESIGN FOR ALL" principle largely remains unfulfilled, the particular needs of specific populations of disabled people have been met during the past 20 years with specific, often ad hoc technological solutions. Although ad hoc in nature and involving small adaptations to the ubiquitous microprocessor, these solutions are ingeniously versatile and more often than not enhance the independence of disabled people by overcoming physical barriers that would otherwise be insurmountable.

Below are some examples of the most commonly used AT devices. In our selection we have focused on those categories of assistive technology that are most familiar to the Bridge Partners.

### The personal computer (PC)

The PC is a powerful and versatile tool par excellence, and can be customised according to the user's needs and skills.

Access to the PC for disabled people is often provided via "special input and output devices". The PC is so widely used by disabled people that a wide range of specialised PC products, designed for people with disability, is commercially available across Europe.



An overlay keyboard

### Special computer input devices

- Including keyboards: adapted keyboards, enlarged keyboards, and small, programmable keyboards, etc.
- Pointing devices: special mice, trackballs, joysticks, head controlled mice, etc.
- Other direct input devices: voice input, eye gaze, etc.
- Indirect switch and scanning systems: to allow people with minimal motor control (such as small movements of a finger or hand, the closure of an eyelid, etc) to access a PC.

### Special computer output devices

Including: braille readers and writers and screen reading software with speech synthesisers, hardware and software screen magnifier, etc.

### Software

Software lies at the heart of the PC's strength and versatility. Standard (and normally inaccessible) programs are adapted or buttressed by supportive software, available for education, leisure, work and rehabilitation



highly sophisticated wheelchairs

### Powered wheelchairs

Powered wheelchairs provide great independence to people with disability. They are highly sophisticated, both in terms of materials used and the operating mechanics. For many years powered wheelchairs could only be controlled via hand-operated joysticks. Today these standard joysticks can be replaced by customized joysticks or emulators that allow the user not only to drive the wheelchair but also to control their environment, access a PC, or use a speech output device.

### Environmental control systems

Today environmental control systems are rapidly spreading into mainstream life. These are systems that enable people to control more easily their home environment or workplace, including the lighting, the television and Hi-Fi set, the telephone, doors, windows, kitchen equipment, etc. For people with disabilities these systems allow the easy control of a domestic house relying on specific remote control technologies, for example using "intelligent" interfaces (adapted to the user's needs). Such "smart" and relatively low-cost technologies offer people with disabilities, and elderly people across Europe, a better quality of life and greater independence.

### Communication aids

High-tech communication aids enable communication between people by means other than natural speech. Voice output communication aids may use recorded and/or synthesised speech to replace or augment spoken language. For people with significant difficulties in developing literacy, words, phrases and sentences may be represented in graphic symbols as well as words, and accessed via the user interface. There are many different speech output devices (well over 100) commercially available in Europe, each with different features and possibilities.





# Assistive Technology and social inclusion

## Education and work

IN EDUCATION, TECHNOLOGICAL aids can support reading, listening, written work, drawing, spoken communication and access to reference material: atlases, dictionaries, encyclopaedias, etc. Often, these aids are useful not only to disabled people but also to teachers and other students. That is, through electronic, mediated means teachers can tailor information presentation to the individual needs and skills of pupils. Further, they can support the effective interaction between the disabled student and their classmates, fostering social inclusion.

In the workplace people with disability can carry out most activities through their PCs or other assistive devices for telecommunication and environmental control. Access to remote telecommunication devices provides opportunities to work or to study from home.

### ALTERNATIVE WAY OF WRITING

*IT IS JUST ANOTHER day at school in a small town. Pupils in the classroom are particularly quiet and focused on a written assignment. The teacher has asked them to comment on the philosophical statement that "the degree of civilization of a culture is measured against its capacity to accept diversity". This is the end of a project that began some months ago and included the main aspects of social legislation, reports of personal experiences and participation in discussion groups.*

*Apart from the occasional sheet of paper being turned by a classroom assistant, a constant clicking sound can be heard. Sara is writing her assignment. Sara has cerebral palsy, a condition that affects some 8,000 newborn babies in Europe each year. She cannot walk and speaks with great difficulty. She also has great difficulty using her hands. Instead of using traditional "pen and paper" she accesses a PC with an infrared device placed on top of the monitor and electronically linked to a "transmitter" attached to her forehead. This input system allows her to control the screen pointer and move it around the screen. With it she can select, click and drag screen items. Sara also uses a virtual on-screen keyboard. This behaves like any other keyboard and is connected to a unit of standard word processing software, Microsoft Word. Finally, Sara completes her assignment. She reads it through once more before printing and presenting it to her teacher.*

## Recreation

ENJOYING LEISURE is essential to a good quality of life. Recreation means being able to choose one's favourite activities, carry them out for as long as one wishes to, and share them with friends and family. Many of today's people with disabilities in Europe do pursue hobbies and activities of their own choice. Although disabled Europeans have long had access to a range of leisure activities, it is only as a result of relatively recent computer-based technologies such as the Internet and DVD that they now have a wider range of recreational opportunities. Accessing a computer to listen to one's favourite music, or renting and watching a video downloaded from a website are just two simple ways of bringing recreation into the disabled person's home. Accessed via the favoured input system (keyboard/mouse emulator or environmental control system, for example), this is likely to increase the individual's sense of independence and spontaneity.

Assistive technologies enable many children with severe motor disabilities to play with battery-operated toys (for example, puppets, trains, remote-controlled cars and tape recorders, etc.) and recreational software. The importance of shared participation in play cannot be overemphasised.

### PEOPLE WITH VISUAL IMPAIRMENT USING THE INTERNET

*SEVEN AND A HALF MILLION Europeans have visual impairments. Many are currently using computers for work, communication or leisure. John is one of them. Screen reading is possible for him through the use of software that translates information shown on the screen – letters, numbers, icons, and symbols – into spoken words.*

*Alternatively, the computer is able to translate all this information into Braille when the computer is connected to a Braille display.*

*In cases of low or poor vision, specific software can be used to serve as a "screen magnifier", enlarging characters or sections of the screen.*

*However, there are some limitations to this technology for John. He cannot always read or understand screens (for example, many multimedia Internet websites) that use pure graphics in the form of images and multiple colours. Where this is the case, it is important that multimedia designers understand that there are often simple, off-the-shelf solutions available. For example, an image can be linked to a caption or description label that can then be "read out" by a voice synthesiser or Braille display. Unfortunately, relatively few programmers make use of these simple and low-cost solutions that can reduce frustration and increase accessibility.*





## Health and rehabilitation

ASSISTIVE TECHNOLOGY CAN also help to improve the quality and speed of professional intervention. For instance, assisted access to the computer technology and communication aids can support professionals and clients / patients in early neuropsychological, cognitive and language rehabilitation. In general such aids allow early enhancement of the patient's independence, with positive effects on their psychological well-being. This can have important implications for the effectiveness and efficiency of more long-term therapeutic interventions.

### A POWERFUL BOOST TO REHABILITATION

*SEBASTIAN IS A YOUNG MAN who underwent neurosurgery to remove a brain tumour and was subsequently admitted to a Rehabilitation Centre. At the centre great care was taken to enable Sebastian to communicate with the staff, his family and the other patients.*

*Sebastian cannot speak and needs ongoing assistance in all aspects of daily living: getting dressed, eating, toileting and moving around. He can keep his head upright and slowly, and precisely, move his right index and middle fingers. He shows good comprehension skills, and is highly motivated to communicate.*

*Initially, intervention supported Sebastian in using a simple electric buzzer connected to a switch to attract attention. Later he was introduced to a portable symbol-based communication aid with voice output. This greatly increased his ability to communicate his needs and thoughts autonomously, and to interact with a variety of other people.*

*Now Sebastian uses a computer and a communication aid based on spelling and the written word.*

## Home

PEOPLE WITH MOTOR DISABILITY using environmental control systems can perform many activities of daily life such as turning on lights, opening doors and windows, using a video-controlled entrance system, answering the telephone, or switching on the television. Environmental control systems can also be used to send messages, request help and carry out automatic functions to ensure safety within the home.

### INDEPENDENCE AT HOME

*MANY EUROPEANS are disabled in traffic accidents each year. It is estimated that in Italy alone 16,000 people each year acquire a severe disability as a result of a road traffic accident. Among the most serious consequences of road accidents are spinal lesions. According to the Italian Health Department there are around 70,000 people with spinal lesions, and each year this number increases by between 800 - 1,000 people; more than 70% of these people below 30 years of age. Another serious consequence of road accidents is brain injury. Most victims experience multiple disabilities (sensory, motor, neuropsychological, behavioural and language deficits). Sabrina's spinal lesion caused a complete paralysis of both legs and one arm. She can use her eyes to point and make a gross movement with her forearm. Sabrina can speak but only those familiar with her speech understand what she says. Using an environmental control system she can still control her house from her bed or wheelchair. As she cannot press the keys on the system's remote control device, she uses a customised switch, which she operates with her forearm. With this she can choose from several options by tracking a visual scan on the panel of the remote control device. Using this system Sabrina can open and close her window blinds, windows and doors, and operate the television and video recorder. The same system enables her to operate a "hands free" telephone. Despite her speech difficulties she can then talk over the phone to her family and friends.*



## AT Service delivery in Europe

THE PREVIOUS SECTION has given an insight into the ways in which people with disabilities might benefit from technology. But how is service delivery in AT organised? How have policy makers and service providers, from the countries of the BRIDGE partnership, responded to the possibilities of AT and the rising demands for AT from people with disabilities? And, most importantly, is there common practice, and a shared vision, for AT service provision across Europe?

A clear outcome of research carried out in this project is that none of the countries of the BRIDGE partnership, Italy, England, Germany or Spain, can claim a comprehensive and coherent AT policy that recognises the complexity and uniqueness of the needs of individuals and their rights to life-long AT services. Perhaps unsurprisingly then, the answer to the last question is NO. There is, as yet, no pan-European approach towards AT. Despite the variety of approaches to AT service provision identified, three critical issues appear common to the experience of the BRIDGE partners: services, funding and formal recommendation.

### Services

#### Policies and services

Although there is a widespread recognition of the fact that AT offers valued opportunities for people with disabilities, policies are often fragmented and not coordinated between institutions. This is reflected in the ways in which services are organised and operate. For the public, it is often not clear who to seek for advice and provision of AT.

Although there is a tendency in many countries towards decentralising service delivery in areas such as health, education and employment, our experience suggests that decentralised models of provision struggle to function adequately where services are not evenly distributed and networks of AT centre peer support are not established.

Fragmentation in AT service delivery weakens its efficiency.

#### Expertise

Local professionals in health, education and social services, typically the first point of reference for people with disabilities exploring the possibilities of AT, often lack knowledge and skills to identify and support AT solutions.

### Specialised services

Notwithstanding the growing request for qualified services, independent AT centres that provide assessment, training and follow-up are very rare, and not all citizens have easy access to those services that do exist. Not only is there a difference between the various European countries described, but disparity of services and information can also be found within countries and regions, with some regions failing to provide any services or access to services.

### Funding

Although some countries provide funding opportunities for the subsidy of AT devices and services, this situation is, again, inconsistent within and between countries. Consequently, not all Europeans have the same opportunities.

Funding arrangements for AT often vary within countries, regions or communities. The public health sector in many cases provides the greatest contribution of funds. Factors influencing the provision of funding include the age of the recipient, their disability and the type of device required. Generally speaking, funding for the school-age population is more easily available than for adults. Funding may be provided directly to the child's family or their school, and is provided by different agencies in different countries. Adults and those not in full time education often experience greater difficulties securing subsidised funding for devices.

Hi-tech aids are often excluded from national registers of devices funded by health services. In some cases funding is obtained for devices but not for customisation to individual needs, training, replacement nor upgrading of equipment. In some situations the user will become the owner of a subsidised device. In other circumstances devices will be loaned to the user for a significant period, but will remain the property of the funding agency. Many regions or countries do not manage funding for Assistive Technology for work or leisure purposes.

In some countries, insurance companies play a central role in funding AT devices.

### Formal recommendation

In case of public or private funding, it seems reasonable to require a formal recommendation for highly specific and sometimes sophisticated devices. However this is not always required. Where it is required, it does not always have to be approved by an AT expert or a specialist service.

In the case of both private and public funding, recommendations frequently require authorisation by a doctor, regardless of their degree of expertise in the AT field. Indeed, in some countries manufacturers or distributors may be supported in their recommendations following their own assessment if conducted in the presence of a doctor. Often, advice and support from independent AT Centres is not sought. Few formal recommendations of devices include a detailed individual plan for support and development, detailing commonly agreed objectives.

THE FULL REPORT of the BRIDGE project, available on the website of any of the BRIDGE partners, provides an overview of service delivery in Italy, England, Germany and Spain/Catalonia.



# Cornerstones for successful AT policies

*This chapter is concerned with key issues in AT Service Delivery and is informed by the shared experiences of the AT Centres in introducing AT into the lives of people with disabilities. The themes of this chapter are relevant to the experiences of professionals and service users across Europe.*

## Service delivery in AT - finding the right balance

THE DEMAND FOR AT in support of improved autonomy for people with disabilities is rising rapidly and those already using AT continue to present life-long changing needs. Developments in "state of the art technology" continue to accelerate, introducing powerful new solutions that were unthinkable only a decade ago. The potential exists for more people with disabilities to benefit from AT. Meeting this potential means investing in human resources, developing new skills among professionals, and identifying appropriate approaches that incorporate the best technical solutions in response to the emerging needs and demands. Professionals working in the field of AT in Europe are continuously asked to challenge their own practices and assumptions. Policy-makers throughout Europe need to find effective solutions to support the evolution of AT Service Delivery Systems (SDS).

Key principles in the development of SDS are the maximisation of *effectiveness* and *efficiency*. Effective services provide the best possible solutions to the largest number of people. Efficient services do so by using the available resources well without wasting money and time. It is, in part, the responsibility of policy-makers in Health, Social Services, Education and Employment to find the best possible balance between desired services and available resources.

## Recognising people's rights

It is a fundamental right of all European citizens to live with dignity, to have opportunities for individual growth, and to take part in social, cultural and political life. AT is concerned with promoting these rights by facilitating the active participation of people with disabilities in all areas of life, whether it is school, work, leisure time or social life. AT can help people exercise their civil rights through freedom of speech, political participation and self development. That is, minimising discrimination and social exclusion.

(Dirk) 😊

## Recognising the complexity of each case

The provision of an AT solution is not in itself the whole solution. Rather it may be considered as a means to an end. In other words, it is a mistaken supposition that a *disabled person with an AT solution* equates to a *non-disabled person*. Such an assumption is a dangerous oversimplification of a complex reality and one that may lead to frustration for the disabled person and their carers. Effective and efficient AT interventions typically are long-term and multi-professional processes that must take into account factors central to the individual and their environment.



## DIRK STAYING ON AIR

*DIRK HAS BEEN INTERESTED in technology for as long as he can remember. As a teenager he recalls being fascinated by Citizen Band (CB) radio and the opportunities it presented for communication. Dirk has cerebral palsy affecting all his limbs but his arms are more severely affected. As a consequence he has to rely on other people to help him with most daily activities such as eating and washing. He can get around by himself using a powered wheelchair, which he controls with his feet and it was by using his feet that Dirk became a skilled CB user.*

*On leaving school he decided to pursue his interests in technology and look for professional training as a data processor. Unfortunately, however, all his applications for training were rejected and he was only able to find a job in the packing department of a*



Dirk's workstation at the office

*'sheltered' workshop, work that he described as unrewarding. So, in addition to his job, Dirk identified a CB licence course that was accessible to wheelchair users. As a result of his earlier experiences with CB radio, Dirk was already familiar with the course content and this gave him the opportunity and confidence to assist other non-disabled participants on the course. Dirk recalls feeling proud about this experience:*

*"I felt it was wonderful that they begged me to help them - I realised that they completely accepted my disability."*

*At about this time Dirk also began to explore alternative methods of using a personal computer (PC). He discovered that he could access a PC with his feet using an enlarged standard keyboard. This offered new opportunities at work. His colleagues recognised his competence in using a PC and, as a consequence, Dirk began to take on additional responsibility.*

*Dirk was frequently presented with the problem of finding new methods of maintaining his current level of computer accessibility and extending his skills. By linking up with an AT Centre, Dirk gained access to on-going specialist support that helped him retain and improve his use of technology. Considerable effort was made to find an optimal method of pointer control that would accommodate his reduced range of movements but without compromising his access efficiency.*

*Working closely with an AT centre has allowed him to capitalise on his own motivation, interests and skills.*

*In recent years his interest in technology, in particular communication technology, has spread to the Internet.*

*Dirk now has his own website, perhaps the most natural extension of his early passion for CB communication and another clear sign of his desire to "stay on air".*





## Information dissemination and awareness raising

AT SERVICE DELIVERY is a relatively new phenomenon, especially where AT is based on the application of electronics and microtechnology. Accurate information about the opportunities and limitations of AT is not widespread across Europe, either among public service professionals or among people with disability, who often remain isolated from events in AT development. Where reliable and independent information does exist, it is confined typically to too few specialist AT centres or European databases and websites. New opportunities and developments in AT are of interest not only to specialist professionals working in the field. Users of AT, policy makers and a wider audience should have access to accurate, digestible and up-to-date information from researchers and professional service providers. Information dissemination and awareness-raising are essential in encouraging wider acceptance of inclusive policies and good practice. European policy-makers can have an important role in promoting pragmatic and *inclusive* mechanisms for accurate and effective AT information dissemination.

### The media

The media play an important role in creating stereotyped representations of AT. Often the attention of the media focuses on the miraculous healing potential of technology and not on the particular circumstances and complexity of each case.

### The audience

This simplistic media representation can lead to unrealistic expectations for AT among disabled people and their families – expectations that are, all too often, disappointed. In the absence of independent and competent AT centres that are able to guide individuals, families and local professionals towards appropriate solutions, the risks of purchasing inappropriate and often expensive equipment are very high. Badly chosen solutions are quickly abandoned and can engender frustration, anger and dejection.



## The professionals

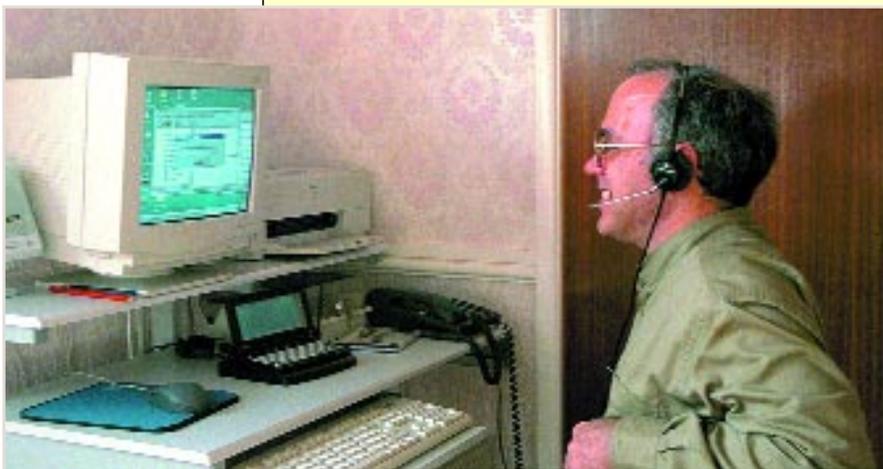
Typically, European professionals in health, education, rehabilitation, social services, and employment do not have the necessary training and experience to provide qualified opinions in the field of AT. Of course, professionals working with clients with a variety of complex needs cannot be experts at every level. However, they do need to be aware of the opportunities and limitations of AT, and maintain an open and flexible attitude and approach to its uses. Professionals should also take initiative in seeking support from independent AT services where they exist. Where they do not exist, support should be focused on their foundation. Those working in the field of AT recognise that the training of local professionals is a

significant element of their work. This includes training aimed at improving the knowledge base of local professionals and the practice of initiating and supporting interdisciplinary interventions in the field of disability, independence and integration.

(Paul) 😊



## PAUL A CHANCE MEETING



Paul using voice recognition to access his computer

*PAUL'S BRAIN HAEMORRHAGE left him with significant physical and communication difficulties. On returning home from hospital, a local speech and language therapist identified several aspects of his communication requiring treatment. The emphasis of therapy was on improving his spoken language and articulation. However, despite his best efforts, this therapy made little difference to his functional communication.*

*Unfortunately, the local team had little knowledge of Augmentative and Alternative Communication (AAC) systems as a potential resource for supporting Paul's communication. It was only as a result of a chance meeting at an exhibition with staff from a national Assistive*

*Technology Centre that Paul became aware of AAC options. Subsequently, as a result of a detailed assessment with the multi-professional team at the AT Centre, Paul borrowed a text-to-speech communication aid and started using it successfully. However, Paul's speech and language therapists experienced difficulties in working with the new technology and discouraged him from using it in therapy. Paul thus discovered that his local services lacked knowledge and skills in the introduction and support of AAC options.*





## An holistic approach

ASSISTIVE TECHNOLOGY AIMS to create opportunities for the personal development and social participation of people with disabilities; that is, improving independence in everyday situations at home, work, school, in leisure activities and in mobility.

Human beings live and move in various social and physical contexts, interacting with many people and in many different environments. People with disabilities are disabled in their environments and by their environments. This means that AT intervention must consider *an overall view* of the person with a disability and their environment, their current needs, how these needs may change over time, and the current and changing perspectives and needs of *all* the significant individuals and organisations in their life.

Only AT solutions that result from an integrated and comprehensive approach to disability can really "make a difference". Therefore, any cost benefit analysis of AT intervention that wishes to have integrity and credibility must view the larger picture - a picture that embraces the end user of AT services, their family, and their physical, social, economic and cultural context.

### Home and daily living

For many, the onset of disability is sudden and multifaceted. The person with a disability and their family will need to consider new approaches to activities that have been, until recently, taken for granted. These activities may include, for example, mobility, transport, communication, and environmental control. In these areas AT can play an important role in enhancing the quality of life of the person with a disability *and* their family. Carefully considered solutions that take account of the individual and their disabling environment are essential.

### Work

The onset of disability is likely to impact greatly on the individual's work. Indeed, it may not be possible to return to work at all. Returning to work will often require significant adaptations to the workspace and the job description. For some, the use of AT in supporting a return to work is considered a simple case of finding an AT tool to fill the skill gap left by the disability. Such failure to acknowledge a broader spectrum of disabling factors in the workplace further hinders the person with a disability. (Carlo) 😊

### School

Mainstream schools may be willing or unwilling to welcome children with special needs. Developing a truly inclusive classroom environment requires school staff to change ordinary practice. Inclusion of a disabled child in school is an opportunity for staff and classmates alike. A technological aid or a computer may become an important tool towards the inclusion of the child in the classroom, supporting access to the curriculum, opportunities to socialise with classmates, and acquiring "status". (Claire) 😊



Carlo using special splints to operate the keyboard. In the background is his adapted telephone set with switches to "pick up" the telephone and to "end" the call. Talking and listening is achieved through a headphone with built-in microphone



Carlo's workstation - a PC with a trackerball and switch, an adapted telephone set and a calculator

## CARLO BACK TO WORK

FOR MANY PEOPLE disability is, in part, defined by an inability to work. For Carlo, return to work after he was knocked off his scooter was a primary objective, not least because his position at the bank would remain open to him for a limited period only. Carlo broke his neck in the accident and his immediate rehabilitation was a long and complex process. By the time Carlo was ready to "find the tools and techniques in order to go back to work and use a computer (via a keyboard and mouse) as well as the telephone" little time remained to meet the deadline.

The team of AT professionals working with Carlo examined specific ways in which he could access and use computer technology and, more widely, how he could work effectively and efficiently within the office environment.

The provision of appropriate equipment involved a focussed effort by his employers, Social Services, the Local Health Authority, the team of the AT Centre and Carlo himself. So, for example, in attempting to meet his needs the assessment team explored design options for a workstation, the production of

customised hand splints to maximise computer keyboard access, adapted and modified methods for controlling the on-screen pointer, adaptations for telephone use, suitable heating equipment to maintain Carlo's body temperature, and a specially equipped minibus for travel to and from work. For Carlo, returning to work was not only a question of finding suitable AT devices but also a case of engaging in an on-going collaborative process with a number of different agencies.

Interestingly, the process of Carlo's reinstatement at work revealed new and more effective ways of organising office procedures for all staff. For example, Carlo experienced significant problems using paper based data and directories, and consequently he developed electronic procedures for data handling within the office. This and a number of data archives became a valuable resource for the whole office.

would obviously not be expected to use a computer all of the time, she would nonetheless require access to a customized computer of her own whenever she needed it. This would be the equivalent of her peers needing access to books and pencils.

Following an initial assessment involving an exploration of the views of Claire, her parents and school staff, an agreement was made for a "package of services to support mainstream inclusion". This package included a biennial assessment followed by up to four training consultations within the first two years. Claire's parents insisted that the local education authority include these recommendations in her 'Statement of Special Educational Needs'. This is a statutory document that defines the special needs and recommendations for pupils with complex difficulties in England and Wales. Claire has continued to receive the package of care agreed at her first assessment. One area of emphasis in terms of support and training has been the enskilling of Claire's teaching assistants at school, as it is they who work with her on a one-to-one basis. It is they, too, who provide essential continuity between one school year and the next and between one teacher and the next.

Claire's experience of successful school inclusion (both socially and academically) has highlighted the value and importance of disabled people, their families, and their facilitators in determining much of the AT service delivery agenda. Claire's experience demonstrates how important it is that the opinions of all stakeholders in the inclusion process are not only heard but also valued. In this way the stakeholders share 'ownership' of the chosen solutions and, consequently, a stronger vested interest in their outcomes.

Claire continues to be a highly motivated and determined learner within an inclusive environment. She is universally acknowledged to be an excellent role model to others.

## CLAIRE INCLUSION IN SCHOOL

CLAIRE HAS ATTENDED mainstream school since she was five. She relies entirely on a powered wheelchair for independent mobility. She requires assistance with all fine motor activities such as playing, feeding and personal care. As a result, she has been provided with a one-to-one teaching assistant throughout her education. Despite Claire's severe physical difficulties, her personal qualities suggested that she would do well in a mainstream school environment. These included a high level of motivation and ability, and above all a determination to "get her message across". Claire was originally referred to an AT Centre "for advice regarding the development of Claire's use of the computer to access the curriculum". The primary aim of this referral was to optimise her use of a personalised computer as a tool for learning and leisure within a well-supported mainstream school setting. Although Claire



Video image of Claire using a joystick





## Multi-professionalism

AN ESSENTIAL CORNERSTONE to the success of AT is the existence of an agreed and clear set of objectives and a multi-professional team capable of supporting their implementation. In addition to support from a specialist AT Centre, the assessment for and provision of AT demand the active participation of the person with a disability, their family, personal carers, and a multi-professional support team. Usually this team is made up of professionals from health, education, social services, rehabilitation and employment services, etc. The sheer number of people involved in this process may appear unwieldy or unnecessary. However, it is essential to consider the views of all the significant professionals involved with the individual, not least because each of these people needs to be aware of the objectives of AT intervention.

AT assessments and recommendations need to remain flexible, and team members - in particular the case manager or keyworker - should guard against the possibility of fuzzy objectives, potential confusion and unproductiveness. Coordinated and interdisciplinary intervention is a key factor for successful outcomes in AT service delivery.

### The end user and their family

The disabled person is the single most important person in the whole process of AT service delivery. A clear and detailed understanding of their needs and goals is central to the success of the intervention. Users of AT and their families need to be supported in becoming as independent as possible in using the recommended equipment.

### The professionals

The professionals working within the multi-professional team should be committed to an ethos of collaboration and mutual support. Genuine interdisciplinary collaboration between professions such as occupational therapists, speech and language therapists, educationalists, teachers, doctors, technicians and social workers requires professional teams to combine and mix their skills and knowledge in exploring AT solutions. This is not always easy to achieve where local professionals may feel vulnerable or lack experience in the field. AT professionals need to show sensitivity to the feelings and perceptions of staff from local teams. This in itself requires special skills and abilities. (Andrea) 😊

### Case manager or key worker

Teams that work well are co-ordinated by a case manager or key worker. This individual is required to maintain a clear and objective view of the overall complexities of the case. They must co-ordinate the implementation of an agreed workplan making certain that the technical components go hand-in-hand with the psychological and emotional elements of intervention. This involves the monitoring of factors such as time, cost and resources. In this way the case manager or key worker is central in driving the AT intervention. This important role need not be profession specific, so a case manager or key worker might be appointed from any of the professional stakeholders.

# ANDREA WORKING TOGETHER



*ANDREA IS A GRADUATE from the University of Bologna. He now works at the Documentation Centre on Disability where he is particularly involved in supporting inclusion in education. Andrea was born with dystonic tetraplegia, a severe form of Cerebral Palsy. His physical difficulties affect his speech; he is*



**Andrea uses a remote control system with speech feedback to control automated devices in his flat such as lights, windows, doors, the TV, and the telephone. He uses his tongue switch to control his remote control system, his personal computer, and his remote paging system.**

*intelligible only to people that know him well. He also has very limited independent movement.*

*Andrea says that from an early age his family and school promoted his participation in school and social life. This involved emphasising his freedom to think, share his opinions and participate as an active and valued member of society. When it came to investigating the use of technology to support his autonomy, Andrea became involved at one time or another with a variety of different professionals working together*

*(for example, an electronics engineer, a psycho-educationalist, an educator, a computer technician, a rehabilitation therapist, personal carers and a social assistant) as well as the multi-professional team at the Assistive Technology Centre. Andrea's personality and skills meant that he was able to lead a long, complex and technically challenging search for suitable assistive technologies in collaboration with the professionals. Through this process he tested a variety of technologies aimed at improving access to computer technology, controlling his home environment (for example, opening doors, operating a television, using a telephone), and ensuring an improved degree of personal security. As a person with a complex congenital disability, Andrea's life experience has also involved many and varied people in organising aspects of his life in a practical and personal sense - for example, helping him to wash and eat. Gaining autonomy in certain practical aspects of life revealed other, previously hidden, deficits in experience and life skills. Importantly, key professionals and particularly the "case manager" working with Andrea needed to recognise that supporting the development of functional and strategic life skills was becoming an important priority. This realisation came about as physical barriers were removed through the introduction of AT. The presence of an educationalist and a social assistant in the team helped Andrea to re-evaluate his expectations of what AT-assisted autonomy might mean for him.*





## Appropriate processes and solutions

THERE ARE NO off-the-shelf solutions in complex AT intervention. The era of "the quick fix" or "do it yourself" solution must be confined to history. Today's AT solutions need to be much more than adequate or sufficient. They need to be *efficient* and *effective*. To address the needs of most AT users takes months, sometimes even years of carefully planned intervention. Above all, then, solutions need to be *appropriate*. That is because appropriate solutions are personalised solutions. An appropriate solution is one that is within the everyday reach of the user and that is fundable, usable, and acceptable to the user across a range of environments. Unfortunately, only a few Europeans have access to customised AT services – services that provide assessment, the personalisation of equipment, training, long-term support and, if necessary, short term loans of equipment. Appropriate solutions not only benefit the end user but are also cost effective to society.

Strategies for the successful implementation of appropriate AT solutions need to be *concrete*, *incremental*, and *timely*. Pressure to find a one off "solution for ever" needs to be avoided so that AT intervention can be provided on an "as needs" and continuous basis. Finally, the timing of AT intervention is equally important in recognising and respecting the needs, capability and resources of the disabled person.

### Personalisation

In almost every case of AT intervention solutions need to be personalised: software configured, computer peripherals (for example, special input devices) adapted, wheelchair control system built in, ergonomic workstation constructed. Often the individual will need a multifaceted and integrated system where various devices interact with each other. In extreme cases no existing device(s) can solve the problem and a new prototype has to be designed and constructed. (Rita) 😊

### Training

The assessment phase of AT intervention should be followed by a period of support, during which the individual user and their facilitator(s) are trained to use the device(s). Where possible, training should take place in the individual's natural environment. Monitoring and evaluation of the training process is equally important, as significant changes can still be made during the support phase.

### Loans

Wherever possible, opportunities should be available for trialing devices for a limited period of time. The decision to purchase an electronic aid will be much easier to make if the end user has already evaluated it. This applies particularly to European countries where AT devices are rarely subsidised and where families, therefore, have to make the final purchasing decision.



## RITA AN INDIVIDUALLY TAILORED SOLUTION

*RITA IS FIFTEEN years old. She lives with her parents and her older sister in the suburb of a large city. Rita has had Hydrocephalus from birth (the presence of an increased amount of cerebral spinal fluid around her brain). She also has some learning difficulties. When she was 12 she became very ill, suffering from the sudden onset of severe headaches. Despite prompt admission to hospital the illness caused a significant reduction in her physical skills, cognitive abilities, tactile sensitivity and vision, leaving her with a profound visual impairment.*

*On returning to school Rita insisted in participating in all activities alongside her peers. She was able to do so verbally but she was unable to read or write independently. Rita's family were also very keen to support her in doing homework where the learning support teacher could not assist her.*

*In addition to single elements of information such as names, acronyms and symbols, Rita was able to memorise and understand the main elements of a short spoken story. School staff and staff of the AT Centre established that a recording system which matched Rita's needs would provide her with the ability to record short, simple sentences. Although the aims for Rita were superficially straightforward, the assessment for and provision of AT was far from so. Indeed, Rita's particular profile of abilities and needs meant that the assessment team were required to explore a wide range of unique computer access options. Eventually after considerable thought and testing Rita was provided with a standard multimedia PC that she accessed via an alternative keyboard with an adapted tactile keyguard. The alternative keyboard could store characters, words or phrases under different cell locations, which could be identified by feeling a distinctive tactile marker on the keyguard placed over the keyboard. (Rita's reduced tactile sensation*

*meant that she had significant difficulty distinguishing between different braille characters). The keyguard would need to be customised to Rita's specific needs over time. Speech output software would also allow Rita to hear what she had written. In this way, an individually tailored assistive technology was developed supporting major access to the curriculum.*



**Rita writes with a special keyboard and keyguard; she can listen to her text via a speech synthesiser. Her keyboard has a customized layout, keyguard and reference markers.**





## Appropriate funding opportunities

The funding of AT devices is a complex matter, but an important factor to consider. Many interventions in AT are under multiagency responsibility leading to personalised and complex solutions implemented through interagency funding. For a variety of reasons not all devices are fundable through institutional channels. The funding of human labour, personalisation and training is sometimes overlooked in drawing up a budget. Frequently the best possible solution is not the easiest to find funding for. The user and their family are not always able to contribute to funding equipment.

(Federica) 😊

## Long-term support

It is not enough to make sure that disabled citizens are supported in identifying the right technological aid. An adequate monitoring of the individual AT project over a longer period, which includes training and feedback from all stakeholders, is necessary to avoid the re-emergence of social exclusion where solutions become redundant or outdated.

(Juan) 😊

## Appropriate timing

Often valuable time is lost before the right support is found or funding is obtained. Delays in the introduction of AT for children can have a profound impact in restricting development during a critical time of life. Good AT service delivery is timed appropriately with early intervention recognised as a priority.

(Claire) 😊



## A NEW WHEELCHAIR FOR FEDERICA

*FEDERICA IS TWELVE. She was born with Arthrogryposis. For her this means that she lacks significant movement in her body other than her head and neck. Unsupported sitting is possible for only short periods with severe joint and muscle contractures that cause stiffness and rigid posture. Federica requires assistance in all activities of daily living (for example, eating, drinking, getting dressed). She attends school six days a week, returning home each day late in the afternoon. Consequently, her leisure time is limited and principally involves watching TV or using her personal computer (PC). On rare trips out her father, mother or sister always accompany her, usually pushing her around in an old*



**Federica moves the screen cursor and “drags and drops” with her chin-controlled trackball.**

*pram. She is not involved in any of the social events organised within her local community.*

*The electric wheelchair provided by the local authority proved inappropriate to her needs. For example, it was not suitable for outdoor use and the arrangement of the*

*control panel was bulky and did not allow full, unobstructed vision when moving around. Furthermore, although Federica’s excellent head control allowed her to make use of a joystick, the device available from the local authority was not adequately sensitive to small movements. This forced Federica to make larger, more frequent head movements, which tired her quickly and caused cervical pain. This, in turn, further reduced her movement and motivation. Eventually,*

*following a long and intricate series of assessments with a regional AT Centre, a suitable solution was identified which provided her with appropriate physical support whilst allowing her to manage her*



**Federica frequently uses her headstick for school activities and types fast on a standard keyboard.**

*wheelchair and computer using the same control.*

*However, the cost of the new equipment was more than double the amount made available by the National Health Service. Further funds were not available and the economic resources of the family were such that they were unable to provide the additional funds required. Consequently, the family and professionals were required to apply for funding from other independent agencies and charities in competition with other applicants. At the moment there is no guarantee that this application will succeed.*





# JUAN AN ON-GOING PROCESS

*JUAN WAS REFERRED to his regional Assistive Technology Centre for the first time in 1991, when he was five. The aim of the assessment was "for advice regarding the advisability of mainstream education and to determine the technical support necessary for access to the curriculum". The physiotherapist, speech and language therapist, psychologist and Juan's parents thought it would be a good idea for him to attend a mainstream school as long as appropriate resources were put in place. These included the backup from specialist professionals and the necessary technical devices to support Juan in realising his learning potential.*

*The AT Centre's recommendations included an orthopaedic chair and a table with a U-shaped cut-out to support Juan's seating and positioning in class; computer access mediated through a switch-operated on-screen scanning system; use of a computer as a central route to curriculum access with the development of literacy skills set as a high priority learning objective; and the introduction of a symbol board to Juan to support his communication and language development.*

*It was agreed that a member of the local Educational Psychology team would assume the role of co-ordinating the educational plan and that the AT Centre would continue to provide advice to*



**First assessment – Juan is operating a switch located vertically on his left side.**

*professionals in the school, as necessary. In addition, the Education Department provided Juan with a full-time teaching assistant.*

*Juan was again referred to the regional AT centre in 1996 when he was 10 years old. Three assessment meetings were held and further recommendations made. In the following year, 1997, the AT Centre conducted three staff training sessions targeting educational strategies supporting the use of assistive technologies. In addition, a home visit was carried out to adapt the home computer in line with the recommendations. In 1998, six follow-up sessions were held in the school, and an application*

*was made for a powered wheelchair and an electronic communication device. In 1999 a successful application was made for a new computer for use at home. Three further sessions aimed at monitoring Juan's progress were carried out, two at his school, and one at home.*

*By January 2000, Juan had a powered wheelchair and had obtained a portable computer from the Education Department. The computer was adapted for use as a communication system with synthesised voice output. Subsequently, seven follow-up sessions were held at school and two at home.*

*Juan's inclusion into mainstream schooling has been an unquestionable right. Fulfilling this right has entailed a long-term, multi-faceted and complicated process - a process that continues...*

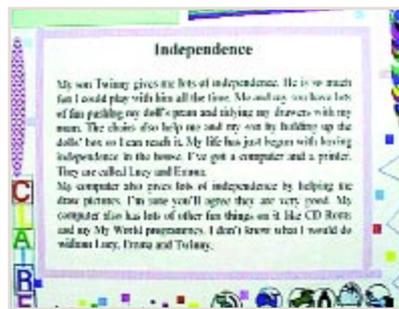


**Juan using his new portable computer at school. Note that, as recommended at the first assessment, the switch is located vertically on his left side.**

## CLAIRE STARTING EARLY WITH AT



CLAIRE WAS FOUR years old when she first attended an AT Centre. Early intervention before starting school, at the age of five, was regarded as paramount in importance. Her first assessment was aimed at optimising her use of a computer as a tool for learning and for leisure. Children learn much about their world through play. Claire has severe physical disabilities and uses a wheelchair. Normal opportunities for early learning through play were somewhat reduced, and so early intervention from an AT service was critical in supporting her pre-school and early school development. Following training and support, Claire and her school became enthusiastic users of the software recommended for her computer and she was soon producing work of a



Claire's tale of independence

similar quality and quantity as other children in her class. At home, the computer became as integral a part of her 'Toy Box' as her dolls and doll's house. Those supporting her described the impact of an accessible and usable computer on Claire's self-image as "remarkably positive". She now had friends who played musical instruments or who played for school sports teams. Whilst Claire might not have been able to out-perform her peers in these areas, technology, appropriately applied and introduced at a young age, gave her an opportunity to excel in other areas. As a result, Claire's self-image and self-motivation were helped to flourish. Indeed, the technology she used was so important to her and played such an integral part in her life, that she gave each AT device an affectionate nickname – "Twinny" was her powered wheelchair, while "Sally" was her computer!



## Independent AT centres

INDEPENDENT, NON-COMMERCIAL AT centres, supported by public institutions and agencies, can play a key role in responding to the individual needs of people with disabilities, particularly in supporting their inclusion in a variety of life contexts.

Experienced AT Centres have a role in mediating between the disabled person and their local professional team, especially where individuals' needs and expectations are not being met by current solutions. In this way an AT centre can become a central, unbiased point of reference for all those with a stakeholding in the process of long term support, proposing technological solutions and intervention approaches. However, AT centres should rarely provide the case managers or key workers, as users of AT are best served by their own local professionals.

AT Centres provide people with disabilities and local health, social and educational authorities with accurate and up-to-date information on assistive technologies, devices and appropriate approaches to intervention. In addition they can assist policy-making agencies in developing realistic and effective models of service delivery in the field of AT.

*AT CENTRES DO NOT necessarily have to share all the same characteristics. A Centre could specialise in specific areas of AT such as environmental control or communication aids or in specific age groups. However, they do share the following characteristics:*

## Non-commercial ethos

*A non-commercial ethos means the disassociation from all commercial and vested interests, for example the production and sale of AT aids. This is an important issue in that it guarantees an independent advisory service.*

## Assessments with multidisciplinary teams

*A competent and independent AT Centre is multi-disciplinary in nature, able to assess and recommend AT that is appropriate to the needs and expectations of the end user and their local support team. Customised solutions may be developed in collaboration with end users and local teams, and evaluated over time.*

# ESSENTIAL CHARACTERISTICS OF INDEPENDENT AT CENTRES

## Training, loaning

*Many AT Centres train those using AT and other professionals. Some centres loan equipment for a limited period as an extension of their assessment. This facilitates testing and evaluation.*

## Research and development

*An AT Centre is the natural place to identify relevant research questions reflecting the needs of disabled people and the professionals that serve them. Development work aims to fill gaps in technology, through the development of prototypes, involving disabled people in the design and development of new hardware and software. As a result AT centres have become valuable "centres of expertise" for designers and developers of AT devices.*

## Networking

*AT Centres should work together in local, regional, national and international networks to share expertise and to co-ordinate interventions. Examples of such networks are available in Europe. For instance, the G.L.I.C. network in Italy unifies all major non-commercial AT centres. The members exchange information and expertise, and work together for a wider recognition of the role of AT in fighting social exclusion.*



## Conclusions

- 

Assistive technology is a powerful ally in the battle against social exclusion. In many cases it can bridge the gap between people with disabilities and mainstream society.
- 

In order for people with disabilities to benefit from the advantages assistive technology can provide, mainstream society needs to implement inclusive policies. Such policies should aim at the elimination of physical and mental barriers, through a profound and on-going reflection on current everyday practice in all realms of life.
- 

AT intervention is, by definition, a complex and long-term process, involving many stakeholders. The outcomes of intervention, in terms of changes in the quality of life or improvements in social inclusion, for people with disabilities are difficult to measure. However, any cost benefit analysis needs to include an evaluation of such long-term benefits in order to reflect accurately the value of intervention.
- 

Independent AT Centres are important resources for many people with disabilities, local professionals, and agencies with formal responsibility in health, education, and employment. Nevertheless, many European citizens do not have access to AT centres. This is because the role of independent AT centres is not yet recognised in every country or region of Europe. Consequently, the provision of AT service provision to European citizens is geographically uneven.

*Inclusiveness is not a privilege,  
it is a right.*

## 7



Commonly, different European countries and/or regions provide different models of AT service delivery. Although most do demonstrate good practice within the context of their funding arrangements, it is rare to find services providing for the global needs of people with disabilities throughout life. Many could have the expertise, but limited or short-term financial support restricts their development.



Policies aiming at supporting the development of AT for the benefit of people with disabilities should:

- Promote the development of technologies according to the principle of "design for all"
- Create models of service delivery capable of offering concrete and adequate answers through the integration of public and private resources
- Promote the provision of accurate, up-to-date information and the life-long training of professionals
- Promote the development of an approach to intervention based on the recognition of individual needs in a life-long perspective
- Promote multiple and transparent funding opportunities for equipment and services
- Favour the growth of an open and well-developed European market for AT devices
- Advance the development of a well-distributed network of independent AT Centres
- Support research and development activities aimed at improving technological aids, adapt existing devices for pan-European compatibility, and explore the impact of service delivery and AT equipment on the life experiences of people with disabilities
- Involve people with disabilities and their organisations in all stages of decision making and policy evaluation.





# AT centres promoting the BRIDGE project

centre





**AUSILIOTECA** is the AT centre of AIAS Bologna onlus, a non-profit making association of disabled people and their families. The centre is supported by the local health service of Bologna and the region Emilia Romagna as a specialised service provider in the field of Assistive Technology, focussing on technical aids for communication, play, environmental control, mobility and daily

living. For people with disabilities, their carers, and professionals from health, education and social services the centre is a national reference point. The centre practises a multidisciplinary approach to assessing individual needs, working with people with disabilities of all ages and in all areas of life: school, work, home, rehabilitation, etc. In addition, and wherever possible, staff of the centre support users of AT and their local teams in introducing AT devices into life-long projects. The provision of information, training, equipment loans and research are among the other activities of the Ausilioteca staff. The centre collaborates closely with other similar centres across Italy and is a coordinating member of the Italian network of AT centres specialising in the field of technological aids (GLIC).

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The **ACE CENTRE ADVISORY TRUST** is an independent charity whose role is to be a centre of information, support and training for parents and professionals in the use of Assistive Technology (AT) for young people in education who have communication or accessing difficulties in speaking and/or writing. We are funded by central government, by The Gatsby Charitable Foundation, by European Union project grants, and by general fund-raising activities.

The staff comprises teachers, speech and language therapists, occupational therapists and technical experts with extensive experience in working with the application of computer technology including alternative and augmentative communication (AAC). The centre maintains a wide variety of services in addition to the core activities of independent assessment and training. We are involved in a number of national and international research projects; we lobby on behalf of those with communication difficulties; and we act as a dissemination centre for an extensive range of AT information. Much of the work we do also contributes to our software development and publications material.

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**UTAC** is a Communication Centre supporting people with motor disabilities who need augmentative and alternative communication (AAC) as well as assistive technology for play, mobility and computer access. UTAC provides assessment, intervention and life-long support to the users, their families, carers and professionals. Staff training, dissemination of information and research are also activities of the UTAC team. Increasing access to mainstream education and improving curriculum access for all school-aged children are among our main goals, which UTAC tries to attain in close cooperation with the school staff and the educational psychology teams (EAP). Collaboration has also been established with health and social services throughout Catalonia (early intervention centres, hospitals, residential and work settings, etc.). This helps professionals build their competence as interaction partners for the AAC users, and as rehabilitation trainers for people of all ages who need assistive technology to participate and to enjoy life.

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#### FORSCHUNGSINSTITUT TECHNOLOGIE-BEHINDERTENHILFE (FTB)

is part of Evangelische Stiftung Volmarstein (ESV), a large rehabilitation centre for physically disabled people, and a scientific institute at the University of Hagen. FTB is organised in three areas of responsibility: information, development and the test centre.

Within the scope of R&D, FTB is concerned with themes like telework/ teleservice, human-machine interaction, wheelchair control, rehabilitation robotics, augmented communication, environmental control, integrated home systems, and "design for all" at a national and European level.

As a centre of excellence in "design for" all FTB is a national reference point for this matter and advises the German Federal Government within the European initiative "eAccessibility".

One main field of work is the information and advice service on AT and home adaptations for people with disabilities, elderly people, as well as rehabilitation professionals. For this purpose FTB runs a permanent exhibition of technical aids including a specially adapted apartment that can be used for demonstrations and short periods of user trial.

#### Forschungsinstitut

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**CENTRO AUSILI** is the AT Centre of Association "La Nostra Famiglia".

Association "La Nostra Famiglia" is a non-profit making organisation with many

branches in Italy and abroad, and a network of Rehabilitation Centres and hospitals providing diagnostic services and treatment for physical and psychological disabilities, especially in childhood and adolescence.

Centro Ausili provides services to people with disability, their families, voluntary workers, carers and professionals who may or may not work for the Association.

The aim of Centro Ausili is to provide specialist counselling to help people with disability achieve the highest possible independence by:

- Using AT equipment;
- Improving accessibility to different environments such as work and education;
- Integrating equipment into rehabilitation and/or educational plans;
- Using software for rehabilitation and educational purposes.

Centro Ausili has a multidisciplinary team, with professionals coming from many different (social, rehabilitation, psycho-educational, engineering and design) backgrounds.

The many services and activities provided by Centro Ausili can be grouped into four main sectors: information provision, counselling and support, research and training, system projects and layouts.

The Centre focuses closely on new technologies and is a coordinating member of the Italian network of AT centres specialising in the field of technological aids (G.L.I.C.).

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