Recent Advances in Assistive Technology and Engineering

CONFERENCE PROGRAMME

Birmingham Botanical Gardens
18th & 19th November 2002

Contents

Welcome to RAATE 2002.

It was a risk when we put together last year's conference — it was our first truly interdisciplinary conference for the whole spectrum of assistive technology. We believed all professionals in the field wanted and needed to work together to provide a rounded, person-centred service, and your response proved that was right.

Some of the best papers from RAATE2001 will be appearing in a special edition of Technology & Disability. Sadly this edition will not be published until the end of the year; nevertheless we will again be inviting speakers to prepare publishable papers for this journal.

But would RAATE be just a one-off success? It appears not. This year the organising committee has received a superb set of paper submissions, and there has been greater commercial involvement and undiminished enthusiasm from delegates.

Moreover, as a direct result of the contribution of last-year's keynote speakers and some vigorous networking during the meeting, RAATE gave birth to significant inter-disciplinary movement — the AT Forum. You'll hear more about this on Tuesday.

But there is so much to enjoy before then! Check the programme out, there have been some minor changes and additions. Choose what to attend with care, but face the fact that there you will miss some things you wanted to attend, so check with friends so that you cover all that's going on. In the breaks mingle and talk with exhibitors, network like mad. So if you haven't got any friends now, don't worry, you will have by the end of the meeting!

We wish you a most enjoyable and useful meeting.

Alan Turner-Smith and the organising committee:
Colin Clayton, Gary Derwent, Donna Cowan, and Moira Mitchell

Plenary Sessions

ICES: A guide for Commissioners
Nick Mapstone, Audit Commission
Monday 10.00 to 11.00 am

The Assistive Technology Forum
Moira Mitchell, Foundation for Assistive Technology
Monday 10.00 to 11.00 am

National Occupational Standards
Paul Richardson, Kings College Hospital
Tuesday 9.30 to 10.30 am

Facing the Challenges in NHS provision of EAT in England
Roger Potter, NHS Purchasing & Supply Agency Customer Consultation Group for EAT
Tuesday 9.30 to 10.30 am

Beginners Sessions

The four beginners sessions will cover basic information from each area of EAT and are aimed at people with little or no experience in that area. They are intended to allow people who work primarily in another area of EAT to broaden their knowledge. For example we would recommend that Speech and Language Therapists attend the Powered Mobility Session and Rehab Engineers from Wheelchair Services attend the AAC Session.

The four sessions are as follows:

Beginners Guide to Environmental Control
Alan Woodcock, Rehab Engineering, Kings College Hospital
Session 1: Monday 11.30 to 1.00pm

Beginners Guide to Computer Access
Jane Bache & Gary Derwent, Royal Hospital for Neuro-disability
Session 4: Monday 2.00 to 3.30pm

Beginners Guide to AAC
Katie Price, The Wolfson Centre, Great Ormond Street Hospital
Session 7: Monday 4.00 to 5.30pm

Beginners Guide to Powered Mobility
Colin Clayton, The Wolfson Centre, Great Ormond Street Hospital
Session 10: Tuesday 11.00 to 12.00noon

DAY ONE PROGRAMME—MONDAY 18th NOVEMBER

10-11 am	Plenary: **ICES: a guide for Commissioners** *Nick Mapstone, Audit Commission* **The Assistive Technology Forum** *Moira Mitchell, Foundation for Assistive Technology*		
11-11 30	Coffee and exhibition		
11 30-1 pm	**S1 Beginners Guide to Environmental Control** Alan Woodcock, Rehab Engineering, King's College Hospital	**S2 Service delivery 1** (a) Providing Electronic Assistive Technology in North West England *D Shakespeare, J Keenan & E Williams, The Walton Centre* (b) Access to Communication and Technology (ACT) service delivery model *Phil Palmer, Clive Thursfield, & Danielle Pulver, ACT Birmingham* (c)Role of Occupational Therapy in Prosthetics *Natalie Branch, King's Community HCT*	**S3 Monitoring** (a)Development of a measuring device to assist in evidence based assessment of EAT *Gerard Cullen & Gary Derwent, Compass, Royal Hospital for Neuro-disability* (b) Remote monitoring of amputee progress with a sensor socket *Doug Cartwright, Alan Turner-Smith et al., CoRE, King's College London* (c)Validation of a novel activity monitor *Jane Mickelborough, Laurence Kenney & Sylvia Moss, University of Salford*
1-2 pm	Lunch and exhibition		
2-3 30 pm	**S4 Beginners Guide to Computer Access** Jane Bache, Gary Derwent, Royal Hospital for Neuro-disability	**S5 Computer access and IT** (a)Improving employability through IT training for severely disabled persons *Aejaz Zahid, Barnsley DGH NHS Trust* (b)Promoting independent living through access to the internet *Roger Hook & Sinder Mahil, Leaming Information & Tech. Centre, Nuneaton* (c)A memory aid with remote communication: preliminary findings *Andrea Szymkowiak, et. al. Applied Computing, University of Dundee*	**S6 Case studies** (a) Eagle Eyes and Camera Mouse™ – *Debra Lees, Hollybank Trust, Yorkshire* (b)Drama on Video to Provoke Older Users to Discuss Requirements for Supportive Technology – *Fran Marquis-Faulkes et al., Applied Computing University of Dundee* (c)Case Study: Amanda – Neil Gregory et al. ACT Birmingham (d) Biomechanics of distortion of the immobile chest – *Goldsmith & Hill*
3 30-4 pm	Tea and exhibition		
4-5.30 pm	**S7 Beginners Guide to AAC** Katie Price, The Wolfson Centre, Great Ormond Street Hospital	**S8 Service delivery 2** (a)Providing Disabled children with custom made AT controls *Simon Judge and Tim Wilson, MERU* (b)Service Delivery: Prioritisation of Provision according to clinical situation and social need – *Phil Palmer & Angie Villers, ACT Birmingham* (c)Behavioural factors that affect the implementation and use of Assistive Technology – *Mark Williams, Assistive Comn. Service, Charing Cross*	**S9 Seating** (a)Improvements to Matrix Seating: Technical and Clinical Developments *Steve Cousins & Ron Clarke, Royal Hospital for Neuro-disability* (b)Lynx: Old material, new application – *Jacqui Romer, Roehampton* (c)Characterising wheelchair cushions for management of tissue integrity: a crucial review of test methods proposed in the Draft International Standard *Martin Ferguson-Pell, Royal National Orthopaedic Hospital*
6 00 pm	Cocktail reception hosted by SRS Technology Ltd followed by Dinner		

DAY TWO PROGRAMME—TUESDAY 19th NOVEMBER

9 30-10 30am	Plenary: **National Occupational Standards** *Paul Richardson, Rehabilitation Engineering Division, Kings College Hospital* **Facing the Challenges in NHS Provision of EAT in England** *Roger Potter et al. NHS Purchasing & Supply Agency Customer Consultation Group for EAT*		
10 30-11 am	Coffee and exhibition		
11-12 noon	**S10 Beginners Guide to Powered Mobility** – Colin Clayton, The Wolfson Centre, Great Ormond Street Hospital	**S11 Statutory requirements** (a) Wheelchair innovation under state control: a historical glance *Brian Woods, University of York & Nick Watson, University of Edinburgh* (b) Medical Device Agency – *Alan Lynch*	**S12 Integrated systems case studies** (a) Case Study: Marie - An integrated solution to communication and environmental control needs *Phil Palmer &, Danielle Pulver, ACT Birmingham* (b) Case Study: Assistive Technology provision for a patient with Locked in Syndrome – *Richard Caley, Pinderfields Hospital* (c) Issues impacting an Electronic Assistive Technology service *Clive Thursfield & Chris Christoforides, Oak Tree Lane Centre*
12-2 pm	**S13 Lunch with Trade Presentations throughout** (a) The Grid – a multi-purpose access and communication tool for Windows – *Paul Hawes* (b) Symmetrikit® Posture Care Pathway – the Family-Centred approach to Postural Care – *Liz Goldsmith* (c) Addressing the challenge of quantifying free-living activity – the activPAL™ professional – *Douglas Maxwell* (d) Integrating assistive technology for users with the WiseDX – wiseUP for professionals – *Colin Clayton*		
2-4 pm	**S14 AT solutions** (a) A universal babycarrier for wheelchairs – *Roger Orpwood, Bath Institute of Medical Engineering* (b) Toileting Equipment for Children with Restricted Growth *Timothy Adlam et al., Bath Institute of Medical Engineering* (c) Progress on an implantable drop foot stimulator – *Laurence Kenney et al., University of Salford* (d) Automatic compilation of a report after an assessment for the provision of an environmental control system – *Chris Christoforides, ACT, Birmingham*		**S15 AT in the community** (a) The Communication Aids Project (CAP) – *Caroline Gray, Ace Centre Oxford* (b) The impact of shower installations on the lives of people with disabilities *Helen Pain, Southampton General Hospital* (c) AT for public housing – Alex Bialokoz, *Alan Turner-Smith, CoRE, King's College London* (d) Service experience in the AT Marketplace: Regulations *Ray Rochester, Chiltern Invadex Ltd*

Providing Electronic Assistive Technology in North West England

D Shakespeare, J Keenan, E Williams

Background
Rates of environmental control system (ECS) prescription vary widely across the UK, largely due to differences in fudning and service configuration. This audit was designed to investigate whether Electronic Assistive Technolgy [North West](EAT [NW]) has improved efficiency, cost effectiveness and equity of ECS provision in North West England.

Service Description
In 1995, a centralised service based in Liverpool was established to offer provision to the 6.6 million people of North West England. Clerical staff accept referrals, arrange assessments, liaise with suppliers and field fault calls. Four engineering technicians (first appointed in 1998) advise on equipment prescription, check out installations, assess faults and oversee maintenance schedules.

Results
Efficiency
ECS provision increased from 536 systems in 1996 to 723 in 2000, without increase in service budget. The mean interval between referral and equipment provision reduced from 20 weeks to 13 weeks in the same time period.

Cost Effectiveness
From 1996 to 2000, total costs reduced by 36% whilst the number of service users increased by 26%. Cost per system installed fell from £5279 in 1996 to £1629 in 2000 with the annual cost per operational system falling from £1457 to £929.

Equity of Provision
The average number of systems per million population increased from 84 (range between Health Authorities of 45 to 104) to 109 in 2000 (range 61 to 148).

Conclusion
EAT (NW) has improved efficiency, cost-effectiveness and equity of ECS provision in North West England. It aims to further integrate ECS provision with that of wheelchairs, communication aids and other electronic technology.

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Access to Communication and Technology (ACT) service delivery model

Phil Palmer, Clive Thursfield, Danielle Pulver

This presentation describes the ACT model of assessment for and provision of electronic assistive technology (EAT) through a regional service. The model offers a potential blueprint for comparable evolving services and highlights three factors in particular

- Co-ordinated assessment from a range of professionals
- The potential for full integration of environmental control and communication
- Partnership between regional and local services

ACT is part of the West Midlands Rehabilitation Centre. ACT has primary NHS regional responsibility for needs assessment and provision of communication aids and environmental control equipment.

Assessment

ACT comprises a clinical establishment of Speech and Language Therapists (SALTs), Occupational Therapists (OTs) and Clinical Engineers, working closely with Consultants in Rehabilitation Medicine and in partnership with local professionals, especially SALTs and OTs. The ACT service has its own technical staff to provide a specialised in-house service.

Integration

The assessment expertise, combined budgets (for communication aids and EC) and the in-house service allow for integration of communication and control solutions. Close links with colleagues in wheelchair control and robotics enable further scope for integrated solutions where necessary.

Partnership

ACT continues to develop in partnership with local services. We are in the process of implementing a Regional strategy that clarifies the responsibilities of ACT and local SALT services. ACT is seeking to improve OT links to develop services along similar lines. In the future we will be offering to support local services through additional consultancy and training.

How much control does an individual with multiple limb loss have?

Natalie Branch

Individuals who suffer multiple limb loss through trauma or illness have an increased likelihood of survival due to developments in medical technology. This presentation will examine how technological developments affect the rehabilitation process that follows and the future lives of those who have suffered multiple limb loss.

A case study will be used to help define 'control' and to highlight issues surrounding control. For the purpose of this presentation control will be discussed in relation to the individuals control over her environment, prosthesis, the rehabilitation process and choices. Professionals working with people with multiple limb loss need to question how much control an individual has throughout the rehabilitation process and for the rest of their lives.

The presentation aims to share the experiences of the multidisciplinary team working with a teenage girl who had meningococcal septicaemia resulting in multiple limb loss; bilateral trans-radial, a right trans-tibial, and left partial foot amputations. The pathology also resulted in a degree of visual impairment and deafness. The treatment of this young lady illustrates how developments in technology and multidisciplinary team working could increase the control of an amputee with multiple limb loss.

The case study will be used to extract some of the problems faced by the multidisciplinary team in multiple limb loss, identifying possible solutions with recommendations for future research topics and service developments.

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Development of a measuring device to assist in evidence based assessment of Electronic Assistive Technology

Gerard Cullen, Gary Derwent

In order to provide the best assessment of Electronic Assistive Technology (EAT) such as environmental controls, AAC and computer access devices, it is advantageous to measure as much objective information about the client's use of the equipment as possible.

The authors of the current paper have developed an electronic unit to assist in measuring and recording single switch access to EAT. The unit is placed between the switch and the target equipment and logs the exact time and duration of switch presses. The unit is discreet (approximately the size of a matchbox) and can record up to 40,000 switch presses over periods greater than a year. Following the equipment trial information can be downloaded into a standard PC where it is graphed and analysed. When analysed, the measurements taken by the unit can be used to assist EAT assessment and provision in many ways. Over short sessions, subtle differences in switch press duration can indicate poor switch positioning. Changing switch press duration within a session can indicate fatigue and help determine optimum session length. Frequency of switch use over longer periods can provide evidence to support funding applications. Decreases in the average time between switch presses can indicate increasing switch competence and familiarity with the EAT equipment. Comparison of written output and switch logs can provide rate of errors in AAC use without constant observation.

Problems encountered during the development of the device will be discussed and case studies of its use at the Royal Hospital for Neuro-disability will be presented.

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Remote monitoring of amputee progress with a sensor socket

Doug Cartwright, Alan Turner-Smith
Peter Janssens, Magnus Lilja
Kevin Murray, Louis Peeraer
Yves Bogaerts, Geoffrey Mathews

Rehabilitation of a below knee amputee is likely to include the fitting of a prosthetic limb.

The success of this procedure is can be assessed in terms of the comfort, fit and function of the prosthesis. The skill and experience of the rehabilitation team is very important in making this assessment. However, there is a need to develop objective measurements in order to better inform the assessment process and any interventions made. The function of the prosthesis ideally also needs to be assessed during the amputees normal activities, rather than just during the rather artificial environment of an outpatient clinic appointment.

There have been a number of technical developments in recent years which mean it is now possible to make real progress in the objective assessment of amputee progress. These include:

1. Fast development in the field of non-invasive sensors and measuring devices for medical application. This includes both physical and physiological measurements.
2. Development of the silicone sleeve. The silicone sleeve is fitted directly over the amputee's stump to provide cushioning between the skin and the socket of the prosthesis. As it is made of a compliant material it has a very intimate fit to the stump profile.
3. Rapid developments in the field of mobile telecommunications.

The opportunity exists to incorporate sensors into the silicone sleeve in order to make measurements at the skin/socket interface. These measurements could be made during normal use and transmitted remotely to the rehabilitation centre via the mobile telephone network.

The aim of this project is to develop such a measurement system and to show that clinically relevant parameters can be measured with validity. It is a collaborative venture between manufacturers of the measurement technologies, prosthetics and telecommunications, and leading European rehabilitation centres and universities.

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Validation of a novel activity monitor

Jane Mickelborough, Laurence Kenney
Sylvia Moss

An activity monitor has been developed (ActivPAL, Pal Technologies Ltd, www.paltechnologies.com/) that is small, self contained and worn taped to the front of the thigh. The monitor is designed to differentiate between standing, walking and sitting/lying and records the time spent in these positions. It records the number of transfers (lie/sit-stand, stand-lie/sit) and the number and cadence of steps taking over a recording period (up to 110 hours). This is a potentially useful tool for the evaluation of assistive devices for gait improvement. However, there are no reported validity studies on the activity monitor.

Researchers from the Centre for Rehabilitation and Human Performance Research at the University of Salford are carrying out research into the effectiveness of functional electrical stimulation for patients who have had a stroke and are interested in using the ActivPal device. This paper will report on a study to test the validity of the ActivPAL activity monitor for use with community-dwelling people who have a gait deficit as a result of a hemiplegic stroke. Preliminary results from healthy subjects will be reported, followed by progress on the validation study with subjects who have had a stroke. This study will address the following questions:

- Does this device accurately record periods of very slow walking and the number of steps taken by stroke patients.
- Can it differentiate reliably between standing and sitting activities in these patients.

Is there a difference in the variables recorded by the ActivPal when worn on the affected or unaffected leg of ambulant stroke patients.

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Improving employability through IT training for severely disabled persons

Aejaz Zahid

The Barnsley Clinical Engineering Service provides Assistive Technology across the South Yorkshire coalfields area, covering a population of over 750,000. More than 30% of the AT provision concerns access to computers and IT. Much of this is customised for persons with severe physical disabilities who have little or no prior experience of using a PC. Thus, the provision of appropriate equipment is often just the first step in a long process before the individual can become a proficient IT and AT user. From our experience, comprehensive training in the use of both the assistive technology and the PC is of paramount importance if the assistive technology provided is to be used at all.

In Barnsley, the Clinical Engineering Service enjoys close working ties with local educational, training and employment services and institutions. This partnership has been instrumental in helping many disabled residents of Barnsley get the most out of the assistive technology they use for IT access. One collaborative project that has helped forge this partnership is a training course designed to impart knowledge and employable skills to disabled persons in both the effective use of the Internet and also in web site design.

This presentation will describe the development and the outcomes of this training initiative, the roles of the various partner institutions and the difficulties encountered in implementing an AT based course in a typical college classroom.

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Promoting Independent Living through Access to the Internet

Roger Hook, Sinder Mahil

The Silver Surfers Project aims:

to promote independent living for older people by providing access to public services through the internet

to use information technology to provide easy access to information and facilities for older people

to help older people communicate with each other, with relatives and with local community organisations, by using information technology.

The means which the Project is using to deliver these aims include:

- the development of an accessible, user-friendly web-site, which enables access to public services on-line
- installation of access devices within the homes of disabled older people to enable access to the Internet through the TV
- installation of communal internet access facilities in locations such as sheltered housing schemes and older people's day centres
- provision of easy to use email.

Several Focus Groups of older people are helping to direct the Project; they cover the "look and feel" of the web-site, the information and services to be provided, disabled access (including visual impairment), Asian language and training.

The Project is funded for three years (to September 2004) under the Government's Invest to Save Programme; Nuneaton and Bedworth Borough Council is the lead agency, but Project partners encompass the voluntary, statutory and educational sectors. Anite Public Sector is the primary IT partner.

The Project is managed by a dedicated team of four people, with backgrounds covering social care and IT, within both the statutory and voluntary sectors. The Project is subject to external evaluation.

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A memory aid with remote communication: preliminary findings

Andrea Szymkowiak, Elizabeth A. Inglis, Peter Gregor, Prveen Shah, Jonathan Evans, and Barbara A. Wilson

Memory problems are often associated with ageing and they are one of the commonest effects of brain injury. Such problems can severely disrupt daily life and put huge strain on family members and carers. Electronic devices have been successfully used as compensatory memory aids to provide reminders to individuals with prospective memory problems. The functions of these devices is to give timely and active action prompts to users such as, e.g., packing lunch or taking medication. At present, we are developing the interface of an electronic memory aid, running on a personal digital assistant (PDA). The recent development of PDAs with mobile technology has rendered them multi-functional and presents an opportunity to be exploited to meet the demands of the user. In addition to providing action prompts, the device used in our project allows data entry on the device itself but also from other stations, made possible through the use of mobile technology. This allows the user as well as carers or even administrative staff to enter data remotely into the device, thus creating flexibility of data entry depending on the characteristics and needs of the user. In addition it also allows to monitor remotely if a user has acknowledged a reminder and – if that's not the case – to initiate further actions. This paper describes usability issues identified in the design of the memory aid, stages in its development, and preliminary findings of field trials in which the device was tested.

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Eagle Eyes and Camera Mouse

Debra Lees

Hollybank Trust is a charity based in West Yorkshire and works primarily with children & young adults with complex and multiple disabilities and associated learning difficulties. For the past four years we have been using a system called EagleEyes that was developed at Boston College Massachusetts. EagleEyes enables the user to interact and control the mouse by moving their head or eyes. The EOG potential is detected by five surface mounted electrodes amplified by two electrophysiological amplifiers and converted to mouse movement by software. The system has now been further developed and is due to be released in a USB version.

Having researched the majority of head mice we concluded that EagleEyes was more reliable and more accurate for our type of client, however, the majority of our clients demonstrated a preference for a system that did not involve electrodes, after some discussions and fine tuning Boston College developed a camera based system – CameraMouse™. CameraMouse™ allows the user to control the mouse with any part of the body (except the eyes), the system is very easy to use and can be tailored to meet the physical abilities of most individuals.

Hollybank has been using CameraMouse™ for approximately 3 years, we currently have 12 clients on the system aged from 5 to 34 years. Some of the clients who were using EagleEyes transferred the skills learnt to CameraMouse™ we now have clients who are taking part in web based courses, regularly email friends and family and use CameraMouse™ to access their curriculum. Both EagleEyes & CameraMouse™ will control most off the shelf applications enabling greater choice and equality for our clients. We are also analysing the physiological benefits to a user:- improved head control, increased levels of concentration and increased self esteem.

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Drama on Video to Provoke Older Users to Discuss Requirements for Supportive Technology

Fran Marquis-Faulkes, Peter Gregor, Stephen McKenna, Alan Newell

A system providing fall detection and movement monitoring to support elderly people living at home is being developed using computer vision technology. Data from demographics and the costs of care show that there is a clear need for such a system. Such systems can support users but they need to be sensitively designed with user involvement to ensure that the presence of the system is experienced as supportive and not invasive. Scenarios, based on focus groups and anecdotal evidence, have been developed and performed by a theatre group. These were filmed and the resulting videos shown to groups of older people to provoke discussion. This innovative approach has led to a large range of useful comments and discussions which have been fed into the system design process. The user requirements gathering methodology of provoking discussion amongst elderly people by using scenario based theatre has proved of particular value with audiences of elderly "potential users", enabling them to focus on the details of a monitoring system at the pre-prototyping stages.

The video was shown to four different groups of older people and the content of the discussion from the different groups will be presented, together with the results of talking to carers, both professional and familial. The effects of the discussions on the system design will also be discussed.

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Case Study: Amanda

Neil Gregory, Danielle Pulver, Dr. Clive Thursfield

ACT has seen Amanda since the September 2001, 6 months post brain stem stroke leaving her with minimal physical function and initially questionable cognitive function. A simple ElectroMyoGraph (EMG) system was setup using Amanda's left eye blink or cheek movement to potentially control a radio. These were the consistent movements available to Amanda.

At the end of February 2002 she was moved from the acute hospital to an in-patient Rehabilitation Unit. As her physical function improved her right thumb began to show signs of moving on command. There was not enough movement for a mechanical switch so an EMG system was developed to give a switched output. This used the commercially available ProComp+ with bespoke software. Special software was needed due to the inherent variability of biological signals and their low power in this instance. Subsequently this system was integrated into the unit's therapy work. Success was limited due to Amanda's hand functioning, where the EMG electrodes were placed and her hand positioned. This caused interference with the EMG signal and made the switching unreliable and diagnosis of the problems with the EMG system difficult. An effective low-tech system was also used, but didn't facilitate Amanda's independence.
In July 2002 Amanda's thumb movement became stronger and so a mechanical switch was tried, which was successful. She was able to use a high-tech spelling chart. Very quickly she communicated functionally using the system with a high success rate.

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Biomechanics of Distortion of the Immobile Chest

Goldsmith and Hill

This presentation will describe a theory of equilibrium and distortion of the immobile chest. It will consider factors, which predispose the chest to distortion, equilibrium of postures and consequences of unstable equilibrium.
Immobility in habitual lying postures causes distortion of body shape. The immobile chest is a particularly vulnerable structure, which distorts readily and predictably in response to internal pressures and asymmetric postures, compromising the basic physical well being of the individual. The characteristics and severity of distortion can be seen to relate to the state of equilibrium and length of an imaginary line called the sterno-spinal line.

The theory of equilibrium and distortion of the immobile chest

The sterno-spinal line is an imaginary line, which runs between the sternum and spine. When the sterno-spinal line is either vertical or horizontal in the habitual lying posture the sum of clockwise moments in the chest equals the sum of anticlockwise moments, the chest is in stable equilibrium and the combined force of gravity and negative intrapleural pressure will compress the chest symmetrically. If the sterno-spinal line is not vertical, clockwise or anticlockwise moments are balanced by restoring forces generated by elastic distortion of the chest. The direction of the restoring forces will follow the sterno-spinal line as it falls towards the horizontal, distorting the chest in a predictable manner.

By understanding the biomechanics of distortion of the immobile chest, clinicians are able to train families to apply the rotational forces to the whole body, which are needed to return the sterno-spinal line to equilibrium and provide contoured support to prevent both rotational distortion and lateral spread of the thorax.

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Providing Disabled children with custom made AT controls

Simon Judge

Introduction to MERU and MERU's Interface Centre

MERU's The Interface Centre Service is a specialist service offered by MERU. We custom make switches, joysticks, mice, keyboards and other interface devices to control computers, communication aids, wheelchairs and other technology.

The Medical Engineering Resource Unit (MERU) is a registered charity established 29 years ago to design and make equipment for disabled children where no commercial alternative exists. The organisation has gone from strength to strength in recent years and now offers an extensive service to disabled children and their carers.

The evolution of a unique, niche, service

Until very recently this service has only been offered within MERU's local vicinity of South London Boroughs, Surrey and Sussex. Given high demand for the service in the first three years that outstripped our limited capacity, we set about a business planning process involving service users and prospective partner organisations. This process identified three main objectives for the next three years:

To increase the number of children referred to the service

To open up the service to children with the greatest need, regardless of where they might live in the United Kingdom

To apply and convert cutting edge technologies to produce innovative products for disabled children

This brief paper communicates a summary of:

The nature of this unique service
'Hands on' examples of our service
The results of our business planning process
Plans for assisting more disabled children

Service delivery: Prioritisation of provision according to clinical situation and social need

Phil Palmer, Angie Villers

This presentation discusses the current practice of prioritisation of hardware provision following assessment by the Access to Communication and Technology (ACT) Service. ACT is responsible for the provision of environmental control (EC) equipment to the people with physical disability who live in the West Midlands Region. The West Midlands serves a client base of 6 million people and has a budget of £400K to provide for installation, maintenance and withdrawal of EC equipment.

ACT currently uses a classification system that seeks to promote rapid provision in the following circumstances:

- To provide access to a means of attention calling
- To those
  - with rapidly progressive conditions
  - who spend significant periods of time alone
- Where provision will impact positively on personal health and safety and quality of life
- For people who have significant problems with upper limb function

These service priorities are expressed using a hierarchy of needs as outlined below:

- Urgent safety needs of existing clients (A1) and new clients (A2)
- Other attention calling needs (B1) and needs for switches and mountings (B2)
- Control needs where the client has a rapidly progressive neurological condition - or spends significant periods of time alone (C1) or a stable condition (C2)
- System upgrade (D) and other needs (E)

ACT serves six different consortia. There may be differing levels of provision in each consortia depending on available resources. The rationale for this system is detailed in the presentation.

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Behavioural factors that affect the implementation and use of assistive technology

The use of assistive technology by individuals with disabilities is influenced by factors other than technical variables directly related to the equipment itself. Primary amongst these are behavioural variables, reported in the literature and commonly encountered by practitioners whose role is the implementation of equipment, and the creation of programs to ensure effective use.

It is perceived that professionals pay too little attention to these factors when discussing the effective implementation and use of assistive technology. However it is essential that such consideration is commonplace or, it may be argued, no implementation program is complete. In addition, technology may be abandoned by the user representing loss of opportunity and poor justification of resources by stakeholders involved in service delivery.

It is argued that it is essentially behavioural considerations (and their subsequent management) that determine whether or not technology will be used effectively by the client. Although psychosocial factors have been explored in the literature reporting on the use of augmentative and alternative communication, these factors may be considered influential across the broad spectrum of assistive technology.

The purpose of this session is to encourage delegates to consider the nature of these psychosocial variables and to discuss their effective management with regard to design and implementation.

It is hoped that through such discussion it will be possible to raise the awareness of those not directly involved in the role of implementation (and associated training) with regard to non-technological issues that determine outcome.

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Improvements to Matrix Seating: Technical and Clinical Developments

Steve Cousins, Ron Clarke

Over the past 19 years nearly 30,000 Matrix seating systems have been fitted world wide. After analysis of manufacturing and clinical issues, improvements to the basic Matrix elements were proposed four years ago at the Royal Hospital for Neuro-disability. After about 200 static mechanical tests a re-designed Matrix clamp element was fitted to a patient (about two years ago) in a limited clinical evaluation. Further design improvements followed with New Matrix shells being fitted with virtually no framework resulting in a system that is lighter, stronger, thinner, and with a better fitting support surface than current Matrix. New Matrix backs have also been fitted with only central mounting brackets allowing improvements in quality of fit and speed of delivery. The technical impact on the manufacturing processes and the clinical implications of these changes will be discussed.

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Lynx—New Applications

Jacqui Romer

Lynx is a re-shapeable material used in the fabrication of custom made seating at Roehampton and other centres nationally.

It comes in sheet form and is made up of a series of inter-linked crosses, which are slotted to allow movement in three dimensions and enable the material to both expand and contract within itself, thus allowing for growth.

In our continuing effort to find solutions to fulfil our client's needs at Roehampton we are constantly looking to find new and innovative designs that do not compromise our clients clinically and improve the service we are able to provide.

A hybrid system, which combined both, the benefits of modular seating, with the advantages of a custom contoured back support and the ability to customise certain elements of the seat, had been on the drawing board at Roehampton for some time.

Following some initial development work at Roehampton, we worked in collaboration with Active Design to develop the idea of incorporating a custom made backrest within the structure of the CAPS II modular seat.

We have been surprised by the versatility of the system and this will be illustrated by a series of short case studies.

The introduction of the Lynx back on a CAPS II seat, has reduced turnaround times to clients and provided an effective solution to the client's postural requirements, often with more complete postural support, than offered by other systems or approaches. During the last 18 months we have explored the application of this system and found it suitable for surprisingly complex cases. Encouraged by our results we have developed a further prototype to support and accommodate even more complex spinal curves.

We hope this presentation will challenge and encourage seating specialists to think laterally and go beyond the limited range of equipment suitable to those clients presenting with a more complex clinical presentations.

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Characterising wheelchair cushions for management of tissue integrity: a crucial review of test methods proposed in the Draft International Standard.

Martin Ferguson-Pell

It is over 25 years since the first commercial pressure measurement tool; the Tally Scimedics Pressure Evaluator was made available for clinical use by Jim Reswick and John Rogers. This was the first step in enabling clinicians to quantify some of the important characteristics of support surfaces in everyday clinical practice. Since then significant advances in pressure measurement, physiological measurement and physical characterisation of support surfaces has occurred. In that time many new concepts for support surface design have become successful established in the marketplace providing consumers and clinicians with a more powerful set of tools to maintain tissue integrity. This paper will provide a brief overview of how these developments have been brought together through the development of a draft International Standard for disclosing the characteristics of wheelchair cushions intended to maintain tissue integrity. The paper will also demonstrate how these standards are beginning to define priorities for future research in this area.

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NOTES

Wheelchair Innovation under State Control: A Historical Glance

Brian Woods, Nick Watson

Prior to 1948, most disabled people had to look to the private market for wheelchairs or rely on charitable gifts and donations. With the advent of the National Health Service, however, the state assumed responsibility not only for the supply and distribution of wheelchairs, but also for their development. Hence, the state altered fundamentally the market for wheelchairs and extended its reach deep into the technical detail of wheelchair innovation. This centralized approach continued until the establishment in 1987 of the Disablement Services Authority, which oversaw the relinquishment of state control over the design and development of wheelchairs and the devolution of wheelchair provision. During those 39 years, the great mass of the state pulled towards it practically everything to do with wheelchairs. So much so, that both the direction and pace of wheelchair innovation during the 1950s, 60, and 70s were largely determined by the actions of the state.

Nevertheless, as influential as the state was, it would be wrong to endow it with omnipotence. It would also be wrong to understand the wheelchair as a homogeneous entity: technologies and the forces that create and sustain them are constructed from heterogeneous elements. The objectives of this paper are: to provide an overview of how the wheelchair's development fared under state control; and to unpack both the disparate interests that shaped the wheelchair's evolution and the social and technical conditions within which that evolution took place.

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ASSISTIVE TECHNOLOGY AND THE MEDICAL DEVICES AGENCY

Alan Lynch

The Medical Devices Agency (MDA) has specific responsibility on behalf of the Secretary of State for Health to safeguard public health where medical devices are involved. MDA will join with the Medicines Control Agency to form the Medicines and Healthcare products Regulatory Agency (MHRA) on 1 April 2003.

MDA works with users, manufacturers, trade associations, professional groups, service providers, and other Government departments where appropriate to reduce safety problems for users both in the short and in the longer term. If MDA finds that there is a need for improvement in design, usage instructions or a manufacturing/supply process then appropriate action is taken with the manufacturer/supplier.

When necessary Safety Warning notice are widely distributed which incorporate the actions required to reduce specific problems with medical devices already in use.

Advice or written guidance on wider issues relating to the safety of users is also given when requested or where route cause, or trend analysis highlights a particular area of concern which requires improvement for the future. Also, if a shortcoming is revealed in an issued British Standard or there is a need for a new Standard, MDA works with the British Standards Institute (BSI), to make any necessary revisions or assist with the drafting of any new Standard.

As a fundamental part of MDA's role the Agency operates an adverse incident reporting system which is open to all users, carers, healthcare staff, repairers etc. The first safety Warning Notice of every year updates and explains all the relevant background and procedures concerning the reporting of adverse incident (SN2002(01)).

In 2001 MDA received a total of over 7,800 adverse incident reports. This was a 9% increase over the year before. Within this total over 2,500 reports were received concerning items of assistive technology. This represented a 6.8% increase over the previous year.

If the reported numbers concerning wheelchairs, seating and artificial limbs are removed from this figure then the overall number of reports for the remaining items of assistive technology drops to approximately 640.

This total of 640 covers all items such as hoists, walking aids, beds, orthoses, environmental controls, communication aids etc and includes an increase of 23.5% over the previous year. The number of reports is being maintained so far during 2002.

The presentation at RAATE 2002 will thank those involved for providing such a percentage increase in reporting since the last RAATE meeting, but will raise various questions such as:

1. Bearing in mind the vast amount of assistive technology that is used, does a total of 640 reports per annum accurately reflect both the potential and actual safety related problems encountered.

1. If it is an accurate reflection, should we be congratulating all concerned for having such safe effective assistive technology?

1. If it is not an accurate reflection what can we all do about it?

Please see the extract from SN 2002(01) below to assist with the discussions:-

What is an adverse incident

An adverse incident is an event which causes, or has the potential to cause, unexpected or unwanted effects involving the safety of patients, users or other persons. Adverse incidents in medical devices may arise due to:

- shortcomings in the design or manufacture or the device itself;
- inadequate instructions for use;
- inadequate servicing and maintenance;
- locally initiated modifications or adjustments;
- inappropriate user practices (which may in turn results from inadequate training);
- inappropriate management procedures;
- the environment in which a device is used or stored;
- selection of the incorrect device for the purpose.

Conditions of use may also give rise to adverse incidents, e.g.

- environmental conditions (e.g. electromagnetic interference);
- location (e.g. devices designed for hospitals may not be suitable for use in the community or ambulances).

NOTES

Session 12: Integrated systems case studies

Case study: Marie - an integrated solution to communication and environmental control needs

Phil Palmer, Danielle Pulver

Marie has Cerebral Palsy, which has resulted in profound physical and communication impairment. She has been known to ACT since initial assessment in 1998 when we explored her face to face communication needs. At that time, Marie was communicating using a combination of undifferentiated vocalisation, facial expression, nods/shakes of the head for response to closed questions and a BlissBoard (through direct access).

Since 98, Marie has been seen on several occasions by ACT and other agencies with regard to the provision of alternative and augmentative communication solutions to her face to face and written communication needs.

In March 1999 she attended a review so that ACT could

- loan a Deltatalker for 6 weeks
- demonstrate the Deltatalker to Amanda and her colleagues
- mount the Deltatalker from her wheelchair
- clarify the best switch arrangement

Following this loan, ACT provided Marie with a Deltatalker on long term loan. In May 2000 she was visited at home to discuss her environmental control needs. At that visit we were able to identify that her EC needs could be best met through the Deltatalker

This presentation outlines briefly her communication needs since first assessment in 98 and presents, in more detail, ACT intervention since May 2000 with an emphasis on clinical reasoning.

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Case Study: An Assistive Technology provision for a patient with 'locked-in-syndrome'

Richard Caley

This presentation dexcribes an Assistive Technology provision for a patient with 'locked-in-syndrome' and how this multidisciplinary experience has influenced the development of a new service for the management of patients with complex neurological disorders

The presentation will address the following areas of interest:

- The clinical presentation of a patient with 'locked-in syndrome'
- The development of an optical eyebrow switch
- An integrated solution addressing communication, computer access, wheelchair and environmental control
- The patient's role in the development of an international support group for people with 'locked-in-syndrome'
- The patient's role as an integral member of the multidisciplinary team

Influences on the development of a new rehabilitation service for the treatment of patients with complex neurological disorders.

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Issues Impacting an Electronic Assistive Technology Service

Clive Thursfield, Chris Christoforides

This case review will explore how the issues of a person centred approach, service logistics, multi-agency co-ordination, private funding and technical possibilities and limitations impact on an Electronic Assistive Technology recommendation.

The paper centres on the Environmental Control, Mobility and Computer Access needs of a high level, spinal injured patient. There will be some in depth examination of the functionality of a range of system configurations with varying degrees of integration.

The paper will follow the process of decision making from the services and patients perspectives. What emerges from this process is:

- the complexity of the issues involved
- the functional gains and losses associated with various approaches
- the lack of clarity of information available to guide decision making

Ultimately, a pragmatic approach based around what was most straightforward within the limitations of service delivery was taken.

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NOTES

The Grid – a multi purpose access and communication tool for Windows

Paul Hawes

The Grid combines dynamic screen AAC software (Winspeak) with our award winning on-screen keyboard (HandsOff) to give the first fully integrated solution to AAC and computer access. Thus, three groups of users are catered for:

- The symbol user requiring an AAC system
- The user with emerging or partial literacy, who is reliant on symbols while aspiring to use text based software
- The able user requiring a powerful on-screen keyboard to take control of the computer.

The Grid incorporates many technical improvements and additional switch modes. It also supports more speech engines for a wider variety of output voices.

As well as running on a PC with Windows, the Grid can also create grids for Winspeak CE or Pocket Winspeak, and can print overlays for use with digitised communication aids.

A cut down version of The Grid (called WordWall) allows exactly the same grids to be used, but without some of the advanced access functions.

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©*Symmetrikit* Postural Care Pathway The Family Centred Approach to Postural Care

Liz Goldsmith

This presentation will introduce the ©*Symmetrikit* Postural Care Pathway. The Pathway empowers families to work with others to provide postural care 24 hours a day, to help the individual with movement difficulties grow and / or stay as straight as possible. The concept that the individual with severe movement difficulties needs symmetrical support in sitting, standing and lying 24 hours a day is accepted by many therapists. Although this may sound a simple concept it is a complex service to put together, involving behavioural change for families, therapists and people in many other agencies. It also requires managerial support and changes within organisations to provide a coordinated approach to many issues including funding.

The © *Symmetrikit* POSTURAL CARE PATHWAY consists of:-

- The Process Map and supporting documentation
- The ©*Symmetrikit* Profile of Postural Care, a client held record to enable the family to coordinate care.
- "The Family Centred Approach to Postural Care" a workbook which explores concepts, consent and risk analysis through a series of paper exercises.
- A Compact Disc with a series of presentations, giving the therapist teaching materials to run a programme of Family Workshops and to give presentations to management on service development
- A Therapist's Pack of supporting documents including a variance report to ensure compliance with minimum legal requirements

The daunting complexity of recruiting management support and updating methods of service delivery becomes a series of logical steps by using the structured approach and teaching materials. This presentation represents a new development in the effort to produce a multi-agency, family centred approach to postural care.

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Addressing the challenge of quantifying free-living activity – the activPAL™ professional

Douglas Maxwell

We have developed a novel method of quantifying the benefits of therapy using activity as an outcome. Our method of quantifying free-living activity identifies the functional activity performed rather than just an arbitrary level of physical activity.

Our background is in rehabilitation and, whilst working at the Bioengineering Unit, University of Strathclyde, we needed to know how active our patients were when they returned to the community. We developed a very small monitor that identifies the time a person spends in the activities of sitting, standing and stepping. This device quantifies both the activity the person is performing (sitting, standing, stepping, walking, running) and the intensity of the stepping activity (in terms of rate of stepping (cadence)) over a period of hours or days.

In recent randomized controlled study of the impact of physiotherapy on recovery following stroke we were able to prove those patients who received extra physiotherapy post-stroke were more active. This was the only significant primary outcome in the study.

Most of the applications of the device to date have been with sedentary populations. However it measures cadence very accurately and validation trials have been performed including running and walking activities.

The activPAL™ professional has proved to be a reliable and valid measure of free-living activity. It has the potential to become the measurement tool of choice for quantifying upright mobility and establish physical activity as the key outcome in the assessment of clinical effectiveness.

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Integrating assistive technology for users with the wiseDX / wiseUP for professionals!

Colin Clayton, Barbara Dunford

The WiseDX integrated control system is a small electronic device enabling a physically disabled individual to drive a powered chair with a switch, more than one switch or a standard proportional joystick. It will also allow the user to change the use of the same switches or joystick to operate other equipment.

The wiseDX is extremely flexible offering any number of ways of driving a powered chair with switches or a joystick. It also has a built in 'learnable' infrared transmitter (Gewa ProgIII) and six relay outputs for connecting other switch operated devices, like communication aids, directly to the unit.

To set up a wiseDX unit for their client, **Rehabilitation professionals** use an intuitive, windows based software package called wiseUP. With this the wiseDX can be configured to be as simple or as complicated as the client needs. Modifying a system to grow or change with a user's abilities and requirements is a matter of modifying the file and downloading a new one into the wiseDX unit. The wiseUP software contains an on screen simulator so that you can experiment with different configurations before downloading the file to a wiseDX. This software is available as a free download on the wiseDX website (www.wisedx.com).

Whilst the system is intuitive, there are safety issues with powered mobility. We think that training in how to use wiseUP with the wiseDX is essential. This is provided at two levels. Level 1 is for professionals who will be installing the wiseDX and configuring for chair driving. Level 2 is for those that will not deal with chair driving but need to be able to change other environmental control parameters.

The presentation will give a brief overview of wiseUP and what the wiseDX can do.

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A universal babycarrier for wheelchairs

Roger Orpwood

Parents who use wheelchairs experience many difficulties when carrying their baby around on the chair. Simply carrying the baby on their lap is dangerous and as any parent would appreciate soon becomes an impossibility as the child develops some independence! Various designs of babycarrier have been explored at BIME. Simple seats attached to the chair work whilst the child is small but start to make the wheelchair unstable once they are older than about nine months. Consequently most work has focussed on a carrier that has its own wheel(s) on the ground. Designs with a single wheel attached to the front of the chair have proved to be most effective, with a largish wheel mounted so that it can castor. A flexible attachment to the wheelchair enables the carrier to negotiate undulating ground and kerbs. The attachment developed enables the device to fit all the chairs that have been tried so far, both standard design and lightweights.

User evaluations showed several key features to be needed.

a) Needs to be free standing when detached from the chair for ease of putting the child in/out
b) Needs to fold flat to aid storage and transport
c) Needs a definite indication that the wheelchair clamp is locked in place.
d) Needs a rainhood and a mudguard for use in rain.

Evaluations of the final device are currently underway together with discussions with potential manufacturers. We are very grateful to Disability Pregnancy and Parenthood International for their support in the development of this device.

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Toileting Equipment for Children with Restricted Growth

Timothy Adlam, Nina Evans, Roger Orpwood

The Bath Institute of Medical Engineering has been developing devices for people with restricted growth: Toilet Handles that fit onto the top of a toilet; and a child's bottom wiper.

A survey showed a need for Toilet Handles to provide stability for a child with restricted growth. The handles provide something secure to hold on to that enables a child to stabilise himself and prevent himself from falling off or into the toilet.
Two different designs have been developed. The first consisted of two separate handles that hooked over the side of the toilet. The handles were retained on the toilet by being positioned under the seat that the child was sitting on. The first series of evaluations that were carried out showed the handles to be very effective and little further development was thought necessary.

Wider evaluations showed that some parents and therapists were very unhappy with the first design, so a different approach was tried. The new design *clamps* onto the top of the toilet and provides secure support. BIME is currently completing its production development ready for a product launch at the Restricted Growth Association Convention in November.

The survey showed a need for a bottom wiper for younger children whose hands are not big enough for an adult size device. Development started and produced a prototype that was evaluated. Though the device worked well and could be used by the children it was intended for, most of them *did not want to use it.*

By the time the children wanted to use the bottom wiper and toilet themselves without the assistance of a family member or member of school staff, their hands were big enough for the adult bottom wiper.

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Progress on research, development and clinical evaluation of an implantable drop foot stimulator

Laurence Kenney, Paul Taylor, Jane Mickelborough, Geraldine Mann, John Hobby

This presentation reports progress on the development and clinical evaluation of a new implantable two channel drop foot stimulator. The stimulator consists of an externally worn transmitter, inductively coupled to an implanted receiver unit located in the lower leg, lateral and distal to the knee. The receiver is connected to electrodes located under the epineurium of the Deep and the Superficial Peroneal nerves. Stimulation is triggered by detection of heel lift and terminated at heel strike in a manner similar to surface mounted systems. The location of the electrodes allows for a degree of selectivity over the resultant moment about the ankle joint that is not possible with surface stimulation of the Common Peroneal nerve. The original design of the system was carried out at the University of Twente and Roessingh Research and Development, in the Netherlands. The prototype system is now being manufactured by Finetech Medical, a UK-based manufacturer of implantable medical devices.

Pilot trials in the Netherlands and the UK have now been completed and the results for 10 patients show that the device is safe and produces functional improvement in patients. The paper will present a summary of the results to date and describe progress on an EU funded project, TUBA, which aims to further develop the technology.

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Software for the automatic compilation of a report after an assessment for the provision of an environmental control system

Chris Christoforides

Access to Communication & Technology is a department within the West Midlands Rehabilitation Centre. One of the activities of the department is the assessment of disabled people with regards the provision of environmental control (EC) systems. During an EC assessment the (ACT) clinician is keeping notes, according to the information given by the client. A detailed report is produced after each assessment, which contains all the information gathered regarding the specific client as well as the recommendations of the clinician for the provision of an EC system.

Composing the report can be time consuming and therefore a piece of software has been designed that will increase the speed of report writing. The software is written in Visual Basic and at this stage is complete by 15% (probably complete by 25% - 30% by the time of the conference). The software provides the clinician with a number of tabs on the screen, one for each topic discussed in an EC assessment (e.g. one tab for attention calling needs, one for telephone control needs etc). Within each tab there are a number of objects (tick boxes, lists, text boxes etc) that the clinician can use according to the information that he is given by the client.

Depending on the objects used, the software compiles paragraphs and then adds all the paragraphs together to produce the report. The software also allows the clinician to add any text that can not be represented by any of the available objects on the screen.

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CAP (Communication Aids Project)

Caroline Grey

CAP is a government funded project managed by the Department of Education and Skills of £10,000,000 over a two year period from April 2002 to April 2004. It is being co-ordinated by Becta (British Educational and Communication Technology Agency). It is intended to augment LEA and school funding by providing additional equipment and technology for pupils who have significant communication difficulties. It does not, however, relieve LEAs and schools of their respective obligations in terms of identifying and meeting individual needs. In particular, where a piece of equipment has been specified as educational provision in a child's statement (ie, is in Part 3), the LEA has to provide it, not the Project.

Funding covers assessment of the pupil's needs, provision of hardware and software, training for teaching staff, the pupil and his or her parents, and ongoing review. Resources funded by this project are provided on long-term loan: the pupil can use them both at home and school and take equipment with them when they move from primary to secondary school or to post-school provision.

To qualify for support, a pupil must meet the following criteria. He or she must:

- be able to demonstrate that a communication difficulty has been identified (in most circumstances, this will have been identified by the pupil's school, LEA or health authority)
- be receiving education in a maintained school or non-maintained special school, or educated otherwise
- show evidence that the school or LEA has taken some measures to meet these needs (measures may include provision of resources, equipment and/or devices and/or classroom support specifically for the pupil's use).

Over the course of the project it is planned to establish a network of local teams (of both health and educational professionals) who can assess and train under the CAP initiative. There is training being offered to those teams who want to update their skills and there is access to a centrally held library of loan equipment to support the assessment process.

The ACE Centres (Oxford and Oldham), along with AbiltyNet, CENMAC/Wolfson, SCOPE and DCCAP (Batod and Deafax) are helping to establish and support the network of CAP contacts and to monitor the assessments.

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The impact of shower installations on disabled people's lives

Helen Pain

Many thousands of showers are installed for people with disabilities every year to make their facilities for personal cleanliness more accessible. Little research has been undertaken to evaluate the effectiveness of showers, but a recent survey (Heywood 2001) of people who had adaptations highlighted that the majority were very satisfied although some experienced poor results.

The above survey covered a wide range of adaptations, so a study focussed on shower installations was undertaken, funded by the Medical Devices Agency, an executive agency of the Department of Health, to investigate the provision process and gain users' views on their showers' effectiveness.

Questionnaires were sent to people within 18 local authorities across England and Wales. Of 700 sent, 366 eligible returns were received. Most respondents were ambulant (85%), the remainder used a mobile shower chair or transferred sideways from wheelchair to shower seat. The most common shower types were trays with a small or no rim.

Most respondents felt they had been involved in the decision-making (83%). Many respondents had experienced delays during the installation, which were reported as stressful.

Results showed that many respondents had improved independence (48% reported needing less help, with a further 23% requiring no help), and nearly all considered the shower had improved their quality of life (95%). The most frequent problem was leakage, usually as a result of poor water containment in the level or easy access trays.

Reasons for sub-optimal outcomes will be discussed using vignettes; guidelines to assist the choice of shower installation will be presented.

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AT For Public Housing
Using ICF Codes to Match Assistive Technology to Persons and Property.

Alex Bialokoz, Alan Turner-Smith, A. Tinker, P. Langsley, K. Bright

This paper describes how the WHO 'ICF (International Classification Functioning Disability and Health)' classification has been adapted as a common language for the integration of three separate types of assessment across different disciplines. A multi-disciplinary project is investigating the introduction of Assistive Technology (AT) into Older People's Homes in the UK in terms of feasibility, acceptability, costs and outcomes (www.fp.rdg.ac.uk/equal/AT). Three organisations are involved each with their own specialities: social gerontology, construction engineering, and rehabilitation engineering. The assessment of individuals includes bodily function (ICF domains such as locomotion, seeing, reaching and stretching), activities and social context. The assessment of buildings includes layout, construction type, and condition. The assessment of appropriate AT includes the degree and type of disability it addresses, the match with the building, and costs. All descriptive parameters were quantified using the ICF classification or comparable codes. By weighting and combining these codes, three multi-dimensional parameters were created that described the person, the building, and possible AT, and so enabled computation of appropriate matches of AT and housing to an individual. Analysis of a given building generates an indication of cost for adaptations and a score for the suitability for an individual. Typical user profiles enable housing providers to assess possible adaptations of their housing stock to match present and future needs of their tenants. This research has produced a tool based on the ICF classification enabling three separate disciplines to communicate in a common language when working to match people, technology and homes together.

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The legislation most relevant to the market place in which we are involved includes:

LOLER 1998 (Lifting Operations and Lifting Equipment Regulations) and
PUWER 1998 (Provision and Use of Work Equipment Regulations).

Both regulations have been in force since 5th December 1998, it is sometimes staggering the number of occasions when customers are unaware of the detail of the regulations. And, as a result, they have not complied with the requirements.
It is clearly in the interests of all affected parties to make themselves aware of the requirements of the regulations and to comply with those requirements. Chiltern Invadex, like many other service and manufacturing companies in the market place are willing and able to help.

Who do the regulations apply to?

The regulations apply to employers, self-employed and persons in control to any extent of: -

- Lifting equipment.
- A person at work who uses or supervises or manages the use of work equipment.
- The way in which work equipment is used.

What do the regulations apply to?

The PUWER regulations apply to the provision and use of all work equipment, including mobile and lifting equipment. LOLER applies solely to lifting equipment used at work.

What equipment is covered?

The products defined as being covered by the LOLER regulations are those products below that are used as work equipment; Mobile wheeled Hoists, Standing and Raising Aids, Overhead Hoists, Patient Slings, Bathlifters (including portable and bath side).

What do the regulations require?

If any employer expects their employee to use lifting equipment, then they have a duty of care to ensure that equipment is; -

- Sufficiently strong, stable and suitable for the proposed use, including any attachments or fixtures taking the load.
- Positioned or installed to prevent the risk of injury,
- Visibly marked with the appropriate information to be taken into account for its safe use.

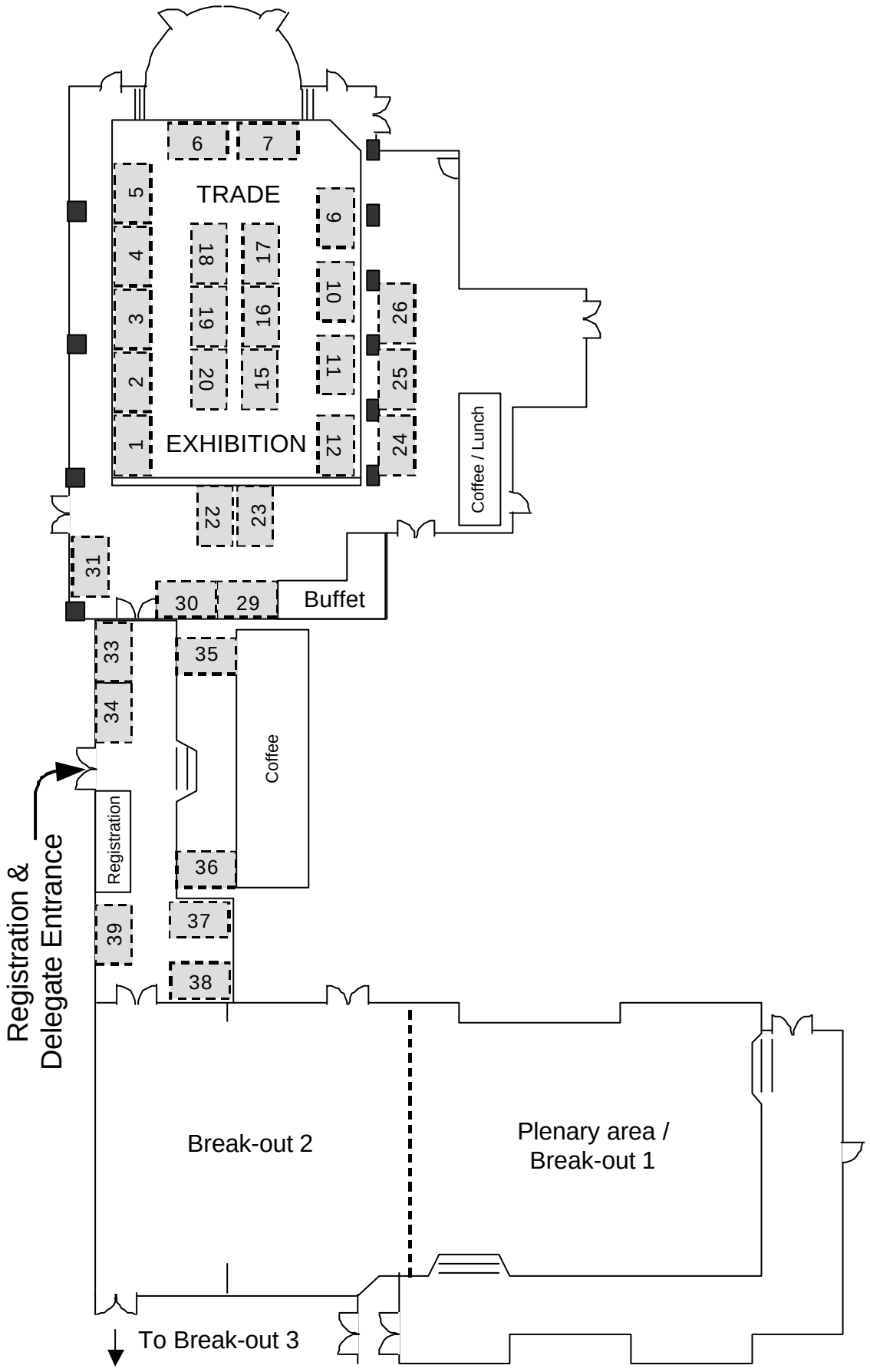
Additionally, you must ensure that lifting operations are planned, supervised and carried out in a safe manner by competent people.
The equipment is clearly marked and safe for use.
Equipment should be thoroughly examined and or tested at a frequency recommended by the manufacturer or as a minimum required by LOLER, which is six months.

Summary

It is frustrating and painful, for some, when incidents occur because of apparent equipment failure or misuse which could have been avoided, had the regulations been complied with.

Responsible organisations should also consider the potential for prosecution by the Health and Safety Executive if legislation has not been followed.

Floorplan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EXHIBITION
Coffee / Lunch
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Buffet
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Coffee
Registration
36
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37
38
Registration &
Delegate Entrance
Break-out 2
Plenary area /
Break-out 1
To Break-out 3

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Haigh Avenue
Stockport
SK4 1QR
STAND 5

Hugh Steeper Ltd
Riverside Orthopaedic Centre
Medway City Estate Riverside II
Rochester, Kent
ME2 4DP
STAND 36

Lomax Mobility Ltd
The Chalmers Building
Claverhouse Ind. Park
Dundee Scotland
DD4 9UB
STANDS 18, 19 & 20

MK Battery International Ltd
Unit 6B Vernon Court
Henson Way Telford Way Ind Estate
Kettering
NN16 8PX
STAND 34

Newton Products Ltd
71-75 Allcock Street
Deritend
Birmingham
B9 4DY
STAND 2

NOVOMED/Wolfson Centre
Mecklenburgh Square
London
WC1N 2AP
STAND 22

Otto Bock Healthcare
32 Parsonage Road
Englefield Green Egham
Surrey
TW20 0LD
STAND 9

PAL Technologies Ltd
141 St James Road
Glasgow
Scotland
G4 0LT
STAND 10

Performance Health Products Ltd
Unit 32 Village Farm Road
Village Farm Industrial Estate,
Pyle
Wales
CF33 6BL
STANDS 6 & 7

Possum Controls Ltd
8 Farmbrough Close
Stocklake Ind. Estate
Aylesbury, Bucks
HP20 1DQ
STAND 12

PRI Ltd
Minerva House
Minerva Business Park
Lynchwood
Peterborough
PE2 6FT
STAND 23

RM Services Ltd
Medway House
277 Gillingham Road
Gillingham Kent
ME7 4QX
STAND 37 & 38

Remploy Healthcare
Jubilee Industrial Estate
Ashington
Northumberland
NE63 NUE
STANDS 29 & 30

Sensory Software International Ltd
26 Abbey Road
Malvern
WR14 3HD
STAND 3

SRS Technology Ltd
The Shrubbery
Erdington Road
Aldridge West Mids
WS9 8UH
STAND 31

Sunrise Medical Ltd
High Street
Wollaston
West Mids
DY8 4PS
STAND 25 & 26

Toby Churchill Ltd
20 Panton Street
Cambridge
CB2 1HP
STAND 17

Urathon Europe Ltd
Thane House
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SN11 8SB
STAND 4

Delegates

Martin Anderson	Lecturer, OT Dept, University of Liverpool
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David Attwell	Clinical Engineer, Medical Physics, Kent & Canterbury Hospital
Rebecca Auterson	Marketing Director, SRS Technology Ltd
Jane Bache	Computer Technician, Royal Hospital for Neuro-disability
Neil Baigent	Buyer, NHS Purchasing & Supply Agency
John Baker	Rehab. Eng. Technician, Thames Gateway NHS Trust
Steven Bannister	Development Director, PHP
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Terry Best	Rehab Engineer, Special Seating Dept, Queen Mary's Hospital, Roehampton
John Birch	Rehab Engineer, King's College Hospital NHS Trust Rehab Centre
Alex Bialokoz	CoRE , King's College Hospital
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Mike Broadhurst	Clinical Engineer, Consort Engineering Ltd
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Doug Cartwright	CoRE , King's College Hospital
Jeffrey Chivers	Rehab Engineer, Rookwood Hospital
Sandy Clark	Occupational Therapist, Active Design Ltd
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Colin Clayton	Clinical Engineer, NOVOMED/The Wolfson Centre
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Alan Dowsett	Rehab Engineer, DSC, Royal National Orthopaedic Hospital
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Peter Firth	Rehab Engineer, Wheelchair Services, St. Luke's Hospital, Huddersfield
Chris Ford	Sales manager, Remploy Healthcare

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David Gallant	Remploy Healthcare
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Sinder Mahil	Project Officer, Silver Surfers Project
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Delegates

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Timothy Wilson	Rehab Engineer, Carshalton
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Stephen Wright	Rehab Engineer, DSC, Freeman Hospital, Newcastle-upon-Tyne
Aejaz Zahid	Dept of Medical Physics, Barnsley DGH
Andras Zöld	Professor, Budapest University of Technology and Economics

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