

RAatE 2008 Abstracts

Measuring the Quality and Outcomes of Community Equipment Services

Community equipment services are increasingly seen as a key element in enabling older and disabled people greater levels of independence and the ability to stay in their own homes. Recent government investment in the expansion of equipment services bears witness to the view that community equipment services are a cost effective way of helping promote independence among older and disabled people. Despite this, there is a lack of adequate measures of both quality and outcomes within equipment services. Those measurement tools that do exist tend to focus almost exclusively on the equipment itself, often on the impact of an individual piece of equipment on a persons' functioning or have been developed in the context of another areas. This paper draws on two projects which aim to develop ways of measuring both the quality and outcomes of community equipment services. The first project developed a set of questions for the 2007/08 User experience survey of adults aged 18 and over receiving community equipment and minor adaptations funded by social services. The second project drew on the findings of this developmental work and is currently exploring how we might further develop our approach to measuring quality and outcomes. In particular, it explores how we might measure the impact and quality of equipment services against the background of initiatives such as individual budgets and Transforming Community Equipment, as well as outlining the key dimensions of quality and outcomes that have emerged from these two projects.

Author-Nick Smith

PatientNet – EAT and Wireless Internet Access on a Ventilator Unit

As part of an ongoing effort to provide residents at the Royal Hospital for Neuro-disability with access to a wide variety of leisure activities, the Electronic Assistive Technology Service (Compass) has installed a wireless network on the Ventilator Unit. This gives the residents access to the Internet via a Broadband connection in the computer therapy facility.

The majority of the residents on this unit are switch users who are highly dependent on staff for their daily needs and require a trained nurse escort when leaving the ward environment. However, as all remain cognitively in tact, the need for access to leisure activities is significant. Residents are highly motivated to use computers and specifically the Internet.

This presentation will describe the various types of assistive technology used on the unit to enable residents to access a variety of Internet-based activities. The presentation will highlight both the technical and logistical difficulties encountered during this project and describe the levels of success achieved via a series of short case examples. It will demonstrate the role of electronic assistive technology in promoting independence and improving the quality of life of this highly dependent group.

Author- Jane Bache, EAT Coordinator, Royal Hospital for Neuro-disability, London

The Secret Lives of People with Dementia

It is almost 3 years since a portable activity monitoring system was first developed for people with dementia, living in their own homes. Now more than 60 local authorities throughout the UK are using the Just Checking telecare system for assessment and care planning. A group of 8 health and social care practitioners who have been using the system have pooled their observations and experiences of how this type of assistive technology

works in practice, and how it benefits people with dementia. Between them they have used the system with more than 350 people, and recurring themes have emerged, including:

- people with dementia function better than expected in their own homes, and can be supported there, postponing residential care
- activity monitoring gives people with dementia a new way to communicate their capabilities and a real voice in the decision making process
- this type of technology challenges fear and some of the myths associated with dementia.

The paper shares the authors' observations and reflects on what this means for good practice in social care.

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Using the “think-aloud” approach to investigate clinical decision-making within electronic assistive technology

Prior to the prescription of electronic assistive technology, a multi-disciplinary team of professionals will usually be involved in the assessment process. Little is known about how these professionals reach decisions regarding what to prescribe and what informs their thinking. No research has been carried out which investigates clinical decision-making during the assessment for electronic assistive technology. A study is currently underway which is investigating if there are differences and similarities in the process and content of clinical decision-making by Biomedical Engineers, Occupational Therapists and Speech and Language Therapists when assessing for electronic assistive technology. A process-tracing approach called Protocol Analysis is being used to gather data about the cognitive processes used during decision-making. This methodology is described in the psychological literature as a means of eliciting thinking and is often referred to as the “think-aloud” approach, resulting in verbal data which will subsequently be analysed according to a coding framework.

Within the context of the current research this paper will:

Outline the different theoretical frameworks within clinical decision-making ;

Discuss the “think-aloud” approach, and provide examples of methodological innovations and challenges encountered during this research.

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Authors Sylvia Taylor-Goh, Dr Ruth Mayagoitia-Hill & Professor Sheila Kitchen

The Development of a European Entry Level Educational Programme in Assistive Technology

Assistive Technology (AT) is a comprehensive multi-disciplinary service delivery system involving the inter-working of a broad range of professionals from Engineers to Therapists to Teachers and many others. It has long been recognised that the success of much AT intervention is dependent on not only the professionals that advise and recommend technology, but also those Personal and Care Assistants, Classroom Assistants, Nursing staff etc., which have to support the technology on a day to day basis.

It is this group, those without a recognised professional background in AT who most require opportunities to participate in a recognised professional training or education programme.

Under the Leonardo Life Long Education Programme, funded by the EU, Hereward College have formed a consortium from across Europe to develop relevant courseware that can be applicable to this particular group of AT personnel. The aim of this two year project is to develop a range of courseware that can be translated and piloted in at least 4 different EU countries.

The purpose of this paper is to outline the need for a comprehensive course of education to be available for all of those working in the field of Assistive Technology. During the course of the project a comprehensive scoping exercise was undertaken in order to ascertain the perceived need for such education across several EU member countries. The results of this exercise will also be presented, in detail, here.

Finally, an overview of the course descriptors will be given, with a view to receiving feedback from conference participants.

Authors: Paul Doyle & Brian Boyle

Portable System for Monitoring ADL in Urban Environments

Activities of daily living may be replicated in a laboratory environment but to truly test functionality they are best tested in the environment where the activities actually take place. Therefore the aim of the project was to develop a portable system, based on three body-mounted triaxial accelerometers and gyroscopes (Xsens, The Netherlands) a PDA (personal digital assistant) used as data logger and proprietary analysis software written in Matlab, to conduct ecological studies. Data to be presented came from normal subjects walking in the London Bridge area and consisted of five 30 m segments including a checkerboard patterned floor, a dark area, a busy section, a cobbled surface and a quiet section. The outcome measure was root mean square (RMS) of the medio-lateral direction acceleration normalised to the subject's average velocity for the section. The result represented the quantity of movement of the back, neck and head. After statistical analysis it was possible to observe how the head and the neck were stabilized by the increased excursions of the lower back, especially when the

walking condition was more challenging to the control of balance. The system has been used to study stair climbing and, more recently, wheelchair self-propulsion.

Authors: Ruth E Mayagoitia, Jose-Manuel Fernandez, Matthew Mueller, Marousa Pavlou

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The Utilisation of Best Practise in Design Theory to Increase the Accessibility of ICT Goods and Services

The use of design standards within the legislative process has the potential to remove barriers to participation in the Information Society by disabled or older people. It can do this by ensuring that accessible design methodologies and techniques are followed. The aim of this paper is to look at the processes by which research has been used in the past to create design standards and ways in which those standards could be used in the future to improve the accessibility of the digital world. The paper will describe the work which is being carried out on EC Mandate 376. This mandate is being used to identify common standards and methods which can be used to ensure that ICT equipment and services are accessible to all.

The author of the paper is chair of the European Design-for-all and Assistive Technology Standardisation Co-ordination Group. DATSCG acts as an interface between the standards community, the Design for All community and the European Union. It acts as an information exchange on all areas of Design for All including research, legislation and international activities. DATSCG is currently organising the users input to the European Standards Organisation with respect to mandate EC Mandate 376.

Author: Gill Whitney

SAFER (Support and Assessment for Fall Emergency Referral) Trial Study Design

Many emergency ambulance calls are made for older people who fall. For some, a community-based response may be more appropriate than being taken to hospital. This trial will assess the costs and benefits of paramedics using a hand-held tablet PC with computerised decision support software to help them decide which patients to convey to hospital.

The objectives are to compare:

- 1) Time to first subsequent reported fall derived from an emergency ambulance call despatch code, or death (primary outcome measure)
- 2) Event free survival period (event = emergency call, A&E attendance, death)
- 3) Patients and carers' quality of life, independence and satisfaction
- 4) Operational 'process' indicators
- 5) Impact on resource utilisation and personal costs

between intervention and control group patients.

Methods

A pragmatic multi-centre cluster randomised controlled trial with a qualitative component will be used. Clusters will be randomised at paramedic level, with 40 paramedics randomly allocated to the intervention or 'care as usual' control groups.

1440 patients aged over 65 for whom an emergency call is made will be recruited, giving more than 80% power to detect a reduction in emergency health contacts from 50% to 40%, at the 5% significance level. Patients will be consented 7-10 days after their index fall, and participants will receive questionnaires at 1 and 6 months. Qualitative interviews will be carried out with 30 patients to ascertain their views of the service provided, and focus groups conducted with paramedics to explore issues of implementation.

Measures of process, outcome and cost will be analysed according to 'intention to treat'. Qualitative data will be analysed thematically using a content analysis approach.

Conclusion

Overall, the study will evaluate a novel IT-based intervention for older people who fall and will provide evidence relevant to the planning and provision of emergency care and services for this group.

Author: B. Wells

Standardisation work on personalised eHealth systems

Many of today's eHealth systems are "one size fits all" solutions that are considered difficult to use. Furthermore, the reporting of care and health alerts depends on the system recognizing a change in well-being or health of the individual being supervised [1]. Therefore, eHealth installations in domestic environments need to be personalized. They should reflect and be adapted to the needs of the user, as well as reflect the current context and domestic situation.

Personalization can range from simple customization such as adjustable ring/alarm tone and volume, to the complex tailoring of the user's entire eHealth environment, including reporting on and interpretation of data gathered by home sensors. This paper presents a generic approach to personalization, wherein a generic "user profile" stores data about the user, his preferences and information about current context [2, 3]. This profile can then be used by eHealth systems to deliver user tailored services [4]. The personalization approach addresses the differing needs of a range of healthcare clients (including disabled, young and elderly) and their caregivers [5]. It also recognizes that the needs of an eHealth system user will differ according to varying situations.

The work is performed at the European Telecommunications Standards Institute (ETSI), Technical Committee Human Factors. It will result in a standard for personalization of eHealth systems.

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[2] ETSI EG 202 325: 2005, Human Factors (HF); User Profile Management, ETSI, Sophia-Antipolis

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[4] http://portal.etsi.org/STFs/STF_HomePages/STF352/STF352.asp

[5] ETSI EG 202 487: 2008, Human Factors (HF); User experience guidelines; Telecare services (eHealth), ETSI, Sophia-Antipolis

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Requirements for building sustainable digital assistive technologies for older people

The term ‘digital assistive technology’ refers to the use of ICTs for the support of older people’s every day tasks. These tasks could range from online shopping to information seeking and searching in the web and they could be supported by the use of desktop or ubiquitous computing. Currently, research funded by the NDA programme, SPARC and the British Society of Gerontology, tries to improve older people’s quality of life through the exploitation and exploration of new developments in computing and information technology. However, the acceptance rate of digital assistive technology by older people is still low, while the abandonment of already existing technologies increases. A study by Phillips and Zhao (1993) suggested that the rate of assistive technology abandonment is higher during the first year of use and then after 5 years. The abandonment of technology during the first year may be attributed to several factors that can have immediate effects on user acceptance of technology, such as lack of trust, concerns about data security and personal information handling, anxiety, lack of support from the social environment (for example, family or friends) and poor system usability. The reasons for abandonment, however, during the fifth year may be more complex and subject to changes in older people’s needs. Although research has investigated aspects related to system acceptance, such as trust, usability and social context (Olphert and Damodaran, 2006; Kray et al., 2007; Lindsay et al., 2007; Lansley, 2001), the issue of dynamic adaptation of assistive technology in relation to older people’s needs has not been investigated in depth. Selwyn (2004) suggested that it may not be a case of trying to change older adults but more a case of trying to change ICT to make it a more viable option for older people. It is anticipated that the design of digital assistive technology that supports the changing users’ needs can decrease the abandonment of technology by older people and increase the level of sustainability of this technology.

The purpose of this paper is to propose a set of requirements for designers and implementers of digital assistive technologies. These requirements should facilitate the development of less obsolete and more user-centred systems that can dynamically accommodate the changing needs of older people. Such needs could involve changes in human information processing (such as dementia) as well as physiological limitations (such as visual impairment). The requirements proposed in this paper are based on the literature review and authors’ research experience in participative design with older people.

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Authors: Leela Damodaran, Wendy Olphert and Panos Balatsoukas

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Prolonging the safe driving of older drivers through technology

Older people, aged 65 and older, are more mobile than ever before. Nevertheless, it is this age group that still suffers from greatest mobility deprivation. There are a variety of reasons why older people travel above and beyond simply getting from A to B, including the need for independence, control and maintaining status, inclusion and “normalness”. These needs are largely met by driving motor vehicles. However, older people give-up driving at varying states of ability. This paper reports on a project that involved an in-depth needs-led study that worked closely with 57 older people and 18 experts using a variety of qualitative research methods over a period 6 months to address what technology might aid older drivers in order for them prolong their driving into later life in a safe manner. Participants reported driving issues including: problems with signage; maintaining a consistent speed; tiredness and fatigue; longer reaction times; and dazzle and glare from the sun and lights at night. The participants tended to want assistance which would increase feedback including technology that gives extra feedback about current road and vehicle speed and displaying road signs in-vehicle. Further investigation and development of such technologies is now proposed.

Author: Charles Musselwhite- University of the West of England

Free And Open Source Software – Case Studies Demonstrating The Use Of Some Commonly Available Software

There is a range of free and open source software available, both Assistive Technology (AT) specific and mainstream but with an AT application. Barnsley Assistive Technology Team have utilised some of these for patients and plan to present case studies demonstrating their use. The presentation will provide case studies and examples of the use of Autohotkey, SteadyMouse, Skype, Special Access to Windows (SAW), Firefox (including extensions) and others. It is intended that delegates are provided with an indication how the software was applied and a brief review of how it performed. It is hoped that delegates will be encouraged to further explore and make use of the array of software freely available.

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Evaluation of Specialist and non-specialist equipment to facilitate head control of the mouse cursor

Goals

To consider whether standard web cams can offer a suitable alternative to the more costly specialist equipment (Head mice).

To compare the functionality of the different devices currently available, with regard to tracking, reliability, dwell select option, mounting options, damping and range of movement required for operation.

To compare device set up both for clinicians and clients to enable successful use of equipment.

To consider support needed for ongoing use of devices in a variety of different environments.

Outcomes

To enable clinicians and clients to make an informed choice between alternatives available for head control of mouse cursor.

This paper contains the initial stages of a process to identify parameters that could be used to develop a protocol for cost effective provision of equipment solutions in this field.

Method

Use of standard set of questions and mouse skills tests to trial all devices in similar conditions both by staff members and clients.

Using timed sessions

Collection and analysis of user feedback

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Priory Woods School - Mouse Movements <http://www.priorywoods.middlesbrough.sch.uk/>

Authors:

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Earpiece Design and Filtering for Capture of Tongue Movement Ear Pressure Signals

This paper reports the ongoing development of a new system for human-machine interface with the goal of enabling patients with limited extremity control to interface with all manner of equipment, ranging from mechanical assist devices, lights, television, prosthetic aids, and even computers. The system is based on an

unobtrusive method for detecting tongue movement, and generating a control instruction corresponding to that movement in real-time. This method consists of detecting specific tongue motions by monitoring air pressure in the human outer ear, and subsequently providing control instructions corresponding to that tongue movement. Our past work has shown that various movements within the oral cavity create unique, traceable pressure changes in the human ear, which can be measured with a simple sensor (e.g. a microphone) and analyzed to produce commands, which can in turn be used to control assistive mechanisms or other peripherals. This system is, to our knowledge, the first ever method of tracking tongue movement without the discomfort, intrusiveness, or hygiene issues involved with insertion of a device in the oral cavity. Internal tongue movements – many of them fundamental gestures repeatable from user to user – are captured within the ear canal by an ear-piece microphone, and analyzed to determine the intent of the user. In this work we report the design and testing of earpieces to capture tongue movement ear pressure (TMPE) signals and filtering results separating these signals from interfering physiological activity.

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Direct selection for environmental controls: hands free?

Direct selection methods for commercial environmental controls are limited to a small number of devices most of which employ hand operated keypads. The devices are fairly small, being intended for operation by fingers, or pointer-sticks held in hand or possibly mouth. If the client has no hand control, direct selection via these devices is impractical, so the usual approach is to move to scanning, actuated by one or more body-operated switches.

Two approaches will be described using technology common to both, developed in Hull.

Firstly a foot operated system in use by a client with cerebral palsy will be described, its philosophy of operation and method of realising the system & its support.

Secondly an optical pointer technique, will be described. This system is in its prototype stages and opens up the possibility of direct access by non-contact head pointer, free of the constraints of a computer. It is envisaged to be appropriate for use by people with high level trauma & possibly people with certain cognitive problems. It builds on work done using optical pointers for communication & choice making with young children.

Initial evaluation results will be presented with plans for future work.

Author: Barry Taylor

Using robots to trigger social interactions in groups of children with autism in a class setting

This article presents an exploratory, longitudinal study on the social interactions of a group of children ($n = 7$) with varying forms of autism during a weekly after-school class on robotics that ran for fourteen weeks.

Programming and playing in teams of two to three, the children learned how to make Lego Mindstorm NXT robots interact with other robots in an arena that gave sensory rewards for successful robot-robot interactions.

From analyzing the video footage of the children's behaviour during class, we observed a marginally significant ($p = 0.063$) increase in the proportion of class time that any child spent looking at the same object as their teammates while standing close to the team ("close and sharing gaze") between the least and most fun classes.

The children would also ask for help or give help to one another more frequently the more time they spent "close and sharing gaze" in the first, last, most, and least fun classes. In addition, there was a significant ($p < 0.05$) increase in the number of times each child initiated joint attention through pointing while being "close and sharing gaze" between the least and most fun classes. Furthermore, private interviews with the children's

parents showed that more than half of the parents observed or predicted positive changes in their children's social behaviour after attending the classes. While it can be seen that a child with autism's enjoyment of a robotics class is intertwined with the amount of social behaviours they exhibit during it, further studies should shed more light on this phenomenon and others observed in this study.

Authors: Joshua Wainer, Kerstin Dautenhahn, and Ben Robins

Supporting Personal Narrative for School Children with Communication Disorders - the Development of a Prototype

Conversations amongst family members about the events of the day, during meal times for instance, are a well established occurrence for children. Research suggests that these conversations can have an effect on language development and even literacy acquisition (Peterson et al., 1999). However, children with communication disorders can find it difficult to tell stories about their day.

In a one year feasibility study we are exploring the potential of a system which provides children with a draft story of the main events of their school day. The story is based on different input sources such as location sensors, interaction sensors, the school timetable and human voice recordings and is drafted using natural language generation (NLG). A visual interface will allow the children to edit the story, embellish the events if desired and then tell the story to a communication partner.

We will discuss the different aspects of data acquisition for the story generation and report on the stage of development of a prototype of the system.

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Authors

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Robot Assisted Play: Detecting Interaction Styles of Children with Autism Playing with a Zoomorphic

Robot

This research is part of the Aurora project [Aurora,DW04], an ongoing long-term project investigating the potential use of robots to help children with autism overcome some of their impairments in social interaction, communication and imagination [Ass04, NAS]. Our research focuses on facilitating play between children with autism and an autonomous zoomorphic robot, in order to help those children experiment with different (progressively higher) levels of play. To this end, a novel approach for robot-assisted play was designed, inspired by non-directive play therapy [Axl46, Axl47, JR04], which has been successfully tested with six children with autism in a long-term study [FPD08b]. In this approach, the experimenter takes part in the play sessions (triadic play is very much encouraged, whereby the robot is a mediator for social interaction) and, while the child is the leader for play, the experimenter can regulate the play situations under precise conditions in order to bootstrap higher levels of play and/or reasoning related to the robot. Results have shown that the method could adapt to the specific needs and abilities of each child involved, since all the children made progress, and progressed differently, according to play, reasoning and affect related to the robot. This work goes beyond related work: on the one hand, it addresses a larger range of play situations (broader than imitation with a remote controlled robot [RDSD04] or chasing games [WD99]); on the other hand, Robins et al. [RD06] started to address the role of the experimenter; here, our approach proposes a precise formalization of the experimenter's role. The second part of this research focuses on the development of computational methods for the real-time recognition of human-robot interaction styles by the robot [FPD07, FPD08a]. The method we developed, namely the Cascaded Information Bottleneck Method [FPD08a], is generic and applicable to different types of robots, i.e. humanoid and non humanoid robots: it is a first step towards socially adaptive robots in robot assisted therapy. It goes beyond related work that either classified interaction offline [Sca05b, KIO+02] or relied on explicit criteria tuned by hand [SDtB06]. Recently, we conducted a case study to compare the influence of an adaptive robot on the children's play styles, compared to using a reactive robot. Here, an adaptive robot reacts differently according to the interaction styles. The long-term goal of this study is to investigate whether an adaptive robot might help children reach more balanced levels of interaction.

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Reflections on Developing knowledge together; Involving people with disabilities in education

Evidence suggests that many assistive technology users are profoundly disabled (Finlayson, Guglielmello & Leifer 2001; Hart, Buchofer & Vaccaro 2004; Petersson et al 2005) therefore involvement in the traditional class/lecture based approach to education can be demanding, particularly if transportation, communication systems and environment create additional barriers.

This paper presentation will reflect on the process of involving people with disabilities in the education of undergraduate occupational therapy students studying an Assistive Technology (AT) module. It describes how the module uses webcams to enable students and disabled people to communicate with each other and will present an evaluation of the process from student and disabled peoples' perspectives.

Disabled volunteers share written case studies outlining specific difficulties for students to solve through investigating potential AT solutions. Mid-point, questions from students are emailed to the volunteers and towards the end, webcam discussions pose further questions to the volunteers.

Key findings of the evaluation identified the positive aspects of involving people with disabilities however technical issues and training needs have to be addressed.

In conclusion, this paper will be of interest to those in health & social care education who want to embrace inclusive teaching by improving accessibility for people with disabilities to future professionals through a flexible and convenient media.

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Stroke, Motivation & Rehabilitation Technology: An Exploratory Study

Over 900,000 people living in England have had a stroke and it is estimated that approximately 33% of these patients will acquire physical and or cognitive disability, leaving patient's dependant on carers and community support for long term help and assistance. Approximately 50% of these patients would prefer to receive treatment at home, however little treatment is available to stroke patients once discharged from community stroke team services.

In addition to physical and cognitive deficits, stroke survivors can exhibit behavioural changes, including reduced motivation. Although the concept of motivation is hard to define, in the context of this research the conflict between intention and action in rehabilitation will be explored.

There are a wide range of technologies currently being developed to assist people regain movement following illness and/or disability. Researchers report that certain types of computer assistive devices can help patients increase motor function. However, current literature reveals that practical application and usability of assistive technology in the rehabilitation setting or home is limited.

It is my proposition that rehabilitation technology can provide functional, task orientated exercises which encourage the repetitive movements recommended in intensive physiotherapy for stroke rehabilitation of an

upper limb. In addition, engaging in this home based rehabilitation promotes self empowerment as the client has to take an active role in rehabilitation planning, goal setting and self management by employing self initiated behaviours, such as planning, volition and purposive action.

Therefore I propose to investigate therapist's views on rehabilitation technology and whether changes in motivational levels occur following the introduction of one type of rehabilitation technology to stroke patients.

Author: Ruth Moore

Effective local teams: developing a link working scheme to support a tertiary specialist service in Electronic Assistive Technology (EAT)

EAT is a specialist area of service provision, often delivered through tertiary teams in regional centres. Access to Communication and Technology (ACT), in common with other regional specialist services, has a low volume/high input caseload distributed throughout a large geographical area.

By definition a tertiary service relies on the flow of clients between local teams and its own service. The successful operation of a tertiary service is dependant on the quality of these interactions.

A review of the service between 2003-05 identified a number of service pressures which included: a failure in consensus around roles of local and regional services, delay in assessment by ACT, poor local follow up and paucity of local knowledge of EAT. As a direct result a link worker model was proposed and implemented to clearly define the responsibilities of local and regional services.

Local teams put forward therapists to attend two days initial training, plus yearly refresher courses, and further optional or bespoke training as needed. Once trained, link workers act as advocates for ACT, gathering information and supporting installations. Therapists report their involvement in the scheme as a unique professional development opportunity. Link working offers service users a local source of support and continuity. Currently, local services receive no financial incentive to nominate link workers which represents a significant challenge to ensuring regional coverage. Managers may be reluctant to offer valuable capacity which must be balanced against existing caseloads.

Positive responses from local teams, link workers and clients support this model as an innovative method of service delivery which optimizes the expertise of both local and specialist services.

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Assistive Technology Assessment Support Service

Enable Ireland's National Assistive Technology Service was established in 2001, and given the broad geographical reach and limited staffing, established itself as a training service in order to best maximise its input. In January 2008, an Assistive Technology (AT) Assessment Support Service was piloted by the service, with two main remits:

- Supporting local staff with AT service provision
- Directly supporting adult service users who were without a primary therapist in relation to their AT needs.

Within our Children's services, local therapists identify AT needs through regular Family Centred Planning meetings and if assistance is required with assessment, call on the AT support person.

Within Adult services, the service user is supported to identify their AT requirements, and input into the Person Centred Planning Process is requested of the AT support person.

Some of the other AT support services provided includes:

- Training on specific products as well as AT training on both certified and customised courses;
- Researching emergent technologies;
- Researching the impact of AT services with a view to informing future development.

The aim is to promote capacity building within the team (which includes the service user/family and staff) so that ongoing AT support can eventually be resourced by the team itself.

The ultimate goal of AT support service is to ensure that AT becomes a core component of services delivered to all service users.

Author: Julianne Bergin

Development of Communication & Assistive Technology (CAT) Services for Children and Adults in East Kent.

Over the last two years, East Kent has seen significant recurrent investment in Assistive Technology Services related to Communication. The multiagency CAT Service for children and young people started in January 2007, and the launch of its counterpart for adults is imminent.

The children's CAT Service is established as a partnership between Children and Families Services within Eastern & Coastal Kent NHS Community Services and Additional Educational Needs & Resources within Kent County Council. Additional funding is provided by Children's Social Services. It is a discrete Service, jointly led by a Health Lead and Local Authority Lead, employing a Clinical Engineer, Clinical Technologist, Occupational Therapists, Speech & Language Therapists, Therapy Assistants and Specialist Teachers.

The Adult CAT Service is being established as a virtual Service, with a Clinical Engineer, Speech & Language Therapist and Occupational Therapist employed by different departments within East Kent Hospitals University Trust and Eastern & Coastal Kent NHS Community Services.

We hope that, by sharing our experiences from East Kent, the information will encourage and support others wanting to develop similar services. This presentation will outline:

Significant factors and steps in establishing both Services.

The services that are now offered to clients and the associated pathways.

Relationships with other Agencies, Services and the Voluntary & Community Sector.

Key obstacles to success that have been or still need to be overcome.

Our experiences of the demands and route to accountability.

Plans for further development, including those in response to the Bercow Review.

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A Pilot Study on Brain-Computer Interface-based Neurofeedback for Enhancing Mental Practice in People with Stroke

Over 150k people suffer from stroke annually and about 20% to 40% of these suffer from permanent upper limb paralysis. It has been clinically established that the mental practice (MP) of therapeutic (or motor rehabilitative) tasks may significantly enhance recovery in impaired upper limbs [1]. However, people with stroke often lack motivation to perform the intense practice required for recovery [2]. Moreover there is no practical method to verify whether an intended MP is actually being performed in the cortex. To address this problem, the work reported in this paper is aimed at providing a rehabilitation paradigm that facilitates MP in a way which is motivating for the stroke survivors and assessing its effectiveness. The paradigm involves providing a computer game based Neurofeedback that is influenced by neurophysiological correlates of successful motor activity using an electroencephalogram (EEG)-based brain-computer interface (BCI). BCI technology is primarily based on the real-time detection of motor imagery (MI) or MP induced patterns in sensorimotor rhythm (SMR) while subjects perform MI tasks (e.g. left/right hand movement imagery).

Objective: To assess the feasibility of using BCI to enhance the MP of therapeutic tasks practiced by people with stroke aimed at improving the impairment and use of their affected upper limb.

Design: Cohort study.

Setting: An electromagnetic field (EMF) screened EEG lab in the ISRC, Magee Campus, Derry, N Ireland.

Participants: Five patients with stroke more than one year before the study entry (4 male and 1 female; mean age, 58.6 years, range, 47-71 years; mean time since stroke, 28 months; range, 15-48 months; with 3 left and 3 right sided hemiplegia).

Intervention: All patients received twelve 30-minute MP therapy sessions (in conjunction with physical practice sessions of the same duration) on 2 days a week for 6 weeks. The session emphasized movements of the upper limb that were most affected but had at least some degree of residual movement control.

Main Outcome Measures: The motricity index, Action Research Arm Test (ARAT), Nine Hole Peg Test (NHPT).

Results: Participants regularly attended most of the BCI supported therapy sessions and showed strong adherence to the protocol. The single trial on-line SMR pattern classification accuracy (CA) for each of the

novice BCI stroke participants was in the range 65-75% , which is a very similar CA range to that for healthy novice BCI participants. From baseline to one week follow up, the group mean motricity index score changed by 26% and the upper limb function use, computed as mean ARAT score changed by 18%.

Conclusions: In this study BCI supported MP has been shown to be a feasible intervention. There were high rates of attendance, there were no negative effects in terms of changes in mood or fatigue and the feedback from users was positive. Results indicate that participation in the BCI supported MP paradigm may enhance a stroke patient's use of more affected limb and its recovery. This is based on the trends obtained from the outcome measures and positive reactions from the participants. However, these findings are limited by the small sample size and the lack of a control group but the results are promising and a plan for a more extensive follow up study is under way.

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Guide – Emulating carer support for acquisition and performance of complex activities

Cognitive impairment reduces a person's ability to carry out activities of daily living (ADL). Complex behavioural sequences in ADL tasks outstrip the persons ability to remember the steps or to sequence these effectively. Omissions of sub-steps, failure to identify and correct errors and intrusion of behaviours unrelated to the goal are common. Increasingly, assistive technology for cognition (ATC) is employing verbal prompting. The development of this may benefit from understanding the processes by which sequences are acquired, are supported and how prompting systems might avert difficulty while maintaining the user's autonomy. A case series of eight is presented to demonstrate use of an auditory verbal prompting system (Guide) to support complex rehabilitation relevant activities. Our results are discussed in terms of social and psychological processes. Understanding these processes may be of benefit to other ATC developers.

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An enabling cooker minder for people with dementia

Cooking for oneself and family is an important and valued role for many people and this is no less the case for older people beginning to suffer from dementia. However, absent-minded use of the cooker significantly

increases the risks of explosion or fire and may necessitate its disconnection. Cooker monitors have proven successful in this population by shutting off the gas or electricity supply to the cooker when a hazard is detected, however, a carer or call centre must intervene to reconnect the supply.

A cooker minder has been developed which utilises similar functionality to existing designs, such as unlit gas and smoke detection, cooker supply shutoff and the option of an external call for help, but also supports the user in rectifying the problem and in reconnecting the cooker. The aim is to maximise the user's independence within safe limits by switching the cooker supply off in hazardous situations but then, once it is safe to do so, guiding the user to reconnect the cooker through a clear and easy to use interface. The user interface includes a visual warning that the cooker has been shut off and audio cues to prompt the user of the actions they need to carry out. The device records the number of cooker shutoff events, providing evidence to allow service providers to calculate the level of risk associated with the user's cooking activities. The device is in the process of being tested with a user and their carer.

Author: Bruce Carey-Smith

Design Considerations in Compliant Seating for Children with Whole Body Extensor Spasms

This paper describes a compliant seat for a child with whole body extensor spasms.

Some children with cerebral palsy experience whole body extensor spasms. They can be triggered by many different stimuli, and in this case the most common stimuli were sudden noises and unexpected touch. Being constrained into a conventional chair also increased sensitivity to spasm stimuli and spasm frequency.

A seat was designed and built that yields when a spasm occurs, yet still maintains postural support of child with complex seating needs in addition to the extensor spasms. A saddle seat configuration was employed that positioned the child with some hip abduction.

The design of the seat is based on previous work carried out by Orpwood[1]. A search of the literature for quantitative characterizations of extensor spasms yielded one satisfactory measurement of extension force [2].

The seat was designed using an iterative design/evaluate process. Early evaluations showed that the seat provided good postural support whether upright or extended. During the first evaluation in a hospital context, the child visibly relaxed into the seat, showing reduced muscle tone in his pelvis, shoulders and arms. Observation of play during this period indicated an improvement in hand function as the muscle tone steadily reduced.

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Why are mobile hoists awkward to manoeuvre; a theoretical answer and practical consequences

Mobile hoists are an assistive technology with a crucial role in enabling access for disabled people. These manual, all-caster vehicles are frequently manoeuvred in confined spaces (e.g. domestic settings) with large loads (i.e. bariatric persons) and with the need for a high degree of positioning precision (e.g. transfer from wheelchair to armchair). Yet, few publications consider mobile hoist manoeuvring. Not least, the relationship between the dynamics of a hoist as a vehicle and ease of manoeuvring has not been reported. This paper presents a simple dynamic model of hoist manoeuvring using published motion resistance values (Frank and Abel 1989) to estimate handle forces. The results from the model indicate:

That changes of direction require relatively small handle forces compared to lateral motion.

The extent to which caster orientation affects the handle forces.

The extent to which trail length and centre of mass position may affect handle forces.

That boom length can have a substantial effect on the forces required for initial motion.

A review is also made of some current mobile hoists using the model.

This work is part of a larger intention to develop a fuller understanding of the motion of vehicles used to enable disability access within domestic settings. (Abraham and Johnson 2006)

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