AUSTRALIAN ASSISTIVE TECHNOLOGY CONFERENCE 2022
activaATe life! - realising opportunities with assistive technology

AATC22 Conference Abstracts
(as at 05/10/22)

Contents

1. Designing custom foam cushions for complex seating

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ABSTRACT

Complex seating is typically a challenge of trying to find the best compromise between the often-competing goals of pressure care, postural support, comfort and functional capability. Sometimes even the most advanced commercial cushions do not seem to be able to offer a solution that suits the individual client's needs. Custom foam cushions provide an alternative that can be designed specifically to suit the individual, often able to achieve a more desirable combination of the seating goals than is offered by commercial products.

This presentation will explore the design philosophy behind custom foam cushion design, comparing and contrasting it with the design philosophies of different commercial cushions intended for complex seating. It will outline the pros and cons of custom foam cushions compared to other cushion options, and consider when a custom foam cushion might be the right solution for an individual client.

It will explore considerations around the composition and make up of custom foam cushions, including cushion covers, and an array of design options to suit common pressure and postural needs. Methods for evaluating the effectiveness of a custom foam cushion design will be discussed, both for considering the suitability of newly designed cushions and for considering the potential need for re-design to suit the changing needs of clients.

This presentation will introduce the idea of regulatory requirements concerning custom AT provision, associated safety considerations and the expected lifecycle of a custom foam cushion.

The presentation will consider a number of case studies where complex foam cushions have been an effective solution for complex seating needs and discuss the commercial alternatives that were considered.

SUMMARY (50 word summary to be included in the program)

Custom foam cushions offer an alternative approach to meeting complex seating needs. This presentation provides a broad overview of custom foam cushions, from the underlying design philosophy, through to practical considerations about designing, making, supplying and evaluating custom foam cushions to meet the needs of the individual.

2. A review of the TGA's requirements for personalised assistive technology

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ABSTRACT

The supply of medical devices, including assistive technology, is regulated in Australia. This regulation is managed by the Therapeutic Goods Administration (TGA) and is intended to ensure that consumers are guaranteed that medical devices the purchase from the Australian market meet acceptable levels of efficacy, honesty and safety. This is achieved by verifying that therapeutic claims made of a product are backed by scientific evidence, that products are designed according to the Essential Principles, and that manufacturing of products complies with Good Manufacturing Practice.

It is a relatively straightforward matter to regulate products that are generic in design, however, devices which are tailored to the individual user, to one degree or another, have been more challenging to regulate effectively. Regulation of such devices, now collectively described by the TGA as 'Personalised Medical Devices' has recently been revised in an attempt to better reflect the growing number of devices that can be produced, often 3D printed, without regard to broader safety and design issues.

While the regulations regarding medical devices in Australia are freely available, navigating the regulatory landscape can be daunting and confusing. This can lead to developers of custom assistive technology being put off or simply failing to comply with their regulatory requirements. This presentation will consider some of the difficulties inherent in the regulation of medical devices that are personalised or custom in design, including assessing their therapeutic claims and conformity with design and manufacturing benchmarks.

This presentation endeavours to answer a number of reasonable questions relating to the supply of personalised medical devices, including:

- What is the difference between 'personalised', 'custom', 'patient-matched' and 'adaptable' medical devices, and what are their respective reporting requirements?
- What are the different classes of medical devices?
- How far can a device be modified before liability for the device transfers from the original manufacturer?
- What devices are regulated? What are exempt? What are excluded?
- What do I need to do if there is an issue with my product?

The presentation aims to present a clear picture of how regulatory requirements have changed, where the regulations are at present, and what further changes in regulation are on the horizon. It will specifically touch on the current review of assistive technology as a whole and the various options being considered for revising regulation covering this space.

SUMMARY (50 word summary to be included in the program)

The Therapeutic Goods Administration regulates the supply of medical devices, including assistive technology, within Australia. The past few years have seen significant changes in the regulatory requirements concerning custom-made medical devices and assistive technology. This presentation aims to provide a clear picture of where regulation has come from, where it is now, and where it is heading.

3. A new approach to home modification and assistive product information and education services: the home environment and assistive technology hub

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ABSTRACT

Australia has undergone significant disability and aged care reforms recently – including nation-wide implementation of a National Disability Insurance Scheme from 2020, and current work to design a new Aged Care Support at Home Program (which includes a focus on Goods, Equipment, Assistive Technology and home modifications). These reforms have increased access to self-managed budgets for people who experience health, disability or age-related conditions to consider their assistive product and home modification needs, and plan for interventions they can purchase to address these. At the same time as these reforms, however, independent assistive technology and minor home modifications information sources that have traditionally been used to support decision making have closed, including various state-based independent living centres. Related to this, demand – and thus wait lists – for assistive technology and home modification advisory services from allied health professionals have grown significantly.

This presentation illustrates a co-operative, multi-stakeholder model designed to respond to these opportunities and challenges. Monash University, Peninsula Health and the new Australian Government-funded National Centre for Healthy Ageing (NCHA) have developed an innovative partnership with St Kilda Football Club and Frankston City Council. This ambitious cross-organisational and interdisciplinary collaboration has established the concept – and secured NCHA infrastructure funding for – a simulated dwelling offering both onsite and telehealth-enabled demonstration of home environment and assistive technology interventions. This visitable hub is also being designed with input from the Building 4.0 Cooperative Research Centre. It has been developed to include a range of traditional assistive technology and ambient assisted living products, smart home technology enablement, and flexible internal and external built design to respond to a person's goals and needs, and maximise their planning of effective design for community living. The built environment has also been enabled with telehealth, to outreach from the hub into people's homes or other environments (such as health networks or aged care settings). It has embedded research technologies included to allow (with visitor consent) the passive collection of data on user needs, investigations and AT and home modifications information supply stemming from each virtual or face-to-face visit.

This presentation has four aims:
- Outline the service offerings available at the Home Environment and Assistive Technology Hub;
1. Provide an overview of the innovative, multi-stakeholder collaboration that led to its establishment;
2. Detail the ways community members, service providers, health and design professionals, and government funders can use the Hub, via either face-to-face visits or telehealth services;
3. Demonstrate the research technology enablement in the Hub's built environment, designed to aid collection of data to inform Home Modifications and AT education, policy and practice nationally.

SUMMARY

Illustrating innovation, this presentation will outline a new Home Environment and Assistive Technology Hub, accessible to the community via both face-to-face visits and telehealth. The innovative, multi-stakeholder collaboration – which includes a University, health network, two national research centres, an AFL football club, and local council – will also be detailed.

4. The use of smart lighting to provide ambient visual prompting of teeth brushing following acquired brain injury: a single-case experimental design

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ABSTRACT

Background and Objectives: Following acquired brain injury (ABI), external compensatory aides may be required to support executive function in performance of activities of daily living. To date, there has been no research that has evaluated the use of smart lighting for ambient visual prompting of daily tasks after ABI.

Method: An *n-of-1* trial using an A-B-A-B withdrawal design was undertaken to evaluate the effectiveness of coloured smart lighting in providing ambient visual prompting of a single personal care task. The participant was a woman, aged 24 years, who experienced an ABI following brain tumour resection and living with her parents and sibling. The target behaviour prioritised by the participant was initiation of night time teeth brushing independently, without verbal cuing from family. The intervention was a single smart bulb located in a desk lamp in the bathroom, turned on and off by an automatic timer within a specified time window. Repeated measures of the target behaviour were undertaken for a total 64 datapoints across the repeated phases (16 datapoints per phase), via documentation logs from a primary family member. Data analyses involved target behaviour count, systematic visual analysis and goal attainment scaling (GAS) across phases.

Results: In both of the 16-day baseline A phases, 5/16 and 5/16 (31%) events of independent teeth brushing and GAS scores of -2 were recorded. In both intervention B phases, independent teeth brushing was recorded at 100%, with GAS scores of +2. The participant requested continued smart lighting use after trial completion, and at 3-month post intervention follow up (16 datapoints), independent teeth brushing was recorded 100% of the time.

Conclusions: The use of smart lighting to provide ambient visual prompting to initiate night time teeth brushing following ABI was highly effective. Further research on the use of smart lighting is now underway, including to test effectiveness in prompting daytime activities. Employing technology support such as smart lighting can contribute to increased levels of client independence and reduce the care burden for informal caregivers.

SUMMARY

Following acquired brain injury (ABI), external compensatory aides may be required to support executive function during activities of daily living. This paper outlines results from a single case experiment, using an A-B-A-B withdrawal design, to evaluate the use of smart lighting for ambient visual prompting of teeth brushing after ABI.

5. The Australian Assistive Technology Equity Study: just how many assistive technology and home modifications funding schemes are there?

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ABSTRACT
Australia is a high-income country, signatory to international conventions and statutes governing human rights and healthcare and with a regionally administered, universal public health insurance program in place. But there are gaps between policy rhetoric and programme implementation. Australians requiring assistive technology (AT) and home modifications (HM) experience significant inequities and many do not have their needs fully met.
In the absence of government data, university and civil society stakeholders sought to establish the government spend on AT/HM. The Assistive Technology for All campaign, supported by more than 60 organisations spanning the health, ageing and disability sectors, partnered with Monash University and our objectives included:

- To establish the breadth of Australian population needing AT/HM and able to access AT/HM;
1. To identify the government-funded pathways to AT/HM in Australia and their cost burden from a government perspectives;
2. To identify any equity gaps and subsequent policy implications; and
3. To cost a nationally equitable AT/HM funding approach for Australia.

Methods included an initial environmental scan, a desktop review, economic evaluation, and policy analysis. We identified 88 government funders delivering 109 separate schemes. Only 38% of schemes made expenditure data available. Virtually every funding scheme provided different AT/HM within its guidelines, used different resource allocation strategies, and featured different eligibility criteria. We found that people who needed AT, but were excluded from the NDIS, faced significant barriers to accessing this support.

Analysis demonstrated that, from an equity perspective, Australians receive differing AT/HM based on a range of eligibility criteria rather than being based upon need. From an economic perspective, the complexity of funding sources, each with separate administrative costs, could be more streamlined if a sector-wide perspective were taken. And from a policy perspective, criteria for good AT/ HM service delivery such as soft technology or 'wraparound supports' including assessment, trial, training, maintenance and followup, are not provided by most schemes. A range of policy-relevant, rights-based implications arise from these findings.

SUMMARY
This study examined the breadth of AT funding streams that exist outside the NDIS. People who needed AT, but were excluded from the NDIS, faced significant barriers to accessing this support. It uncovered issues of inequity and access across these non-NDIS schemes and suggests how these problems could be resolved.

6. Six grand challenges in assistive technology outcomes and impacts: a call to arms for Australia

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ABSTRACT

Capturing the outcomes of assistive technology (AT) is essential. Such evidence enables demonstration of what works, and what is needed. People across the globe are working to close the gap of unmet need for AT, and to open the gate to quality AT products and services. Such efforts are not however always co-ordinated. Globally, different terminology and different measures are used. Crucially, the international AT community lacks systems to enable the sharing of knowledge and demonstration of effectiveness to inform policy makers and argue for equitable resource allocation.

The Global Alliance of Assistive Technology Organisations (GAATO) has brought global stakeholders together to articulate the challenges related to outcome and impact measurement as a first step to finding solutions, hosting the Global AT Grand Challenge.

The Global Grand Challenge
AT stakeholders across all global regions took part in a collaborative consensus process to identify the AT Outcomes and Impacts Grand Challenges of our time. Three hundred and seven participants across 57 countries and nine languages identified 109 Challenges, which were consolidated into a longlist of 39 Challenges. Analysis by AT stakeholders from global bodies resulted in a set of six related Grand Challenges: 1) measuring need; 2) documenting inputs; 3) measuring outcomes; 4) measuring impacts; 5) sharing data; and 6) informing policy.

A call to action
Despite huge diversity of regions and stakeholders, many common AT challenges were identified. This presentation has two key aims:

- Provide an overview of the global Grand Challenges identified through this work with AT stakeholders globally;
1. Detail the overarching Impact Model of AT Outcomes proposed, which captures the relationships between the challenges identified; and
2. Outline implications of this proposed model for Australian AT policy and practice.

The Global AT Grand Challenge gave voice to many hundreds of AT stakeholders from across the globe. Findings will inform research, and support systemic advocacy for better AT policy and practice.

SUMMARY
How can the value of assistive technology (AT) be fully realised if AT impact isn't measured? The Global Alliance of Assistive Technology Organisations, in collaboration with ARATA, asked this question of AT stakeholders globally. This presentation outlines Grand Challenges identified, a proposed Impact Model, and Australian policy and practice implications.

7. Evaluating, selecting, and implementing outcomes measures for wheelchair and seating provision: an overview

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ABSTRACT

Increasingly, Australian AT funders such as the NDIA require participants and practitioners to report outcomes or impacts of AT provision. This may require use of instruments such as questionnaires to measure these outcomes in a systematic way.

However, Australian research over the past decade indicates that few AT Practitioners or AT service providers have used outcome measures as part of routine clinical practice. Practitioners are unsure about how to evaluate and select appropriate outcomes measurement instruments, and are uncertain as to how they can be successfully incorporated into clinical service delivery processes.

Three keys to the successful use of outcomes measures are (1) understanding how outcomes measurement instruments are developed, constructed, and psychometrically evaluated, (2) having skills to evaluate and select appropriate instruments using published psychometric, administrative, and procedural data, and (3) understanding the practical realities of implementing and administering outcomes measures in "real world" clinical practice settings. Selection and use of outcomes measures may require practitioners to locate and evaluate published information from peer-reviewed and grey literature, outcomes measurement databases, and administration manuals. Implementation and use of outcomes measures may also require knowledge of organisational systems and policies on collection, storage, and use of health information for clinical decision making.

The purpose of this paper is to describe the development, construction, psychometric evaluation, administrative, and implementation properties of outcomes measures used in wheelchair and seating provision. The outcomes measures reviewed are drawn from critical appraisals and reviews published in the past decade.
The paper begins with a brief overview of outcomes measurement development and the basic psychometric properties of relevance to decision-making. Each outcomes measure is then evaluated in terms of these properties. Practical administrative data, drawn from relevant administration manuals and other sources, is presented. The paper then presents an overview of practical considerations for incorporating outcomes measurement into routine clinical practice. These include determining organisational policies on clinical and ethical governance, health data collection and protection, and using service data for research quality control and research. Finally, the paper provides some practical considerations for implementing outcomes measures into routine clinical practice, drawn from published literature.

SUMMARY
This paper provides and an introduction to the selection and use of outcome measures in wheeled mobility and seating provision. It describes the psychometric, administrative, and procedural properties of these outcomes measurement instruments. It then explores administration and implementation considerations for incorporating these outcomes measures into 'real world' clinical practice.

8. The Functional Benefits of Power Seat Functions – Collecting relevant evidence from trial

Tracee-lee Maginnity (Tracee-lee.maginnity@Permobil.com)

ABSTRACT

Within a functional based funding model such as NDIS, the outcomes are based on how a support will assist a participant to meet their goals. As the prescribing clinician, the clinical reasoning process comes between the assessment and the trial. The purpose of the trial is to confirm the identified AT provides the required support and to gather evidence to support how it meets the participants goals. The majority of rejected applications we are asked to support are usually where the NDIA has highlighted that the application has not met the reasonable and necessary criteria. Further discussion with the prescribing therapist usually highlights that they have appropriately identified a power seat function however often have nor articulated the appropriate evidence, or completed a task analysis that shows how the AT will provide functional support. When we understand the clinical benefits and limitations of power seat functions and pre plan the trial we will have all the information required to articulate the clinical justification clearly and supported with specific evidence.

SUMMARY

It almost goes without saying the associated health and wellbeing that can be achieved from seating functions from pressure management to odema management. But how do these seat functions relate to the users' goals? Will they improve functional outcomes for the end user? How can you use the trial process to gather evidence to support how specific AT prescription increases personal capacity? This session will focus on specific functional benefits of power seat functions and the required evidence for funding applications. Case studies with specific client goals will be discussed to assist so you can start to identify how these functions can assist in day-to-day living

9. Considering Comfort in Client Focused Seating Outcomes

Tracee-lee Maginnity (Tracee-lee.maginnity@Permobil.com)

ABSTRACT

Comfort is a subjectively constructed constraint; we all have different levels and ideas around what is comfortable. What is comfortable for one person may not be for another. Some cultures enjoy soft beds…. others prefer no mattress. Our experiences and lifestyle can have a significant impact on what we determine is comfortable. Media and community also impact
So how do we know someone with complex postural asymmetries is comfortable? Whilst funding agencies don't all consider comfort, they do consider sitting tolerance. How can we increase sitting tolerance? The most common reasoning is to provide a softer surface however for those who experience asymmetrical postures, positive support with a firmer surface can promote both increased siting tolerance and improved functional capacity.
Pressure redistribution is an important consideration when prescribing seating, but we need to achieve this without compromising the functional and postural benefits of positive support. Case studies will conclude the session with real life examples of how this has been successfully achieved.

SUMMARY

Comfort is a subjectively constructed constraint; we all have different ideas around what is comfortable. What is comfortable for one person may not be for another. Some cultures enjoy soft beds…. others prefer no mattress. Our experiences and lifestyle can have a significant impact on what we determine is comfortable. Can we provide seating without compromising functional and postural?

10. When Manual is Not Enough – Considerations of PAD to increase functional participation

Tracee-lee Maginnity (tracee-lee.maginnity@Permobil.com)

ABSTRACT

With an increasing number of power assist device options on the market, how do we know what type will provide best outcomes for the end use? What do we need to consider when identifying a potential power assist device on? Who benefits from PADs and how do we determine which device will provide the specific supports to enable someone to meet their specific mobility goals? What evidence do we need to demonstrate to support this AT being funded? What do we need to consider in relation to the mobility base prior to trialling a PAD? This session will look at the development of powered assistive technology devices that can be added to manual wheelchairs. This area of AT encompasses a range of very different devices, how they attach, how they function, how the user accesses the drive and the impact on the manual chair are some of the points we will discuss. A recent white paper on PADs published by Permobil has identified and completed a systematic review of the available literature. We will take a look at the available evidence including a recent survey of end users that highlights the variability of device choices. From amplification of push stroke to converting a manual chair to a powered trike, we will look at some of the advantages and disadvantages of each.

SUMMARY

There are an increasing number of PADs available. These can facilitate increased community participation, however, can also create barriers or result in abandonment when there is an inappropriate match between device and user. This session will provide an overview of the different styles of PAD available and discuss the considerations for selection and prescription.

11.Powered wheelchair suspension – pretty coloured coils or essential component for best functional outcomes

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ABSTRACT
Suspension is an important and integral part of powered mobility bases, yet a feature not always considered by prescribers. Whilst many powerchairs may look similar and provide the same powered seat functions, when it comes to identifying an appropriate base for trial we need to consider not only the drive wheel configuration but also suspension. Who benefits from suspension in a powerchair? Why do we have suspension systems integrated to rehab powered mobility bases? What difference will be felt? Why is onsite adjustability of suspension important? How can suspension enable increased environmental access?
These questions and more will be addressed in this session that focuses on the role suspension plays as part of a powered mobility base. Following the session we encourage attendees to have a look at how different chairs throughout the expo use suspension and to make the most of the opportunity to test them out for yourself.

SUMMARY
Suspension is an important and integral part of powered mobility bases, yet a feature not always considered by prescribers. Whilst many powerchairs may look similar and provide the same powered seat functions, when it comes to identifying an appropriate base for trial we need to consider not only the drive wheel configuration but also the role suspension plays and the impact it can have on the consumer. This session considers the clinical impact of suspension for consumers.

12.Computer control for people with severe disabilities

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ABSTRACT

People with severe/progressive disabilities require access to computer-related technology in order to communicate, control their environment and access information. It becomes central to their lives. One prominent option for this group is eye gaze. This paper will report on three (3) clients with severe/progressive disability who have trialled eye gaze and other options over the past year. Their names have been changed in order to safeguard their privacy. The work of trialling available technology options with these clients has been undertaken by Ability team members: Dr Graeme Smith, Michael Berryman (OT) and Sharon Baldacchino (SP). The participants have each grappled with eye gaze, with mixed success. This paper will summarise their journeys, with consent of the participants. It will describe their experience with eye gaze and other technologies, issues that arose, and how they came to a decision regarding computer/tablet access. Issues such as advice, availability of trials, funding, accuracy, reliability, comfort, mounting, and past experience with technology, are included and evaluated.

SUMMARY

This paper will detail the experience of three (3) clients with significant/progressive disabilities who have trialled eye gaze and other technology options. It will describe their journeys, document their experience with eye gaze and analyse the factors that affected their ultimate decision re technology.

13.Advanced manufacturing of personalised cushions

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ABSTRACT

The STARS Rehabilitation Engineering Centre (REC) runs a clinical service which helps clients with long term pressure wounds that are related to seating. These clients have typically unsuccessfully tried to use off-the shelf systems. They refer to the REC as a last resort for a bespoke solution to meet their needs. While the service has been successful in designing and hand fabricating custom solutions for many years, there are several challenges with the current model of service delivery.

Complex hand fabricated cushions can be heavy, prone to absorbing fluids such as urine, and are difficult to document and exactly replicate when replacements are required. Even slight differences in the cushions can cause significant problems with comfort or function for some users. This service has also been difficult to expand to reach more clients. The hand fabrication of cushions requires staff with specific skills and access to a relatively large workshop equipped with a few large and noisy pieces of machinery. These requirements often don't fit well with other clinical services, particularly in hospital settings.

Advanced manufacturing technologies, such as 3D printing, offer many opportunities in the field of custom assistive devices. These technologies are becoming more accessible and lower in cost. The question was asked, "Is it possible to use advanced manufacturing to print a custom pressure relieving cushion to overcome some of the barriers?"

Two projects, one funded by the Jamieson Trauma Institute and the second by the National Injury Insurance Scheme of Queensland, have been completed in collaboration with the Herston Biofabrication Institute. The focus has been on developing a technique for 3D printing cushions. The printed cushions produced so far offer enhanced skin surface microclimate, endless design options, repeatability, and the possibility of relatively low production costs and low impact set-up costs for expanding services.

While these projects have proven that it is possible to make a cushion using 3D printing, there is still further work required before this technology can be implemented more broadly. Initial consumer focus groups have indicated positive support from end users and prescribers, but clinical trials are still needed to confirm that they work in everyday use, as designed. There is also work required to reduce the very long printing times associated with the current state of this technology.

SUMMARY

A report on the outcomes of two research projects looking to develop a method for 3D printing low cost, repeatable custom pressure management cushions. It covers the rationale for the projects as well as discussing the results, the ongoing plans, and the advantages and disadvantages of the concept.

14. Innovative technical solutions for everyday activities

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ABSTRACT

Sam's journey with assistive technology started with a desire to improve productivity on his personal computer. Apple's switch control and built-in assistive technology was fine for surfing the internet, sending emails, and keeping up with his social media. But when he started editing and producing a short film, he knew he needed something a little more bespoke. Very fortunately, Sam is surrounded with some very intelligent people who helped him to create some very inventive systems to improve his life style.

Kieran, who has been a friend of Sam since high school, worked in IT and was able to help him setting up custom switch panels using keyboard shortcuts and a smattering of apple script to edit films with much improved efficiency. The products can be viewed at https://www.youtube.-com/c/SamRenProductions

Sam has a passion for music, and wanted to be a part of the music team at his local church. Karl, a fellow parishioner with a background in electronics, helped Sam to build a device to connect the switches on his wheelchair to an electronic drum kit, so he can kick out the beats every Sunday night.

Graeme, another friend from Sam's church who is a Software Developer, helped Sam to build a programmable remote control for his TV, using a dance mat from a console game for buttons. So now Sam can control his TV from the floor.

SUMMARY (50 word summary to be included in the program)
Sam is a young man who loves using his computer, playing the drums, watching TV, and going fishing despite his conditions of cerebral palsy. With the help of professional friends Sam benefited greatly from tailored assistive technology solutions to help him achieve marvellous results.

15. Engaging AT users in the AT process: a critical discourse analysis of communication in an initial AT session.

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ABSTRACT

Background: Involvement of AT Users in the AT Process contributes to user satisfaction and positive outcomes in device use. However, there is a lack of consensus about the precise nature of user involvement and limited evidence to inform how it can be achieved. To understand the nature of engagement in real-world AT encounters, this study critically examined the communication behaviours of a health professional and AT Users in real-world AT sessions.

Method: The analysis was conducted on initial sessions where individuals with a disability met with a health professional to explore Smart AT. The analysis was conducted on three cases purposefully selected from a larger study for their diversity in terms of their level of verbal participation and patterns of interaction. A critical discourse analysis was undertaken using two lenses. Initially, the health professional's and AT Users' communication behaviours were identified and categorised in terms of the *instrumental*, *content*, and *relational* function. Following this, the engagement of the health professional and AT Users were critically analysed using three complementary dimensions of engagement, namely, *behavioural, cognitive,* and *emotional*.

Findings: The health professional was primarily responsible for the instrumental communication behaviours, directing the session's structure and focus. Consequently, the AT Users mostly contributed only within the health professional's agenda resulting in passive behavioural engagement. The session was primarily characterised by content communication, with both the health professional and AT Users contributing and attending to the information provided by the other speaker, indicating that both were cognitively engaged in the session. There were, however, differences in the extent to which individual AT Users engaged with the content due to differences in their purpose for attending the session and level of prior knowledge. Relational communication was generally positive and supportive. However, while the AT Users engaged emotionally in the session using a range of relational communication behaviours, the health professional's primary focus was on instrumental and content communication, limiting their emotional engagement.

Discussion:
This study showed that behavioural engagement of the AT Users was constrained by the health professional. Cognitive engagement was promoted by the health professional through questioning and tailoring the information provided but could be enhanced by pacing information and being attentive and responsive to individual AT User's specific concerns and purpose for attending the session. The results of the study suggest that focussing on procedures, identifying problems and providing solutions can hinder health professionals' engaging with the emotional content of the conversation and AT Users' need for emotional connection.

Conclusion: To successfully engage AT Users in the AT Process, AT Users need to be oriented to the focus and sequence of the session and provided with time and resources to contribute. Health professionals should also recognise individual AT User's readiness for and unique ways of processing information and provide them with the resources to actively participate. Finally, awareness and acknowledgement of the AT Users' relational communication and need for emotional engagement would allow deeper exploration of their experiences and assist in the development of a deeper therapeutic relationship.

Summary

There continues to be confusion and a lack of consensus about the precise nature of user involvement in the AT Process. This presentation reports on a study that critically examined the communication behaviours of a health professional and AT Users in initial real-world AT sessions to understand the nature of engagement.

16. Are we doing with or doing for? A critical discourse analysis of AT user agency in initial AT sessions.

Desleigh de Jonge (desleigh.dejonge@uqconnect.edu.au), Dr Tammy Aplin (t.aplin1@uq.edu.au), Dr Merrill Turpin (m.turpin@uq.edu.au) and Dr Lynda Shevellar (l.shevellar@uq.edu.au)

ABSTRACT

Background: For AT Users to achieve choice and control when selecting assistive technology, health professionals need to understand AT User agency and the power dynamics at play in professional-consumer interactions. Agency involves exercising control in our lives and in specific situations through intentional decisions and actions. To understand AT User agency in AT sessions, this study critically examined the agentic actions of AT Users and how these were enabled in real-world AT sessions.

Method: The analysis was conducted on verbatim transcriptions of initial sessions where individuals with disability met with a health professional to explore Smart AT. Three cases were purposefully selected from a larger study for the analysis for their diversity in verbal participation and patterns of interaction. Two lenses were used in the critical discourse analysis, where initially, agentic actions of the AT Users were identified. Following this, the health professional's actions, and the extent to which these involved *doing to*, *doing for* and *doing with* the AT User, or enabling them to *do for themselves,* was examined.

Findings: The findings showed that AT Users made intentional choices, initiated actions, and proactively sought information both prior to and during the session. They willingly worked with the health professional in the session to achieve a goal, sharing experiences, providing information, expressing interest, and asking questions. However, opportunities to exert agency during the session varied as the health professional moved back and forth between *doing to* or *for* AT Users*,* as opposed to *doing with* or allowing AT Users to *do for themselves*. AT User agency was further influenced by each AT User's level of understanding of Smart AT, how time was allocated within the session, and differences between the AT Users' and health professional's purpose.

Discussion: Independent actions undertaken by AT Users to address their concerns both prior to and during the AT session need to be acknowledged if AT User agency is to be harnessed and strengthened to address their AT needs. Access to information about the range of Smart AT available allows AT Users to engage in active discussions that address their unique concerns and questions and evaluate the value of Smart AT to them personally. Without this understanding, AT Users remain reliant on health professionals to identify options. AT Users also need opportunities to *do with* and *for themselves* if they are to actively participate in the AT process. While some AT Users have sufficient knowledge and confidence to take action and exert control within the session, others who require more time to process the information before making decisions, may struggle to influence the focus of the session.

Conclusion: To promote AT User agency, health professionals need to resist the temptation to *do to* and *for* AT users and work *with* them or afford them more opportunities to identify their needs and create solutions *for themselves.* Health professionals also need to be sensitive and responsive to individual's readiness for identifying needs and solutions in order to ensure AT Users achieve choice and control over AT decisions.

50 word summary

For AT Users to achieve choice and control, health professionals need to understand agency and the power dynamics at play in professional-consumer interactions. This presentation reports on a study that critically examined the agentic actions of AT Users and how these were enabled in an initial real-world Smart AT session.

17. MASS Palliative Care Equipment Program bringing equity in palliative care assistive technology access across Queensland

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ABSTRACT

Effective end-of-life care typically involves the timely and short-term provision of assistive technology to compensate for functional decline. People receiving palliative care often fall through the gaps of assistive technology programs, especially in rural and remote areas.

In 2020, the MASS Palliative Care Equipment Program was piloted to provide palliative care equipment to Queenslanders across the state to support people to spend more days at home at end-of-life. Now an ongoing program, this paper reflects on the first two years of the program.

The RE-AIM Framework was applied retrospectively to evaluate the program. In the first twenty-one months of the program, 3,695 palliative care clients were accepted into the program. The geographical spread of participation in terms of Hospital & Health Services regions, rurality and remoteness was highly representative of the Queensland population, indicating equitable reach.

Effectiveness of the program was evaluated through prescriber, client/carer and stakeholder surveys. Feedback on the program was primarily positive with the vast majority (>75%) of patient and carers indicating that they would not be able to get the aids and/or equipment without PCEP, that it helped them do things by themselves, made it easier for the carer, and that basic, off-the-shelf equipment was adequate for their needs. Prescribers were similarly positive, with 96% agreeing that the equipment and/or aids helped the person with the palliative condition to stay at home.

Adoption of the program was strong, with consistent and high numbers of applications. These exceeded expectations of demand when establishing the project. With regards to implementation, a wide variety of equipment was provided, however the mostly frequently provided equipment (>25% of participants) included electric adjustable beds, pressure redistribution mattresses or overlays, pressure redistribution cushions, small toileting aids and over toilet aids, manual wheelchairs, continence aids and home oxygen. Strategies to promote access included establishment of a clinical advisor position, remote area equipment loan pools for faster access to equipment in remote areas, and training of administrative staff.

With regards to maintenance, the program provides timely access to basic, off-the-shelf equipment to support staying at home during end-of-life care. However, the program continues to evolve to promote sustainability, including research into the factors that predict whether participants live greater than 6 months (eligibility for the program is prognosis of 6 months or less), and strategies such as nominating a support person (e.g., family member) responsible for equipment to avoid, for example, disposal of the loan equipment after death.

These reflections can support benchmarking for future palliative care equipment schemes.

SUMMARY (50 word summary to be included in the program)

The MASS Palliative Care Equipment Program aims to provide timely, equitable access to assistive technology to support end-of-life care at home. The first two years of the program have been retrospectively evaluated using the RE-AIM Framework. Assistive technology helps people to stay at home, and meet carer and client needs.

18. Evidence-based and practical approaches to prescribing assistive technology via telehealth

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ABSTRACT

Telehealth can overcome challenges with physical access, access to expertise and service efficiency. However, practitioners are often reluctant to adopt telehealth due to real and perceived issues. Beliefs that telehealth is less effective than face-to-face and lack of knowledge of how to adapt face-to-face skills to virtual contexts are barriers that can be addressed through the application of evidence-based practice and clinical experience.

More contemporary evidence in wheelchair and mobility aid prescription consistently suggests that outcomes of telehealth are equivalent or better than face-to-face, while negating the need for travel. These findings are consistent with other associated assessments and interventions such as functional assessment (e.g., functional reach, Timed Up and Go, and Functional Independence Measure) and home modification.

Effective telehealth practice requires additional considerations to face-to-face practice. Practitioners can combine elements of asynchronous assessment and intervention such as photos and videos (before and/or after the visit) with synchronous telehealth visits (e.g., Coviu, Zoom). Use and upskilling of a support person or "technology assistant" such as a family member, support worker, or allied health student can enhance telehealth outcomes with regards to the range of possibilities and improved sustainability of outcomes. Specific techniques for improving perspective and visual quality, providing visual feedback, calibrating measurements, and completing assessments (e.g., of range of motion or strength) can improve accuracy and reliability.

As a service approach that typically achieves equivalent or superior outcomes to face-to-face visits, while achieving enhanced service efficiencies and service access, telehealth should become a standard consideration in models of care and service design. Therapists should be appropriately upskilled to implement effective telehealth assistive technology prescription and to be able to advocate for telehealth where appropriate.

SUMMARY (50 word summary to be included in the program)

Contemporary evidence suggests that telehealth has similar or superior clinical and service efficiency outcomes compared with face-to-face assistive technology prescription for a range of assistive technologies. Effective telehealth prescription should consider asynchronous and synchronous options, the use of support persons or "technology assistants" and specific strategies.

19. The on-task attention of individuals with Autism spectrum Disorder - An eye tracker study using Auticare

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ABSTRACT

Background: Autism Spectrum Disorders (ASD) are characterized by atypical patterns of behaviors and impairments in social communication. Among the fundamental social impairments in the ASD population are challenges in appropriately recognizing and responding to facial expressions. Traditional intervention approaches often require intensive support and well-trained therapists to address core deficits, with many with ASD having tremendous difficulty accessing such care due to lack of available trained therapists as well as intervention costs. Attention is one of the fundamental elements of effective learning. The design of learning environments often consists of a blend of visual stimuli. Investigating the effect of visual stimuli types on the attention of children with autism spectrum disorder (ASD) is important for the theoretical understanding of attention. As a result, emerging technology such as virtual reality (VR) has the potential to offer useful technology enabled intervention systems. In this paper, an innovative VR-based system called Auticare was developed and an eye tracker device was incorporated that allows monitoring of areas of interest and on-task attention of the user.

Objective: This study explores the on-task attention on 13 virtual reality based scenarios of individuals with Autism spectrum disorder (ASD) and typically developing (TD) groups. 420 participants (ASD = 400, TD = 20) took part in a series of attention tests. We examined four eye-gaze measures: time to first fixate, first fixation duration, average fixation duration, and the sum of fixation count. The eye tracking data were analyzed to determine the on-task attention of the user while performing VR based scenarios. Performance data, eye tracking indices and physiological features indicated the on task attention of the individuals with ASD and TD.

Results: In the results we observe the comparison in the eye tracking parameters of ASD and TD group. This gave insight into the attention patterns of the participants of the study in each VR scenario. The present study performed an analysis for predicting the level of autism from the eye tracking performance scores using machine learning.

Conclusion: It is concluded that virtual reality based inclusive learning platform is a promising medium of skill training for individuals with Autism.

Keywords- Auticare, virtual reality, attention, eye tracker, Autism spectrum Disorder.
SUMMARY (50 word summary to be included in the program)

Embright Infotech Private Limited is an XR based company providing an inclusive learning platform for individuals with special needs. Our solution, Auticare is an XR AI Based Assistive Technology Inclusive Learning Platform for Autism Spectrum Disorder (ASD) & Special Education.

The solution provides assistance in diagnosis that makes the process faster and more effective, virtually simulated environment facilitating rehabilitation in cognitive, social, self-care, sensory, vocational, behavioral,physio-motor, driving, and special education aspects.
Auticare Video: https://www.youtube.com/watch?v=XFyMoh-8mgk&t=4s
Autilite Video: https://www.youtube.com/watch?v=dkr7TeS4UFg

20. Proposal of a control unit with Arduino for myoelectric control-type electrolarynx

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ABSTRACT

Currently, many patients have lost their vocal cords, their larynx including them, and their function of them as a sound source caused by the laryngectomy. The voice is articulated from the sound generated by the vocal cords by a sound filter as an oral cavity, a nasal cavity, and tongue. Therefore, the loss of their vocal cords leads them to speech impairment patients. On the other hand, most speech impairment patients can use their sound filter. Then if they can reconstruct their source sound of the voice, they can get their voice again. The electrolarynx is one of the speech production substitutes for these patients, and it has the merit of being easy to master. But, it has the weak points of low articulation caused by its monotonous sound and needs to hold by a hand. To solve these weak points, we research the control method for the electrolarynx with biosignal. We chose the neck myoelectric signal as the control signal, and have been studying the control system. In our previous research, we developed the PC-based control system with the myoelectric signal, the performance evaluation was carried out. As the result, it was confirmed that this system could control the on/off and 3-step tone height of the electrolarynx.

The above-mentioned PC-based system is too large and expensive for daily use, so we started to develop of new control system with Arduino which is a widely used one-board microcomputer. In our proposed control system, MyoWare (Advancer Technologies, LLC) was adopted for myoelectric signal measurement. The MyoWare's measurement electrode is attached along with the flow of the sternohyoid muscle in the neck, and the reference electrode is attached at a slightly distant point. The electrolarynx we used requires two control signal inputs to control the on/off and the tone of the sound produced and the prototype control system was fabricated to accommodate this.

Three thresholds T0, T1, and T2 (T0<T1<T2) are set in advance, and, when the processed detection signal exceeds a threshold value of T0, a signal of turning on the sound generation is generated and is applied to the on/off control input. When the processed signal is smaller than the threshold value T1, it was generated as the control signal for high tone, when it is between T2 and T1, it was a signal for mid-tone, and when it is bigger than T2, it was a signal for low tone, and these signals are applied to the tone control input. To visualize this, two LEDs were prepared, and an on/off control signal and a height control signal were input to each. As a result, it was confirmed that this prototype system could generate each signal. In this report, we describe the above-mentioned performance evaluation of this system and its result.

SUMMARY (50 word summary to be included in the program)

We have been studying a control method using neck myoelectric signals to improve the performance of an electrolarynx for laryngectomy patients. In this report, we describe the results of the prototype of the control system using Arduino and Myoware for inexpensive devices, and the operation experiments of the system.

21. Challenges and considerations of providing assistive technology in regional, rural and remote areas of Australia.

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ABSTRACT TEXT

Assistive technologies (AT) aim to remediate the effects of an impairment, a chronic illness or aging to increase independence and participation. When implemented effectively, AT has been demonstrated to reduce the impact of an individual's functional limitations, thus reducing the need for formal support services, achieving greater independence and quality of life.

Best practice guidelines for assistive technology provision have been established worldwide. The AT process can be viewed as a somewhat cyclic process with multiple stages that require a unique combination of hard and soft technologies, along with a number of key stakeholders to ensure an effective and sustainable AT solution is achieved that meets an individual's current and future needs. These stages require the availability of trained personnel to complete evaluations, training, and maintenance as well as access to resources to trial and choose the best AT for the person within their environment. Allied health professionals are one of the key personnel in this process.

It is well documented that Australians living in rural and remote areas experience shorter life expectancy, higher burden of disease and limited access to healthcare services compared to metropolitan residents. Further to this, it is also known that there are a lower number of allied health clinicians who work within regional, rural, and remote areas combined as compared to those numbers who work in major cities.

Combining these two factors, we sought to better understand what the implications of a smaller regional workforce has on being able to deliver an effective assistive technology service. A literature review highlighted a gap in the literature surrounding the challenges and considerations of providing assistive technology in regional, rural, and remote areas of Australia.

Hence this research aimed to address these gaps in the literature by exploring clinician's perspectives of the challenges, considerations, and barriers to assistive technology service provision for rural, regional and remote areas of Australia. We sought to understand what, if any, are the key differences between regional, rural and remote service provision to the metropolitan setting and what are the potential strategies that could improve assistive technology provision in regional, rural and remote Australia.

Eligible participants were allied health professionals who had been delivering assistive technology service provision in a rural, remote or regional area with at least 6 months experience. Two online focus groups were held in May 2021 with a total of 11 participants.

This presentation will provide a summary of the results.

SUMMARY

What are the challenges, considerations and key differences in providing assistive technology services to regional, rural and remote areas of Australia? What are the strategies used to improve assistive technology services within these areas? This presentation will present the results of two focus groups conducted in May 2021.

22. Teaching assistive technology practice without touching: can it be done? A team based approach.

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Abstract

Determining the most suitable assistive technology solutions with people, communities and institutions across the health care continuum continues to be an essential skill for occupational therapists, specifically identified in professional competency standards. As specialised AT practice and provision is an expectation of the occupational therapy role, there has been an increased need for graduates to have a higher level of AT knowledge and training than previously expected.

Following a recent curriculum review at one national university program, an opportunity arose to implement a dedicated fourth year unit focusing on assistive technology practice. This new assistive technology unit was developed by academic staff with experience in assistive technology practices and in consultation with consumers and an external advisory committee. The unit was developed throughout 2021 and implemented in three Australian states in February 2022 for an undergraduate occupational therapy program.

Overall the unit aimed to develop students' ability to uphold the autonomy of the assistive technology user and their central role in all stages of the assistive technology process whilst considering the interests of other key stakeholders including the client, family, other health professionals, suppliers and funding bodies. Students needed to build upon their understanding of disability, occupational rights, and their existing familiarity with a range of assistive technology products, and occupational and environmental assessments to develop, design, implement and evaluate effective assistive technology solutions to optimise a person's participation.

Designed on a team based learning approach, as originally designed by Professor Larry Michaelson, this unit was implemented as a 6-week intensive unit for all fourth year undergraduate bachelor degree occupational therapy students at the commencement of semester 1 2022.

Students were allocated to diverse teams based on certain characteristics and consisted of five to seven members each. Students remained within these teams throughout the unit. To ensure adequate baseline knowledge for classes, students needed to engage with the pre-learning materials prior to attending the interactive tutorials. They were required to complete formative individual and team-based quizzes at the beginning of each session. Preparation materials and tutorials were specifically designed so that students needed to actively apply their knowledge by discussing this within their team, practice their professional reasoning skills and communicate with others to analyze and determine a solution for a range of complex scenarios. Teams then shared their solution and further discussed and debated with other teams about the foundations for their choice, further developing critical questioning, professional reasoning, and communication skills.

The team-based learning approach has been demonstrated to increase student participation and engagement, increase student satisfaction, and achieve deeper learning and is an effective way of teaching larger class sizes. It is also an effective teaching method for complex concepts and students' further benefit by developing their skills in professional and clinical communications, collaboration and giving and receiving feedback.

This presentation will provide an overview of the team-based learning approach, the process of developing and implementing the unit, and insights from the students and the teaching staff.

Summary

There is an increased expectation for occupational therapy graduates to have a higher level of AT knowledge and training than previous. This presentation will provide an overview of how one university occupational therapy program implemented an intensive 6-week unit focusing on assistive technology practices using a team-based learning approach.

23. What is the current scope of service in assistive technology practices for recently graduated occupational therapists working in Australia?

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ABSTRACT

Introduction

Determining the most suitable assistive technology solution with people, communities and institutions across this health care continuum is still considered a core, foundational skill for many occupational therapists (OT) and is specifically identified in their professional competency standards.

Of the 13,000 occupational therapists in Australia working in clinical roles, it is possible that up to 75% work in areas that are likely to have a high rate of assistive technology need: i.e. rehabilitation, paediatrics, aged care, mental health, disability, neurological, driving assessment.

The continual advancement of assistive technologies combined with the changes in funding and service provision models in recent years have impacted the role and scope of practice for occupational therapists working in this area of practice.

As AT practice and provision becomes more entrenched into the occupational therapy role amid technological and social evolution, it has been perceived that there has been an increased need for occupational therapy graduates to have a higher level of AT expertise than previously expected.

Given the ever-growing demands and crowded curriculum of OT undergraduate programs; the amount and nature of the training and experience which can be provided to undergraduates regarding assistive technology will always be limited.

As university programs strive to stay abreast of contemporary practice, and to best prepare graduates for the demands of their impending careers, we sought to better understand what the current rate and scope of practice for newly graduated occupational therapists in relation to assistive technology in Australia.

An online survey implemented in 2021 sought anonymous responses from newly graduated occupational therapists in Australia to identify their current assistive technology practices.

Results:

A total of 83 participants completed the survey. After removal of incomplete data, 55 valid responses were analysed. The most common level of AT used by graduates was level 1 (basic) (35.9%), however 47% of the time spent on AT was on level 3 (specialised) and level 4 (complex). Graduates indicated they were neutral with their level of satisfaction in preparation for AT practice from university (mean=2.81), however somewhat satisfied with the range and quality of current

supports and training for AT, despite 52.1% reportedly not using any formal communities of practice for AT.

Conclusion:

Overall, the results suggest that newly graduated occupational therapists reported spending a significant amount of time on complex AT in practice and indicated a need for more preparation relating to complex AT equipment and the provision process.

Information from this project will enable the tertiary education sector as to how they may improve and target their curriculum in relation to assistive technology practices.

SUMMARY

Do occupational therapy graduates need a higher level of AT expertise than previously expected? What is the rate and scope of assistive technology practice for graduate occupational therapists in Australia? An online survey was implemented in 2021 to address these questions. This presentation will detail the results of this survey.

24.Beach-based leisure using assistive technology

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ABSTRACT
Many Australian beaches are largely inaccessible for people with physical disabilities. Recently there has been growth in available assistive technology to enable access to Australian beaches. There is little known evidence about using assistive technology for beach access. This study explored the experience of people with physical disabilities' use of assistive technology to engage in sandy beach-based leisure.

Data was collected from 14 people with physical disabilities who use assistive technology to engage in sandy beach-based leisure. All participants consented to participate in online video- recorded semi structured interviews, which lasted between 30 and 90 minutes. These interviews include photo elicitation allowing the sharing of their photos or videos of beach leisure as a trigger for the interview. A semi-structure interview guide was used to facilitate open conversation and discussion. All recordings were transcribed verbatim.

This phenomenological study adopted an interpretative hermeneutic approach aligned with the Sheffield School. Attention was paid to lifeworld aspects of embodiment, temporality, spatiality, moodedness, sociality, and selfhood. Analysis was aimed at exploring the essence and meaning of using assistive technology to participate in sandy beach-based leisure. Data analysis was guided by Braun and Clarke's updated thematic analysis method (2019) to identify semantic and latent themes. Data was managed using Nvivo. The research team engaged in regular discussion and interrogation of themes until final themes were agreed upon.

The experience of using assistive technology to participate in sandy beach-based leisure was complex as reflected in themes. Many participants, "did not know beach-based leisure was possible until …" they were introduced to appropriate assistive technology. Participants identified that, "Assistive technology connects me," to friends, community, society and the outdoors. Other themes included, "Assistive technology impacts my identity"; "Assistive technology impacts spontaneity"; "Assistive technology requires other people"; "Assistive technology attracts attention". Furthermore, another theme described, "Assistive technology limitations and trade-offs," highlighting the complexity of this technology and the beach setting. It was also clear that "Using assistive technology differs between land and water".

This study is the first known in-depth exploration focused specifically on the use of assistive technology to participate in sandy beach-based leisure. The analysis aligns with some known concepts of assistive technology use, it associated benefits and challenges. Exploring the complexity of this specific type of assistive technology led to an understanding that not everyone wants to own their own beach assistive technology. Owning one's own beach assistive technology can be beneficial however access to loan equipment is also important for all beach communities in Australia.

SUMMARY (50 word summary to be included in the program)
The experience of people with physical disabilities' use of assistive technology to participate in sandy beach-based leisure was explored. Data was collected from fourteen participants via semi-structured interviews. Phenomenological analysis led to the identification of a complexity of themes showcasing benefits and challenges of using assistive technology on the beach.

25.Bringing *Joy* to people with disabilities – the first accessible, disability driven sex toy.

Dr Claire Lynch & Ms Heather Morrison
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ABSTRACT

Sexual pleasure is a human right. Several studies have suggested that frequent sexual activity is associated with a range of benefits for psychological and physiological well-being, such as improved quality of life and mental health, increased heart rate variability and lower risk of certain cancers and fatal coronary events (Diener & Chan, 2011). A positive sex life has been associated with a lower annual death rate (Smith et al., 2019).

Living with a disability, whether as a consequence of a disabling musculoskeletal, neurological or psychiatric condition, can impact an individual's sexual performance, expression and identity, however many individuals with disabilities are or have a desire to be sexually active. As occupational therapists, there is a responsibility to affirm the sexuality of people with disabilities so that such people are able to be involved in the sexual activities they desire (Lynch & Fortune, 2019).

This presentation will take the audience on a journey of the involvement of an occupational therapist researcher in the design and delivery of the Joystick - the first disability driven sex toy. It will provide an overview of why developers of the Joystick saw the need for occupational therapists to be involved, as well as the perspective of the occupational therapist/researcher experience in this process.

SUMMARY
This presentation will provide an overview of the design and delivery of the Joystick - the first accessible, disability driven sex toy. It will focus primarily on the importance of occupational therapists involvement in this design process.

26. Technology and Innovation for Cerebral Palsy

Alistair McEwan (alistair.mcewan@sydney.edu.au)

ABSTRACT

From an engineering point of view I will outline the latest understanding of assistive technology needs in Cerebral Palsy, the most common childhood disability with no cure and delayed diagnosis. There have been major engineering advances in technology that can assist communication, mobility and cognition. We will report preliminary outcomes from a survey on community preferences for technology that addresses spasticity and pain using peripheral nerve stimulation, ablation or electroporation. We will also provide an overview of the latest advances in mobility technology using electrical stimulation and robotics, and communication and cognitive tools using machine learning and novel computer interfaces.

SUMMARY

What opportunities are emerging to use engineering innovations to improve the lives of families living with cerebral palsy? I will cover a range of projects using machine learning, electrical stimulation and robotics to assist communication, mobility and cognition.

27. A new approach to transfer

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ABSTRACT

For over 60 years, there has been no fundamental change in the practice of lifting and transferring people with disability (e.g., bed to wheelchair or commode). Current hoist systems and their (miss)use cause high levels of occupational injury to caregivers and service providers. Hoists require two people to assist the transfer due to the significant physical effort required to position unpredictable users of different shapes and sizes in order to support their safety throughout the transfer. This increases costs and reduces choice and flexibility for people receiving care.

A new, patented transfer system addresses the problem from a sound engineering position. People are lifted from below, on an inflatable mattress connected to a stationary lifting machine, which lifts them without need for carer assistance and moves them into a wheelchair with minimal effort by one carer. The system is versatile efficiently carrying out other patient handling tasks which are causes of significant carer effort, including boosting, turning and supporting limbs.

In 2017/18, Australia's healthcare and social assistance workers had the third highest incidence of occupational injury of 55 per 1000 employed persons (compared to construction industry workers at 59 per 1000). In 2014/15,17,565 serious claims were recorded, a 20% increase from 2000/01(ABS) Cost of injury and illness to these workers in Australia in 2012/13 was estimated at $3.9Bn (SafeworkAustralia)

Preliminary clinical assessments confirm the potential of this system "to significantly reduce the effort and work required by persons managing the client transfer" A research grant from the Cerebral Palsy Alliance Research Foundation was awarded to the University of Sydney in May 2022 to study the system. Aims and purpose of the research program include to:
- prove through comparative measurement and evaluation that the system significantly reduces musculoskeletal effort of a single caregiver,
- assess the relative preferences of a representative range of populations of the new system to existing,
- consider possible changes to workflows,
- assess the potential financial and non-financial benefits of the system to health systems
- consider specific seating and postural needs including for people with CP to be incorporated into the support mattresses.

An update on the research progress will be given

Video presentations will demonstrate the various functions of the system. Participants can discuss examples relevant to their discipline and how the technology can positively impact these processes. Solutions to other patient handling tasks will be discussed including prone to supine transfers, Trendelenburg and reverse Trendelenburg positioning.

AT professionals will learn about the engineering basis of this new transfer technology, how it will reduce the incidence of occupational injury to nurses and care providers and provide more control for people with disabilities. Whilst functionally simple, it challenges the audience to reconsider practices unchanged for 60 years. New

applications of the technology are discussed widening the scope of the presentation. An in-depth discussion on reimagining workflows and daily routines is invited.

SUMMARY

A novel patented transfer system has been developed that has the potential to positively disrupt current practice in the movement of people with disabilities. Lifting the person from below, it reduces carer demand, provides a totally different transfer experience for the user and presents the opportunity to reimagine daily routines.

28.Supplying AT in a consumer world

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ABSTRACT
Supplying AT in a consumer world and dealing with the "Fit for Purpose" expectations under consumer regulations is not simple. However, there are methods to mitigate this risk when you understand the intent of the consumer regulations.
There is no perfect solution, there is no one size that fits all when prescribing AT, plus the person's circumstances can change, post prescription. So, how can you mitigate the risk, if the question is raised – *is this AT Fit for Purpose?*
This question is now more important than ever before as the consumer of AT now has greater control in their choices.
The presentation lays out the elements of the consumer legislation that you need to consider as you address the prescribing of AT as a key influencer for the purchase of AT. Designed and intended to provide general information in summary form, for general informational purpose only and not legal advice. The material may not apply to your specific circumstances.

SUMMARY (50 word summary to be included in the program)
Supplying AT in a consumer world and dealing with the "Fit for Purpose" expectations under consumer regulations is not simple. However, there are methods to mitigate this risk when you understand the intent of the consumer regulations.

29.The use of telerehabilitation in supporting goal-setting: a scoping review

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ABSTRACT

Introduction:
Globally, there has been an increase in the use of telerehabilitation over the past 20 years. Goal-setting is an essential component of promoting behaviour change to address rehabilitation needs, including improving the independence and functionality of their daily life, facilitating their participation in self-training, and maintaining their health and well-being. However, it remains unclear how rehabilitation practitioners have been delivering telerehabilitation goal-setting using different approaches.

Objectives:
This study aims to identify and categorize telerehabilitation goal-setting evidence to inform practice, policy, and future research needs.

Method:
This scoping review included a preliminary study with original data analysis written in English addressing the investigation of telerehabilitation goal-setting from PubMed, CINAHL Complete, Scopus, Web of Science, Embase (via Ovid), and PsychInfo (APA). Certain study types, including review or conference papers, were excluded. This study used the following key terms following the PCC framework: P rehabilitation practitioner"; C "Goal setting: and C "Telerehabilitation". However, 'rehabilitation' was added in the search to limit the studies to only rehabilitation settings. After excluding duplicate studies, two review authors independently conducted the title and abstract screening. The interrater reliability was measured based on the review author's response in "include", "maybe", or "exclude" with reasons, and it was used for the screening. Upon completion, two review authors conducted full-text screening and extracted data related mainly to four concepts: General information of the article; Characteristics of telerehabilitation; Characteristics of goal-setting; and effectiveness of telerehabilitation.

Results and Practice Implications
This study mapped 80 articles that investigated the telerehabilitation goal setting. A large number of articles were published between 2018 and 2022 (n=39) in the USA (n=37). Following the target medical conditions were identified in multiple articles: cardiovascular disease (n=11), stroke (n=10), cancer (n=7), diabetes/obesity (n=6), and elderly condition (n=5). However, research gaps identified no studies addressing psychosocial conditions except two that targeted psychotic disorders, including schizophrenia or schizoaffective (n=2). Regarding used information and communications technology and the delivered intervention, smartphone use (n=35) and smartphone-used coaching intervention (n=9) in synchronous mode (n=30) appeared to be the highest and the most common intervention duration to be between one and six months (n=52). Most commonly, the Canadian Occupational Performance Measure (n=7), motivational interviewing (n=6), and Goal Attainment Scale (n=6) were used in the goal-setting. The

occupational therapist (n=20), the most identified service provider, performed collaborative goal setting with the client (n=29), most commonly addressing health promotion-related goals (n=27) and daily activity-based goals (n=15). Although multiple studies highlighted collaborative goal setting, no strategies or resources were identified for those with communication difficulties in telerehabilitation goal setting.

Conclusion
Despite telerehabilitation's potential to effectively deliver rehabilitation to the clients remotely, there is still limited evidence available to facilitate remote goal setting in particular practices such as psychosocial conditions. This highlights further research needs to fill current research gaps in telerehabilitation goal setting. Along with building the evidence, the clinician needs to stay up-to-date on the technology advancement and implement the best possible intervention in clinical practice.

SUMMARY
This presentation will explain findings from the presenter's PhD research of the scoping review on the use of telerehabilitation in supporting goal setting. The presentation will describe the characteristics of the identified 80 articles and highlight the evidence gap to inform practice, policy and future research needs.

30.A novel program contributing to AT service provision for people with SCI

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ABSTRACT

Background: Learning about new assistive technology (AT) options can be challenging for potential users, especially for those who have limited access to assistive technology expertise. Potential AT users may live in an area where they cannot easily access demonstration and trial equipment or expert advice. Services are often provided at disability onset or when there is change of circumstances, and people may miss out on opportunities to review their AT or be exposed to new products at other times. AT users may also have limited exposure to peers, who can be valuable sources of information based on lived experience of AT. Some AT cannot be trialed without installation, so potential users (or those advising them) may not be able to work out the suitability of this AT for their needs prior to purchase. Health professionals, who play an important role in introducing AT to potential users, may not be able to keep abreast of developments in the wide range of AT available, or have the expertise to facilitate trial or selection of all types of AT. A novel program for people with spinal cord injury (SCI) is helping to address this gap. Sargood on Collaroy is a short-term accommodation facility for people with SCI on Sydney's northern beaches. An important aspect of the program is exposure to, and trial of, new AT.

Methods: Case study research has been used to explore the program from multiple perspectives, using qualitative methods. Interviews with guests with SCI and program staff, field observations and a document review were used to describe the program and identify critical elements. The presentation will describe how this novel program contributes to AT service provision, and the perceptions of people with SCI about the AT aspect of the program.

Results and discussion: The program provides unique opportunities for AT exploration. People with SCI can trial AT they may otherwise not have been exposed to, as part of the adapted recreation program. A home automation system and specialised hoists provide an opportunity to trial AT that would otherwise be difficult to access without installation. Guests, particularly those from non-metropolitan areas, may take the opportunity to have their equipment needs reviewed while expert health professionals and suppliers are readily available, and when they can trial equipment for prolonged periods. The non-medical atmosphere of the facility is a draw to people with longer term injuries who would otherwise not have contact with SCI-related services, providing a means for AT exposure to people who might otherwise miss out. Sargood staff 'push the boundaries' of AT, creating and customising new AT solutions that guests can trial. 3D printing workshops equip people with SCI with a tool to design or customise their own AT solutions. People with SCI meet and socialise at the facility, providing valuable peer support and advice about AT. People with SCI value being exposed to new possibilities through AT. They also value being able to contribute their expertise to others.

SUMMARY (50 word summary to be included in the program)

Learning about AT options can be challenging for potential users, but a novel program for people with SCI is helping to fill that gap. While staying at an accommodation facility, people can be exposed to new AT, trial equipment, and connect with peers and health professionals who can share their expertise.

31.Sustainable loan wheelchair provision within a hospital setting

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ABSTRACT

The Rehabilitation Engineering Clinic (REC) within Department of Health (DoH), Western Australia (WA) consists of 16 multi-disciplinary staff providing a range of complex outpatient and inpatient services across Western Australia. The Rehabilitation Engineering Clinic is spread across two sites, with outpatient clinics and supporting workshops located at Fiona Stanley Hospital and the main wheelchair workshop and equipment library at Royal Perth Hospital. This presentation covers the Rehabilitation Engineering Clinic's loan wheelchair provision to facilitate discharge and rehabilitation of inpatients and the model of service that has been developed to make the service sustainable and cost effective whilst exceeding the minimum requirements for patient outcomes.

The Rehabilitation Engineering Clinic on average receives 110 loan wheelchair requests per month for inpatients of five major hospitals and has a key performance indicator requirement of 80% of the requests to be fulfilled within 4 business days. The loan duration can range from 3 months to several years depending upon the patient's diagnosis and prognosis. To meet this Key Performance Indicator several aspects of the service such as the workflow, clinical and technical staffing requirements, inventory and stock levels of various wheelchairs and parts, along with nature of the requests, were investigated and a sustainable and cost-effective model of service provision developed over 40 years.

The workflow for this service provision involves the allied health staff across the hospitals completing a purpose-built electronic form where they choose the type of wheelchair and enter the measurements of the patient etc. This is then vetted by clinical staff of the Rehabilitation Engineering Clinic for any discrepancies or issues. The referral is then processed and entered into a cloud-based dashboard which technical staff access to set up a wheelchair based on the request. The wheelchairs are then delivered to various hospitals, and when the loan term has expired the equipment is collected and cleaned as per the hospital's infection control standards.

The infrastructure to provide this service requires an extensive stock of wheelchairs, seating systems, skilled clinical and technical staff, well stocked interchangeable and adaptable modular components, automated reordering procedures, IT support and a recall procedure that ensures that wheelchairs are repurposed and reused efficiently. In addition, the Rehabilitation Engineering Clinic has developed a range of foam-based wheelchair cushion designs that meet fast turnaround requirements of the service and provide required pressure management and comfort for patients. Work instructions, standard operating procedures and quality control checklists have been developed as part of Rehabilitation Engineering Clinic's ISO 9001 quality management system, and all staff receive required training and professional development regularly.

The cost savings to Western Australian DoH as a result of this model are enormous. A preliminary analysis showed that Western Australian DoH saved approximately $600,000 a year by using this

model to issue powered wheelchairs when compared to the potential cost if these items were rented from wheelchair providers. Further analysis is being completed to estimate cost savings from this model in reducing delays in discharge by timely provision of equipment.

SUMMARY (50 word summary to be included in the program)

This presentation discusses the Perth Rehabilitation Engineering Clinic's loan wheelchair provision to facilitate discharge and rehabilitation of inpatients and the model of service that has been developed to make the service sustainable and cost effective for Department of Health, whilst exceeding the minimum requirements for patient outcomes.

32.Complex wheelchair controls for clients with neuromuscular degenerative disorders and high level spinal cord Injuries

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ABSTRACT

Speciality input devices such as chin operated joystick and head switches enable those with significant physical limitations to operate assistive devices such as power wheelchairs, augmentative communication devices and environmental controls to enable independence over their mobility, communication and immediate environment.

The Rehabilitation Engineering Clinic (REC) has been a pioneer in designing and developing custom assistive and mobility products for over 35 years in WA. The clinic has prescribed and set up complex mobility solutions for over 100 clients with high level spinal cord injuries, motor neuron disease, multiple sclerosis etc. and this session outlines clinical factors that need to be considered when setting up this complex technology and demonstrates some of the systems that the Rehabilitation Engineering Clinic has been instrumental in developing

The learning objectives of this session include:

- Awareness of assessment and prescription process utilised by staff at the REC for complex wheelchair operation for people with significant physical disability such as high level spinal cord injuries and neuromuscular disorders (Motor Neurone Disease, Multiple sclerosis etc.)
- Understanding the use of the motorised electric arm used in conjunction with the proportional chin joystick
- Demonstration of the use of head array / switch set up for wheelchair control
- Awareness of programming parameters that can be adjusted according to individual ability of the wheelchair user
- Awareness of individual custom made devices that can be fabricated (eg. 3D printed joysticks)
- Awareness of Bluetooth and infrared capabilities of power wheelchair controllers and how this can enhance independence

SUMMARY

Speciality input devices such as chin operated joystick and head switches enable those with significant physical limitations to operate assistive technology such as power wheelchairs. This session outlines clinical factors that need to be considered to identify the user abilities and optimising the various wheelchair electronics when setting up this complex technology

33.An adapted control system for remote controlled vehicles

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ABSTRACT

Sargood on Collaroy is a luxury resort for people with spinal cord injury, and runs a recreational activities program, of which remote-controlled sports are a regular feature. The standard controllers provided with remote-controlled vehicles (cars, boats, drones, planes, helicopters) are designed for use by people with intact hand function, and usually require a high degree of finger and thumb dexterity to operate them. People with limited or no hand function can find it difficult or impossible to use these controllers, and can thus be excluded from this recreational pursuit.

This paper presents a control system that has been designed to circumvent these barriers. Centring around an Arduino-based signal translator, the system is able to take controls from an array of gaming-oriented input devices (e.g. standard XBOX controller, XBOX Adaptive Controller, Quadstick, Warfighter Engaged joysticks, FreedomWing) and use them to operate standard remote-controlled vehicles.

The system is not commercially available as a complete solution, but is built from commercially available parts that are assembled by the end user. Two-channel devices such as cars and boats are easily controlled; operation of vehicles with more than two channels (drones, planes, helicopters) is possible but more complex. A video is available on the internet that instructs users as to what components they require, and the steps to assemble them.

Providing such a control system allows users with limited or no hand function (but at least some head and mouth movement) to fully participate in remote-controlled sports as part of the recreational program at Sargood on Collaroy, and even alongside able-bodied peers in community-based remote-controlled sports groups.

SUMMARY

This paper presents an Arduino-based, adapted control system that has been designed to allow people with limited or no hand function to use gaming-oriented input devices (XBOX Adaptive Controller, Quadstick) to operate standard remote-controlled vehicles.

34. ActivATing potential: Embedding a capable Assistive Technology Assessor workforce within Interdisciplinary practice

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ABSTRACT

Participants of the National Disability Insurance Scheme continue to drive a demand for a responsive and capable Assistive Technology workforce. When an Assistive Technology assessor is embedded within an interdisciplinary therapy team, we can support a person to live a good, everyday life.

Everyday Independence has incorporated an Assistive Technology education and training framework within our interdisciplinary practice. This has included:

- Developing a clearly defined Scope of Practice for Assistive Technology Assessors
- Interdisciplinary and discipline- specific Assistive Technology training programs combining on-demand and live training content
- Embedding Assistive Technology support into our mentoring program which is accessible to all clinicians
- Creating career progression pathways for clinicians who want to focus on providing high cost and high complexity Assistive Technology services

Our Assistive Technology Assessors are part of a tight knit, highly collaborative therapy team that can wrap a range of supports around a person and adapt to changing goals and priorities as people transition through different life stages. The success of the Assistive Technology solution is supported by the interdisciplinary team approach. The Assistive Technology solution becomes one of the many strategies that we implement to support people to achieve life changing outcomes.

This strategy has allowed us to create opportunities for service users to access trained Assistive Technology assessors across most of our therapy hubs Australia- wide. This means that service users can access timely support, team members can have Assistive Technology assessors available on demand, and services can be provided in a more holistic and person-centred manner.

Join us to unpack our wins, lessons learnt and vision for the future, where responsive and capable Assistive Technology services can be embedded into an interdisciplinary approach to therapy. We believe this will support people to get the right support, at the right time, so they can continue to live a good, everyday life.

SUMMARY

Everyday Independence has embedded an Assistive Technology training and credentialling framework within our interdisciplinary practice. Join us to unpack our wins, lessons learnt and vision for the future, where responsive and capable Assistive Technology services can be embedded into an interdisciplinary approach to therapy.

35.Goal Attainment Scaling in an Assistive Technology Service

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ABSTRACT

Person-centred goal setting has the potential to improve a client's engagement in assistive technology provision, improve outcomes and improve team efficiency. This presentation describes an implementation strategy and early results of clinician uptake of Goal Attainment Scaling (GAS) at the Rehabilitation Engineering Centre (REC) in Brisbane. With a purview of improving quality of life for people with disabilities, REC provides advice and builds or modifies assistive technology (AT) and mobility equipment to suit clients' personal needs.

The REC uses a person-centred approach to goal setting by working collaboratively with the client to develop an individualised goal related to their AT equipment and its intended use. The goal should be functional, meaningful, and important to the client on intake. For example: *Sophie's posture is supported in her wheelchair so that she can attend school.* GAS has been implemented to objectively document and determine the level of achievement of a client's individualised goals - the client trials their new equipment, and the outcome is scored in terms of whether the goal was met as expected using a 6-point scale at program end. After years of practising the GAS approach at REC, data audit (of 2018 calendar year) revealed a general trend toward impairment (rather than function) based goals, and a GAS completion rate of only 15%, indicating a strong need for change.

In 2020-21 REC was awarded project funding from Allied Health – Translating Research into Practice (AHTRIP), to examine the effectiveness of the goal setting process and use of GAS as an outcome measure at REC, from which the following was completed:

- A literature review and focus group discussion to determine whether GAS was the most appropriate outcomes measurement tool for REC.
1. The barriers / enablers to implementing GAS were determined guided by behaviour change theory, including structured interviews of the clinical team using the Capability, Opportunity, Motivation, Behaviour (COM-B) model.
2. A "Task List" of strategies to facilitate improvement in implementation of GAS were collaboratively developed with the clinical team, which included database and data collection re-design, consumer guided protocol updates, clinician education and data feedback sessions.

To date, the first intervention strategy – database and data collection re-design – has been completed. The changes made have enabled clinicians to enter GAS data more quickly and easily and review their monthly progress. Comparing sample data from the same month pre-intervention (April, 2021) to post-intervention (April, 2022), there has been an increase in recorded instances of goal setting from 17% to 60%. The next step is to engage clinicians and consumers in workshopping a double-barrelled goal setting approach, which includes both the impairment being addressed and

the function being enabled. This presentation describes the methodology, implementation strategies, and early successes of implementing GAS for AT provision in an Allied Health setting.

SUMMARY

Person-centred goal setting has the potential to improve a client's engagement in assistive technology provision, improve outcomes and improve team efficiency. This presentation describes an implementation strategy and promising results of clinician uptake of Goal Attainment Scaling at Brisbane's Rehabilitation Engineering Centre.

36. Trial of gamification using non-immersive virtual reality on fitness training following traumatic brain injury: Co-design of a cycling game with an elite BMX athlete

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ABSTRACT

Background: Reduced cardiorespiratory fitness is a common secondary impairment for people who have sustained a severe traumatic brain injury (TBI). The consequences of reduced fitness include reduced participation in work, recreational and daily activities due to fatigue and an increased risk of morbidity and mortality. Fitness training has been shown to improve cardiorespiratory fitness in adults after TBI, however, effective fitness training through provision of sufficient exercise dosage, is not routinely delivered in rehabilitation. Reasons for this challenge include physical (e.g. muscle weakness), cognitive (e.g. reduced attention) and behavioural (e.g. reduced motivation) impairments commonly seen after TBI.

Aims: To develop a non-immersive virtual reality (VR) fitness training platform for a stationary bike to increase engagement in training and therefore increase time in heart rate (HR) training zone for adults with TBI.

Methods: A co-design methodology was employed with an elite BMX athlete who experienced an extremely severe TBI, and his family. The novel VR platform was designed in a process of meaningful goal setting and tailored to return-to-sport by simulating competitive cycling. It involved an extensive and collaborative approach to testing and redesign through partnerships between health professionals and engineering and information technology academics. The platform is being evaluated using a single case experimental design case series (n=10).

Results: Using a withdrawal/reversal design, initial piloting (n=1) found higher levels of engagement and effort during the VR phases compared to usual care.

Discussion: The benefits of using a co-design approach, is that it incorporates feedback from all key stakeholders to facilitate an end product that is goal-centric and intuitive to use. This highlights considerations for return to sport after traumatic brain injury and also highlights emerging research and industry collaboration that could impact future clinical practice in traumatic brain injury rehabilitation.

Future directions/sustainability: A study is underway to develop a non-immersive VR treadmill training platform for adults with TBI with which a single-case experimental design case series will be conducted.

Key take home message/conclusion: The non-immersive VR bike fitness training platform shows initial promise in fitness training with TBI.

SUMMARY

Insight into the development of a non-immersive virtual reality (VR) stationary bike fitness training platform through co-design with an elite BMX athlete and its evaluation using a single case experimental design case series in increasing engagement and effort in fitness training in adults with traumatic brain injury.

37. Design and development of a motivational chatbot for brain injury rehabilitation

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ABSTRACT

Adults with traumatic brain injury can experience many symptoms including functional impairments, decreased memory, and low motivation. Recovery following traumatic brain injury is possible due to the physiological mechanism of neuroplasticity – a process in which the brain forms new neuronal connections in response to rehabilitative training. Recovery is supported through multi-disciplinary, brain injury rehabilitation, in which client-centred goals are pursued. However, rehabilitation care is time limited. Additionally, clients may experience low motivation. Novel care approaches which leverage service provision and support client motivation are needed.

Conversational agents – or chatbots – which provide a personal, human-computer conversation interface, can be designed support the user in a focused task with motivational content. Specific motivational approaches have been applied to chatbot design including Motivational Interviewing, and Self-Determination Theory which has been recommended for human-centred design of digital technologies including chatbots. Motivational Interviewing and Self-Determination Theory have also been recommended for supporting motivation in brain injury rehabilitation.

This presentation outlines the co-design, development, and initial evaluation of a motivational embodied conversational agent – or avatar chatbot – for brain injury rehabilitation, called RehabChat. This is the first time an avatar chatbot has been developed for this purpose. Key considerations for developing RehabChat were addressing the clinical needs of clients with traumatic brain injury; contextualizing RehabChat to the clinical setting; and integrating aspects of Self-Determination Theory and Motivational Interviewing within its content. This research incorporated iterative consultation with key stakeholders and intended end users utilising the Living Laboratory methodology, including co-design with clinicians and clients, and testing of the avatar chatbot in the real-life setting (two ambulatory care clinics, and the client's home environment).

Three development phases for RehabChat were conducted to optimise its feasibility and acceptability: in-house development and testing, co-design workshops, and a mixed methods feasibility pilot trial. The initial prototype model was developed in-house using Clevertar Pty Ltd software, and then tested through alpha testing – to check for glitches and general usability –, and beta testing to detect any technical disjunctions and to gather feedback regarding its intended use in brain injury rehabilitation.

For the co-design workshops and the feasibility pilot trial, full ethics approval was gained, and clients and clinicians of the collaborating clinics were recruited. Four rounds of co-design workshops were conducted comprising three cohorts (current clients, discharged clients and clinicians). Separate meetings were conducted for each cohort for the first three rounds, followed by one final fourth workshop meeting comprising all cohorts. Changes were made to RehabChat in response to participant feedback. RehabChat was then thoroughly checked in two cycles of technical testing. The refined stable prototype of RehabChat contained goal-setting and -pursuit dialogues, and cues for completing practice activities at home. This prototype was then used with clinician oversight in the feasibility pilot trial.

For the mixed methods feasibility pilot trial, client-clinician pairs completed a two-week intervention using RehabChat alongside usual rehabilitation care. Participants' interview feedback and System Usability Scale

scores indicated that RehabChat was motivational and easy to use alongside usual care, and highlighted suggestions for future development of RehabChat.

SUMMARY

Adults with traumatic brain injury can experience low motivation during recovery, and rehabilitation is time-limited. Novel approaches are needed to support motivation and leverage care. We report the design and development of a motivational chatbot for brain injury rehabilitation. End-user feedback indicates RehabChat supports motivation and is easy to use.

38.AT Chat model of assistive technology mentoring

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ABSTRACT

AT Chat is a peer-led, co-designed online community for assistive technology (AT) users to share information and lived experience about AT. Our purpose is to increase capability and confidence of people with disability to make AT decisions through access to peer support and peer-led information.

AT Chat achieves its purpose through two workstreams:
- Our peer-led information products, that show people using assistive technology to Live, Play, Work, and
1. Our Peer Support initiatives, where we provide a space for people with disability to seek and offer support to each other. Within our peer support stream, we have Chatterbox and AT Mentoring:
    a. Chatterbox is a Facebook group, open exclusively to AT users and it provides a safe and supportive space to ask questions, share information and chat with other AT users. We have over 1200 people within this online community.
    b. AT Mentoring provides people with personalised AT solutions that aligns with their goal setting and enables decision making in relation to assistive technology.

AT Chat successfully piloted AT Mentoring in 2020, using a living labs method to explore the evidence base and to design and test a service deliver model. This involved an online survey and focus groups, followed by a user driven prototyping session to explore how AT users would see AT Mentoring being delivered. Further co-design activities were undertaken, and these iterations led to the final AT Mentoring model and guided the pilot conducted in early 2020.

Evaluation data from the Pilot demonstrates all mentees reported an increased opportunity to be able to **access** unbiased information about AT, an increased sense of **choice and control**, **empowerment** to independently source information, construct an AT solution, and make informed decisions and an improved general **self-efficacy** following the pilot. The quality of the peer mentor service model was also evaluated in line with the AT Service Quality Indicators and Procter's' Implementation steps. The model has been further co-developed over 2021-2022, with two AT Users employed to deliver AT Mentoring.

Recent changes to the NDIS mean AT Mentors, who have a recognised qualification in assistive technology, are included in the list of qualified people who can provide written advice to support the purchase of low to mid-level AT priced under $15000. This creates a significant market for AT Mentors in Australia. AT Chat is currently exploring business models that support the expansion of AT Mentoring services across Australia.

AT Chat represents an important enactment of co-production in the AT arena. Our AT Mentoring is evidence based and has successfully developed roles for AT Mentors to be integrated according to

the good practice AT service delivery. This presentation will share the service deliver framework developed to support quality AT Mentoring in Australia.

SUMMARY

Qualified AT Mentors can now provide written advice to support the purchase of AT under $15000 in a NDIS participant's plan. AT Chat successfully piloted AT Mentoring in 2020, testing a service delivery model that explored scope-of-practice and risk. We present findings and future directions for AT Mentoring in Australia.

39.LiveUp and the LifeCurve – supporting older people to maintain or regain activities of daily living through reablement and AT

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ABSTRACT

WHO defines healthy ageing as "the process of developing and maintaining the functional ability that enables wellbeing in older age" The 2015 WHO World Report on Ageing and Health examined the latest evidence about the ageing process, emphasising that healthy ageing is more than the absence of disease, for most older people, the maintenance of functional ability has the highest importance.

Further, research suggests that only around 25-30% of the age-related decline is due to genetics, the rest being linked to lifestyle choices and socio-economic factors. Over the past 20 years, research shows the benefits of focusing on supporting, as much as possible, an individual's continued independence, minimising decline through a "doing with" rather than "doing for" approach.

Subject to the ability and motivation of the individual, the best order for interventions based on the research is to maintain or recover, that is, **re-able** an individual through interventions such as strength, mobility and balance programs, exercise, regaining confidence or skills through practice and learning new ways to do everyday activities. Next comes **compensate**, when interventions such as properly matched assistive technology (AT) or home modifications (HM) are considered to support an individual to compensate for any difficulties but still be as independent as possible.

The AHA Review of Assistive Technology (AT) in Australia however, concluded that consumers understanding of AT is often poor, with many unaware of how AT can assist them with their activities of daily living (ADL). Often low-risk AT, purchased off-the-shelf, was abandoned, or stigma associated with ageing prevented consumers from accessing AT at a stage when low-level AT products were most appropriate.
In response, iLA (funded by Commonwealth Department of Health) launched LiveUp, a website designed to provide free, independent, and easily accessible information and advice to older consumers to improve their access to AT, better enabling them to maintain or improve their independence at home. A key component of LiveUp is to reduce age-related sigma including in relation to AT, and support AT decision making.

Research conducted by Gore et al (2018) shows we can predict how well we are ageing by our continued ability to perform 19 specific ADL's. A framework called the LifeCurve™ based on this research shows how people decline sequentially in their capacity to independently manage ADL's. It also illustrates how any decline rate can be positively impacted by behaviour and intervention.

www.LiveUp.org.au brings LifeCurve™ to Australia as a digital behaviour change intervention.

LiveUp reinforces reablement, encouraging older people to set personalised goals to maintain or regain ADL's. The LifeCurve guides older people through tailored strategies, such as exercise and recommended AT to achieve their goals. The LifeCurve centres the older person as chief goal setter whilst providing clear actions that result in optimised function and well-being.

This presentation will explore how the LifeCurve can support two older people (based on personas) to maintain or regain ADL's through reablement and AT. Evaluation of LiveUp in Australia is being conducted by Monash RAILS teams with preliminary results presented.

SUMMARY
www.LiveUp.org.au brings LifeCurve™ to Australia to enable older people to set personalised goals to maintain or regain activities of daily living (ADLs), guiding people through tailored strategies, including assistive technology. This presentation will demonstrate how the LifeCurve can support older people to maintain or regain ADL's through reablement and AT.

40. Pressure cushion performance on armchairs – identifying a buttock analogue for older adults.

Authors: Michele Verdonck, Gavin Brealey, Kieran Broome, Selvan Pather

ABSTRACT

The use of pressure redistribution cushions in the community is widespread, however little evidence is available to support clinicians and policy makers to determine which pressure redistribution cushions are clinically effective when used at home on a client's own armchair. This is in contrast to the use of pressure redistribution cushions on wheelchairs. A 2017 survey of clients in community and outpatient services in NSW found a pressure injury prevalence of 9.3%, further this survey found that these pressure injuries were significantly more severe than those occurring in an inpatient setting. They reported that the most likely place for pressure injury was the buttocks and sacrum. These findings support the need for research in this area (Clinical Excellence Commission 2018). Our study follows two smaller pilot studies conducted in 2016 and 2022.

This presentation reports the outcomes of a small study completed as part of a Masters by research study. The goal of which is seeking to determine if pressure cushion performance on armchairs can be accurately predicted using easily measured physical properties of armchairs.

In this study seated buttock and thigh interface pressure was measured for 10 older adults (aged 66 – 86) when seated in one of 3 armchairs, and on each of 5 commercially available pressure redistribution cushions. The armchairs were purchased from a second-hand shop so as to closely represent a variety of armchairs utilised by clients in the community.

The 5 cushions utilised in the study were a; Roho Quattro (Air); a Repose (Air), an Equagel (Solid gel matrix), an active gel segment (semi-Liquid gel) and a Foam cushion (Foam). These were chosen to replicate those currently in use in Metro North Community Occupational Therapy practice. These 5 cushions cover a broad range of construction types and materials.

This provided data sets for 150 experimental conditions. Interface pressure measurements were recorded using a Boditrak pressure map, set to record 0-200mmHG, at a single representative point in time. Pressure was measured 3 times successively for each data combination of volunteer; chair: pressure redistribution cushion – providing 450 discrete data sets.

The results were exported from the Boditrak software FSA 4.1 to Excel where they were formatted for use in the SPSS version 28. They were then analysed using multiple statistical techniques, for normally distributed data. Linear regression was used and for non-linear data Friedman's tests were conducted.

The results collected demonstrated several consistent patterns across all 3 armchairs and clients. These showed that the 5 cushions performed significantly differently than what would be expected if used on a Wheelchair, there were also other surprising results pertaining to participant factors.

The results of this study reinforce the need for further research in this area to ensure that prescribed pressure redistribution cushions decrease measured IP. There is a possible risk that when compared to using

the armchair itself without a cushion, using a cushion designed for wheelchairs can negatively impact the performance of armchairs.

SUMMARY (50 word summary to be included in the program)

Five pressure redistribution cushions were used to compare interface pressure measurements for 10 older adults when used on 3 different armchairs, conducted as part of a larger research program.
Results collected demonstrated several consistent patterns across all 3 armchairs and clients different to those expected in wheelchair use.

41.Understanding vehicle solution assessments

Amin Akbarian (amin@mobilityengineering.com.au)

ABSTRACT

We all have different abilities and needs for vehicle transport however the way a vehicle works always remains the same, the vehicle gets you from point A to point B. Throughout the journey inside of the vehicle we may either be a driver or a passenger, then if you are a passenger the position within the vehicle can differ depending on your preference. All of this then needs to be done in a way that is safe and meets the Road Transport regulations.

Matching a participant needs, seating position preference, vehicle type and personal needs within a safe vehicle solution that meets the regulations can be quite complex and daunting. We have developed this presentation to help guide you through this process.

This session will explore the various vehicle solutions available on the market and matching them to participants specific transport needs. Throughout each vehicle section there will be an overview of the relevant regulations and standards with their applicability criteria. Depending on the position in the vehicle and participant needs various parties will need to come together to ensure the solutions meet the safety regulations as well as the NDIS funding criteria.

SUMMARY (50 word summary to be included in the program)

Learning Objectives:
- Understanding the assessment process for vehicle prescribed Assistive Technology
1. Identifying the solution that will meet a client's specific needs
2. Understanding the safety regulations and standards applicable
3. Identifying the various people who will need to be involved through the solutions process

42.Informing better manual wheelchair training: exchanging evidence and practice knowledge

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ABSTRACT

This dynamic session shares a current PhD journey aiming to improve community participation outcomes for people becoming manual wheelchair users later in life.

Evidence demonstrates wheelchair training is pivotal for the safety, independence and community participation of wheelchair users. Multiple training programs designed to support independent wheelchair use exist, however, many wheelchair users and their carers continue to receive insufficient training or training that is not fit for purpose for a significant proportion of people who come to use a wheelchair later in life. This limits user's skills and confidence, social interaction opportunities, psychological wellbeing and quality of life, as well as heightening the likelihood of wheelchair related injuries and creating deeper dependence on carers or family members.

Current International and Australian evidence from scoping reviews and wheelchair training pilot programs will be presented, outlining potential barriers and enablers of wheelchair training. Delegates will be invited to review the current evidence and share their practice knowledge on key points throughout the session via digital polling. This will contribute to a rich picture of stakeholder perspectives about the barriers and enablers to mastery of wheelchair use in the community.

Having an increased understanding of barriers and enablers of wheelchair training approaches will help form recommendations towards better approaches to support community participation outcomes that are achievable for health professionals and wheelchair users.

50 word summary

For people with mobility restrictions obtaining an appropriate wheelchair and associated training can be life changing. This dynamic session shares evidence from a scoping review on barriers and enablers of manual wheelchair training and uses digital polling to seek delegates' 'practice-based evidence' on key factors.

43. Assistive Technology Solutions training after graduation - a fresh look through a participatory action research lens

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ABSTRACT

The professions involved in providing assistive technology (AT) solutions are broad and can include occupational therapists, rehabilitation and vocational counsellors, speech pathologists, physiotherapists, rehabilitation and other engineers, prosthetists, social workers, researchers, assistive technology specialists, computer specialists, manufacturers, and suppliers (Dicianno et. al., 2019; Jans & Scherer, 2006).

Consequently, AT training needs are wide ranging, whilst also being interdisciplinary (Fifield & Fifield, 1997). De Witte et al (2018, p.470) agree that "professionals involved must have the knowledge and skills needed to properly meet the user needs". Competence is about the availability of knowledge, skills and experience necessary to serve the client; and opportunities for ongoing training and professional development need to be explored (Layton et. al., 2015). It is recognised that "support, training and education for prescribers, distributors, users, and their carers is vital in the adoption and use of AT" and that "evidence indicates a need for comprehensive education in the AT field (Manship, 2020, p.91).

Across available literature, barriers to achieving or implementing sustainable AT solutions training and education are reasonably consistent over time. Barriers include lack of funding for training, equipment, and AT devices, difficulties getting training information to audiences (e.g., marketing the training), a need for more hands-on training (Jans & Scherer, 2006, p.73), "inconsistent provision and quality, lack of evaluation, shortage of qualified professionals to teach, and the increasingly rapid development of the technologies" (Manship 2020, p.91). There are examples of AT solutions training to be found via continuing professional development offered by peak bodies, suppliers and registered training organisations. However, the rapid change in service funding models and the rise of the small to medium size business sector has eroded many of the 'on the job' mentoring and training opportunities available to new graduates, further exacerbating potential difficulty developing their ongoing AT solution skills.

Literature specific to the training barriers present in the South Australian context was not able to be located, however anecdotally there are reports of a gap in training options. The gap highlighted the need to consult key stakeholders with experience and knowledge of the South Australian AT solutions environment to come together to reflect on what AT solutions training and education is, and is not, currently being provided for new allied health graduates and how the post graduate training and education gap may be addressed in innovative ways.

This participatory action research project invited interdisciplinary lived experience experts and AT solution professionals to join in an exploration of the barriers and enablers present in South Australian context. Three rounds of focus group sessions involving activities to identify, discuss and

reflect on the current situational context and identify possible options, with each iteration resulting in narrowing down potential actionable training options to address the gap. In between sessions, data synthesis and analysis of the previous rounds is presented back to the participants, for reflection and comment before the next session. Consideration of these elements aim to facilitate the generation of possible training solutions for the workforce, ensuring consumer focused outcomes are achieved.

SUMMARY

Assistive technology (AT) solutions training needs are diverse and interdisciplinary, while barriers to implementing sustainable training and education exist. This participatory action research invited lived experience and interdisciplinary participants to explore barriers and enablers to training, aiming to identify possible training solutions for the workforce, ensuring consumer outcomes are achieved.

44. Exploring the potential of mainstream technology to assist those with deafblindness to achieve their individual goals.

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ABSTRACT
Mainstream technology is commonplace and there is potential for the deafblind population to utilise this. Yet there are multiple factors that may hinder successful uptake, causing a 'digital divide' and isolation from society. This project has been designed to measure not only the potential of mainstream technologies to enable achievement of deafblind user goals but identify barriers to uptake and successful use while considering participants disability and the availability and effectiveness of formal and informal supports.

Through Swinburne University of Technology in partnership with Able Australia, a planned research cohort of 20 individuals will be invited to participate, with multiple single-case study design methodology.

Case study presentation will outline factors that influenced whether a participant was able to achieve their technology goals and will conclude with suggestions on how the systems that support Deafblind people could be improved.

Over a three year period, research will involve:

- Initial interviews to establish participant goals and barriers to achievement, using the Canadian Occupational Performance Measure (COPM), Technology acceptance questionnaire and tactile working memory scale.
1. Individual trialling and real-time tracking of mainstream technology use and the role of routine formal (therapist, house staff) and informal (family and friends).
2. Follow-up interviews using same tools as initial interviews.
3. Data analysis using mixed methodology framework

Upon completion, this study will have obtained a rich source of data around the technology experiences of those with deafblindness. Results will reveal the influencing variables and gaps in resources. This research can be used to advocate for better supports around technology use for those with deafblindness.

Mainstream technology offers endless opportunities to assist people to connect, communicate and increase their participation in community and society. People with deafblindness at present experience a multitude of barriers to accessing the tech that may assist them. Findings from this project will contribute a rich data pool from individual participants to demonstrate the resource gaps and advocate for further research and funding in this area.

SUMMARY The project seeks to investigate mainstream technology as a potential tool to increase accessibility, autonomy, and communication for those with deafblindness and their support networks. This will be achieved through interviews and technology testing to see the potential of mainstream technology to contribute to achieving goals as set out by participants.

45.Virtual Reality as a remote rehabilitation tool; systematic review and co-design of a potential solution

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ABSTRACT

Introduction: Virtual Reality (VR) is a multimodal sensory experience, where users immerse themselves in a virtual world, where the senses are disrupted, and the user can be transformed into a world where they perform activities such as exercise in a stimulating way. VR has been utilised in simulations and training since the 1960s but has become increasingly mainstream as a technology since the mid-2000s. This is due to the increasing accessibility of both operating systems and hardware. As a gaming technology, VR is now mainstream, and it is becoming increasingly recognised as an effective simulation technique in training health professionals, however, is still considered outside mainstream in the delivery of health and rehabilitation.

Method: We undertook a systematic review of the use of VR to address the issue of remote rehabilitation of people experiencing chronic pain. Inclusion criteria included adults living with chronic pain, interventions that utilised Virtual or other reality methodologies as a rehabilitation tool and intervention studies. Literature reviews and opinion pieces were excluded. Both qualitative and quantitative methodologies were included to ensure that the breadth of the area was covered. Alongside the systematic review, we undertook a development project to co-design VR games that directly addressed the needs of end users (people with chronic pain), in order to produce a suite of games that have the potential for remote delivery of targeted intervention.

Results: Despite the increasing number of publications in the topic area of rehabilitation and virtual reality, the quality of research on which these papers are based remains generally low, and concentrates on a few people. Missing is the translation into delivery in remote setting and integration with other techniques or technologies. VR solutions for rehabilitation are often retrospectively applied to existing programs, which affects both the fidelity of the experience and its effectiveness. By co-designing a suite of virtual reality games with clinicians and end-users, we have produced VR that can be rapidly translated into remote clinical and rehabilitation practice.

Discussion: There has been an explosion of literature in virtual reality for health and rehabilitation over the past 2-3 years. This may be a result of the immediate need for telerehabilitation due to the COVID19 pandemic, the increased development of the field, including the availability and accessibility of both developers and technology, or most likely a combination of both.

In this paper we will present the current state of evidence on which to base the remote delivery of VR as a rehabilitation technique, together with a framework for co-design of VR technologies.

SUMMARY
Virtual and other associated reality modems have potential for remote delivery of health and rehabilitation. Despite an explosion of literature over the past 3 years, the evidence of translation into practice remains scant. We present the current state of the literature with regards to VR rehabilitation and present a

framework for the co-development and evaluation of a suite of VR games directly designed to address the issue of rehabilitation for chronic pain in a remote environment.

46.MedTechVic: Developing a co-design method for development and evaluation of enabling technologies

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ABSTRACT

Introduction: MedTech Vic is an initiative originally funded by the Victorian Government to seed fund co-design of enabling and assistive technologies. The aim of the co-design process is to provide user-focussed solutions that are locally sourced, innovative, useful, and useable, co-created and co-evaluated but also desirable for the end user.

There are approximately 3.9 million people living with a disability in Australia and approximately 4.2 million of us are aged over 65, many of whom will need technologies to support participation, leading a dignified life and accessing education, work and communities. Traditional technologies are often either retrofitted to people with different needs or designed by people without knowledge of the end-users desires.

We have developed a framework that includes co-design opportunities at all levels, including 'blue sky' as well as pragmatic and short-term solutions. The framework consists of an Enabling technologies platform, to provide physical space in a Living AT facility and a Volumetric Capture (VolCap) facility. The Living AT facility is a co-designed co-creation space which is configured for maximum flexibility and accessibility. Volumetric capture is a mechanism of recording physical place, object, person or event in a way that makes it appear 3 dimensional, and can therefore be utilised in enabling one to visualise oneself in a space.

Conducted in these facilities are a user engaged, research lead and industry enabled Challenge Program, where end users pose challenges that are then workshopped in co-creation challenge workshops. These workshops then lead to the development of prototypes – either physical or digital as a platform for further development with industry.

Two further elements are essential – firstly a clinical innovation program, which is an 8 week program developed for allied health professionals and clinicians with the aim of creating a network of people to advise companies on co-design from a clinical standpoint. Finally, underpinning it all is the development of a skills program and lived experience network; developing a network of people with lived experience who can consult on every stage of development of products and services to explore best practice. When co-designing with end users at all stages, products and services that re able to address a real, rather than an assumed need is paramount.

This paper will present the framework surrounding the development of MedTech Vic together with the learnings gained from working with non-traditional collaborative partners.

SUMMARY

MedTechVic is a collaborative program focussing on end-users of enabling technology to co-create and co-evaluate products and services. It consists of both physical platforms as well as collaborative multidisciplinary challenge projects and innovative skills development programs. This presentation reports on our learnings and presents a framework for future co-design work.

47. Pacific Wayfinders Mentoring Programme - Strengthening rehabilitation and assistive technology sectors in Pacific Island Countries

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ABSTRACT

Background

The need for quality continuous professional development opportunities, including mentoring, was first identified by Pacific Island country health workers at the 2019 Pacific Rehabilitation and Mobility Conference held in Nadi, Fiji. Motivation Australia, an Australian not for profit international development organisation conducted a Continuous Professional Development (CPD) and Online Learning survey in 2020. 34% of 50 health workers in Pacific Island countries surveyed indicated that they would learn best from one-on-one mentoring. In the same survey, 98% (49/50) of 50 health workers surveyed indicated they were interested in group mentoring sessions with other health professionals in Pacific Island countries.

There is a growing health and rehabilitation workforce across Pacific Island countries. By providing an opportunity for them to collaborate with other professionals outside their own country, Motivation Australia aims to strengthen the capacity of this workforce and provide opportunities for personal and professional growth for mentees and mentors alike. In 2020, the Pacific Wayfinders mentoring program was established and a first cohort of 15 mentor-mentee pairs participated in the programme.

What is the mentoring programme?

The Pacific Wayfinders mentoring programme pairs personnel working in the health and rehabilitation sectors in Pacific Island countries with experienced health professionals, advocates, organisational leaders and other professionals in other Pacific Island countries, Australia and New Zealand. This gives mentees an opportunity to meet, communicate, interact with, learn and share with leaders in their field.

The Pacific Wayfinders mentoring programme was piloted in 2020/21 to develop the professional and personal skills of health workers and health service managers working in Pacific Island countries. The pilot was highly successful and participants in the mentoring programme have encouraged and supported Motivation Australia to continue offering the Pacific Wayfinders mentoring programme. Build on feedback and learnings from the first and second round and recommendations from an external evaluation, the Pacific Wayfinders Mentoring Programme is currently recruiting into its third cohort of mentor-mentee pairs.

The session is presented by participants from the mentoring programme cohort together with Motivation Australia staff.

The presentation will highlight:

- The structure, delivery modality and content of the programme

1. Experiences, feed-back and recommendations from cohort 1 and 2 of the programme
2. Stories from mentoring pair participants about programme impact
3. Opportunities for professionals in Australia to get involved

SUMMARY

Motivation Australia's Pacific Wayfinders mentoring programme responds to a need for targeted continuous professional development for workers in the health and rehabilitation sectors in Pacific Island countries. The presentation will share experiences and highlights how the programme provides a mutually beneficial learning opportunity for both, mentees and mentors.

48. Strengthening capabilities through training in assistive products: the WHO TAP approach

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ABSTRACT

The 2022 WHO/ UNICEF Global Report on Assistive Technology outlines the critical role of assistive products for an estimated 2.5 billion people globally. Assistive technology is made up of both products and services, and service steps to support selection, fitting, use and follow up are vital for safe and effective product use.

To tackle unmet need for both assistive products and services, the World Health Organization has a number of global initiatives underway. This paper focusses on the WHO Training in Assistive Products (TAP) initiative.

What is TAP?

TAP is a flexible, modular training resource designed to be tailored to support the integration of assistive technology into health systems by training personnel in the provision of assistive products. This is achieved by blending online learning with clinical practice, supported by local mentors to build competencies for the referral and provision of assistive products. TAP empowers users of assistive products directly through the provision of readily accessible information about basic assistive products. TAP equips community level workers with the knowledge and skills to enable them to provide a range of simple assistive products.

Consistent with an ecosystem view of assistive technology, TAP delivery requires service systems to be in place, including a supply of assistive products. The TAP platform includes supporting resources for managers and supervisors, to support implementation into existing services.

Developed and piloted across 8 countries (Fiji, Ghana, India, Iraq, Liberia, Papua New Guinea, Romania, Tajikistan), TAP will be launched in October 2022 and available to the assistive technology community in multiple languages.

The session is presented by people from Australia, PNG and Fiji who were part of the TAP development and piloting process, who will introduce TAP to an Australian audience and cover:

- The WHO's Priority Assistive Products List and the TAP range of assistive products to support cognition, communication, vision, hearing, self-care and mobility
1. The TAP modules and how personnel may select the modules that match their role and the needs of the local population
2. The structure of the TAP self-paced modules

3. Facilitation strategies (individual and group, and interactive elements)
4. Face to face learning elements (local mentors; interactive group work, role play practice)
5. The design of supervised practice, supported by local mentors, until a learner is ready to practice independently.

We will discuss relevance and opportunities for Australia's assistive technology community.

SUMMARY
Training in Assistive products (TAP) is a newly launched WHO open access online learning platform, developed in response to the widespread shortage of personnel trained to provide assistive products. We introduce the training modules with their 'four step' approach to safe and appropriate AT provision, and discuss relevance for Australia.

TAP References:
- World Health Organization 2022, 'TAP – Training in Assistive Products', available at: https://www.who.int/teams/health-product-policy-and-standards/assistive-and-medical-technology/assistive-technology/training-in-products
- World Health Organization 2022, 'Training in Safe and Effective Provision of Assistive Products', available at: https://www.gate-tap.org/about/
- Motivation Australia 2022, 'Training in Assistive Products (TAP): A WHO GATE initiative, available at: https://www.motivation.org.au/our-work/global/tap/

TAP contributors:
Core development team: Emma Tebbutt, Kylie Shae, Giulia Oggero, Ainsley Hadden, Irene Calvo, Sarah Frost, Lucie Pannell
Accessibility advisors: David Banes, E.A. Draffan and Adam Ungstad
Illustrators: Codi Ash, Ainsley Hadden, Jordan Bang
Film makers: Julie Desnoulez, Human Study
Website development: Physiopedia
Development partners: Human Study, Mobility India, Motivation Australia

49.Did we consider the shoulder?

Rachel Fabiniak (Rachel.Fabiniak@permobil.com)

ABSTRACT

Manual wheelchair users are dependent on their upper limbs for propelling a chair, with their shoulders being vulnerable to injury due to a variety of reasons.   Understanding the implications of shoulder dysfunction can assist with wheelchair prescription and appropriate use of power mobility, to assist end users to maximise their function in the long term.
This workshop explores will touch on
-       Shoulder anatomy
-       Implications of wheelchair use on shoulder function
-       Impingement as a common cause of shoulder pain
-       Assessment and use of outcome measures

 SUMMARY

Manual wheelchair users are dependent on their upper limbs for propelling a chair, with their shoulders being vulnerable to injury. Understanding the shoulder complex anatomy, physiology and implications of dysfunction can assist with wheelchair prescription, to assist end users to maximise their function in the long term.

50.The evidence behind standing power wheelchairs

Rachel Fabiniak (Rachel.Fabiniak@permobil.com)

ABSTRACT
Standing as a therapy intervention has been broadly recognised as an effective method providing clinical outcomes and improvement of functions. Power standing wheelchairs offer great means for extending these outcomes to the home and community situation, adding additional functional and also psycho-social outcomes.
Permobil conducted a systematic review of the current state of literature on the outcomes of standing and the impact of standing with power wheelchairs. During this presentation, we will look at the results from this systematic review and understand how to bring this research into our clinical practice.

SUMMARY

Standing as an intervention is recognised as an effective method providing clinical outcomes, with power standing wheelchairs extending these outcomes in the home and community, adding additional functional and psychosocial outcomes. Permobil's systematic review of the literature and how to bring this research into clinical practice will be discussed.

51.Identification: Leading tertiary healthcare to more enabling environments

Kristen Morris (Kristen.morris@austin.org.au), Lucinda Russell, Gillean Hilton

ABSTRACT

The United Nations Convention on the Rights of Persons with Disabilities requires countries to collect data to identify and address barriers faced by persons with disabilities in exercising their rights (Article 31). Whilst Victorian Public Health Services do not currently mandate the collection of said data, anecdotal evidence suggests there are significant barriers faced by people with disability when accessing healthcare. Failure to identify, document and refer people with disability correctly and consistently may contribute to poorer health outcomes, adverse clinical events and funding shortfalls for health services.

Data drives understanding about how users of the health system are found and how they navigate their own healthcare journey. Identifying persons with disability systematically will enable opportunities to adapt and tailor our care, understand individual needs and preferences and connect appropriate resources. Utilising assistive technologies can improve the user experience.

The World Health Organisation's recently released Global report on assistive technology, identifies the assistive technology system with four key components: products, provision, personnel and policies. Often these are simple solutions within the assistive technology system. The disability liaison officer program in Victoria is building the foundation to imbed these services and enabling environments within the local healthcare system to deliver positive health experiences for people with disability. The disability liaison officer program at Austin provided support to 173 inpatients and outpatients with disabilities in the 21-22 financial year.

The session will identify some, often simple, assistive technology interventions that impacted significantly on outcomes and experiences for individuals and staff, as well as reducing length of stays. As we move through this journey, we ask the audience to contribute to the discussion and how enabling environments are being established within other health services.

SUMMARY

Data drives understanding about how users of the health system are found and how they navigate their own healthcare journey. We anticipate that systematically identifying persons with disability will enable opportunities to improve the user experience. The session will identify some, often simple, assistive technology interventions that impacted significantly on outcomes and experiences for individuals and staff.

52.Remote participation for classroom activities in special needs education

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ABSTRACT

In special needs education, there are barriers to participation in cooperative activities in society. In Japanese primary education, classroom cleaning is required to learn cooperative activities. People with physical disabilities are also required to participate in this activity. For example, wheelchair users are given brooms but cannot move them as they wish. Students with severe disabilities are not able to participate in these activities in the first place. Therefore, this study targets classroom cleaning tasks to support cooperative activities with classmates.

First, a system was implemented to remotely control the cleaning robot to engage in the activity. This system can be controlled from a tablet device to operate the robot like a radio-controlled car.

A field test was held at a special needs school with 13 elementary and middle school students with physical disabilities. Since it was found that students with hand disabilities could not operate the on-screen buttons smoothly, it was decided to modify the interface to allow students to use the interface they regularly use. In some cases, even students who were able to operate the robot had difficulty understanding the association between the direction of operation and the direction of movement of the robot. Therefore, the design of the operating UI the button design needed to be reconsidered.

The user can choose a control method that suits his/her degree of disability, such as eye gaze input for those with moderate disabilities and button operation for those with severe disabilities. In the case of gaze input, it is necessary to operate the cleaning robot while checking its position and posture. For this reason, icons for operating the robot back and forth, left and right were overlaid on the image captured by the camera. The robot can be advanced in the desired direction by gazing at the icon while keeping track of the remote view on the display screen.

In addition, buttons are placed for each direction the robot moves forward and backward, left and right, so that the robot can be operated physically. Furthermore, gamification was introduced so that the user can continue the cleaning task while having fun. Specifically, by placing items in the AR field, users can enjoy cleaning with AR game elements such as a score showdown.

In this paper, we report on the operation verification of the prototype as it has been implemented and field trials have started. We hope that the system we have developed will be used in the field of special-needs education to improve the quality of education by increasing opportunities for students to learn cooperative activities.

SUMMARY

In Japanese primary education, classroom cleaning is required to learn cooperative activities. We designed a system for students with severe disabilities to remotely control the cleaning robot. In this paper, we report on the operation verification of the prototype as it has been implemented and field trials have started.

53. The Art of Collaboration: Consumer – Therapist – Suppliers; Reducing the occurrence of AT non-use

Lauren Hunter (Lauren@Lindsrehab.com.au); John Mckenna (john@betteraccess.com.au); Craig Lindqvist (Craig@lindsrehab.com.au)

ABSTRACT
Lived Experience. How do therapist and suppliers learn from the consumers around them who have lived experience with the equipment they prescribe? How can we reflect on the good experiences and the not so good experiences we have through the prescription process to enhance every interaction with an AT consumer?

There is nothing so humbling, as collaborating with experienced people around you. Each having the opportunity to teach the other something that will forever enhance their knowledge and allow them to pass that knowledge onto the next.

Using a case example, we reflect on the collaboration process of an experienced industry figure, who also happens to be a wheelchair for the past 50+years; the supplier with whom he has a long standing relationship with; and the clinical specialist OT who used clinical experience and best practice principles to guide the consumer through todays product market, allowing him to make informed decisions about equipment and implementing daily intervention strategies which lead to the healing of a grade 4 pressure injury without bed rest.

The EnableNSW and LTCSA Guidelines for the Prescription of Seated Wheelchair or Mobility Scooter for people with Traumatic Brain Injury or Spinal Cord Injury examined research studies for the reasons why people provided with assistive technology continue to use it, do not ever use it or stop using it. This document highlights limited client participation throughout the prescription process and the client's opinion was not proactively taken into account as a reason for equipment non-use. This presentation will use the literature review in conjunction with the case study's lived experience to highlight the collaborations success through communication, relationship building, and each team member knowing their roles and responsibilities in the process.

SUMMARY
Lived Experience. How do therapist and suppliers learn from the consumers around them who have lived experience with the equipment they prescribe? How can we reflect on the good experiences and the not so good experiences we have through the prescription process to enhance every interaction with an AT consumer?

54.Managing behaviours of concern through wheelchair interventions that allow for sensory expression and enhance participation

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ABSTRACT

We all have ways in which we communicate and express ourselves. At times, individuals with disabilities are labelled as having "behaviours of concern" because their communication, sensory and functional needs are not being met. Often these individuals are also wheelchair users who become reliant on their wheelchairs not only for mobility, but for enhanced participation and socialisation through meaningful ADLs.

What happens when certain features prescribed with good intention, are used in ways that promote restrictive practices? Are there features of wheelchairs, that when appropriately prescribed, reduce agitation to enhance sensory and motor experiences for those users who have been labelled "destructive" and "difficult"?

Together, we can unravel the assessment process essential to understanding the individual in the wheelchair. We will discover intervention practices to consider, that will lead to a deeper understanding of how the features you prescribe in a wheelchair can help the goals you set to improve the quality of life for this population demographic. Explore the outcomes of the RESNA position paper on the Application of Dynamic Seating and how paper highlights evidence through peer review and literature reviews to support dynamic hardware applications in wheelchairs to promote movement and sensory engagement through thoughtful, client centred prescriptions.

SUMMARY

We all have ways in which we communicate and express ourselves. Unravel the assessment process essential to understanding the individual in the wheelchair to debunk the "challenge behaviours" labels and celebrate the "sensory expressive" individual through the review of current RESNA paper and case review of the prescription of dynamic wheelchair hardware.

55.Making for All: including people with disabilities

Kirsten Ellis (kirsten.ellis@monash.edu)

ABSTRACT

The Electronic Maker (eMaker) Movement which includes consumer electronics and digitally enhanced fabrication activities attempts to broaden participation in technology design and making to the wider community. There are a number of benefits to undertaking these activities including building technical skills, improving creative thinking and providing opportunities for problem-solving. However, people with disabilities are often excluded from these spaces because the activities are not designed to cater for their abilities or they are not perceived to be relevant or of interest. We have been creating an inclusive eMaking program that caters for people with different abilities and is customised to ensure that activities are relevant to people's interests and fun. Through custom creation of toolkits and utilising commercial products, we have created an eMaking program that includes circuit making, construction with electronics and a variety of activities for programming robots.

The custom tools we created include TapeBlocks, which are a low-cost, chunky, creative circuit-making kit that people can make from individual components which are particularly suited to people with limited motor skills. TapeBlocks can be used in a variety of ways from making light, vibration and fan circuits. They are also useful to introduce concepts including conductivity and switches. Building TapeBlocks is a skill that can then be used to facilitate the creation of characters, vehicles and consumes with electronic component. We also created TronicBoards which are a custom designed printed circuit boards (PCB) toolkit that was developed with accessibility features built in. TronicBoards enable rapid prototyping with several tactile features and connection options.

In the eMaking program we are also utilising commercial tools including Bee Bots and Spheros to provide opportunities for programming. The activity can be introduced and learned incrementally including sequential processes, selection based on choices and repetition with loops; these are the fundamentals of programming.

We have run the eMaking program with 6 groups of people that have a variety of cognitive and physical disabilities. Working in groups of 2-4 people with coaches, people have been able to progressively learn skills and are now independently able to create new activities that they would like to undertake and designing items that they conceptualise to build personally meaningful items. The skills learned and activities undertake in the eMaking programs have provided opportunities for social interactions and improving self-confidence for the participants.

SUMMARY

Electronic Making (eMaking) builds skill, improves creative thinking and problem solving. An inclusive eMaking program can be created using a range of custom tools including TapeBlocks and TronicBoards and commercial tools including Bee Bots and Spheros. The technology is the starting point for creativity and personally meaningful activities.

56. Raising communicative participation of young people who use AAC by realising opportunities for online conversation

Emma Grace (emma.grace@flinders.edu.au), Parimala Raghavendra, Julie McMillan, Jessie Shipman

ABSTRACT

Individuals who use augmentative and alternative communication (AAC) experience more difficulties in face-to-face conversation and have reduced social participation compared to their peers. Social participation is linked to positive health outcomes and rated by adolescents as an important factor affecting their quality of life. Online conversation may offer young people who use AAC increased convenience, reduced time pressure and the ability to communicate more widely than with face-to-face conversation. Access to assistive technology, information, and supports is known to be a facilitator of participation in online conversation.

This presentation will report on a multilevel concurrent mixed-methods project investigating changes in participation in online conversation before, during and after an e-mentoring intervention. The objective of the mentoring intervention was to support adolescents (n = 4; 13-18 years) who use AAC to participate in online conversation. Mentors were cross-age peer mentors, meaning that both mentors and participants shared the similar characteristic as AAC consumers. The mentors were also experienced users of the internet, social media, and related assistive technologies. The research aimed to investigate improvements in participation in online conversation and investigated participant, family member, and mentor perceptions of these changes.

Small increases were observed in the days and hours that participants spent in online conversation and number of words used in online conversation following the intervention. Increases were replicated across three participants using systematic visual inspection, although this was not statistically significant. Qualitative data were analysed using a deductive approach to framework analysis with coding based on the Family of Participation Related Constructs (Imms et al., 2017). Perceptions of change in attendance, involvement, activity competence, preferences, availability, accessibility, affordability, accommodability and acceptability will be discussed including a focus on the role of assistive technology. Participants relied on family members to access social media and assistive technology support. The presentation will include discussion of the assistive technology used by participants and how access to this technology and related supports provided an important pre-condition for the intervention effects. For example, potential participants were unable to be included in the research due to lack of access to assistive technology in their home environment.

Accessibility of social media environments may have impacted effectiveness of the intervention for goals where technology was incompatible, or challenges with access were not successfully resolved with e-mentoring support. For example, three participants were unable to physically access online conversation via a platform they preferred to use.

Barriers to participation in online conversation include access to assistive technology, and communication partners knowledge and skill. This research raises the affordability of social media and an awareness of the challenges associated with accessing online conversation by young people who use AAC. This research confirms the feasibility of e-mentoring as an approach to intervention and confirms that participation in online conversation is a viable and relevant context for intervention.

Imms, C., Granlund, M., Wilson, P., Steenbergen, B., Rosenbaum, P., & Gordon, A. (2017). Participation, both a means and an end: A conceptual analysis of processes and outcomes in childhood disability. Developmental Medicine and Child Neurology, 59(1), 16-25

SUMMARY

Online conversation may offer young people who use Augmentative and Alternative Communication reduced time pressure and the ability to communicate more widely than with face-to-face conversation. This presentation focusses on an investigation of change in participation in online conversation following an e-mentoring intervention, including discussion regarding use of assistive technology.

57. Electronic assistive communication technology improving communication outcomes for Adults following a Traumatic Brain Injury?: A Review

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Abstract

Background: Traumatic brain injury (TBI) is a significant public health issue which can result in long term and debilitating communication impairments. Finding effective treatment and rehabilitation options benefits not only the individual with the TBI, but also their family and friends. Augmented and Alternative Communication (AAC) is a technology that has been showed to be effective in stroke and aphasia populations, but less is known about the effectiveness of AAC as an intervention for communication deficits in TBI recovery.

Objectives: A systematic review was contacted in line with the Synthesis without Meta-analysis (SWiM) guidelines. The objective of this review was to locate and synthesise research related to the role of electronic and assistive communication technology (EACT) to enhance communication competence for adults following TBI.

Method: Four electronic Databases EMBASE (Ovid), MEDLINE (Ovid), CINAHL (EBSCO), and PSYCHINFO (OVID) were searched with predetermined search terms. The search combined three targeted concepts: a) TBI b) Electronic Assistive Communicative Technology, C) communication aid and/or Augmentative and Alternative Communication (AAC) terms. The review considered all primary research studies of quantitative methodology published in peer-reviewed journals between 2001 and 2021 that were reported in English. Studies were included if classed as published research with a primary focus on adults (defined as 18 years old) who had experienced a TBI who used technology to promote and improve cognitive-linguistic function, communication skill, and/or communication activity and participation.

Results: 1459 studies were identified with an additional 19 included from reference list screening. Twenty-one papers remained following administration of inclusion and exclusion screening. Review of the papers identified key themes related to dosage/intensity, communication severity and technology interventions. In particular, the most common technology examined in ten of the twenty-one papers was microswitch access to customised computer/tablet to facilitate interactions for people with severe communication impairments as a result of severe TBI. There was significant variability in reporting of duration and intensity of session intervention. Dosage for interventions for participants with profound communication impairments was observed to have high frequency and shorter duration. Whilst specific need technology for high level language needs had less frequent session but longer duration.

Conclusion:
Further research is needed with randomised controlled trials with larger samples sizes to make specific recommendations on the effectiveness of various EACT in TBI. From the limited research identified, interventions that are tailored to the individual, rather than follow a specific protocol, are recommended.

SUMMARY:
A systematic review was conducted in line with SWIM guidelines to summarise the effectiveness of electronic and assistive communication technology on communication impairments in TBI. Twenty-one papers were identified and are discussed in themes related to dosage/intensity, communication severity, and technology interventions. Individual tailoring of interventions is recommended.

58.Preliminary outcomes of LEGO® Robotics Therapy with autistic adolescents

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ABSTRACT

Introduction
LEGO® Therapy uses LEGO® brick sets as a tool to help autistic children to interact through play and develop their communication and social skills. Developed by clinical neuropsychologist Dan LeGoff in the early 2000's following personal observations involving LEGO® and autistic children, the therapy encourages participants to work together in groups, adopting and performing three specific roles to complete a LEGO® model. The assigned roles are: (a) the 'Engineer', who reads and describes the LEGO® instructions; (b) the 'Supplier', who finds and distributes the LEGO® bricks; and (c) the 'Builder', who incorporates instructions received from the Engineer with bricks from the Supplier to build the model. The roles are rotated after a set time until the model is complete.

While LEGO® Therapy has been shown to have potential to support the development of social skills and to reduce maladaptive behaviours in pre- and primary school aged autistic children, there is little research on the effect of LEGO® Therapy on autistic adolescents. This study aimed to explore the use of LEGO® Robotics Therapy – which uses the principles of LEGO® Therapy applied to LEGO® Robotics as a more age-appropriate intervention – to reduce anxiety and increase social skills specifically for autistic adolescents.

Aims
The aims of the study were to examine the effect of an 8-week LEGO® Robotics Therapy: a) on anxiety levels, social skills, and school engagement of autistic adolescents; (b) to explore the views and perceptions of the intervention from stakeholders (e.g., adolescents, parents, and teaching staff); and (c) to assess the usability of the intervention. The presentation will focus on the utility, acceptance, and engagement of the intervention from all stakeholders.

Method
24 autistic adolescents (female = 9; aged 13-16 years, mean age = 14.5 years) in groups of 3 participated in 45-minute sessions during school hours, alongside scheduled classroom activities, in a separate classroom. The LEGO® *Mindstorms EV3* robotics set was chosen for the study, where the main robot was built using the principles of LEGO® Therapy, followed by 3 robotic 'challenges' that needed to be solved. The intervention was provided by two facilitators from Autism SA. The adolescents and their parents completed the System Usability Scale (SUS) before and after the intervention. School staff completed the SUS after the intervention. Interviews were conducted post-intervention.

Results
The average participant SUS score of 66.4 ± 17.6 (n=18) indicated the off-the-shelf kit had acceptable usability, with 9 scores greater than the standard 'acceptable' score of 68. Autistic adolescents felt very confident using the kit (SUS question 9 = 3.8 ± 1.1, n=13). Post-intervention interviews indicated mostly positive student experiences. Most parents were satisfied that it was held during school hours and reported that their children were keen to go to school on the day of sessions. The facilitators reported that the participants were mostly engaged in the sessions, supporting their peers.

Conclusions
The preliminary findings indicate that LEGO® Robotics Therapy was acceptable and usable to be implemented at school, with many insightful suggestions provided for future implementation following the interviews.

SUMMARY

LEGO® Therapy has the potential to support the development of social skills and to reduce maladaptive behaviours in autistic children. This pilot study explored LEGO® Robotics Therapy – using the principles of LEGO® Therapy but with robotics – with autistic adolescents. Initial outcomes imply that it's a mostly acceptable and useable intervention.

59. A Custom FES-suit for Spasticity Management due to Cerebral Palsy – an end user's experience and perspective

Graham Calma (gcalma@kern.com.au), **Henry Rischbieth** (henry@activ8.net.au) & David Hobbs

ABSTRACT

What is the motivation for using daily Functional Electrical Stimulation or FES to the face and the body? And what is it doing?

Graham has Cerebral Palsy (CP) that presents with choreoathetosis, characterised by writhing movements of the arms and legs, highly excitable spasticity, and persistent tongue thrusting and gag reflexes throughout his childhood that also persisted partly into adulthood. As a child, Graham resisted all attempts by surgeons to intervene. Instead, he spent many years using gym equipment to increase his whole-body strength, but was unable to gain noticeable functional benefit.

Graham began his FES journey with a two-channel stimulator, alternating output to wrist flexion and extension muscles. He immediately noticed reduced spasticity that lasted for a few hours. He gradually added electrodes to stimulate other limb muscle groups, noticing similarly reduced spasticity. He then suggested stimulating facial muscles, with immediate improvement of oral control.

On-going FES use and experimentation reduced the effects of Cerebral Palsy over time, thus improving daily independence and functioning. In this presentation, Graham will construct a picture of some of the most severe impairments in his body that presented considerable difficulties to his physical independence and everyday activities, including the safety aspects related to drinking and eating to avoid a peg-feed scenario. The specific functional changes discussed result from an individualised FES home program that was being applied 1-3 hours each day.

These changes have enabled Graham to perform several functions independently and to make conversation without needing an interpreter or a communication device, providing sufficient motivation to use FES almost daily for over 25 years. Stimulation time and effort were reduced by developing and using a custom stimulation suit and mask with a 16-channel stimulator system.

Explaining these physiological responses remains a challenge. Absence of muscle hypertrophy following Graham's long-term FES practices indicates that the muscles are no stronger, and treatment effects now last for some days but are not permanent, so the underlying neurology has not changed either.

The abrupt changes to spasticity and oral control indicate immediate modulation of central nervous system (CNS) pathways. Perhaps those changes occur via afferent stimulation more than by muscle contraction.

The influence of different afferent pathways is discussed to establish a working hypothesis for the mechanism of the observed responses. Graham's experiences could be extrapolated to other individuals with CP, in whom use of FES is now an accepted treatment modality, but with a focus on muscle action. Additionally, brain plasticity is greater during childhood, so is there an optimal time for introducing FES?

Further reference: *Neuromodulation with Electrical Stimulation for Choreoathetoid Cerebral Palsy (CP): a Case Study*, by Henry Rischbieth, Graham Calma, and David Hobbs.

SUMMARY

Graham has been living with CP for more than 50 years, and during that time he's used and experimented with functional electrical stimulation (FES) to improve coordination and control, and to improve his independence. This presentation will discuss Graham's personal FES journey and the custom FES suit that he developed.

60.Wheelchair and seating models of care: a scoping review

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ABSTRACT
Background

For wheelchair users with complex seating needs, specialised wheelchair and seating services can be vital in prescribing the right wheelchair system. Research and clinical guidelines may inform clinical decision-making about the most appropriate system for the user. But they do not provide guidance about models of service delivery. Service providers need evidence-informed guidance about how to best deliver and evaluate such services. This type of service delivery is complex and multi-faceted, and decisions need to be made about the context, location, timing, stakeholders involved, funding body who is best served by a specialised service, and how to evaluate these services. Funders of such services may also be interested in how to most efficiently provide these services, which are often resource intensive. Research and grey literature exist about models of wheelchair and seating service delivery, but it is disparate. Mapping and synthesising the literature may help service providers make decisions about the most appropriate model of wheelchair service delivery for various individuals and contexts.

Aim
The aim of this research is to explore what the literature says about models of service delivery for wheelchair assessment and intervention. The primary question is "What models of service delivery are used to provide wheelchair assessment and intervention and in which contexts?" The secondary questions are "What are the barriers/facilitators for the success of these models of delivery?" and "How have models of service delivery been evaluated?"

Methods
Scoping review with knowledge synthesis, following PRISMA-ScR reporting guidelines. We searched peer reviewed literature and grey literature and selected studies that described or evaluated wheelchair and seating service delivery. Data about the type of study and service delivery context were extracted to map the existing literature and describe the services studied. We used content analysis, using an inductive approach, to synthesise study themes.

Results and discussion
This paper will report the nature and scope of the existing literature about wheelchair and seating service delivery, including the type of research used, and the nature, timing and context of the services studied. We will also report common themes in these studies, in relation to facilitators and barriers to service delivery. The discussion will include strengths and gaps in the existing literature, and directions for future research. We will also discuss how the synthesised study findings may inform decision-making for service providers, including factors to consider when planning services in various contexts, barriers that may need to be overcome, and how such services may be evaluated.

SUMMARY
There is a need to synthesise the literature on wheelchair service delivery to ensure that there is a clear service delivery model for all stakeholders involved. This scoping review will collect peer reviewed and grey literature to find all available evidence and synthesise it.

61. Teaching assistive technology design to engineers: Considerations in course design

Lauren Kark (lauren.kark@unsw.edu.au), Alistair McEwan, David Hobbs, Iain Brown

ABSTRACT

Assistive Technology plays an essential role in allowing many people to maximise their independence and capacity for participation in all aspects of society. The scope of the term assistive technology (more specifically assistive products) is expansive with blurry edges, as can be seen by considering ISO 9999. Despite this, all AT, regardless of how complex or ubiquitous, has been designed to meet particular functional needs. Engineers often form part of the design team, but may not always have relevant training or experience specific to assistive products, which can result in product designs reflecting poor assumptions about who will be using the product, how it is to be used, and the myriad other considerations that should necessarily inform the product design.

A number of engineering faculties in Australia are now offering courses with elements of AT design at their core. This is largely a response to the greater awareness of assistive products, and associated market opportunities, brought about through the implementation of the National Disability Insurance Scheme, but also reflects the fact that targeted training in assistive technology has been missing from the majority of university engineering programs. These courses have seen significant interest from student cohorts, who are eager to find practical ways to use their engineering education and training to make a practical difference to the lives of individuals and society more broadly.

This presentation will reflect on experiences and learnings from 3 such courses at different universities (UNSW, University of Sydney and Flinders University) considering:

- Ethical and practical considerations for engaging with end users and experienced practitioners
- Balancing consistency and uniqueness across courses. Core similarities and differences in content, and sustainability of course designs
- How to effectively introduce the wider environment within which AT design, manufacture, provision and use takes place. Including regulatory, funding bodies/schemes, suppliers, multidisciplinary teams
- Complementary design philosophies: co-design, user-centred design and universal design
- The setting and assessment of AT design challenges
- Feedback from recent student cohorts and how this might shape changes in course design

This presentation will also explore how to improve the experience of these courses by partnering with allied health faculties to provide students with practical experience working in multidisciplinary teams.

SUMMARY

All AT, regardless of how complex or ubiquitous, has been designed to meet particular functional needs and engineers are often part of the design team. A number of universities in Australia now offer courses with elements of AT design at their core. This presentation reports on learnings from the implementation and review of these courses.

62.Growing Assistive Technology Solutions in Queensland (Part 1) – Normative and comparative needs

Louise Gustafsson (louise.gustafsson@griffith.edu.au), Christy Hogan, Amelia Di Tommaso, Tenelle Hodson, Michelle Bissett, Camila Shirota

Background

Significant reforms in the disability sector in Australia means that a range of agencies and schemes are supporting assistive technology [AT] provision. AT advisors require readily accessible and current information to ensure their work aligns with these various agencies and schemes. Likewise, recipients can use this information to support their knowledge of what may be available to them. This first phase of a needs assessment aimed to establish the normative (Queensland) and comparative (Australia) needs of the AT sector by examining the current practices of the agencies and schemes that provide and manage funding for people living with disability.

Method

The publicly available websites of agencies and schemes supporting AT provision within Queensland and comparative organisations around Australia were audited to extract information related to AT practices including policies, procedures, funding and type of AT supported. Representatives of the agencies were recruited to complete semi-structured interviews that explored the AT process, overview of AT provided, budget, and barriers/challenges to AT provision.

Results

Seventeen websites were audited, representative of national (n = 3), normative (n = 3) and comparative need (n = 11). Seven were insurance commissions providing support for people with minor injuries from motor vehicle accidents and six were schemes funded to provide care and support following catastrophic injuries from motor vehicle accidents. The seventeen websites ranged in quantity and depth of information, containing 1 to 15 webpages in total (Mdn = 4, M = 5.8), and 0 to 14 consumer-specific webpages or brochures (Mdn = 3, M = 3.9). Information mostly highlighted the availability of AT for driving and transport, design and building for access and safety, and mobility.

Four themes were identified from the interviews:

Operationalising the legislation confirmed the findings from the audit that there was a lack of external facing information regarding internal procedures and guidelines.

Internal AT processes discussed the internal procedures, guidelines and multiple approval levels for more complex AT, the pressure points within this process, and that the ultimate decision lay with the agency/scheme and not the advisor.

Reasonable and necessary identified that the agencies /schemes differed in how they operationalised reasonable and necessary, with everyday technology a major point of discussion and limited clarity.

Risks in the AT pathway suggested that lack of advisor knowledge, skill and availability were considered a major risk to the professionals themselves, recipients, and agencies/schemes. Lack of access to trial equipment to ensure a "good fit" was also highlighted as a risk.

Discussion

This study identified opportunities for enhancement of the information about AT provision available on websites for AT advisors and recipients. The limited externally facing information together with the ambiguity in the operationalisation of the terms "reasonable and necessary" are pressure points for the sector. The second pressure point was the interaction between the advisor and the recipient with variable health professional availability, knowledge and skills, and limited accessibility to trial AT impacting best-practice. These findings were explored further from the perspective of other stakeholders with subsequent expressed need and felt need studies.

SUMMARY

The normative (QLD) and comparative (Australia) needs surrounding AT provision, phase one of a larger needs analysis, was explored by examining agencies'/schemes' practices. Findings revealed a lack of external-facing policy information, complex approval systems, varying definitions of reasonable and necessary, and risks pertaining to advisors' knowledge/skill/time and accessing trial AT.

63. Growing Assistive Technology Solutions in Queensland (Part 2) - Expressed needs

Louise Gustafsson (louise.gustafsson@griffith.edu.au), Christy Hogan, Camila Shirota, Amelia Di Tommaso, Tenelle Hodson, Michelle Bissett

Abstract

Background

A normative and comparative needs exploration with schemes and agencies who support assistive technology (AT) provision identified pressure points in the information publicly available to guide practice; perceived availability, knowledge, and skills of advisors; and access to AT to trial. This presentation reports a subsequent phase of the needs assessment aimed to establish the expressed needs of the AT sector in Queensland.

Methods

An exploratory sequential mixed methods design collected data using custom designed surveys, focus groups with advisors, and interviews with suppliers in Queensland.

Results

Twenty-nine advisors completed the survey, nine advisors participated in focus groups, and six suppliers participated in individual interviews. Survey respondents generally rated the quality of their service provision as high to very high and were confident to very confident in enacting the steps of the AT process. However, greater variability was observed in rating of adequacy of training, from very inadequate to very adequate. Commonly reported barriers to effective AT provision included limited funding, lack of staff capacity and expert consultation, and geographical location. Combined qualitative findings were:

Waste was highlighted in terms of advisor, participant, and supplier time, the 'AT graveyard', and a failure to retain expertise in the sector.

Capacity and capability building included that there were not enough advisors with requisite skills and that more AT specialists were required for consultation. Online forums and networks were common forms of support. Suppliers recognised that the increasing number of advisors had not led to increasing capability and there was a call for continuing professional development in this sector. From the supplier perspective, the advisor and supplier working together during the 'scripting' process was considered best practice.

Advisor choice and control meant that advisors decided who to accept referrals from, with complex clients often not accepted due to advisors determining they did not have the skills or interest in working within some schemes.

Access to AT for hire and trial was difficult due to the loss of loan pools, geographical distance, and inability to trial equipment from suppliers. Advisors considered that Expos and Tech spaces, inclusive of a range of suppliers, supported this element of AT provision. Suppliers discussed the costs, challenges, and impact of supporting AT trials including the long timelines from actual trial to when they would receive payment for the item. These delayed timelines were troublesome and occurred due to three factors: delayed completion of documentation by therapists, the funding approval process, and the delivery of items from overseas.

Discussion

The expansion of the sector and the influx of private companies employing advisors, including newly graduated or people with limited AT experience, has led to a consistent call for additional training opportunities for advisors to ensure that there is no expectation for people to work out-of-scope. The limited access to equipment for trial is problematic, leading to inappropriate provision and reduced opportunities to explore possibilities. Frustrations with the approval processes of the agencies/schemes was raised by both advisors and suppliers. A sector-wide solution is required.

SUMMARY

This second phase of a needs analysis explored the expressed needs of AT advisors/suppliers in QLD. Findings highlight a waste of time, product, and expertise within the sector; the increasing need for capacity/capability building; advisor choice/control of working with clients/schemes; and the various barriers to accessing AT for hire/trial.

64.Growing Assistive Technology Solutions in Queensland (Part 3) – Felt needs

Tenelle Hodson (tenelle.hodson@griffith.edu.au), Christy Hogan, Michelle Bissett,
Amelia Di Tommaso, Camila Shirota, Louise Gustafsson

Background

Previous normative, comparative, and expressed need explorations with schemes, agencies, assistive technology (AT) advisors, and suppliers who support AT provision identified pressure points related to: the limited information publicly available from schemes and agencies to guide practice; insufficient availability, knowledge and skills of advisors; and the challenges of accessing AT to trial. This presentation reports the final phase of the needs assessment, which aimed to establish the felt needs of the AT sector in Queensland.

Method

An exploratory sequential mixed methods design collected data using custom designed surveys and interviews with recipients of AT in Queensland.

Results

Survey responses were received from 41 recipients who received the AT. The top five unmet AT needs were: communication and information technology (software, apps, smart devices); home automation; hearing and vision; seating, sleeping, and body support; and vehicle modifications. Fourteen recipients were satisfied with their current AT, 19 had no follow-up contact, and the main barriers to obtaining AT related to limitations of available AT through funding bodies, costs if paid out of pocket, and being unaware of what AT is available.

Twenty recipients participated in interviews and three themes were identified:

Expertise and an individualised approach resulted in AT that had a positive impact on AT recipients. However, when needs were not met or there was poor AT set up, it would at best, not be used or at worst, lead to further health issues. Off-the-shelf solutions were often not effective and trials within recipients' homes were preferred to prevent unsatisfactory outcomes. Recipients considered that all stakeholders in the AT process should have condition specific as well as AT expertise. Trust, choice and confidence in the advisors and suppliers were essential with a wariness of the opportunity for financial gain that was present in these relationships. Access to a showroom or hub with a range of AT and objective expertise was preferred.

Process rejections and delays were highlighted in all stages including multiple rejections of funding applications. The timeframes from trial to receipt of the AT sometimes placed individuals in risky situations as they sought their own solutions purchasing second-hand AT. Mainstream AT was desired to meet their needs. The need for advocacy across this process was highlighted.

The bigger picture reflected that wider community environment and attitudes were not always conducive to AT use. Internalised ableism could delay acceptance, while for others, AT was readily accepted if it communicated there was a hidden disability. Community and connection were important drivers for the ultimate acceptance of AT.

Discussion

People living with disability value AT but their experiences within the process from funding to delivery can be challenging and frustrating. The need for all stakeholders in the process to have expert knowledge and better access to a range of AT for trial was highlighted. Further, opportunities exist for enhanced advocacy for AT recipients across the process.

SUMMARY (50 word)

The felt needs, phase three of a larger needs analysis, were established with Queensland AT recipients. Findings point to the need for: increased expertise within the sector; an individualised approach for better outcomes; transparency and efficiency (particularly time) in the AT provision pathway; and greater access to AT trials.

65. Creating Maps of Attention Using Virtual Reality (VR) for Brain Injured and Spatial Neglect Patients

Chelsea Hannah Marsh, Daniel S. Harvie, Michael Francis Norwood, David Ross Painter, Connor Reid,Trevor Hine, Christie Woodman, Amanda McAuley, Susan Jones, Kelly Dungey, Ben Chen, Marilia Libera, Leslie Gan, Julie Bernhardt, Elizabeth Kendall and Heidi Zeeman

Abstract
Objectives:
To describe the results from a research program examining the feasibility of using VR to map, in 3D, a brain-injured patients' spatial attention. To explore if VR can assess for hemi-spatial neglect. To provide clinically relevant visual outputs.

Methods:
Patients were consecutively recruited through two hospital rehabilitation departments in Southeast Queensland, Australia, and performance on the VR game was compared against healthy controls. Following consent, patients completed traditional pen-paper neuropsychological tests for neglect including the clock drawing, line cancellation and letter cancellation. Later in the week, they completed the VR game. The game involved patients finding targets (L's) amongst distractors (T's) through various levels of a 3D VR space. Levels increased in difficulty through increasing the number of distractors and the field of vision required. Reaction time and accuracy data was collected. Attention maps were created by tracking eye-gaze, controller, and head set movement. Acceptability was measured through motion sickness and gaming experience surveys.

Results:
Healthy controls and patients all reported the VR as acceptable; motion sickness was minimal and enjoyment high. Patient and healthy control performance was significantly different on reaction times but not accuracy. Various analyses indicated the Attention Atlas was able to identify spatial biases in patients. Attention maps were a visually effective way to present a patients spatial attention strengths and weakness to clinicians.

Conclusions:
The Attention Atlas was an enjoyable, low-risk method for assessing for attention issues and for hemi-spatial neglect. The system identified patient outliers with potential attention problems given normative control and patient data. The Attention Atlas produces a visual, clinically relevant assessment of a patient's spatial attention. Implications for improved assessment and rehabilitation for both patients and clinicians are significant. The Attention Atlas may be useful for more subtle cases of neglect, that may be more difficult to detect on pen-paper methods, but that have significant impact on functional activities such as driving. This approach also suggests that VR can identify potential attention problems in those deemed intact by the current standard.

66. The Implementation Potential of a VR System for Use in Brain Injury Rehabilitation

Chelsea Hannah Marsh, Michael Francis Norwood, David Ross Painter, Daniel S. Harvie, Trevor Hine, Christie Woodman, Amanda McAuley, Susan Jones, Kelly Dungey, Ben Chen, Marilia Libera, Leslie Gan, Julie Bernhardt, Elizabeth Kendall and Heidi Zeeman

Abstract:
Background:
Visuospatial attention deficits following brain injury, known as neglect, result in long-term cognitive disability but are underdiagnosed in clinical settings by traditional pen-and-paper methods. Using virtual reality (VR) systems in rehabilitation contexts has the potential to be more sensitive to mild neglect and neglect phenotypes. However, effectiveness in terms of patient outcomes (i.e., detection of and rehabilitation of neglect) alone may not translate to clinical feasibility. This could be due to operational, logistical, systemic, and psychological/perceptual barriers that possibly accompany VR. This study explored the usability and implementation potential of VR in a stroke rehabilitation context.

Methods/design:
A novel virtual reality attention assessment game 'The Attention Atlas (AA)' was co-designed by researchers and clinicians to meet the clinical need for improved neglect assessment. Clinical usability was assessed using the Think Aloud technique, where clinicians were taught how to operate the AA for patient, and were then asked to complete various tasks as though they were administering it for assessment. They were asked to 'think aloud' through the process. Then, interviews were conducted to assess the clinician's perception of the implementation potential in the hospital. Theoretical Domains Framework and Theoretical Framework of Acceptability were adapted for the study to form the interview questions. Finally, patients and clinicians were asked to play the VR game as participants for neglect assessment, and feedback was collected quantitatively and qualitatively regarding their experience.

Results:
Instant data analysis was employed following the Think Aloud activity to evaluate usability. Thematic analysis was used for the interviews. A deductive approach was employed, with themes matched to domains in the Theoretical Domains Framework. Additionally, other unique themes were explored inductively. Descriptive statistics and T-tests were used to analyse quantitative data from patients and clinicians who trialled the AA as an assessment of their spatial attention.

Conclusions:
The development and validation of the AA is part of a new generation of translational neuroscience that exploits the latest advances in technology and brain science, including VR technology repurposed from the consumer gaming market. This study finds that the AA was generally regarded as usable by clinicians and was well received. The implementation of the AA in clinical settings appears to be achievable and desirable, with key recommendations outlined. Patients and clinicians who played the VR game found it enjoyable and acceptable, reporting low levels of motion sickness, low levels of negative affect, and high levels of positive affect. Patients reported wanting to use VR in the future to assist their rehabilitation.

67.Assistive Technology and Information Asymmetry: The Economic Imperative For AT Information Services

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ABSTRACT

The economic effect of information asymmetry is well known across a range of goods and service areas and industries. Reducing information asymmetry is essential in the development of consumer markets and in the prevention of market failure. What does this mean in AT services? Australian national and state governments have been referring to the need to reduce information asymmetry in AT since at least 2104, including in the National Disability Insurance Schemes AT Strategy, published in 2015. However, the absence of evidence together with poor understanding in managing this issue has become problematic, with the closure of several state based AT information services in Australia. During 2021, AT Australia engaged the Health and Economics faculties of the University of Canberra to undertake literature reviews and research on the topic. The outcomes were two papers: *Information Asymmetry and Assistive Technology: the Role of Brokerage Services (D'Cuhna et al)* and an *Economic Evaluation of Assistive Technology Information: An Australian Perspective (Pezzulo et al).*
In the absence of economic data, the economic analysis was undertaken using data provided by Assistive Technology Australia.
This presentation will focus on the results and recommendations from the study.

SUMMARY

Information Asymmetry is understood to be a key component in developing a vibrant consumer driven market place and preventing market failure. Due to lack of evidence to guide the in addressing information asymmetry, Assistive Technology Australia commissioned research from the University of Canberra. This presentation presents the results of this research and analysis.

68. Assistive Technology Mentoring: Creating an Assistive Technology Workforce For and By People with a Disability

Robyn Chapman – CEO, Assistive Technology Australia, robyn@at-aust.org
Peter Simpson – AT Mentor, Assistive Technology Australia, PeterS@at-aust.org

ABSTRACT

Assistive Technology Australia has developed and is delivering a course, within the Australian national qualifications framework, that prepares people with disabilities to work in various roles within the broad AT delivery system. The Certificate IV in Assistive Technology Mentoring is a 17 competency course, 16 of which are focused on AT. The Certificate IV is available only to People with Disabilities and their carers. Notably, AT Mentors are now able to advise on AT products up to the value of $15,000, within the National Disability Insurance Scheme (NDIS). Although still in the early phases of implementation, employment rates of graduates is very high. The graduates have recently developed a self-regulating association supporting the development of this profession. Students and graduates of the course are currently from Australia, New Zealand, Papua New Guinea and Rwanda. The 16 AT focussed individual competencies are also applicable for others. The focus of this presentation will give an overview of the qualification and the employment outcomes thus far.

SUMMARY

The Certificate IV in Assistive Technology Mentoring, developed and delivered by Assistive Technology Australia, is creating new employment opportunities for people with lived experience of disability. When selecting their AT, individuals have the opportunity to seek advice from peer's who have a lived experience of using AT.