Application of the extended technology acceptance model to explore clinician likelihood to use robotics in rehabilitation.

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Abstract

Purpose: Evidence suggests that patients with upper limb impairment following a stroke do not receive recommended amounts of motor practice. Robotics provide a potential solution to address this gap, but clinical adoption is low. The aim of this study was to utilise the technology acceptance model as a framework to identify factors influencing clinician adoption of robotic devices into practice.

Materials and method: Mixed methods including survey data and focus group discussions with allied health clinicians whose primary caseload was rehabilitation of the neurologically impaired upper limb. Surveys based on the technology acceptance measure were completed pre/post exposure to and use of a robotic device. Focus groups discussions based on the theory of planned behaviour were conducted at the conclusion of the study.

Results: A total of 34 rehabilitation clinicians completed the surveys with pre-implementation data indicating that rehabilitation clinicians perceive robotic devices as complex to use, which influenced intention to use such devices in practice. The focus groups found that lack of experience and time to learn influenced confidence to implement robotic devices into practice.

Conclusion: This study found that perceived usefulness and perceived ease of use of a robotic device in clinical rehabilitation can be improved through experience, training and embedded technological support, however, training, and embedded support are not routinely offered, suggesting there is a discordance between current implementation and the learning needs of rehabilitation clinicians.

Keywords: stroke, rehabilitation, technology acceptance, allied health, therapy, robotics

Introduction

It is estimated that up to 85% of stroke survivors have impairment of upper limb function in the acute phase with less than 50% achieving full functional recovery at six months post stroke [1]. There is a correlation between upper limb dysfunction following a stroke and anxiety, poorer perception of quality of life and higher rates of disability [2,3]. Clinical interventions that have the strongest evidence base share a common emphasis on task-specific training applied with a higher intensity than usual care [4,5]. However, there are major barriers associated with the provision of such interventions, including limited rehabilitation resources and time constraints. It is therefore not surprising to find that patients receive on average between 4-11 minutes of practice during therapy sessions with a focus on basic exercises rather than functional arm and hand tasks [6-8].

Technological advances in robotics and gaming technology can address the gap between recommended intensity of treatment and current provision of upper limb rehabilitation following a stroke. Robotics have been used in stroke rehabilitation for more than 30 years, with significant progressions in design made in that time [9]. Defined as a manipulator that is re-programmable and can move parts, material or devices through a variety of motions [10], robots have been used as both a therapeutic tool and assistive device with the stroke population. Robotic devices offer a number of advantages including greater sensitivity when used for assessment and evaluation, multiple feedback mechanisms including audio, visual and haptic, and reduced manual handling, particularly when patients have little to no active movement [11]. From a rehabilitation perspective, robots have the potential to support patients to engage in massed practice with a focus on task specific training, factors that have been shown to be important to improve functional outcomes. A recent systematic review exploring the effectiveness of robotic and electromechanical devices for rehabilitation of the upper limb following a stroke found that patients improved in activities of daily living, arm function and arm muscle strength [12]. The review included 45 trials with a total of 1619 participants and concluded that the studies provided high-quality evidence for the intervention, no increase in participant dropout and few adverse events. It is not surprising that dropouts are low as robotics are typically coupled with gaming technology which provides a highly engaging platform and may enhance patient compliance with rehabilitation.

Despite the growing evidence base suggesting that robotic devices can have positive effects on numerous patient outcomes, clinical adoption remains low. A survey of clinicians (n=233) who primarily work in stroke rehabilitation found that less than 6% had used robotic devices in their clinical practice [13]. A recent qualitative study exploring therapists' perceptions of robotic therapy prior to its introduction into practice, identified support from management and adequate training as important factors for adoption [14]. The few studies that have been published on this topic have not explored clinician acceptability of robotics as a healthcare intervention in the neurological rehabilitation context. Yet, there is a growing body of evidence that suggests there is a relationship between stakeholder acceptability of an intervention and subsequent adoption in practice [15]. The technology acceptance model was developed more than 30 years ago as a framework to identify factors that determine adoption of technology [16]. The model suggests that perceived usefulness (PU) and perceived ease of use (PEOU) have a significant influence on an individual's intention to use and eventual adoption of technology. Over the years and following numerous studies, the model was extended (TAM2) to include subjective norms, image, output quality, job relevance and results demonstrability as determinants of PU (Figure 1). Experience and voluntariness were identified as important moderators in adjusting users' judgements of a system [16].

A brief search on PubMed completed in July 2021 indicates that since 2002, more than 600 studies have been published featuring the technology acceptance model. A systematic review of the TAM in health informatics [17] found that the model was primarily applied in 3 areas: electronic health records, telehealth and mobile applications. However, most of the published studies included in the review focused on physicians, nurses and/or patients with less than 1% exploring allied health professionals' experience with technology. Furthermore, none of the studies included the use of robotics or emerging technologies in a rehabilitation context. The systematic review also identified that many studies incorporated the theory of planned behaviour (Figure 2) in addition to the TAM due to the complex and dynamic environment of health services. The theory of planned behaviour (TPB) is a widely used model proposing that an individual's intention to undertake a behaviour, such as using a robotic device, is influenced by their attitude, subjective norm, perceived behavioural control and context specific factors such as organisational policies [18].

Several studies have found that the TPB has a strong ability to predict health professional intentions and subsequent behaviours, particularly in relation to clinical decision-making [18-21]. To date, there are no published studies that have used any version of the TAM and/or the TPB to explore and identify factors that influence clinicians' likelihood to adopt robotics in rehabilitation of the upper limb following a stroke.

The objective of this study is to use the TAM2 and TPB to identify factors that influence a clinician's decision to adopt a robotic device into clinical practice; and to explore how these factors change following 3-months of exposure to and regular use of the robotic device.

Materials and methods

The study presented here is one component of a larger study which aims to investigate and implement a robotic device that meets the needs of both patients and clinicians [22]. The parent study is a user-based design that initially presents a prototype robot to the clinicians and then modifies it according to feedback from all key stakeholders. The study reported here focuses on the clinicians' experience of using the robotic device.

Study design

This study utilised a mixed-methods pre-post design due to the complex nature of the topic. An individual's adoption of robotic devices in practice is likely to be influenced by multiple factors including the individual's relationship with technology and the context in which they work. A singular approach to data collection may not have provided adequate depth of information to identify beliefs as well as behaviours. Surveys and focus groups were selected as the methods of data collection to identify beliefs related to technology as well as experience and behaviours utilising devices in practice.

Participants and setting

The study took place across two healthcare organisations in Australia. One site is a large publicly funded metropolitan hospital whilst the other is a private provider of neurological rehabilitation within a community setting. Allied health clinicians were invited to participate in the study if they had a primary caseload with a focus on rehabilitation of the upper limb with patients who have a neurological condition. There were no exclusion criteria and purposive sampling was used to obtain a range of experience given the exploratory nature of the topic. A maximum number of eight participants for each focus group was determined as sufficient to obtain a deep understanding of participants' experience of robotics in neurological rehabilitation.

The robotic device (EMU)

The EMU is an end-effector upper limb rehabilitation robotic device which attaches to the patient at a single location along the forearm (Figure 3). The hand is not constrained by the device which enables interaction with real objects and the option for therapists to manipulate or work with the hand during a robotics therapy session. The EMU can facilitate movement of the arm in three planes: up and down, forwards and backwards and left and right. The forces that can be applied in these planes include passive mobilisation, de-weighting and resistance. The EMU system includes the robotic device and a touch-screen computer which has dual purposes: control of the robotic device (start, stop and configuration) and as an optional user interface for gaming-based exercise.

Procedure

The EMU was presented to clinicians and subsequently modified according to feedback. Relatively minor modifications were made with most focusing on the software / gaming interface. The robotic device was implemented at the sites for three days per week according to the preferences of the clinicians and their patients. All clinicians involved in the study participated in a two-hour training session prior to commencing use of the device. During the training session the participants practiced using the device in mock role-plays where they acted as a patient receiving the intervention and then as a therapist using the device.

Clinicians selected patients they assessed as being eligible to receive robotic interventions. The only inclusion criteria for patient selection was that they had a neurologically impaired upper limb and were willing and able to participate in a minimum of 6 robotic therapy sessions. At least one research engineer was present during every session where the robotic device was used and was able to support the clinician if/as needed. The type of support depended on the clinician's needs but could include assistance with setup and/or addressing any technology-related issues.

Data collection

Prior to commencing the trial with the robotic device, allied health staff from the sites who self-identified as meeting the eligibility criteria, were invited to complete the TAM2 survey. The survey was available via a web-link to an online platform as well as hard-copy and it was left up to the clinician to choose mode of completion. Hard-copy surveys were manually entered into the online platform by one of the research team (MK). Each respondent was allocated a unique identifier to maintain confidentiality and maximise honest responses to questions.

Following completion of the pre-exposure survey, an education session on using the robotic device was conducted by the engineer researchers (VC & JF) and occupational therapist leading the study (MK). The robotic device was scheduled for use at each clinical site for three days per week until a minimum of six patients had used the robot for at least six rehabilitation sessions.

At the end of the robotic trial, all allied health staff who had used the robotic device at any point during the site trial were invited to complete the post-exposure survey. Once again this was made available through a web-link or via hard copy, which was manually entered by one of the research team (MK). As in the first survey, respondents were anonymous in order to encourage honest responses about their experience of using the robotic device.

All relevant staff were invited to participate in a focus group discussion, set at a time most suitable for the majority. Each focus group was scheduled to last for 60 minutes and was facilitated by one of the research team (MK) who has experience in focus group data collection methods. All group sessions were recorded and later transcribed with notes taken during the discussion providing a supplementary source of information.

Instrument

The survey (Supplemental File 1) used in this study was developed by Venkatesh and Davis [23] and has been validated in a number of studies exploring technology adoption in multiple settings, including healthcare [24]. It has high reliability (Cronbach's alpha > 0.80) and construct validity. The survey consists of a total of 24 questions grouped into 9 sections that reflect the TAM2 constructs. A preliminary page on participant demographics such as professional group, years practicing, qualifications and work setting was also included in the survey.

Questions guiding the focus group discussion (Supplemental File 2) were developed using the theory of planned behaviour (TPB), the pre-cursor to the technology acceptance model. The TPB explores attitudes, beliefs, norms and perceived behavioural control in relation to the behaviour being explored [18]. The TPB provides a useful framework for exploring and explaining allied health professionals' experiences, facilitators and barriers for using robotics in neurorehabilitation.

Data analysis

Analysis of the survey data were completing using SPSS software (version 26; IBM Corp., Armonk, NY, USA). Given the small sample size, a non-parametric independent samples test (Mann-Whitney) was conducted to measure change in the TAM2 scores pre/post exposure to the device. Effect sizes for each construct of the TAM2 were calculated using z-values and the formula $r = \frac{z}{\sqrt{N}}$ with N being the total number of cases. Cohen's criteria of .1/.3/.5 were used to indicate small, medium, and large effect sizes respectively.

Focus group data were analysed using QSR International's NVivo 11 Software. Transcripts were initially reviewed for frequency of words and statement content by two coders (MK & JF). These data were then mapped against the theory of planned behaviour constructs *i.e.,* attitudinal, normative and control beliefs pertaining to the use of robotics in neurorehabilitation. Frequently mentioned beliefs for each construct were deemed to be significant contributors to the intention to use robotics for neurorehabilitation. A second researcher who was involved in the study but did not participate in the qualitative component of data collection also reviewed the transcripts and analysis to increase validity.

Ethics

This study was approved by the Human Research Ethics Committee at Melbourne Health (2018.067).

Results

TAM2 survey pre-and post-exposure

A total of 34 surveys were completed *i.e.,* 17 pre- and 17 post-exposure to the robotic device. Demographics of the sample are presented in Table 1. The majority of respondents were either occupational therapists (41%) or physiotherapists (41%), worked in community-based rehabilitation (53%), had been practicing for between 6-10 years and had a bachelor's degree as their highest qualification. Table 2 presents the differences in TAM2 constructs measured pre- and post-exposure to the robotic device. There were statistically significant changes in all constructs except for subjective norm, voluntariness and image. The constructs with the greatest change were intention to use the system (U=29.0, p<0.001, r=.707), perception that the system was easy to use (U=42.50, p<.001, r=.629) and explaining benefits of using the system (U=9.00, p<.001, r=.816).

Focus group study post-exposure

A total of 12 rehabilitation clinicians participated in the two focus group discussions. Demographics presented in Table 3 indicate that the majority were female (87%) physiotherapists (87%) who worked in community rehabilitation (75%) and had a bachelor's degree as the highest level of qualification. Themes were mapped according to the theory of planned behaviour (Table 4).

Discussion

This study found that clinicians' perceptions of the effort required to use, and subsequent usefulness of a robotic device for rehabilitation of the neurologically impaired upper limb, changed significantly after gaining experience using the device. However, the participants reported that exposure alone to the robotic device would be inadequate for safe and effective use. Rather, they felt there was a need for embedded technological support over the initial introductory period, until the clinicians felt confident and skilful enough to use the device independently. This is different to other studies that have used the TAM2 to explore adoption of technology. Venkatesh and

Davis [23] tested the TAM2 with four longitudinal studies in non-health industries. The systems introduced into each of the sites primarily related to a new computer package or operational system, which was accompanied by a training program of minimum duration four hours up to a maximum of two days. Venkatesh and Davis found that as users gained experience with the new system, perceived usefulness was influenced more so by the potential benefits of the system rather than social information. However, none of these systems involved a patient-robot interaction, which introduces an additional level of complexity and the potential need for a different type of training experience.

Robotic interventions for rehabilitation of the neurologically impaired upper limb are rarely simple to use. Clinicians must first assess whether the robotic intervention is appropriate for the patient. This includes consideration of the patient's cognitive status, the presence of any sensory impairment(s) and goals for rehabilitation. Once it is determined that the robotic intervention is appropriate, the clinician must prepare the robot for the intervention, strap the patient into the device, ensure that all necessary data are entered correctly into the computer, including limb length and patient demographics, and then select the appropriate program. The clinician must also be able to trouble-shoot the inevitable technology difficulties that arise when using such devices in practice. Therefore, the clinician is required to establish and maintain a new set of skills related to the use of robotics in neurological rehabilitation – skills that are not a fundamental part of the training to become a clinician.

Another potential factor that may influence the relationship between experience using a robotic device and subsequent adoption is clinician perception of safety [25]. Rehabilitation therapists typically use a "hands-on" approach when delivering interventions and monitor a patient's responses, subtle and overt, as a measure of effectiveness and safety. Robotic devices can prohibit the clinician from a hands-on approach thus making it difficult to gauge the musculoskeletal response from the patient. Instead, the clinician must closely monitor the patient for compliance, comfort and safety using either verbal feedback or facial expressions. It would be reasonable to assume that clinicians require adequate exposure to and practice using a device before they are confident that it is safe for patient use.

Limitations

The study has several limitations. First, the sample size was small and all participants were from metropolitan sites. It is possible that rehabilitation clinicians from regional sites have different learning needs and experiences of robotic devices. A number of clinicians had experience with robotic devices prior to the study and this was not controlled for in the analysis. The amount of exposure to the robotic device may have varied across participants, making it difficult to determine the amount of experience that is necessary to change the constructs in the TAM2. Survey data have limitations as they are a proxy measurement of the constructs.

It is also important to note that these results do not fully generalise to any robotic device given the variety of approaches taken. This appears particularly true for the “attitude” analysis where participants reported primarily on the opportunity to physically engage with the patients during the session. This is possible for devices designed as adjunct to the therapy, such as the device used in this study, as opposed to the more classic stand-alone approaches in which therapists have a more restricted hands-off role.

Conclusion

This study identified that exposure alone to a robotic device may be inadequate to support sustainable adoption in clinical practice. Training and technological support during the introductory phase of implementation may enhance acceptability and therefore intention to use robotic devices in practice. Future research should focus on type, frequency and intensity of training/experience necessary to effect change. Furthermore, comparing the effectiveness of experience with and without embedded technological support would also provide important data on likely adoption of devices.

Disclosure statement

The authors report there are no competing interests to declare.

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Table 1 Demographics of survey participants

Characteristic	**Pre exposure (N=17)**	**Post exposure (n=17)**
Professional group		
Allied health assistant	2 (12%)	2 (12%)
Exercise physiologist	1 (6%)	1 (6%)
Occupational therapist	7 (41%)	7 (41%)
Physical therapist	7 (41%)	7 (41%)
Practice location		
Inpatient rehabilitation adult	5 (29%)	5 (29%)
Outpatient rehabilitation	12 (71%)	12 (71%)
Grade of employment		
1	3 (18%)	3 (18%)
2	10 (59%)	10 (59%)
3	4 (23%)	4 (23%)
Years clinical practice		
Less than 2	1 (6%)	1 (6%)
3	3 (18%)	3 (18%)
4	3 (18%)	3 (18%)
5	2 (12%)	2 (12%)
6-10	4 (22%)	4 (22%)
11+	4 (24%)	4 (24%)
Highest qualification		
Bachelor’s degree	12 (70%)	12 (70%)
Graduate certificate or diploma	2 (12%)	2 (12%)
Master+	3 (18%)	3 (18%)

Table 2 Non-parametric analysis comparing responses pre and post exposure to the robotic device

Construct	Variables	Pre-exposure N=17			Post-exposure N=17			Test statistic U	Z - score	*p*-value	Effect size
		Median	Mean rank	Sum of ranks	Median	Mean rank	Sum of ranks				
Intention to use	Intention to use system	4.0	10.71	182.0	7.0	24.29	413.0	29.0	-4.12	<.001	.707
Perceived usefulness	Performance	5.0	13.74	233.50	6.0	21.26	361.50	80.50	-2.32	.021	.398
	Productivity	5.0	12.68	215.50	6.0	22.32	379.50	62.50	-2.93	.003	.502
	Effectiveness	5.0	13.62	231.50	6.0	21.38	363.50	78.50	-2.37	.018	.406
	Useful	6.0	15.65	266.00	7.0	19.35	329.00	113.0	-1.17	.243	.200
Perceived ease of use	Clear and understandable	5.0	12.24	208.00	6.0	22.76	387.00	55.00	-3.23	.001	.554
	Mental effort	5.0	11.74	199.50	6.0	23.26	395.50	46.50	-3.48	.001	.597
	Easy to use	5.0	11.50	195.50	7.0	23.50	399.50	42.50	-3.67	<.001	.629
	System will do as wanted	5.0	12.62	214.50	6.0	22.38	380.50	61.50	-2.97	.003	.509
Subjective norm	People who influence	5.0	18.06	307.00	5.0	16.94	288.00	135.0	-.35	.728	.060
	People who are important	5.0	18.00	306.00	5.0	17.00	289.00	136.0	-.31	.758	.053

Voluntariness	Voluntary use	6.0	15.53	264.00	6.0	19.47	331.00	111.00	-1.21	.226	.208
	Supervisor doesn't mandate	4.0	15.09	256.50	5.0	19.91	338.50	103.50	-1.45	.146	.249
	Not compulsory	5.0	16.24	276.00	6.0	18.76	319.00	123.00	-.77	.441	.132
Image	Prestige	3.0	17.50	297.50	3.0	17.50	297.50	144.50	.00	1.00	.000
	High profile	3.0	15.97	271.50	4.0	19.03	323.50	118.50	-.92	.360	.158
	Status symbol	3.0	16.35	278.00	4.0	18.65	217.00	125.00	-.68	.494	.117
Job relevance	Important	5.0	14.71	250.00	6.0	20.29	345.00	97.00	-1.72	.086	.295
	Relevant	6.0	14.15	240.50	7.0	20.85	354.50	87.50	-2.07	.038	.355
Output quality	High quality	5.0	12.44	211.50	7.0	22.56	383.50	56.50	-3.11	.002	.533
Results demonstrability	Communicating results	5.0	13.56	230.50	7.0	21.44	364.50	77.50	-2.43	.015	.417
	Communicating consequences	5.0	13.29	226.00	7.0	21.71	369.00	73.00	-2.58	.010	.442
	Apparent	5.0	13.21	224.50	6.0	21.79	270.50	71.50	-2.62	.009	.449
	Explaining benefits	5.0	25.47	433.00	1.0	9.53	162.00	9.00	-4.76	<.001	.816

Table 3 Demographics of focus group participants, conducted post exposure to the robotic device

Characteristic	**Focus group 1 N=8**	**Focus group 2 N=4**
Gender		
Male	1 (13%)	1 (25%)
Female	7 (87%)	3 (75%)
Professional group		
Occupational Therapist	0	3 (75%)
Physiotherapist	7 (87%)	0
Allied Health Assistant	0	1 (25%)
Exercise physiologist	1 (13%)	0
Education		
Bachelor degree	4 (50%)	1 (25%)
Master degree	3 (37%)	3 (75%)
Other higher qualifications	1 (13%)	0
Practice location		
IPR adult	0	3 (75%)
OPR centre-based	8 (100%)	1 (25%)

Table 4: Focus group data mapped to the theory of planned behaviour

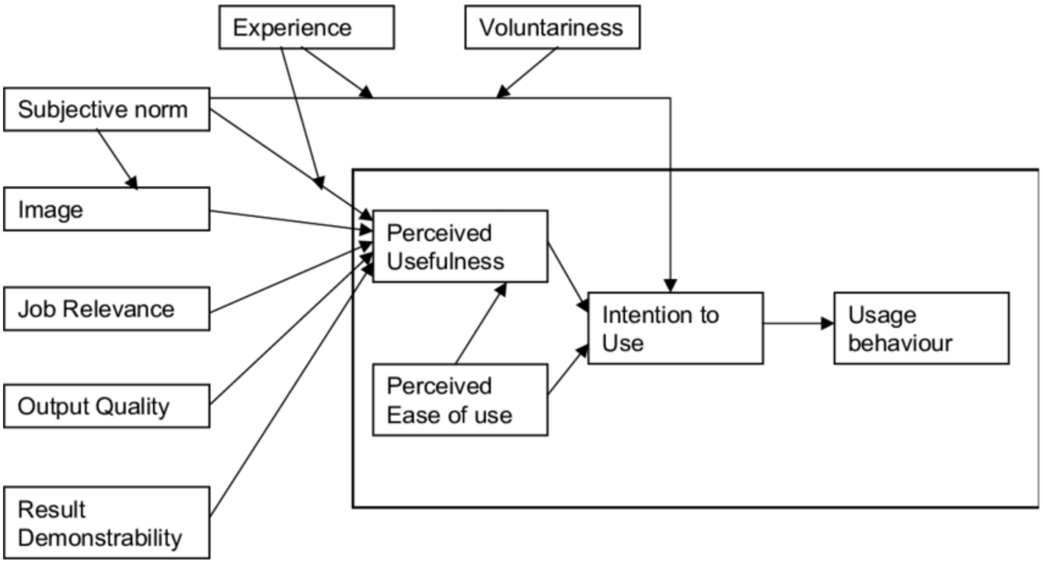
Themes	Participant quotes
Attitudes The degree to which the clinician has a favourable or unfavourable perception towards the use of robotics in rehabilitation of the neurologically impaired upper limb.	Participants reported numerous advantages to using robotics including patient engagement and additional opportunities for patients to practice movements. "I think for patient engagement. Especially for some of the younger patients, technology is integrated into every aspect of their world. And I think that it draws them in, it motivates them." (OT) "I think it's a good adjunct, and the hours and repetition, that you can't, as a therapist, physically put in." (PT) Both physiotherapists and occupational therapists reported that robotic devices enabled them to focus on the quality of movement rather than quantity.

	"I could focus a lot more on trunk and positioning of trunk or trying to deactivate traps (trapezius). Sometimes there's not enough hands to go around and fix every part of the movement. Knowing there's something else helping then I can focus on some other areas as well. Then you get much better quality and the patient gets better quality of movement earlier." (OT) The disadvantages to using robotic devices primarily related to the reduced opportunity to physically interact with the patients. However, the clinicians recognised that the device augmented their treatments rather than replacing the 'hands-on' approach that is considered critical to their interventions. "I do better with my hands." (PT) "I think that the robotics and hands-on therapy work quite well in conjunction together. But I do think there's that risk of someone just doing one over the other." (OT)

Subjective norms The clinician's beliefs about whether people who are important to them (e.g., managers, patients, colleagues) will approve or disapprove of the use of robotics in rehabilitation of the neurologically impaired upper limb.	The participants reported an increased interest in robotics from multiple groups including patients, students, and recently graduated clinicians. "I quite often get patients, especially a lot of the younger ones who have done their own research and are asking about different interventions that they've seen or looked into or heard about from other people." (PT) "As new therapists come through, they've got more and more technology in their learning." (OT) The participants did not mention any groups who they felt would not approve of using a robotic device in neurorehabilitation.
Perceived behavioural control	Clinicians reported that having the engineers on-site, helping trouble-shoot any problems with the device, was a critical component of their

The clinician's perception of how easy or difficult it is to use robotics in rehabilitation of the neurologically impaired upper limb.	learning experience. There was a perception that a user manual would be insufficient for the early stages of learning to use the device. "…if I had a manual, I would've felt overwhelmed, but having a chance to chat with them (engineers) and them having to explain things, and to try and do it yourself, and then have them chip in was really helpful." (PT) "…if it was a commercial device, you would want them to be with you for a week and set it up and help you with problems, and then for them to stay for another week while they got their hands off, in a user role, and to pop back every month, at three months, and then maybe four touch points a year, because I can see even with changing of staff and ... The worst thing you could do is buy something like that and then it sits and gathers dust in the corner." (PT)
Background factors	Clinicians discussed the importance of having support from management, in terms of protected time to practice using the device.

Individual and organisational factors that can impact a clinician's intentions to use robotics in rehabilitation of the neurologically impaired upper limb.	There was a sense that mastering using the robot was an important pre-cursor to safely and effectively using it with a patient. "…support helps. From management and seniors…being given the time to learn how to use them yourself…" (OT)


Experience
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Job Relevance
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Result Demonstrability
Perceived Usefulness
Perceived Ease of use
Intention to Use
Usage behaviour

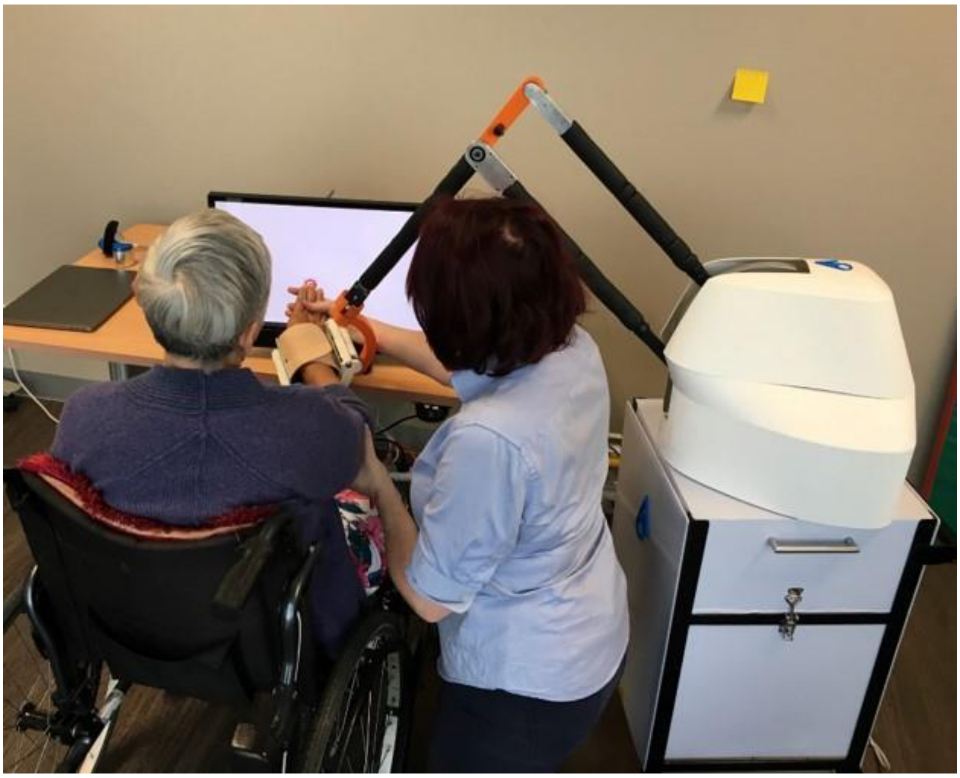

Figure caption list

Figure 1 Caption: TAM2 An extended technology acceptance model

Figure 1 Alt Text: The technology acceptance model suggests that perceived usefulness is influenced by subjective norm, image, job relevance, output quality, results demonstrability and perceived ease of use. Perceived usefulness and perceived ease of use in relation to a robotic device in clinical rehabilitation, are thought to influence intention to use and subsequent use of the device.

Figure 2 Caption: The theory of planned behaviour

Figure 2 Alt Text: Application of the theory of planned behaviour to understand clinician intention to use robotics in the context of rehabilitation of the neurologically impaired upper limb.

Figure 3 Caption: The robotic device (EMU)

Figure 3 Alt Text: The EMU robotic device being used with a patient (shown on the left) and a therapist (show on the right). The hand is unconstrainted and we can observe the patient being supported to interact with a screen.

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