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The Mount'N Mover Mounting system: a consumer-centered approach to assistive technology outcomes.

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THE MOUNT'N MOVER MOUNTING SYSTEM: A CONSUMER-CENTERED APPROACH TO ASSISTIVE TECHNOLOGY OUTCOMES

A Masters Thesis presented to the Faculty of the
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Master of Science

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by

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CERTIFICATE OF APPROVAL

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This is to certify that the Thesis of

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Submitted in partial fulfillment of the requirements for the degree of Master of Science in the Department of Occupational Therapy, School of Health Sciences and Human Performance at Ithaca College has been approved.

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Abstract

Background: Research on the outcomes of assistive technology devices and services is necessary in order for consumers and other associated parties to fully realize the impact that these devices can offer to those with disabilities. A previous study found that a mounting system improved functional and psychosocial characteristics of users, and that it was used in unanticipated ways. Purpose: To improve upon the methodology of prior research conducted that evaluated the consumer's perspective on using the Mount'n Mover mounting system. Method: A quasi-experimental research design was implemented to evaluate the device's impact on the functional capacity and quality of life of participants that had just acquired the device. Four new users were participants in this study. Two participants used the device in a school setting, and two used the device in a community-based habilitation program. The Occupational Self-Assessment (OSA) and sections of the Assistive Technology Predisposition Assessment (ATD-PA) at pretest and three-week follow-up were administered. Personal factors, environmental conditions, and expectations for device use were also explored in relation to whether or not the device was used. Results: Marginal improvements in functional capability and quality of life were noticed, with few outcomes producing statistically significant results. No conclusions could be drawn regarding differences between those who abandoned the device and those who continued device use. Results of this study were very different to those in previous work, and environmental conditions were implicated as a potential factor. Conclusion: Limitations resulting from low sample size prevented generalization of results, but the results raise important questions regarding the potential effect of environmental conditions on device outcomes.

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All participants included in this study

Dedication

This research is dedicated to all of my family and friends who have provided me with support throughout the years, and to Leonard Zimet, who first helped me realize the profound impact that assistive technology has on the lives of those with disabilities.

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Chapter 1: Introduction

Background

The World Health Organization (2001) describes the word disability as an umbrella term for impairments, activity limitations, and restrictions on participation. In 2010, the United States Census Bureau estimated that 56.7 million people in the United States were living with a disability (Brault, 2012). With such a large portion of the population classified as disabled, there is a need for tools and strategies that facilitate the participation in society by those with disabilities. Perhaps the most effective means by which this goal can be achieved is through the use of assistive technology devices and services.

The Assistive Technology Act of 2004 defines an assistive technology device (ATD) as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (Public Law 108-364.118, p. 118)." Simple devices such as a rubber pencil grip or more complex devices such as augmentative and alternative communication (AAC) devices could fall under this definition, and are often an important component of skilled assistive technology services.

Assistive technology *services* are defined as "any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device (Public Law 108-364.118, p. 118)." This may include assessment of the user's functional needs, selection of an ATD that meets the user's specific functional needs, customization of the ATD, the necessary training to appropriately use the device, and maintenance that is required to insure that the ATD is continuing to serve its intended

purpose (Fuhrer, 2007). Professionals in a wide variety of settings are equipped to provide assistive technology services, but occupational therapists provide a unique and valuable perspective to the process.

The American Occupational Therapy Association's (AOTA) Assistive Technology Within Occupational Therapy Practice statement paper (2004) articulates the valuable perspective that occupational therapists can offer during the provision of assistive devices: "Occupational therapy practitioners' understanding of their clients' daily occupational needs, abilities, and contexts make them ideal collaborators in the design, development, and clinical application of new or customized technological devices" (p. 678). As previously mentioned, an important component in the provision of assistive technology services is assessing the user's functional needs (Fuhrer, 2007). Occupational therapists provide a skillset that allows them to understand a user's assistive device needs in the context of the daily functional tasks they must perform.

Rationale

Despite the recognized importance of assistive technology as an intervention for individuals with disabilities, there is limited research that documents the outcomes of assistive technology devices and services (Brandt & Alwin, 2012; Lenker & Paquet, 2004; Lenker et al., 2010, Public Law 108-364.118). Furthermore, the existing knowledge this research has provided lacks the characteristics which would allow meaningful conclusions to be drawn from the results (Anttila, Samuelsson, Salminen, & Brandt, 2012; Vincent & Routhier, 2012).

Research that investigates the outcomes of assistive technology use has implications for many parties. The user's social supports, individual service providers,

third-party payers, rehabilitation scientists, and policy makers all benefit from the existence of quality research investigating the outcomes of assistive technology (Fuhrer, Jutai, Scherer, & Deruyter, 2003). While these parties have different perspectives on the provision and use of an assistive device, virtually all of these parties are concerned with the potential abandonment of the device.

Abandonment has a variety of definitions in the assistive technology literature, but for the purposes of this study, it will be defined as the non-use of the device at the current time (Phillips & Zhao, 1993 as cited in Wessels, Dijicks, Soede, Gelderblom, & De Witte, 2003). This lack of consensus makes the exact rate of abandonment difficult to determine. Regardless of this fact, most investigators have concluded that it is far too high and a study by Scherer put the rate at between one-third and one-half (Scherer, 1997 as cited in Wessels, Dijicks, Soede, Gelderblom, & De Witte, 2003).

A high rate of abandonment of assistive technology is cause for concern for the aforementioned stakeholders. A device not being used could indicate that funds stemming from a community or third-party payer are not being used efficiently; it could indicate an issue with assistive technology service quality; and, it could most importantly result in the user not achieving the independent lifestyle that the device was meant to facilitate (Wessels, Dijicks, Soede, Gelderblom, & De Witte, 2003). An important way to limit the rate of abandonment is to gain the consumer's perspective through extensive assistive technology outcomes research.

The Mount'n Mover

The Mount'n Mover is a mounting system created by BlueSky Designs[1] that

[1] BlueSky Designs, 2637 27th Ave S. #209, Minneapolis, MN 55406

allows access to a variety of assistive devices by those with disabilities. Users can attach the mounting system to laptops, cameras, tablets, speech devices, and other products that facilitate participation in personally meaningful activities. It can be mounted on a mobility device or any flat surface such as a kitchen table or desk. The system is unique in that it allows users to manipulate the attached device with ease and flexibility by pushing levers with little exertion and without the need for fine motor function. By manipulating these levers, the user can move the attached devices in a wide range of angles according to their immediate functional needs and the environment that they are operating within (Basics and Features, 2014).

Manufacturers can benefit greatly when assessing the user experience with their products, and BlueSky Designs is one manufacturer that recognizes this potential benefit (Choi & Sprigle, 2011). A member from BlueSky Designs contacted a team of researchers in an effort to evaluate the experience of Mount'n Mover users. This presented the opportunity to participate in a preliminary research project, which the Ithaca College Human Subjects Review Committee approved in 2013. This initial study served as the basis of the current study.

The next section briefly describes the preliminary research study and how the results informed the current study.

Prior Research

A group of researchers conducted a retrospective case study design using quantitative assessment to investigate the impact that using the Mount'n Mover had on clients who had already been using the device (Gitlow, Kinney, Goodwin, & Chapman, 2014). More specifically, they investigated the functional and psychosocial impact of

using a mounting system on those who use it and used the Psychosocial Impact of Assistive Devices Scale (PIADS) to measure changes in functional independence and the psychosocial impact of the intervention. This instrument was administered online using Qualtrics (Qualtrics, 2014). The PIADS is a 26-item, self-report questionnaire designed to assess the effects of an assistive device on functional independence, well-being, and quality of life. It measures factors intrinsic to the individual, as well as environmental factors which impact the psychosocial functioning of the person using the device. This instrument has documented reliability and validity, as well as good clinical utility (Jutai & Day, 2002).

After completing the PIADS, participants were interviewed to investigate their performance and satisfaction with their performance on meaningful activities that they wanted to engage in before and after use of the mounting device. The Canadian Occupational Performance Measure (COPM) was used to structure the interview. The COPM is an individualized and standardized instrument that researchers have used in several studies investigating outcomes of assistive technology, and is a reliable and valid measurement tool (Carswell, McColl, Baptiste, Law, Polatajko, & Pollock, 2004). The instrument asks participants to list the daily occupations they consider most important to them. The participants then describe their performance of and satisfaction with each of these occupations by assigning each a number from 1 to 10 (one being the least level of satisfaction or performance). Participants are asked to complete this process before and after intervention, which allows an opportunity to capture the effect that the intervention had on a participant's ability to perform occupations most meaningful to them.

A convenience sample consisting of existing users of the device were recruited by email to take place in the study. Ten respondents completed the online survey (3 females and 7 males) and 4 of them consented to participate in the interviews (1 female and 3 males). The mount was used to access a wide variety of devices including communication devices, phones, laptops, eating trays and cameras (Gitlow, Kinney, Goodwin, & Chapman, 2014). The variety of devices used was consistent with information available through the company regarding the diversity of devices accessed using this system (Basics and Features, 2014).

The PIADS results indicated that for 9 of the 10 respondents, their competence, adaptability and self-esteem increased as a result of using the Mount'n Mover. Competence is a subscale consisting of items that represent the user's perception of their own performance and productivity. Adaptability is a subscale consisting of items that represent the user's willingness to try novel tasks and take risks. Self-esteem is a subscale consisting of items that represent the user's emotional health and happiness (Day & Jutai, 2003).

Results of the 4 COPM interviews were perhaps most interesting from an occupational therapy perspective (Gitlow, Kinney, Goodwin, & Chapman, 2014). While the results indicated that all 4 respondents had clinically significant improvement (a change in performance score or a change in satisfaction score greater than 2), in their performance and satisfaction with performance of meaningful tasks, it was the nature of the tasks that they selected as being impacted by the device that was most unanticipated. One would assume that users would highlight tasks directly related to what they attach to

the mount (e.g., attaching a computer to the mount to provide convenient access while completing school or work-related activities).

While these important areas of occupation were mentioned, the users often mentioned activities not directly related to what they attached to the mounting system. Examples included transferring, answering technical calls, socializing, feeding, engaging in community service, participating in adaptive baseball, and shopping. Many users mentioned the ease with which the mount's position is changed made these seemingly unrelated tasks easier to perform (Gitlow, Kinney, Goodwin, & Chapman, 2014).

Prior to the completion of this study, the researchers assumed the impact of the mounting system would be felt most when the users were participating in occupations related to the device to which it was attached. For example, if the user attached an AAC device to the mount, they assumed that the device would impact the user as a result of their increased ability to communicate. The results indicated the importance of considering the user's experience with an assistive device in the context of the performance in all the user's daily occupations in a variety of environments, and not just the functional deficit that it is meant to address.

Problem Statement

Assistive technology is recognized as a powerful intervention for the promotion of independence for individuals with disabilities, but research documenting the results of such interventions is scarce (Brandt & Alwin, 2012; Lenker & Paquet, 2004; Lenker et al., 2010; Public Law 108-364.118). A previous study (Gitlow, Kinney, Goodwin, & Chapman, 2014) aimed to contribute to the pool of outcomes research by assessing the functional and psychosocial implications of using the Mount'n Mover mounting system.

While this research raised some important questions regarding the importance of attending to the use of the device in a variety of contexts when considering a solution to a user's mounting needs, the retrospective design of the study and small sample size resulted in limitations of the internal and external validity of the results.

Purpose of the Study

This study addressed the aforementioned limitations of the previous research while further investigating the impact that the device has on the functional capacity and quality of life of the user. The aim was to increase the number of subjects by providing a more concise and convenient method to collect information regarding the users' functional capacity when compared to the COPM.

Basic Definitions of Terms

Assistive Technology Device: "Any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (Public Law 108-364.118, p. 118)."

Assistive Technology Service: "Any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device (Public Law 108-364.118, p. 118)."

Abandonment: The non-use of a device or the replacement of a device by a different type of device (Phillips & Zao, 1993, as cited in Wessels, Dijcks, Soede, Gelderblom, & Witte, 2003).

Quality of Life: Perhaps the most important outcome indicator from the assistive technology user's perspective, and is characterized variously by standard of living,

subjective well-being, health status, quality adjusted life years, social relationships, and social role performance (Lenker & Paquet, 2004).

Social Role Performance: A domain of a person's quality of life that reflects the impact of rehabilitation. The ability to perform activities deemed necessary to fulfill roles related to work, school, or participating in the community (Lenker & Paquet, 2004).

Device Usability: The effectiveness, efficiency, and satisfaction with a product within a specific context of use (International Standards Organization (ISO), 1998, as cited in Arthanat, Bauer, Lenker, Nochajski, & Wu, 2007).

Effectiveness: "The accuracy and completeness with which users of a particular product accomplish specified goals in a particular environment (ISO, 1998, as cited in Arthanat, Bauer, Lenker, Nochajski, & Wu, 2007, p. 235)."

Efficiency: "The accuracy and completeness of goals accomplished in relation to the cost expended with regard to the user's effort and time (ISO, 1998, as cited in Arthanat, Bauer, Lenker, Nochajski, & Wu, 2007, p. 235)."

Volition: "The process by which people are motivated toward and choose the activities they do. The thoughts and feelings that make up volition are referred to as personal causation, values, and interests (Kielhofner, 2009, p. 150)."

Habituation: "A process whereby people organize their actions into patterns and routines. These patterns of action are governed by habits and roles. Together, they shape how people go about the routine aspects of their lives (Kielhofner, 2009, p.151)."

Performance Skills: "Underlying mental and physical abilities and how they are used and experienced in performance (Kielhofner, 2009, p. 152)."

Chapter 2: A Review of the Literature

Assistive Technology Use

Assistive technologies can be an effective tool to facilitate independence for those with a wide range of disabilities and needs associated with those disabilities (Public Law 108-364.118). The versatility and effectiveness of assistive technology is reflected in the increase of available assistive technologies in the preceding decades. The ABLEDATA database developed by the National Institute on Disability and Rehabilitation Research (NIDRR) currently provides information on over 40,000 different assistive technologies. These devices are separated into twenty categories based on the body structure or function that it addresses (e.g., blind and low vision, deaf and hard of hearing), functional implications (e.g., aids for daily living, communication), or descriptors of the technology itself (e.g., computers, controls) (ABLEDATA, 2014). In the early 1980's there were only approximately 6,000 devices listed (OTA, 1985, as cited in Committee on Disability in America, 2007) and only 21,000 as early as 2007 (ABLEDATA, 2006, as cited in Committee on Disability in America, 2007).

The prevalence of assistive technology use is further illustrated by a study conducted by Cornman, Freedman, and Agree (2005) who aggregated the data from population surveys of 6 different countries. The results of the survey suggested that a significant portion of the general population over the age of 65 (14-18%) implement some type of assistive technology into their daily lives. In a 2003 study, similar data among nonelderly adults who report a physical disability were reported (Hanson et al., 2003, as cited in Committee on Disability in America, 2007); 45% relied on assistive devices to help them with basic needs at home or work.

While assistive technology devices can be used for a wide variety of uses, the most commonly used assistive devices, according to a survey sponsored by NIDRR, (Carlson & Ehrlich, 2005) were related to facilitating the mobility of individuals with disabilities (over 68%). These included canes, crutches, walkers, wheelchairs, and scooters. In the 2005 study, 9.4% of respondents used some type of hearing device and 7% used personal or medical use assistive technology such as respirators, nebulizers, oxygen tanks, or diabetic equipment (Carlson & Ehrlich, 2005).

Despite the diverse and abundant nature of available assistive technology devices, abandonment of these devices remains a major issue. As mentioned previously, abandonment has a variety of definitions in the assistive technology literature. These varying definitions of abandonment include: 1) the device is not used at all; 2) the device is not used full-time; 3) the device is not used voluntarily; 4) the device is not used at the time of questioning; 5) the device is used infrequently; 6) the device is not used for a substantial part of the day; 7) the device is not used at any given point following discharge; 8) the average use is low; 9) the device has not been used at least three times since prescription; 10) the device is not used correctly; or, 11) the device is not used for the activities it was prescribed for (Wessels, Dijicks, Soede, Gelderblom, & De Witte, 2003). For the purposes of this study, abandonment was defined as the non-use of the device at the time of questioning (Phillips & Zhao 1993 as cited in Wessels et al., 2003).

Although the fact that there are a variety of definitions of abandonment makes the rate of abandonment hard to measure, most investigators have concluded that it is far too high. A study by Scherer (1997) put the rate at between one-third and one-half. The

potential reasons for the abandonment of assistive technology devices has far-reaching implications, and has been researched accordingly.

Kraskowsky and Finlayson (2001) performed a review of studies that examined the factors influencing the use of adaptive equipment among older adults. They found that between 47% and 82% of adaptive equipment prescribed for older adults continues to be used, but the rate of that use decreases over time. The suitability of the device, adequate training, and home visits prior to the prescription of the device all contributed to the rates of use. The rates of nonuse were impacted by a lack of fit among the device, the person, and the environment.

Louise-Bender Pape, Kim, and Weiner (2002) performed a literature review focusing on the impact of personal factors on the use of assistive devices. They found that the individual meaning that users assign to assistive technology is influenced by psychosocial and cultural factors. They suggested that the successful use of an assistive technology device requires users to identify the meaning they assign to devices; their expectations of assistive technology; the anticipated social costs; and an understanding that disability is one feature of their identity.

A literature review by Wessels et al. (2003) identified client factors, device-related factors, environmental factors, and the nature of the intervention itself as the most important predictors of abandonment. The quality and the appearance of the device seemed to have a significant impact on whether or not the user retained the device, as did the user's physical and social surroundings (Wessels et al., 2003). Notable client factors included expectations of their abilities and social surroundings, emotional maturity and

motivation, nature of their disability (i.e., progression, severity, acceptance of), and whether or not they had multiple devices (Wessels et al., 2003).

Related to these client factors was the nature of the intervention itself. The use of a client-centered approach (i.e., accounting for users opinions, amount of instruction and training, correct provision process, extent of follow-up service) significantly increased the users' chances of retaining the device (Wessels et al., 2003).

The users themselves are the most important casualties of abandonment of assistive technology devices. If the device is not being used as prescribed, the functional deficit that the device was intended to address is no longer being addressed and still present. In addition, the user's social supports, individual service providers, third-party payers, rehabilitation scientists, and policy makers all have a vested interest in making sure that the prescribed device is being used as intended (Fuhrer, Jutai, Scherer, & Deruyter, 2003).

A device which is not being used might indicate that funds stemming from a community or third-party payer are not being used efficiently. It could also indicate an issue with assistive technology service quality, or it could most importantly result in the user not achieving the independent lifestyle that the device was meant to facilitate (Wessels et al., 2003). As the findings in the aforementioned studies suggest (Kraskowsky & Finlayson, 2001; Louise-Bender Pape et al., 2002), it is imperative to gain the consumers' perspective on their personal characteristics and the interaction between the device and their environment in order to identify and remediate potential causes of abandonment. In order to gain this valuable perspective, rigorous outcome research of assistive technology devices must be conducted.

Conceptualization of Assistive Technology Outcomes Research

Researchers have documented the outcomes of assistive technology devices and services in various ways. Lenker, Scherer, Fuhrer, Jutai, and DeRuyter (2005) described outcome domains commonly found in assistive technology literature. These are device usability, user satisfaction, quality of life, social role performance, functional level, and cost.

Device usability is said to be emerging from interactions between the user, device, and environment during task performance. Common indicators include device usage, safety, and benefits of use. User satisfaction is described as the user's evaluation in response to the assistive technology device and it's impacts. Quality of life is often considered to encompass all outcome variables, but it is most often used to describe the user's subjective well-being. Social role performance is often considered a domain of quality of life, and concerns the performance in activities shaped by the roles that the user fulfills (e.g., student or worker). Functional level involves the degree of independence of the user and their functional capacity. Costs may be expressed in monetary value or time expended on behalf of the caregiver or user during assistive technology device use or service.

Lenker and Paquet (2004) contended that a conceptual model with predictive and descriptive traits is necessary when conducting high quality assistive technology outcomes research. A conceptual model serves to provide structure within which areas of investigation can be organized; predictive models of the use of a specific device can be formed (Gitlin, 1998, as cited in Lenker & Paquet, 2004); alternative designs of a device can be evaluated (Rouse, 1998, as cited in Lenker & Paquet, 2004); and data collection

systems across states, regions, and countries can be analyzed (Scherer & Vitaliti, 1997, as cited in Lenker & Paquet, 2004). Despite the importance of such a model, there fails to be a single conceptual model that dominates the field of assistive technology outcomes.

An overarching framework of assistive technology outcomes has been found extremely useful in facilitating the development of such a model (Fuhrer et al., 2003). Fuhrer et al. (2003) provided structure for future model developers to choose assumptions, variables, and populations that are relevant to the specific devices and associated outcomes that they are investigating. This framework considers outcomes of device use as an interaction among factors associated with an intervention, the targets of that intervention, and the environment in which the intervention is being applied.

The framework begins with the procurement of a device-type which is determined by the user's need for a device (e.g., functional deficits the user wants to address), the intrinsic (e.g., physical design and reliability), and extrinsic (e.g., costs and availability) properties of the device, and the services surrounding the procurement of the device (e.g., participation in a rehabilitation program or simply purchasing the device online). The user then enters a period of introductory use which could include a trial period insuring that the user is comfortable using the device in a safe and effective manner. Following this period, the user enters a period of short-term and long-term outcomes which are derived from the *Activities and Participation* domain of the ICF (WHO, 2001, as cited in Fuhrer et al., 2003), psychological characteristics of the individual, and the efficiency with which the effects are observed (i.e., time and effort associated with achievement of the outcome). Factors such as financial costs, the body functions and structures of the person, and environmental characteristics affect the extent to which the individual

experiences these short and long-term outcomes. The extent to which the devices within this framework will be used is determined by the extent to which the above outcomes are achieved.

While this framework is useful in providing structure for models examining the nature of the experience users have once obtaining a device, it is also useful to provide a framework for the factors influencing the recipients and providers of a device prior to its procurement (Scherer, Jutai, Fuhrer, Demers, & DeRuyter, 2007). This model highlights the personal and environmental factors that influence the provider and recipient of the assistive device prior to the interaction between them that ultimately leads to the procurement of the device. These factors include the resources available to them, the knowledge and information that they bring to the process, their expectations of the process, and each party's preferences and priorities.

The selection of the assistive technology device is a collaborative process between the consumer and the provider, and must include consideration of both the user's objective need and subjective need for the device. The objective need includes the assessment of the functional needs of the individual and the devices that would be successful in satisfying those needs. The subjective need includes the assessment of the predisposition to certain devices on behalf of the individual. This assessment can be determined by gathering information regarding the user's preferences, experiences, quality of life, and other psychological characteristics (Scherer et al., 2007).

The personal factors that influence the consumer and provider and which consequently influence the selection of the assistive technology device itself are moderated by broad environmental factors. These environmental factors include: the

cultural factors, financial priorities, the legislative and policy procedures dictating elements of the process, and the attitudes of others associated with the process (e.g., family or caregiver attitudes towards the device and the relationship with the provider) (Scherer et al., 2007).

As mentioned previously, there is a lack of a dominant conceptual model in assistive technology outcomes research. However, there are models available that are widely used in assistive technology and related fields and which incorporate the tenets of the above frameworks. The use of one or more such models would guide the assessments used within assistive technology outcomes research and would thus likely benefit any research being conducted.

The Assistive Technology Device Predisposition Assessment (ATD-PA) is a standardized measurement developed according to the Matching Person and Technology (MPT) model, and addresses many of the elements included in the above frameworks. This instrument is designed to gather information regarding the user's perception of how well the assistive device meets their needs by assessing the user's satisfaction with their functional capacity, what aspects of their lives they feel needs the most change, their personal and psychosocial characteristics, and their interaction with the device within their environmental context (Scherer, Sax, Vanbiervliet, Cushman, & Scherer, 2005).

The OSA is an instrument based on the Model of Human Occupation (MOHO) (Baron, Kiehlhofner, Iyenger, Goldhammer, & Wolenski, 2006) aimed at determining both the objective functional needs of the individual as well as the subjective needs of the individual (e.g., what they want to do, how important each area of functioning is to them). The assessment captures a person's perception of their performance in occupations

that they consider most important. The user is asked to rate their performance on items that relate to their performance capacity (i.e., bodily functions used in the context of meaningful activity), habituation (i.e., organization of behavior into patterns of activity related to the user's social roles), and volition (i.e., the process dictating what activities people choose to do) (Kielhofner, 2009); and then, to rate those same items according to importance.

Overall State of Assistive Technology Outcomes Research

Despite the importance of assistive technology outcomes research and the frameworks available to simplify and structure the process, there is a lack of such research (Brandt & Alwin, 2012; Lenker & Paquet, 2004; Lenker et al., 2010, Public Law 108-364.118). To gain a better understanding of the available evidence from outcomes studies on various assistive technologies, a summarization of systematic reviews of these studies was conducted (Antilla, Samuelsson, Salminen, & Brandt, 2012). The reviews that were included in the overview evaluated the outcomes related to deficits in mobility, hearing, speech, cognition, vision, or a mixture of deficits.

The reviews included a diverse sample of severity of limitations, settings, and age groups. Assistive products were categorized according to the international classification for assistive devices (International Organization for Standardization, 2007, as cited in Antilla et al., 2012), and included devices for personal care, mobility, housekeeping, adaptations to homes and other premises, communication, handling products and goods, environmental improvements, tools and machines, and recreation.

The quality of the evidence was assessed using principles from Grading of Recommendations Assessment, Development, and Evaluation (GRADE) (GRADE

Working Group, 2004, as cited in Antilla et al., 2012). The quality of each review was organized into categories of "high", "moderate", "low", or "unclear". This descriptive category was determined by examining the quality of the primary studies, design of the primary studies, consistency, and directness.

The results of this overview of systematic reviews indicate that quantity of assistive technology outcomes research is low. The reviews were related to a relatively small number of products relative to the abundance of and diversity of different product categories on the market. This finding indicates that evidence regarding the effectiveness of the majority of assistive products is unavailable, and therefore the extent to which these products help those with disabilities is unknown. Furthermore, the quality of the available evidence is low. The majority of the reviews that were included had been assigned a label of either "low" or "unclear" quality of evidence. All of the authors of these reviews stated that there was a clear need for further and better quality research based on the methodological limitations and low sample size (Antilla et al., 2012).

Occupational Therapy Related Outcomes and Implications for Practice

As previously mentioned, occupational therapists provide a valuable perspective when it comes to providing assistive technology devices and services. This perspective was articulated in the AOTA's position paper regarding the occupational therapist's role in evaluating for and implementing assistive technology (AOTA, 2004). The authors describe the unique abilities that occupational therapists bring to the provision of assistive technology services, including their ability to analyze activity and the occupational needs of the client; their ability to understand the client's abilities in the context of those occupational needs; and their ability to understand the client's interaction with their

environment. Given the appropriate skillset that occupational therapists bring to the process of assistive technology services, they are involved in the provision of these services in a variety of ways, including: evaluation for and recommendation of assistive devices, training for the use of the device, increasing awareness of funding resources, and tracking the effectiveness of the device (AOTA, 2004).

The importance of assistive technology in occupational therapy intervention has also been described in systematic reviews of occupational therapy intervention that address disabilities or functional deficits commonly treated by occupational therapists. Arbesman and Sheard (2014) performed a review that described occupational therapy-related interventions for individuals with amyotrophic lateral sclerosis (ALS), and found that bathroom durable medical equipment was among the most useful devices for this population. Furthermore, the authors stated that occupational therapists are uniquely qualified to recommend appropriate equipment in the context of the disease progression. Smallfield, Clem, and Myers (2013) conducted a similar review regarding interventions addressing the reading ability of older adults with low vision. These authors' conclusions included recommendations for training the client on the use of assistive devices that allow for electronic magnification or optical magnifiers when addressing the client's reading ability.

Despite the importance of assistive technology in occupational therapy practice and the extent to which occupational therapists are involved in assistive technology services, there is a lack of outcomes research that articulates this role. In a review of the literary content of 5 prominent occupational therapy journals during a 5-year span

beginning in 2001, Case-Smith & Powell (2008) found that only 5% of those articles included topics relating to assistive technology.

Dahlin Ivanoff, Iwarsson, and Sonn (2006) performed a literature review of 9 international peer-reviewed occupational therapy journals in an attempt to describe the nature of research related to assistive technology provision and interventions targeting the physical environment. They found that many articles related to assistive technology had significant methodological issues that limited the studies' external validity. They identified a need to incorporate occupational performance as an outcome in research related to assistive technology. They also found that the majority of the studies used the device's impact on a specific body function as an outcome, rather than highlighting how the limitation within that body function impacted the user's ability to perform necessary activities.

The professional body recognizes the need for occupational therapy research related to assistive technology services. The AOTA (2014) recently published a paper highlighting research opportunities in the area of productive aging. Research on interventions related to home adaptations and the assistive technology within the home to assist with instrumental activities of daily life (IADLs) was identified as a research area with high priority.

Fuhrer et al. (2003) touched upon possible explanations for the insufficient evidence for an intervention as pervasive and effective as assistive technology devices and services. The authors attributed the paucity of outcomes research to a variety of factors, including: 1) the belief that the benefits of assistive technology use is self-evident; 2) an over-reliance on anecdotal evidence by relevant stakeholders; 3) assistive

technology developers focusing on technical aspects of their product rather than the user's performance; 4) underdeveloped theories regarding the acquisition of assistive technology and the nature of it's use; 5) the rapid increase in the quantity of available technologies and their individualized use; 6) the lack of mandates to collect outcomes data; and, 7) a lack of demand for that research from relevant stakeholders.

Outcomes Related to Mounting Systems

Mounting systems, the Mount'n Mover by BlueSky Designs in particular, has been shown to improve the functional capability and quality of life of individuals who use the device. A retrospective study by Gitlow et al. (2014) examined the impact that the mounting system had on the users' functional capabilities and psychosocial status. Users attached a variety of devices to the mount, including: communication devices, phones, laptops, tablets, eating trays, and cameras. The results of the study demonstrated that the mounting system had a positive impact on their ability to function in areas that were related to what they were attaching to the mounting system (e.g., attaching a phone impacted their ability to call others and attaching a camera impacted their ability to take photographs). The results also indicated that the mounting system had a positive impact on their ability to function in areas that were not directly related to what they were attaching to the mounting system due to the relative ease with which the position of the mount could change (e.g., their ability to go out to eat or transferring was impacted due to the ease with which the attached device could be moved).

Despite the results of the above study, a considerable lack of evidence remains. While research has demonstrated the effectiveness of devices that are commonly attached to mounting systems such as AAC devices (Johnson, Inglebret, Jones, & Ray, 2006), a

thorough literature review uncovered no research, aside from the above study, that examined the impact that a mounting system allowing access to a variety of different assistive devices has on a users' occupational performance. The purpose of this study is to address the methodological limitations of the previous research while further examining personal and environmental factors related to the impact of the device on the user's functional capabilities and quality of life.

Chapter 3: Methods and Procedures

Research questions

1. To what extent does the Mount'n Mover have a positive impact on the quality of life and ability to independently perform meaningful activities of the user?
2. How do individuals who continue to use the device at follow-up differ from those who abandon the device at follow-up in terms of personal characteristics and expectations of device use prior to beginning use of the device?
3. How do individuals who continue to use the device at follow-up differ from those who abandon the device at follow-up in terms of the impact that the device has on quality of life and ability to independently perform meaningful activities?

Hypotheses

Hypothesis 1: The Mount'n Mover will improve the user's quality of life and will increase their ability to function within their environment.

Hypothesis 2: Users who continue to use the device at follow-up will report more favorable personal characteristics (e.g., positive affect, high engagement in therapy, high amount of support, and high readiness to change) and higher expectations for device use prior to device use when compared to those that abandoned the device at follow-up.

Hypothesis 3: Users who continue to use the device at follow-up will report a larger increase in their quality of life and ability to function when compared to those who abandoned the device at follow-up.

Design

This study is a quasi-experimental design with no control group. It consisted of

the measurement of participants both prior to intervention (i.e., the acquisition of the Mount'n Mover) and 3 weeks after intervention. The Human Subjects Review Board (HSR) of Ithaca College granted an extension of a previous proposal to allow the implementation of this quasi-experimental design with no control group on August 29, 2013. See Appendix C for the HSR Proposal and approval letters for both studies.

Users were asked to fill in responses to a web-based survey that included demographic data and standardized instruments using the Qualtrics survey software (Qualtrics, 2014). In instances when a user was unable to independently enter responses to the questionnaires, caregivers were asked to enter responses on behalf of the users with or without their specific direction. Users or caregivers completed a pre-test prior to installing and using the Mount'n Mover, and a post-test was completed three weeks after the completion of the pre-test. In instances of caregivers entering responses for users, instruction was given to ensure the same caregiver entered responses for the same user on both the pre and post-test.

Participants

Following HSR approval, the collection of a convenience sample of prospective Mount'n Mover users was conducted. A flyer that contained information on the purpose of the study and information regarding incentives was developed in conjunction with BlueSky Designs. The incentive consisted of being entered into a drawing from which 10 $20 Amazon gift cards would be provided. BlueSky Designs provided the flyer to those who had just purchased the device. See Appendix A for a copy of the flyer used. This method elicited no responses, and additional recruitment strategies were implemented.

The same flyer was given to BlueSky Designs to provide at its official booth at

the 2014 Assistive Technology Industry Association (ATIA) Conference in Orlando, FL. Flyers were also distributed at the presentation of the initial retrospective research at the conference. These strategies resulted in a convenience sample of users that had attended or users who were enrolled in programs that sent representatives to the 2014 ATIA Conference. Representatives of the programs that the users attended or the caregivers of the users were provided a link to the online survey; no information that could identify the user was gathered in order to insure the anonymity of the participants.

All users that purchased the device following HSR approval on August 29, 2013 were eligible for the study. An overall response rate was unable to be calculated because the number of users who purchased the device and received the flyer could not be obtained. Data of users who had not completed both the pre-test and post-test was not included in final analysis. Seven users responded to the pre-test, and 4 users responded to the pre-test and post-test, resulting in a sample response rate of 57%.

Of the 4 participants, 2 were female and 2 were male. Caregivers filled out 2 surveys with the direction of the user in the clinical setting, and caregivers filled out 2 surveys without the direction of the user while in a school setting. At follow-up, 3 participants continued to use the device, while 1 user replaced the device with a similar one. This participant provided no further information regarding the specific reasons for replacing the device.

Users provided consent prior to completing the pre-test if over the age of 18 (n=2), and parents provided consent for users under the age of 18 (n=2). Since the parents were not present at the school to provide consent when the survey was administered, a physical copy of the consent form was provided to them, and the signed copy was

scanned and sent to the researcher prior to collection of data.

Measurement Instruments

In order to ensure that the collected data accurately represented the constructs related to our research questions and to allow for future replication of the study, standardized measurement tools were used (Lenker, et al., 2005).

To measure the psychosocial and personal characteristics of the users, as well as the nature of their experience with the device, sections of the Assistive Technology Device Predisposition Assessment (ATD-PA) were used. The ATD-PA is a standardized measurement developed according to the Matching Person and Technology (MPT) model, which is a model frequently used in the provision of ATDs and research investigating the outcomes of such devices (Scherer et al., 2005; Lenker & Paquet, 2004). This instrument is designed to gather information regarding the user's perception of how well the assistive device meets their needs by assessing the user's satisfaction with their functional capacity, what aspects of their lives they feel needs the most change, their personal and psychosocial characteristics, and their interaction with the device itself (Scherer et al., 2005). The instrument includes initial and follow-up forms, and when given before and after implementation of the device, it can be used as an outcomes measure (Scherer et al., 2005). The instrument manual further states that it is appropriate to use sections of the instrument independently (Scherer, 1998).

The first draft of the web-based survey included all sections of the ATD-PA, as well as questions that asked the participants about how the device was used and the amount of training they received. Since this study was a collaborative project, the draft was then submitted to BlueSky Designs for their input. BlueSky Designs explained that

they had significant concern regarding the length of the survey. Their concern was based on the knowledge that their client-base is made up of individuals with significant cognitive impairments, physical impairments, or a combination of both. They were concerned that accurate data would not be collected due to the high cognitive and physical load (completing a survey requires twenty minutes) produced. Actions were taken to reduce the length and cognitive demand of the survey. Only the Device Form of the ATD-PA and the 33-item Psychosocial and Personal Characteristics Section were included, and were explained in further detail in the delimitations section. In addition, questions regarding how the device was used and the amount of training the users received were removed from the survey. Instead, they were sent via email to the representatives of the programs in which the devices were used. This selective notification allowed important information to be captured by those with intimate knowledge of the use of the device while further reducing the length of the survey. See Appendix A for email correspondence with relevant representatives containing questions and answers.

The ATD-PA has been used in several assistive technology outcomes studies. The instrument is considered a high quality outcomes measure (Craddock & McCormack, 2002; Scherer & Glueckauf, 2005; Scherer et al., 2005) as evidenced by the following review of studies establishing the psychometric properties of sections of the ATD-PA relevant to this study.

Scherer et al. (2005) established predictive validity for 45 ATD-PA items (including the Psychosocial and Personal Characteristics section used in this study) in two cohorts of subjects concerning the ability of these items to predict degree of

predisposition to device use and realized benefit of the device using the Device Form of the ATD-PA. The results indicate that these items reliably predict the degree to which the user is predisposed to use a particular technology (Wilks' Lamba significant at p=.03 for 2002 cohort, and at p=.00 for 2004 cohort) and the match between the device and the user once the device has been acquired (Wilks' Lamba significant at p=.00 for 2002 cohort, and at p=.01 for 2004 cohort). In other words, the more positively that a user rated their psychosocial and personal characteristics on this assessment, the more likely they were to be favorably predisposed to device use and achieve an ideal match with a particular device.

Graves et al. (2006) found that the 33-item scale included in the ATD-PA could be separated into four factors accounting for 58% of the variance following a full information factor analysis. These 4 factors were affect/mood, resistance to (vs. readiness for) change, engagement in therapy, and support from others and achieved marginal reliability scores of .62, .54, .39, and .47, respectively. The results of this study suggest that this 33-item scale includes subscales that are well defined with acceptable reliability properties.

The OSA was also administered as a part of the online survey. The OSA is an instrument based on the Model of Human Occupation (MOHO) (Baron et al., 2006) that measures a person's perception of their performance in meaningful occupations which they consider most important. The user rates their performance on items that relate to their performance skills (e.g., concentrating on my tasks), habituation (e.g., having a satisfying routine), and volition (e.g., doing activities I like). See Basic Definitions and Terms in Chapter 1 for definitions of performance capacity, habituation, and volition.

The user then rates the same items on their importance to the user (Baron et al., 2006). This instrument captures the user's ability to perform occupations that they consider most valuable to them in the context of their own unique roles, capabilities, and desires, and how satisfied they are with this ability. While the literature pertaining to the OSA mentions constructs specific to MOHO (Baron et al., 2006) and not quality of life specifically, a case can be made that this instrument can also measure the quality of life of the user.

Given the fact that the instrument measures a user's perception of their performance of activities related to their respective roles (e.g., family member, employee, student) that they deem most important, it can be said that this instrument measures a user's social role performance. These social roles help to define the individual's perception of their existence and shape which daily activities they perform (Dijkers, Whiteneck, & El-Jaroudi, 2000). The performance of the daily activities necessary to fulfill these roles is useful in determining goals for rehabilitation, and can reflect the impact that rehabilitation in general (Keith, 1995, as cited in Lenker & Paquet, 2004) and assistive technology provision (Gitlin, 1998, as cited in Lenker & Paquet, 2004) has on the individual. Social role performance is therefore a domain of quality of life that is relevant to both the therapist and patient in the rehabilitative context.

There is no consensus on the definition of quality of life and how best to assess it (Farquhar, 1995). This acknowledgment, along with the acknowledgement that social role performance is a domain of quality of life that is most useful in the rehabilitative and assistive technology context (Keith, 1995; Gitlin, 1998, as cited in Lenker & Paquet, 2004), suggests that the results of the OSA can be considered an acceptable measure of

the user's quality of life. This holds true regardless of the fact that quality of life is not a construct explicitly measured by the OSA.

When administered before and after implementation of the device, the OSA has the ability to measure the impact that the intervention (i.e., the Mount'n Mover) had on these domains and thus the quality of life of the user (Baron et al., 2006). Kielhofner, Forsyth, Kramer, and Iyenger (2009) demonstrated that the OSA has good internal validity, reliability, and sensitivity for people with a wide range of disabilities across various contexts. They achieved this by combining the results of three successive studies examining the instrument's internal validity, sensitivity, and reliability with a diverse population of subjects. They found that the instrument had acceptable internal validity, with only one item not meeting fit requirements. Furthermore, this item was found to have acceptable content validity and clinical utility. The instrument was also found to have acceptable reliability, with 90% of participants using the Occupational Competence and Values scales consistently (Kielhofner et al., 2009).

Limitations

There are several limitations to the design of this study, and the results of this study should therefore be interpreted in the context of these limitations. The sample used and the quasi-experimental design of the study affect the internal validity of the study and should therefore be sufficiently explained. The sample size was limited (n=4), which reduced the power of the study and made proper significance testing difficult. The likelihood of finding a statistically significant effect upon analyzing the data with such a small sample size is low, and if a statistically significant effect was found the likelihood of a Type II error having occurred is high.

The internal validity of this study is impacted by limitations inherent in quasi-experimental designs with no control group. Any changes in functional status and quality of life that are noted when comparing the pre-test and post-test data must be interpreted with caution, as the lack of a control group and randomized sample prevents a clear causal link between the intervention and change in status from being drawn. One must be aware that extraneous variables that were not controlled for could contribute to the variation in the data between the two observations. The natural maturation of the subjects, additional rehabilitative services, or the acquisition of an additional device during the period between collection of the pre-test and post-test data are all potential variables that could affect the users' responses in addition to the intervention that is being tested.

The size of the sample and the method with which it was selected results in challenges for external validity as well. The size of the sample (n=4) is not large enough to suggest that the results of this study would be experienced by the entirety of those who would benefit from using a mounting device. The method with which the convenience sample was selected created another challenge for generalizing the results of this study.

First, financial restrictions may have prevented users from attending the conference, and therefore prevented them from exposure to the device and the study itself. The cost of travel, hotel accommodations, and conference registration are a notable financial burden and should be considered a potential barrier for users that could benefit from the device but have a lower socioeconomic status. Second, the time and effort it takes to attend a four-day event is significant. Individuals who benefit from the Mount'n Mover are often using a mobility device to ambulate and may have additional sensory or

cognitive impairments. While the conference offers significant accessibility options for those with impaired mobility, vision, hearing, and cognition (ATIA, 2014), the challenges inherent in travelling and attending a four-day conference as an individual with disabilities could deter a user or their caregiver from attending and gaining awareness of the device and our study

Delimitations

The short length of time between the pre-test and post-test was chosen due to the adaptive nature of the intervention and time constraints resulting from deadlines in the Ithaca College curriculum. The intervention did not include a gradual rehabilitative process, but an adaptive solution that suggests a relatively immediate change in functional status. This coupled with the time constraints on the study resulted in the researcher deciding that three weeks was both a reasonable and necessary length of time between the observations.

The retrospective study that was conducted prior to beginning this research (Gitlow et al., 2014) gained important information from the administration of the COPM, but this researcher estimated that the extensive process of administering a semi-structured interview resulted in a lower number of users participating in that interview (n=4). The OSA garners similar information to the COPM, but in a format that is quicker to complete and is more easily distributed online. Not only did this provide a better fit with the methodology of this study, but this researcher estimated that the efficiency with which the online survey could be completed would increase the chances of a high response rate, thus increasing the power of the study.

The sections of the ATD-PA that measured the client's specific performance

capacities (e.g., ability to hear, control of arms) and the user's satisfaction with participation in important activities or roles were eliminated when BlueSky Designs suggested shortening the survey. The reason for the elimination of the section measuring performance capacity was that this study aimed to measure the client's performance in functional activities deemed important to them, not the individual components that result in that functional performance. The section that measured the user's satisfaction with participation in important activities or roles was eliminated because it was deemed redundant with the administration of the OSA which gathers similar information.

Assumptions

The methodology and interpretation of the results of this study rests on several assumptions. Since the data collected with this survey includes the user's perception of their current functional status and quality of life, the first assumption is that the data provides an accurate representation of those domains. In the case of the surveys filled out with the user's direction, the user had to have accurate awareness of their current performance. In the case of caregivers providing answers without the user's direction, the accuracy of the data in representing the users' functional status and quality of life required that the caregivers have a thorough knowledge of the user's functional status and have insight into the user's quality of life.

The second assumption is that the user's provided responses to the pre-test prior to beginning use of the device. Completion of the survey following use of the device would not give an accurate representation of the user's status prior to implementation of the device and thus the affect that the device had on the user. Instruction was given to complete the survey prior to beginning use of the device and those who received the link

to the survey provided confirmation, but the researcher was not physically present and therefore cannot be completely certain that this assumption was met.

The last assumption was that the same caregiver filled out the survey for the pre-test and post-test. This assumption may not be as crucial for the users whose caregiver filled out the survey with their direction, because the users themselves were providing the information. However, this assumption is important for the users whose caregiver filled out the survey without their specific direction. An accurate representation of the affect that the device had on the user requires that the same caregiver filled out the survey before and after intervention, as different caregivers may have a slightly different perception of the users' functional status and quality of life. Instruction was given to ensure that the same caregiver filled out the pre-test and post-test, and confirmation was provided by those who received the link to the survey. Again, however, the researcher was not physically present and therefore cannot be completely certain that this assumption was met.

Data Analysis

The overall functional capability and quality of life of the users was measured by the OSA Keyform Score. The Keyform Score is a numerical score that represents the client's overall rating of their own performance and the value they assign to each aspect of performance, and is useful when comparing the effects of an intervention among more than one client (Baron et al., 2006). The Keyform Score was calculated by entering the client data into a section of the Model of Human Occupation Clearinghouse website (2014) that allows you to enter the raw data of a particular assessment to obtain clinically

relevant results. This method allowed for obtaining consistent and accurate Keyform Scores.

Items on the OSA are grouped according to particular MOHO constructs. Not all items included in the constructs were answered by the participants, so an index score between zero and one was calculated for each construct by dividing the total score provided by the total possible score. For example, if a user answered four of the items, their total possible score would be 16. If they rated each as a three, their total score would be 12, giving them an index score of .75. These constructs, as they relate to outcome measures for this study, are as follows: 1) performance skills: items that relate to underlying mental and physical abilities and how they are used and experienced in performance of activities, 2) habituation: items that relate to how the user manages the routine aspects of their lives, and, 3) volition: items that relate to performance of activities that the user is motivated by or enjoys doing (Kiehlhofner, 2009).

To measure the user's expectations for device use and realization of device use, a device predisposition index and a device match index were calculated from the results of the Device form of the ATD-PA using a process identical to that used to create the MOHO construct index scores. The psychosocial and personal characteristics of the user were measured using the Psychological and Personal Characteristics section of the ATD-PA, and the items were grouped to create four subscales that align with the four subscales that emerged from the study by Graves et al. (2006).

The subscale scores were calculated by taking the sum of the items in each subscale with the item receiving a value of one if it was selected and a zero if it was not. One item (I prefer a quiet lifestyle in the Readiness for Change scale) was reverse coded

in accordance to the results of the factor analysis by Graves et al. (2006) to receive a one if the item was *not* selected. This change resulted in subscales with scores representing various psychosocial and personal characteristics that potentially impact device use, including 1) affect, which is represented by a value between zero (positive affect) and nine (negative affect); 2) readiness for change, which is represented by a value between zero (low readiness for change) and nine (high readiness for change); 3) engagement with therapy, which is represented by a value between zero (low level of engagement in therapy) and eight (high level of engagement in therapy); and, 4) support, which is represented by a value between zero (low amount of support) and six (high amount of support).

Descriptive statistics were used to compare the results of the intervention in individuals who abandoned the device at follow-up to those who continued use of the device using the above measures, as well as the difference in their predisposition using the measure of psychosocial and personal characteristics and expectations of device use. A paired samples *t*-test was used to compare pretest and posttest scores, and Cohen's *d* was used to calculate the size of the effect (Cohen, 1992).

Chapter 4: Manuscript

The manuscript below is formatted for submission to the international and multidisciplinary journal titled *Disability and Rehabilitation: Assistive Technology.* See Appendix E for Author Guidelines.

Introduction

The Assistive Technology Act of 2004 defines an assistive technology device (ATD) as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" [1, p.118]. The complexity of these devices vary from very simple (e.g., rubber pencil grip) to more complex [augmentative and alternative communication (AAC) device] and are extremely important to individuals with a variety of disabilities and associated functional deficits.

Despite the recognized importance of assistive technology as an intervention for individuals with disabilities, there is limited research that documents the outcomes of assistive technology devices and services that allow meaningful conclusions to be drawn from the results [1-3]. The outcomes of such research can describe many aspects of the complex process that is assistive technology device (ATD) provision, but the most important to measure is the perspective of the consumer [4-5].

Researchers have demonstrated that investigating the personal characteristics of the consumer and how they interact with device use and the user's environment is key to understanding why a device is used or not [6-7]. The rate of abandonment is difficult to calculate with a high degree of accuracy given the variety of definitions in the literature [7]; an accepted estimate is 30% [8].

The factors leading to this abandonment vary and are both positive (e.g., the remediation of functional deficits that necessitated the ATD) and negative (e.g., the device did not successfully address deficit) [8]. Regardless of the nature of the reasons for abandonment, the adequate assessment of consumer needs has the potential to reduce

or eliminate the abandonment of ATDs [8]. BlueSky Designs contacted Dr. Lynn Gitlow in an effort to evaluate the experience of Mount'n Mover users, and this resulted in a preliminary research study. The Mount'n Mover mounting system and the results of this preliminary research study that served to explore the consumer experience are briefly described below. Following the brief description of the device and the initial study, the results of a second study will be presented in detail. The Ithaca College Human Subjects Review Committee approved both studies.

The Mount'n Mover

The Mount'n Mover is a mounting system created by BlueSky Designs that allows access to a variety of assistive devices by individuals with disabilities. Users can attach the mounting system to laptops, cameras, tablets, speech devices, and other products that facilitate active participation in meaningful activities. It can be mounted on a mobility device or any flat surface such as a kitchen table or desk. The system is unique in that it allows users to manipulate the attached device with great ease and flexibility by utilizing levers that require little exertion and fine motor function. By manipulating these levers, the user can move the attached devices in a wide range of angles according to their immediate functional needs and the environment that they are operating within [9].

Previous Research

Researchers working on a previous study chose a retrospective case study design using quantitative assessment to investigate the impact that using the Mount'n Mover had on clients who had already been using the device [10]. More specifically, they investigated the functional and psychosocial impact of using a mounting system on those who use it using the Psychosocial Impact of Assistive Devices Scale (PIADS) [11]. This

instrument was administered online using Qualtrics [12]. After completing the PIADS, participants were interviewed to investigate their performance and satisfaction with their performance on activities that they deemed most important both before and after device use. This interview was structured using the Canadian Occupational Performance Measure (COPM) [13].

Users reported a positive impact on their functional capacity and quality of life as measured by the PIADS, and the results of the COPM interview revealed a clinically significant improvement (a change in performance score or a change in satisfaction score greater than 2). Interestingly, the activities that the participants selected as being most impacted by the device were typically unrelated to the functional deficit that the device attached to the Mount'n Mover was meant to address and were performed in a variety of contexts [10]. These results indicate the importance of considering the user's experience with this device and those like it while completing activities related to all areas of participation in a variety of contexts, not just those that are directly impacted by the device that the mount is providing access to.

Introduction of Current Research Study

While the aforementioned research raised important questions regarding the importance of attending to the use of the device in a variety of contexts when considering a solution to a user's mounting needs, the retrospective design of the study and small sample size resulted in limitations of the internal and external validity of the results. This study will address these limitations while further investigating the impact that the device has on the functional capacity and quality of life of the user. Specific research questions are as follows: 1) To what extent does the Mount'n Mover have a positive impact on the

quality of life and ability to independently perform meaningful activities of the user? 2) How do individuals who continue to use the device at follow-up differ from individuals who abandon the device at follow-up in terms of personal characteristics and expectations of device use prior to beginning use of the device? 3) How do individuals who continue to use the device at follow-up differ from those who abandon the device at follow-up in terms of the impact that the device has on quality of life and ability to independently perform meaningful activities?

Methodology

Design

The Human Subjects Review Board (HSR) of Ithaca College approved this study on August 29, 2013. This study is a quasi-experimental design with no control group. It consisted of the measurement of participants both prior to intervention (i.e., the acquisition of the Mount'n Mover) and 3 weeks after intervention. Users were asked to fill in responses to a web-based survey that included items gathering demographic data and standardized instruments using Qualtrics survey software [12]. In instances when a user was unable to independently enter responses to the questionnaires, caregivers were asked to enter responses on behalf of the users with or without their specific direction. Users or caregivers completed a pre-test prior to installing and using the Mount'n Mover, and a post-test was completed three weeks after the completion of the pre-test. The Human Subjects Review Board (HSR) of Ithaca College approved the initial retrospective case study on February 15, 2013. HSR granted an extension of this proposal to allow the implementation of a quasi-experimental design with no control group on August 29, 2013.

Participants

Following HSR approval, the collection of a convenience sample of prospective Mount'n Mover users was conducted by developing a flyer in collaboration with BlueSky Designs that contained information on the purpose of the study and information regarding incentives. The incentive consisted of being entered into a drawing from which 10 $20 Amazon gift cards would be distributed. This flyer was given to BlueSky Designs to distribute at it's official booth at the 2014 Assistive Technology Industry Association (ATIA) Conference in Orlando, FL. Flyers were also distributed at the presentation of the initial retrospective research at the conference. These strategies resulted in a convenience sample of users that had attended or users who were enrolled in programs that sent representatives to the 2014 ATIA Conference. Representatives of the programs that the users attended or the caregivers of the users were provided a link to the online survey; no information that could identify the user was gathered in order to insure the anonymity of the participants.

All users regardless of age or disability that purchased the device following HSR approval were eligible for the study. Users provided consent prior to completing the pre-test if over the age of 18 (n=2), and parents provided consent for users under the age of 18 (n=2). Seven users responded to the pre-test, and 4 users responded to both the pre-test and post-test, resulting in a sample response rate of 57%.

Instruments

The first draft of the web-based survey included all sections of the Assistive Technology Predisposition Assessment (ATD-PA) and Occupational Self-Assessment, as well as questions that asked the participants about how the device was used and what

amount of training they received. The ATD-PA is a standardized measurement developed according to the MPT model, which is a model frequently used in the provision of ATDs and research investigating the outcomes of such devices [14]. The OSA is a standardized instrument based on the Model of Human Occupation (MOHO), which is a client-centered model frequently used to guide occupational therapy practice [15]. When the initial draft was submitted to BlueSky Designs for their input, they expressed concern regarding the length of the survey due to the nature of cognitive and physical impairments that their users typically experience.

This feedback resulted in the exclusion of certain sections of the ATD-PA, and questions regarding how the device was used and the amount of training the users received were removed from the survey. Instead, they were sent via email to the representatives of the programs that the devices were used. This selective notification allowed important information to be captured by those with intimate knowledge of the use of the device while further reducing the length of the survey.

The Psychosocial and Personal Characteristics section of the ATD-PA was used to measure the psychosocial and personal characteristics of the user. This section includes 33 dichotomous items made up of statements that reflect various psychosocial and personal attributes that may impact device use. Graves et al. [16] determined that four well defined and reliable factors emerge from these 33 items, including: 1) affect, 2) readiness for change, 3) engagement in therapy, and, 4) support from others.

The Device form of the ATD-PA was used to gather information regarding the nature of the user's experience with using the device. The form consists of 12 items, and the user rates their expectations for or experience with using the device with a five point

Likert scale. When administered prior to intervention, it provides insight into the user's expectation of benefit. When given after intervention, it provides insight into the benefit experienced by the user [14].

The OSA was used to measure the user's perception of their performance in particular activities, and how important those activities were to them with a four-point Likert scale. This measure provides an overall representation of the user's quality of life by gathering information regarding their performance of activities that they deem most important (i.e., the activities that allow them to fulfill relevant roles). In other words, this assessment measures social role performance, which many consider a domain of quality of life that is extremely important when considering the outcomes of assistive technology devices and rehabilitation in general [2].

Data Analysis

The overall functional capability and quality of life of the users was measured by the OSA Keyform Score. The Keyform Score is a numerical score that represents the client's overall rating of their own performance and the value they assign to each aspect of performance, and is useful when comparing the effects of an intervention among more than one client [15]. The Keyform Score was calculated by entering the client data into a section of the Model of Human Occupation Clearinghouse website [17] that allows you to enter the raw data of a particular assessment to obtain clinically relevant results. This method allowed for obtaining consistent and accurate Keyform Scores.

Items on the OSA are grouped according to particular MOHO constructs. Not all items included in the constructs were answered by the participants, so an index score between zero and one was calculated for each construct by dividing the total score

provided by the total possible score. For example, if a user answered four of the items, their total possible score would be 16. If they rated each as a three, their total score would be 12, giving them an index score of .75. These constructs, as they relate to outcome measures for this study, are as follows: 1) performance skills: items that relate to underlying mental and physical abilities and how they are used and experienced in performance of activities, 2) habituation: items that relate to how the user manages the routine aspects of their lives, and, 3) volition: items that relate to performance of activities that the user is motivated by or enjoys doing [18].

To measure the user's expectations for device use and realization of device use, a device predisposition index and a device match index were calculated from the results of the Device form of the ATD-PA using a process identical to that used to create the MOHO construct index scores. The psychosocial and personal characteristics of the user were measured using the Psychological and Personal Characteristics section of the ATD-PA, and the items were grouped to create four subscales that align with the four subscales that emerged from the study by Graves et al. [16].

The subscale scores were calculated by taking the sum of the items in each subscale with the item receiving a value of one if it was selected and a zero if it was not. One item (I prefer a quiet lifestyle in the Readiness for Change scale) was reverse coded in accordance to the results of the factor analysis by Graves et al. [16] to receive a one if the item was not selected. The minimum and maximum scores for each subscale along with constructs assigned to each are described in the notes for each table presented below.

Descriptive statistics were used to compare the results of the intervention in individuals who abandoned the device at follow-up to those who continued use of the device using the above measures, as well as the difference in their predisposition using the measure of psychosocial and personal characteristics and expectations of device use. A paired samples *t*-test was used to compare pretest and posttest scores, and Cohen's *d* was used to calculate the size of the effect.

Results

Of the 4 participants, 2 were female and 2 were male, and the average age of the 4 participants was 19 years. Caregivers filled out two surveys with the direction of the user in the clinical setting, and caregivers filled out two surveys without the direction of the user while in a school setting. At follow-up, three participants continued to use the device, while one user replaced the device with a similar one. This participant provided no further information regarding the specific reasons for replacing the device or at what point the device was abandoned.

Two participants used the devices while enrolled in a public school setting that serves students with multiple and significant needs, and two participants used the device while in a community-based habilitation program. None of the four participants received training on the device, but the caregivers of those participants were trained on the use of the device. Representatives of the public school setting in which two participants used the device stated that devices are typically not allowed to be used outside of the school setting. At follow-up, the participants enrolled in this public school setting reported using the device for four and five out of seven hours per day, which suggests that the mount was used only in this setting and was not used at home and in the community. Policies of

the community-based habilitation setting did not allow the devices to leave the setting, and users did not report the number of hours per day the device was used.

Overall Effect of the Mount'n Mover

The effect that the device had on the participants' functional capability and quality of life, psychosocial characteristics, and perception of device use was evaluated using paired-samples *t*-tests with alpha for significance set at .05 and 0.1. Effect sizes were estimated using Cohen's *d*. Table 1 summarizes the results of these tests.

The results showed a marginal increase in performance of daily activities important to the individual as measured by the Keyform Score of the OSA, but did not demonstrate a statistically significant effect ($p>0.1$). Similarly, the OSA index scores for Performance Skills and Habituation increased but did not demonstrate significance. The index score for Volition was shown to improve with statistical significance nearly at the .05 level, and was significant at the 0.1 level ($p=.055$).

The results showed that of the four subscales of the Psychosocial and Personal Characteristics section of the ATD-PA, only the subscale score measuring the user's perception of the amount of support they have increased with statistical significance at the 0.1 level ($p=.092$). The subscale score measuring affect decreased with a large effect size ($d=-1$) which represents a shift toward a more positive affect/mood.

The paired samples *t*-test did not demonstrate a significant difference between the user's expectations of device use (pretest index score on Device form) and realization of device use (posttest index score on Device form), and results indicate that the realized benefit was less than the expectation of benefit. It should be noted that the participant who was not using the device at follow-up answered all items on this form with the value

"0=Not Applicable", which impacted the overall posttest index score representing device use.

Insert Table 1 Here

Differences in Those Who Continued Use or Abandoned Device at Follow-up

Three participants continued to use the device at the three-week follow-up, while one participant abandoned the device. Descriptive statistics of the assessment scores for the group who had continued to use the device were gathered, and the resulting values were compared to the corresponding value provided by the user who had abandoned the device. This method was used to compare the characteristics of these two groups prior to device use and the differences in device effect between groups. Table 2 summarizes the results.

Differences in psychosocial and personal characteristics prior to device use between the groups were evaluated by comparing the subscale scores on the Psychosocial and Personal Characteristics section of the ATD-PA at pretest. The user who abandoned the device was shown to have more favorable scores on all subscale scores at pretest other than the subscale representing the amount of support the user has. It is important to reiterate that this does not mean this user had more favorable scores when compared to each individual in the group that continued to use the device, but rather the average of those three individuals' scores.

Differences in expectations of device use between groups were evaluated by comparing the index scores of the Device form of the ATD-PA at pretest. Results indicate that the group of users that continued to use the device at follow-up expected the device to provide more benefit when compared to the user who abandoned the device at

follow-up. Similar to the caveat mentioned above, this does not mean that each individual in this group expected a greater benefit than the user who abandoned the device.

Despite the fact that this participant was not using the device at follow-up, he experienced a more favorable change between pretest and posttest as measured by the Keyform Score, OSA indices, and the subscale scores of the Psychosocial and Personal Characteristics section of the ATD-PA. Exceptions include the Habituation index of the OSA and the Affect subscale score of the Psychosocial and Personal Characteristics section of the ATD-PA.

In regards to the comparison of user's expectations of device use and realization of device use, the users who continued to use the device at follow-up found that the actual use of the device exceeded their initial expectations. The user who abandoned the device had a realization of benefit that fell significantly short of his expectations, although as mentioned previously, this is due to the user answering all items on the Device form as "0=Not Applicable".

Insert Table 2 Here

Discussion

The results of this study should be interpreted in the context of the study's limitations. The small sample size and the convenience sampling method reduced the power of the study and prevent to infer definitive conclusions or generalization. Furthermore, the study's internal validity was impacted by limitations inherent in quasi-experimental designs with no control group. Additional variables (e.g., therapy services, maturation of the subjects) could have contributed to the effects noted and prevent a causal link from being established.

Furthermore, because the physical presence of the researcher was not possible, the assumptions that the results of this study rest upon cannot be completely verified. In the case of caregivers providing answers without the user's direction, the accuracy of the data requires that the caregivers have a thorough knowledge of the user's functional status and have insight into the user's quality of life. The second assumption is that the user's provided responses to the pre-test prior to beginning use of the device. Completion of the survey following use of the device would not give an accurate representation of the user's status prior to implementation of the device and thus the affect that the device had on the user. The last assumption was that the same caregiver filled out the survey for the pre-test and post-test. The authors attempted to address the above concerns by providing instruction, and those who received the link to the survey confirmed this instruction.

With these limitations in mind, the results of this study indicate that the use of the Mount'n Mover had a significant effect ($p<0.1$) on the users' ability to perform activities that they enjoy or are motivated by, and the perception of the amount of support they had. These results suggest that using the device allowed the users to perform activities they enjoy with greater competency when compared to their performance without the device. They also suggest that the device gave the users a greater sense of being supported. This greater sense of support may result from the device itself, or a change in their perception based on the program being willing to provide such a device in the first place.

While an increase was noted on most measures, the results did not suggest a significant effect on any other measure, including a measure of overall functional capability and quality of life as measured by the Keyform Score of the OSA. There are various reasons for this, including the methodological limitations mentioned above, but

the nature of device use is also a potential reason. This information was provided by the two representatives of the programs that the four participants were enrolled in, and indicates that the users were not provided any training on the device and the device was only used in one setting.

The lack of training could potentially have prevented the users from experiencing the maximum benefit of the device. The fact that the participants only used the device in one setting could have also resulted in the users only realizing the benefit of the device when used for activities relevant to the program (e.g., school-related tasks or vocational tasks), and this benefit would not necessarily translate into a more general measure of functional capacity and quality of life.

In regards to the differences noted between those who continued to use the device at follow-up and the user who abandoned the device at follow-up, the data provided counterintuitive results. On most measures, the user who abandoned the device at follow-up reported more favorable personal characteristics and higher expectations for device use at pretest then those who continued to use the device at follow-up. This user experienced a greater effect on most measures when compared to those who continued to use the device. One would expect that the user who abandoned the device would compare unfavorably to those who continued to use the device in terms of these variables. This counterintuitive result could be explained by the high expectations that the user had for device use. This user had higher expectations for device use than those who continued to use the device, and this may have led to the user being discouraged once he began to use the device and these high expectations were not met. This discouragement may have led him to abandon the device.

A true comparison of those who continued to use the device at follow-up to those who abandoned the device was difficult due to the small overall sample and inability to garner descriptive statistics for both groups, as only one user abandoned the device. Consequently, while there were differences noted, truly meaningful conclusions cannot be drawn from this method of comparison. Further research is needed to explore the experience of the users in more depth using qualitative methods. This method would allow a meaningful comparison of characteristics of both groups and would result in meaningful conclusions regarding potential reasons for abandonment that cannot be produced using quantitative methods with such a small sample.

Implications for Further Research

This study's methodology did not allow to obtain the expected large sample that would allow quantitative analysis to produce significant results. Future research with a sample size similar to this study should consider using more detailed qualitative or mixed methods to provide a deeper understanding of the personal characteristics, nature of device use, and the interaction between them. Such study would allow a greater understanding of potential reasons for abandonment of this device and devices like it, and would provide meaningful information to stakeholders involved in the provision of that device.

A cursory comparison of the results of a previous study on the impact of this device [10] to the results of this study reveal interesting questions for further research, specifically regarding the impact that environmental variables may have on the consumer's perception of the effect that the device has on the daily life. Participants in the previous study used the device in a variety of different environments, while

participants in this study used the device only in the setting that provided the devices. This fact could potentially be a factor in why those involved in the preliminary study reported a larger impact on their functional capacity and quality of life. The impact that the quantity and diversity of environments in which devices are used should be further investigated. Studies with methodologies that allow for more meaningful comparisons of environmental conditions as they relate to outcomes of device use should be fully explored, as this relationship has potentially far-reaching implications. Yet, this study indicates that assistive technology outcomes research can provide useful information to potential users and the developers of such devices, and it further highlights the value that multiple methodologies can provide to fully understand the nature of the impact that these devices have on users.

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Tables

The tables below were prepared to submit separately to *Disability and Rehabilitation: Assistive Technology* in accordance with the author guidelines for the journal (see Appendix D for full author guidelines).

Table 1

Results of Paired-Sample T-Test Comparing Pretest and Posttest Scores

Assessment	Pretest Score	Posttest Score	*df*	*t*	*p*-Value	Cohen's *d*	ES
OSA Results							
Keyform Score	30.75 (14.89)	37.75 (23.17)	3	1.32	.279	.359	Small
Performance Skills[a]	.41 (.15)	.51 (.21)	3	2.23	.112	.547	Medium
Habituation[a]	.58 (.24)	.67 (.18)	3	2.27	.108	.43	Small
Volition[a]	.43 (.11)	.61 (.18)	3	3.06	.055**	1.2	Large
ATD-PA Results							
Affect[b]	1.25 (.5)	.75 (.5)	3	-1.73	.182	-1.0	Large
Readiness for Change[c]	5.5 (.58)	6 (1.15)	3	1.73	.182	.548	Medium
Engagement in Therapy[d]	4.75 (2.99)	5 (2.16)	3	.23	.836	.096	Small
Support[e]	3.75 (.96)	4.75 (.96)	3	2.45	.092**	1.045	Large
Device Match[f]	.77 (.19)	.68 (.45)	3	-.4	.716	-.247	Small

Note. Pretest and Posttest Assessment Scores are represented as M (SD) (M=mean, SD=standard deviation; *d*=Cohen's *d* that determines size of effect; *ES*=effect size interpreted from Cohen's *d* (.2=small, .5=medium, .8=large)

[a]Indices for OSA subscales with a value between 0 (minimum) and 1 (maximum); [b]Subscale of the Psychosocial section of the ATD-PA with a value between 0 (positive affect) and 9 (negative affect); [c]Subscale of the Psychosocial section of the ATD-PA with a value between 0 (low readiness for change) and 9 (high readiness for change); [d] Subscale of the Psychosocial section of the ATD-PA with a value between 0 (low level of engagement in therapy) and 8 (high level of engagement in therapy); [e]Subscale of the Psychosocial section of the ATD-PA with a value between 0 (low amount of support) and 6 (high amount of support); [f]Index representing the match between the device and user with a value between 0 (poor match) and 1 (ideal match)

*p<.05

**p<.1

Table 2

Descriptive Comparison of Change in Assessment Scores by Device Use

	Using Device (*n*=3)			Not Using Device (*n*=1)		
Assessment	Pretest Score	Posttest Score	Change in Scores	Pretest Score	Posttest Score	Change in Scores
OSA Results						
Keyform Score	27.33 (16.2)	31 (23.07)	3.67 (10.12)	41	58	17
Performance Skills[a]	.37 (.16)	.44 (.19)	.07 (.08)	.53	.73	.2
Habituation[a]	.52 (.26)	.64 (.21)	.12 (.06)	.75	.75	0
Volition[a]	.42 (.13)	.55 (.16)	.13 (.21)	.45	.8	.35
ATD-PA Results						
Affect[b]	1.33 (.58)	.67 (.58)	-.67 (.58)	1	1	0
Readiness for Change[c]	5.33 (.58)	5.67 (1.15)	.33 (.58)	6	7	1
Engagement in Therapy[d]	4.33 (3.51)	4.33 (2.08)	.00 (2.65)	6	7	1
Support[e]	4 (1)	.67 (1.15)	.67 (.58)	3	5	2
Device Match[f]	.79 (.23)	.91 (.02)	.11 (.21)	.68	.00	-.68

Note. Scores for those who continued use of the device at follow-up are represented as M (SD) (M=mean, SD=standard deviation); scores for the participant who did not continue use of the device at follow-up are represented by original values

[a]Indices for OSA subscales with a value between 0 (minimum) and 1 (maximum); [b]Subscale of the Psychosocial section of the ATD-PA with a value between 0 (positive affect) and 9 (negative affect); [c]Subscale of the Psychosocial section of the ATD-PA with a value between 0 (low readiness for change) and 9 (high readiness for change); [d] Subscale of the Psychosocial section of the ATD-PA with a value between 0 (low level of engagement in therapy) and 8 (high level of engagement in therapy); [e]Subscale of the Psychosocial section of the ATD-PA with a value between 0 (low amount of support) and 6 (high amount of support); [f]Index representing the match between the device and user with a value between 0 (poor match) and 1 (ideal match)

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Appendix A: Surveys and Recruitment Materials

Version of Initial Assessment Formatted for Microsoft Word

Are you aged 18 or older?

- ❍ Yes
- ❍ No

Question only appears if user is 18 or older

My name is Adam Kinney, and I am performing research investigating the affects of the Mount'n Mover. You will be asked to complete an anonymous online survey that collects information about your current functional abilities and quality of life. The survey will take 10-15 minutes to complete. After approximately one month, you will be asked to complete a follow-up survey that will show any changes in your functional ability or quality of life while using the device. Participants who complete both surveys will be entered into a drawing, and 10 participants will be selected to receive a $20 gift card to Amazon. The only risk associated with this research is the time it takes to complete the survey. If you have any questions about the study, if you would like to take the survey in a different format, or if you would like to receive the results of the study, please contact Adam Kinney at akinney1@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to leave out answers you feel uncomfortable answering. Thank you for your help with this research.

- ❍ I agree to participate in this study
- ❍ I refuse to participate in this study

Question only appears if user is under 18

My name is Adam Kinney, and I am performing research investigating the affects of the Mount'n Mover. Please have your parent or caregiver provide consent below. You will be asked to complete an anonymous online survey that collects information about your current functional abilities and quality of life. The survey will take approximately 10 minutes to complete. After approximately one month, you will be asked to complete a follow-up survey that will show any changes in your functional ability or quality of life while using the device. Participants who complete both surveys will be entered into a drawing, and 10 participants will be selected to receve a $20 gift card to Amazon. The only risk associated with this research is the time it takes to complete the survey. If you have any questions about the study, if you would like to take the survey in a different format, or if you would like to receive the results of the study, please contact Adam Kinney at akinney1@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to leave out answers you feel uncomfortable answering. Thank you for your help with this research.

- ❍ I am this person's parent or caregiver, and I provide permission to collect their responses for this study
- ❍ I am this person's parent or caregiver, and I do not provide permission to collect their responses for this study.

The form is being filled out at (choose one)

- ❍ Home
- ❍ A Clinic
- ❍ Other (Please Specify) _____

The form is being filled out by (choose one)

- ❍ The client, without any help
- ❍ The client, with help from the caregiver (e.g., client showed or told caregiver what answers to give)
- ❍ The caregiver on behalf of the client, without any direction from the client
- ❍ Other (Please Specify) _____

What is your age?

Sex:

- ❍ Male
- ❍ Female

Who recommended the Mount'n Mover to you?

Who installed the Mount'n Mover?

Please choose the statement that best describes your device:
- ❍ It is a purchased device and I did not receive a trial device
- ❍ It is a purchased device and I received a trial device
- ❍ It is a trial device

What do you currently use as a mounting system?
- ❍ A mount from a different company
- ❍ A custom designed mounting system
- ❍ A lap tray attached to the armrests
- ❍ Nothing: my lap
- ❍ A table
- ❍ Other (Please specify) _____

Below are statements describing things you do within your environment (where you live, work, go to school, etc.). For each statement, identify how well you do it. If an item does not apply to you, skip it and move on to the next item.

	I have a lot of problems	I have some difficulty	I do this well	I do this extremely well
Concentrating on my tasks	❍	❍	❍	❍
Physically doing what I need to do	❍	❍	❍	❍
Taking care of the place where I live	❍	❍	❍	❍
Taking care of myself	❍	❍	❍	❍
Taking care of others for whom I am responsible for	❍	❍	❍	❍
Getting where I need to go	❍	❍	❍	❍
Managing my finances	❍	❍	❍	❍
Managing my basic needs (food, medicine)	❍	❍	❍	❍
Expressing myself to others	❍	❍	❍	❍
Getting along with others	❍	❍	❍	❍
Identifying and solving problems	❍	❍	❍	❍
Relaxing and enjoying myself	❍	❍	❍	❍
Getting done what I need to do	❍	❍	❍	❍
Having a satisfying routine	❍	❍	❍	❍
Handling my responsibilities	❍	❍	❍	❍
Being involved	❍	❍	❍	❍

as a student, worker, volunteer, and/or family member				
Doing activities I like	❍	❍	❍	❍
Working towards my goals	❍	❍	❍	❍
Making decisions based on what I think is important	❍	❍	❍	❍
Accomplishing what I set out to do	❍	❍	❍	❍
Effectively using my abilities	❍	❍	❍	❍

Next, for each statement, identify how important this is to you.

	Not so important	Important	More important	Most important
Concentrating on my tasks	❍	❍	❍	❍
Physically doing what I need to do	❍	❍	❍	❍
Taking care of the place where I live	❍	❍	❍	❍
Taking care of myself	❍	❍	❍	❍
Taking care of others for whom I am responsible for	❍	❍	❍	❍
Getting where I need to go	❍	❍	❍	❍
Managing my finances	❍	❍	❍	❍
Managing my basic needs (food, medicine)	❍	❍	❍	❍
Expressing myself to others	❍	❍	❍	❍
Getting along with others	❍	❍	❍	❍
Identifying and solving problems	❍	❍	❍	❍
Relaxing and enjoying myself	❍	❍	❍	❍
Getting done what I need to do	❍	❍	❍	❍
Having a satisfying routine	❍	❍	❍	❍
Handling my responsibilities	❍	❍	❍	❍

Being involved as a student, worker, volunteer, and/or family member	❍	❍	❍	❍
Doing activities I like	❍	❍	❍	❍
Working towards my goals	❍	❍	❍	❍
Making decisions based on what I think is important	❍	❍	❍	❍
Accomplishing what I set out to do	❍	❍	❍	❍
Effectively using my abilities	❍	❍	❍	❍

Please mark all the statements below that describe you. Mark only those that frequently or often apply to you and ignore those that very rarely or never apply to you.

- ❑ I have the support I want from family
- ❑ I have the support I want from friends
- ❑ I feel encouraged by therapists, caregivers
- ❑ I feel the general public accepts me
- ❑ I aspire to go to school or work
- ❑ I have many things I want to accomplish
- ❑ I do what my therapist(s) say without question
- ❑ I view my therapist(s) as friends, too
- ❑ I am often frustrated or overwhelmed
- ❑ I am curious & excited about new things
- ❑ I am determined to meet my goals
- ❑ I am usually calm and patient
- ❑ My life has purpose, meaning
- ❑ I am self-disciplined
- ❑ I am often angry
- ❑ I am often depressed
- ❑ I prefer to be left alone
- ❑ I am often discouraged
- ❑ I am quite resourceful
- ❑ I like having a challenge
- ❑ I am responsible & reliable
- ❑ I am generally satisfied with my life
- ❑ I find technology interesting
- ❑ I am cooperative
- ❑ I prefer a quiet lifestyle
- ❑ I often feel isolated & alone
- ❑ I accomplish what I set out to do
- ❑ I am not sure who I am now
- ❑ I want more independence
- ❑ I have a good self image
- ❑ I often feel insecure
- ❑ I feel as if I have little privacy
- ❑ My therapist(s) know better than I about what I need

Please rate the Mount'n Mover on the items below according to the following scale:
0 = Not applicable
1 = Not at all (0% of the time)
2 = Sometimes (around 25% of the time)
3 = Half the time, neutral (about 50% of the time)
4 = Often (around 75% of the time)
5 = All the time (100% of the time)

	0	1	2	3	4	5
This device will help me to achieve my goals	❍	❍	❍	❍	❍	❍
This device will benefit me and improve my quality of life.	❍	❍	❍	❍	❍	❍
I am confident I know how to use this device and its various features.	❍	❍	❍	❍	❍	❍
I will feel more secure (safe, sure of myself) when using this device.	❍	❍	❍	❍	❍	❍
This device will fit well with my accustomed routine.	❍	❍	❍	❍	❍	❍
I have the capabilities and stamina to use this device without discomfort, stress and fatigue.	❍	❍	❍	❍	❍	❍
The supports, assistance, and accommodations exist for successful use of this device.	❍	❍	❍	❍	❍	❍

This device will physically fit in all desired environments (car, living room, etc.).	❍	❍	❍	❍	❍	❍
I will feel comfortable (and not self-conscious) using this device around family.	❍	❍	❍	❍	❍	❍
I will feel comfortable (and not self-conscious) using this device around friends.	❍	❍	❍	❍	❍	❍
I will feel comfortable (and not self-conscious) using this device at school or work.	❍	❍	❍	❍	❍	❍
I will feel comfortable (and not self-conscious) using this device around the community.	❍	❍	❍	❍	❍	❍

Thank you for taking the time to complete this survey. If you would like to be considered for the gift card drawing, please enter your email below:

Version of Follow-up Assessment Formatted for Microsoft Word

Are you aged 18 or older?

- ❍ Yes
- ❍ No

Question only appears if user is 18 or older

This is a follow-up survey to a survey that you completed approximately a month ago. My name is Adam Kinney, and I am performing research investigating the affects of the Mount'n Mover. You will be asked to complete an anonymous online survey that collects information about your current functional abilities and quality of life after using the Mount'n Mover for a month. The survey will take approximately 10 minutes to complete. Participants who complete both surveys will be entered into a drawing, and 10 participants will be selected to receive a $20 gift card to Amazon. The only risk associated with this research is the time it takes to complete the survey. If you have any questions about the study, if you would like to take the survey in a different format, or would like to receive the results of the study, please contact Adam Kinney at akinney1@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to leave out answers on that you feel uncomfortable answering. Thank you for your help with this research.

- ❍ I agree to participate in this study
- ❍ I refuse to participate in this study

Question only appears if user is under 18

This is a follow-up survey to a survey that you completed approximately a month ago. My name is Adam Kinney, and I am performing research investigating the affects of the Mount'n Mover. Please have your parent or caregiver provide consent below. You will be asked to complete an anonymous online survey that collects information about your current functional abilities and quality of life after using the Mount'n Mover for a month. The survey will take approximately 10 minutes to complete. Participants who complete both surveys will be entered into a drawing, and 10 participants will be selected to receve a $20 gift card to Amazon. The only risk associated with this research is the time it takes to complete the survey. If you have any questions about the study, if you would like to take the survey in a different format, or if you would like to receive the results of the study, please contact Adam Kinney at akinney1@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to leave out answers you feel uncomfortable answering. Thank you for your help with this research.

- ❍ I am this person's parent or caregiver, and I provide permission to collect their responses for this study.
- ❍ I am this person's parent or caregiver, and I do not provide permission to collect their responses for this study.

The form is being filled out at (choose one)
- ❍ Home
- ❍ A Clinic
- ❍ Other (Please Specify) _____

The form is being filled out by (choose one)
- ❍ The client, without any help
- ❍ The client, with help from the caregiver (e.g., client showed or told caregiver what answers to give)
- ❍ The caregiver on behalf of the client, without any direction from the client
- ❍ Other (Please Specify) _____

What is your age?

Sex:
- ❍ Male
- ❍ Female

Please provide any suggestions that you feel would improve your experience with the Mount'n Mover.

Please choose the answer that best describes your use of the Mount'n Mover.
- ❍ I am still using the device
- ❍ I no longer use the device

Question only appears if user indicates that they still use the device

How many hours a day do you currently use the Mount'n Mover?

Question only appears if user indicates that they no longer use the device

How many weeks did you use the device?

Is your device a trial device?
- ❍ Yes
- ❍ No

Question only appears if user indicates that it was a trial device

Do you plan on using the device in the future?
- ❍ Yes
- ❍ No

Below are statements describing things you do within your environment (where you live, work, go to school, etc.). For each statement, identify how well you do it. If an item does not apply to you, skip it and move on to the next item.

	I have a lot of problems	I have some difficulty	I do this well	I do this extremely well
Concentrating on my tasks	❍	❍	❍	❍
Physically doing what I need to do	❍	❍	❍	❍
Taking care of the place where I live	❍	❍	❍	❍
Taking care of myself	❍	❍	❍	❍
Taking care of others for whom I am responsible for	❍	❍	❍	❍
Getting where I need to go	❍	❍	❍	❍
Managing my finances	❍	❍	❍	❍
Managing my basic needs (food, medicine)	❍	❍	❍	❍
Expressing myself to others	❍	❍	❍	❍
Getting along with others	❍	❍	❍	❍
Identifying and solving problems	❍	❍	❍	❍
Relaxing and enjoying myself	❍	❍	❍	❍
Getting done what I need to do	❍	❍	❍	❍
Having a satisfying routine	❍	❍	❍	❍

Handling my responsibilities	❍	❍	❍	❍
Being involved as a student, worker, volunteer, and/or family member	❍	❍	❍	❍
Doing activities I like	❍	❍	❍	❍
Working towards my goals	❍	❍	❍	❍
Making decisions based on what I think is important	❍	❍	❍	❍
Accomplishing what I set out to do	❍	❍	❍	❍
Effectively using my abilities	❍	❍	❍	❍

Next, for each statement, identify how important this is to you.

	Not so important	Important	More important	Most important
Concentrating on my tasks	❍	❍	❍	❍
Physically doing what I need to do	❍	❍	❍	❍
Taking care of the place where I live	❍	❍	❍	❍
Taking care of myself	❍	❍	❍	❍
Taking care of others for whom I am responsible for	❍	❍	❍	❍
Getting where I need to go	❍	❍	❍	❍
Managing my finances	❍	❍	❍	❍
Managing my basic needs (food, medicine)	❍	❍	❍	❍
Expressing myself to others	❍	❍	❍	❍
Getting along with others	❍	❍	❍	❍
Identifying and solving problems	❍	❍	❍	❍
Relaxing and enjoying myself	❍	❍	❍	❍
Getting done what I need to do	❍	❍	❍	❍
Having a satisfying routine	❍	❍	❍	❍
Handling my responsibilities	❍	❍	❍	❍

Being involved as a student, worker, volunteer, and/or family member	❍	❍	❍	❍
Doing activities I like	❍	❍	❍	❍
Working towards my goals	❍	❍	❍	❍
Making decisions based on what I think is important	❍	❍	❍	❍
Accomplishing what I set out to do	❍	❍	❍	❍
Effectively using my abilities	❍	❍	❍	❍

Please mark all the statements below that describe you. Mark only those that frequently or often apply to you and ignore those that very rarely or never apply to you.

- ❑ I have the support I want from family
- ❑ I have the support I want from friends
- ❑ I feel encouraged by therapists, caregivers
- ❑ I feel the general public accepts me
- ❑ I aspire to go to school or work
- ❑ I have many things I want to accomplish
- ❑ I do what my therapist(s) say without question
- ❑ I view my therapist(s) as friends, too
- ❑ I am often frustrated or overwhelmed
- ❑ I am curious & excited about new things
- ❑ I am determined to meet my goals
- ❑ I am usually calm and patient
- ❑ My life has purpose, meaning
- ❑ I am self-disciplined
- ❑ I am often angry
- ❑ I am often depressed
- ❑ I prefer to be left alone
- ❑ I am often discouraged
- ❑ I am quite resourceful
- ❑ I like having a challenge
- ❑ I am responsible & reliable
- ❑ I am generally satisfied with my life
- ❑ I find technology interesting
- ❑ I am cooperative
- ❑ I prefer a quiet lifestyle
- ❑ I often feel isolated & alone
- ❑ I accomplish what I set out to do
- ❑ I am not sure who I am now
- ❑ I want more independence
- ❑ I have a good self image
- ❑ I often feel insecure
- ❑ I feel as if I have little privacy
- ❑ My therapist(s) know better than I about what I need

Question only appears if user still uses the device

Please rate the Mount'n Mover on the items below according to the following scale:
0 = Not applicable
1 = Not at all (0% of the time)
2 = Sometimes (around 25% of the time)
3 = Half the time, neutral (about 50% of the time)
4 = Often (around 75% of the time)
5 = All the time (100% of the time)

	0	1	2	3	4	5
This device is helping me to achieve my goals.	❍	❍	❍	❍	❍	❍
This device is benefiting me and improving my quality of life.	❍	❍	❍	❍	❍	❍
I'm confident I'm getting the most out of this device and its various features.	❍	❍	❍	❍	❍	❍
I feel more secure (safe, sure of myself) when using this device.	❍	❍	❍	❍	❍	❍
This device fits well with my accustomed routine.	❍	❍	❍	❍	❍	❍
I have the capabilities and stamina to use this device without discomfort, stress and fatigue.	❍	❍	❍	❍	❍	❍
I have the supports, assistance, and accommodations	❍	❍	❍	❍	❍	❍

to successfully use this device.						
This device physically fits in all desired environments (car, living room, etc.).	❍	❍	❍	❍	❍	❍
I feel comfortable (and not self-conscious) using this device around family.	❍	❍	❍	❍	❍	❍
I feel comfortable (and not self-conscious) using this device around friends.	❍	❍	❍	❍	❍	❍
I feel comfortable (and not self-conscious) using this device at school or work.	❍	❍	❍	❍	❍	❍
I feel comfortable (and not self-conscious) using this device in the community.)	❍	❍	❍	❍	❍	❍

Question only appears if user no longer uses the device

Please rate the Mount'n Mover on the items below according to the following scale:
0 = Not applicable
1 = Not at all (0% of the time)
2 = Sometimes (around 25% of the time)
3 = Half the time, neutral (about 50% of the time)
4 = Often (around 75% of the time)
5 = All the time (100% of the time)

	0	1	2	3	4	5
Did the device help you to achieve your goals?	❍	❍	❍	❍	❍	❍
Did the device benefit you and improve your quality of life?	❍	❍	❍	❍	❍	❍
Are you confident you got the most out of the device and its various features?	❍	❍	❍	❍	❍	❍
Did you feel secure (safe, sure of myself) when using this device?	❍	❍	❍	❍	❍	❍
Did the device fit well with your accustomed routine?	❍	❍	❍	❍	❍	❍
Did you possess the capabilities and stamina to use this device without discomfort, stress and fatigue?	❍	❍	❍	❍	❍	❍
Did you have the supports, assistance and	❍	❍	❍	❍	❍	❍

accommodations to successfully use this device?						
Did the device physically fit in all desired environments (car, living room, etc.)?	❍	❍	❍	❍	❍	❍
Did you feel comfortable (and not self-conscious) using this device around family?	❍	❍	❍	❍	❍	❍
Did you feel comfortable (and not self-conscious) using this device around friends?	❍	❍	❍	❍	❍	❍
Did you feel comfortable (and not self-conscious) using this device at school or work?	❍	❍	❍	❍	❍	❍
Did you feel comfortable (and not self-conscious) using this device in the community?	❍	❍	❍	❍	❍	❍

Question only appears if user no longer uses the device

Please choose the primary reason you stopped using the Mount'n Mover.

- ❍ It was a trial period
- ❍ I couldn't get anyone to attach it to my wheelchair
- ❍ I don't think it was set up properly
- ❍ It broke and I can't use it
- ❍ It was too inconvenient to use
- ❍ It wasn't the right size for me
- ❍ It didn't help as much as I hoped
- ❍ It didn't work as I expected
- ❍ It was too difficult to use
- ❍ It costs too much money to use
- ❍ I didn't get the training I needed to use it well
- ❍ The purpose for using the device wasn't that important to me
- ❍ I replaced it with a similar but better device or support
- ❍ I replaced it with something entirely different. Please Specify: _____
- ❍ I no longer need to use it because: _____
- ❍ Other (please specify): _____

Thank you for taking the time to complete this survey. If you would like to be considered for the gift card drawing, please enter your email below:

PDF Sent to Representatives with Questions and Explanations

The following is a PDF sent via email to the representatives of the two programs that all four subjects participated in.

The Assistive Technology Act of 2004 recognizes that assistive technology has the ability to substantially minimize the discrepancy between the functional abilities of those with disabilities and the general population. Despite the recognized importance of AT, there is a continued need to provide information about the efficacy and functionality of assistive technology (AT Act, 2004). This information can help minimize the abandonment of AT devices by informing the individual user, the user's social supports, manufacturers and vendors, third-party payers, policy makers, and rehabilitation scientists; and can be provided by assistive technology outcome measures research.

This study will provide valuable insight into the extent to which the Mount'n Mover mounting device improves the user's quality of life and functional capabilities. The relationship between client factors such as temperament, social supports, and amount of training with the device and the satisfaction with the device will also be investigated. Investigating these relationships will further help determine what types of clients are the best candidates for retaining or abandoning the device.

Questions:

- Can you provide a brief description of the program that these devices were used to participate in?
- Did the participants receive any formal training for using the device?
- Did each participant receive his or her own device?
- Was the participant allowed to take the device with them or did it have to remain in your facility?
- If not, was the device used in multiple environments (e.g. community outings, etc) or was it primarily used in the facility?

Answers to these questions can determine if there are relationships between the nature of how the device is provided and used and the impact that the device has. Knowledge of these relationships will better inform individual users and the user's social supports, manufacturers and vendors, third-party payers, policy makers, and rehabilitation scientists. If these parties are better informed, the users will have an increased chance of receiving a device that is right for them.

Email Correspondence with Relevant Representatives

The following are the contents of emails to the representatives of the two programs that all four subjects participated in. The questions appear in bold, and the answers from both representatives were combined and appear below the questions. Information identifying the programs (e.g. names, locations, etc.) was blacked out. The contents were formatted for Microsoft Word.

Can you provide a brief description of the program that these devices were used to participate in?

Representative 1: We are a public school in Delaware that is a self contained setting. We serve students 3-21 with multiple and significant needs. Our preschool houses approximately half of our population and those students typically have moderate to severe needs but will end up moving on to a less restrictive environment. Elementary up students typically have multiple and significant cognitive and physical disabilities. It is a 12 month program and students are in school 6.5 hours a day. They receive special education, pool, music, physical education, OT, PT, SLP services. Each classroom has 8 students with a special ed teacher and two para professionals. We have extensive adaptations and assistive technologies available in every classroom.

Representative 2: Day Habilitation services are provided in the community-based settings of Worcester and Devens in Massachusetts, and Woonsocket, Rhode Island. All programs offer integrated occupational, physical, and speech therapy along with nursing and behavioral supports either on-site or in the community. Training is offered in functional life skills, health maintenance, fine- and gross-motor skills, self- direction, community utilization, socialization, and communication.

Skill-based learning is offered through: Community Navigation, Comprehensive Arts Curriculum, Saori Weaving, Music Therapy, Assistive Technology, Health and Wellness Curriculum, Gross and Fine Motor Rooms, Therapeutic Horticulture, Massage Therapy, and Multimedia Clubhouse.

Each Day Habilitation location provides an environment that reflects the needs, interests, abilities, and desires of the participants. The programs operate Monday through Friday from 9:00 a.m. to 3:00 p.m., or 8:00 a.m. to 2:00 p.m. All locations have specialists trained to assist people who are aging or who have significant medical involvement. All participants are encouraged to maximize their participation and their potential with the assistance of our skilled staff.

Did the participants receive any formal training for using the device?

Representative 1: Caregivers were provided with training when students received their personal devices. The students were introduced to the device but their physical limitation prevented independent use of device. Teachers and paras were trained extensively on devices since they were providing the every day carry over.

Representative 2: No specific training on the device was provided to the client. Staff were given an overview of basic operations.

Did each participant receive his or her own device?

Representative 1: There are no shared devices. Every student in our building is provided a school. Purchased device. When a student has their eon purchased and dedicated speech generating device we then purchase the device through their personal insurance. We have yet to be denied a device through our state Medicaid program. We have about 5 students with their own personally purchased device.

Representative 2: No. Participants did not receive their own devices. However, several parents and clinicians are doing more research on the devices for possible future purchasing.

Was the participant allowed to take the device with them or did it have to remain in your facility?

Representative 1: Families are welcomed to borrow school owned devices as long as they come in for a training. Personally owned devices are sent to and from school if the parent wishes to have it home.

Representative 2: No, the devices remained at the program.

If not, was the device used in multiple environments (e.g. community outings, etc.) or was it primarily used in the facility?

Representative 1: Devices are remain in the students seating system throughout the day. If they go into the community, it goes with them. It goes to music and physical education and even goes on gait training devices when they "walk" throughout the building. We have one student that our building purchased a bed mount since she does not have access to her device in her wheelchair in home setting. She is using it quite successfully at home now.

Representative 2: The primary use of this device was proper placement of the iPad for program related activities at the center, not in the community.

Recruitment Flyer

Mount'n Mover

by BlueSky Designs

Mount'n Mover Research Project

Please help us improve the Mount'n Mover by participating in important research on the device conducted by Ithaca College! Participation will involve completing two 10-minute surveys online.

Please complete the first survey before you start using the device if possible.

All participants who complete both surveys will be entered into a drawing.

10 participants will be chosen from this drawing to receive a $20 gift card to Amazon.

If you are interested, please email Adam Kinney at akinney1@ithaca.edu, and you will be emailed a link to the online survey.

Appendix B: Written Consent of Parent/Caregiver for Participants Under Age of 18

Mount'n Mover Research Consent

My name is Adam Kinney, and I am performing research investigating the affects of the Mount'n Mover. Please have your parent or caregiver provide consent below. You will be asked to complete an anonymous online survey that collects information about your current functional abilities and quality of life. The survey will take approximately 10 minutes to complete. After approximately one month, you will be asked to complete a follow-up survey that will show any changes in your functional ability or quality of life while using the device. Participants who complete both surveys will be entered into a drawing, and 10 participants will be selected to receive a $20 gift card to Amazon. The only risk associated with this research is the time it takes to complete the survey. If you have any questions about the study, if you would like to take the survey in a different format, or if you would like to receive the results of the study, please contact Adam Kinney at akinney1@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to leave out answers you feel uncomfortable answering. Thank you for your help with this research.

- [x] I am this person's parent or caregiver, and I provide permission to collect their responses for this study

- [ ] I am this person's parent or caregiver, and I do not provide permission to collect their responses for this study.

Mount'n Mover Research Consent

My name is Adam Kinney, and I am performing research investigating the affects of the Mount'n Mover. Please have your parent or caregiver provide consent below. You will be asked to complete an anonymous online survey that collects information about your current functional abilities and quality of life. The survey will take approximately 10 minutes to complete. After approximately one month, you will be asked to complete a follow-up survey that will show any changes in your functional ability or quality of life while using the device. Participants who complete both surveys will be entered into a drawing, and 10 participants will be selected to receive a $20 gift card to Amazon. The only risk associated with this research is the time it takes to complete the survey. If you have any questions about the study, if you would like to take the survey in a different format, or if you would like to receive the results of the study, please contact Adam Kinney at akinney1@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to leave out answers you feel uncomfortable answering. Thank you for your help with this research.

- ◉ I am this person's parent or caregiver, and I provide permission to collect their responses for this study

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- ○ I am this person's parent or caregiver, and I do not provide permission to collect their responses for this study.

Appendix C: Human Subjects Proposal

Human Subjects Proposal

ALL-COLLEGE REVIEW BOARD

FOR
HUMAN SUBJECTS RESEARCH

COVER PAGE

Investigators: Lynn Gitlow, Ph. D., OTR/L, ATP & Adam Kinney MSOTS

Department: Occupational Therapy

Telephone: 607-274-1532 (Campus) 207-944-7188 (Home)

Project Title: Measuring the impact of an assistive technology mounting device on users

Abstract: (Limit to space provided)

Demonstrating the outcomes of assistive technology (AT) intervention is critical in the current and future health care environment. Recent research reports that functional decline in persons with physical disabilities is slowed by the use of AT and there is a decreased need for caregiver assistance when AT is used. While these reports are encouraging there are still numerous challenges cited in the literature that present barriers to obtaining and demonstrating outcomes related to AT use. These include complexity, lack of assessment tools and low numbers of clients with varying AT needs limiting the pool of subjects for study and the diversity of stakeholders interested in collecting and interpreting the outcomes data. Of the many stakeholders interested in these data are the developers of the products as well as those who provide and use assistive devices. Of particular importance in the delivery and successful use of AT is the user perspective from product development to product use and impact. Neglecting to include the consumer voice in all aspects of AT development, use and impact results in AT abandonment. In this study, at the request of BlueSky Designs, we will investigate the functional and psychosocial impact of using a mounting system developed by the aforementioned company on those who use it. Using a retrospective single subject research design, we will measure the psychosocial impact of this intervention on client's functional independence, well-being, and quality of life. An additional opportunity to participate in an interview will be available to participants to describe their performance and satisfaction with their performance on meaningful activities that they wanted to engage in before and after use of the mounting device.

The Psychosocial Impact of Assistive Devices (PIADS) will be used to measure changes in functional independence and psychosocial impact of the intervention based on literature that reports that changes in functional performance and user satisfaction data are highly valued outcomes data requested by product developers. The Psychosocial Impact of Assistive Devices Scales (PIADS) is a 26-item,self-report questionnaire designed to assess the effects of an assistive device on functional independence, well-

being, and quality of life. The PIADS was researched and developed to fill the need for a reliable, valid, and economical measure that is generically applicable across all major categories of assistive technology.

Additionally participants will be invited to participate in a semi structured interview using the Canadian Occupational Performance Measure (COPM) to measure satisfaction with performance before and after use of the mounting device. The COPM is a standardized instrument, in that there are specific instructions and methods for administering and scoring the test. It is designed as an outcome measure, with a semi-structured interview format and structured scoring method.

Proposed Date of Implementation: 2/2013

Print or Type Name of Principal Investigator and Faculty Advisor Lynn Gitlow, PhD.

Signature (Use blue ink) Principal Investigator and Faculty Advisor

ALL-COLLEGE REVIEW BOARD
FOR
HUMAN SUBJECTS RESEARCH
CHECKLIST

Project Title: _ Measuring the impact of an assistive technology mounting device on users _____

Investigator(s): _Lynn Gitlow , Ph.D., Adam Kinney, MSOTS

_____

Investigator HSR Use
Use Only Items for Checklist

_____ _____ 1. General information
_____ _____ 2. Related experience of investigator(s)
_____ _____ 3. Benefits of the study
_____ _____ 4. Description of subjects
_____ _____ 5. Description of subject participation
_____ _____ 6. Description of ethical issues/risks of participation
_____ _____ 7. Description of recruitment of subjects
_____ _____ 8. Description of how anonymity/confidentiality will be maintained.
_____ _____ 9. Debriefing statement
_____ _____ 10. Compensatory follow-up
_____ _____ 11. Appendix A - Recruitment Statement
_____ _____ 12. Appendix B - Informed Consent Form (or Tear-off Cover Page for anonymous paper and pen/pencil surveys)
_____ _____ 13. Appendix C - Debriefing Statement
_____ _____ 14. Appendix D - Survey Instruments
_____ _____ 15. Appendix E - Glossary to questionnaires, etc.

Items 1-8, 11, and 12 must be addressed and included in the proposal. Items 9, 10, and 13-15 should also be checked if they are appropriate - indicate "NA" if not appropriate. This should be the second page of the proposal.

Human Subjects Review Board
Proposal Details

1. General Information

A. Funding- $225 for COPM manual, forms and training materials provided by Blue Sky Designs. Ten Amazon gift card ($25 each) incentives provided by BlueSky Designs to award in a raffle to those participants who complete the intervews.

B. Location- at consumer's homes where a combination of phone and/or email interviews and emailed surveys will be used to collect data, based on an individual's abilities.

C. Time Period-February 2013- May 2013.

D. Expected Outcomes: Collection of outcomes data regarding functional performance and psychosocial impact of the Mount'n Mover, an assistive technology mounting device. This information will be provided to the designers of the product so that they can improve it. The results of the research will add to the body outcomes research for assistive devices as we will submit it for presentation at a conference and for publication..

2. Related Experience of Researchers; Lynn Gitlow, Ph.D, OTR/L, ATP is an associate professor of occupational therapy at Ithaca College. Dr. Gitlow has been an Occupational Therapist (OT) for over 20 years specializing in the areas of mental health and assistive technology. She is also certified by RESNA as an assistive technology practitioner (ATP). Her research has focused on barriers to assistive technology use in various groups including health care practitioners and elder. Dr. Gitlow has published her research in peer reviewed journal. Additionally she has presented at local and international conferences on the topic of assistive technology. Adam Kinney, MSOTS has completed a Bachelor's degree in statistics He has had experience developing a sound literature review including: writing a research question, reviewing the literature, and interpreting the data and results. Coursework has also included hypothesis testing and statistical analysis of data. Finally Dianne M. Goodwin, MEBME ATP is the President/Director of Research and Development of BlueSky Designs Inc. in Minneapolis Minnesota. She has been a Rehab Engineer for 26 years, first as a service provider, developing custom solutions for people, and later as a product developer and entrepreneur.

3. Benefits of the Study: Collection of outcomes data regarding functional performance and psychosocial impact of the Mount'n Mover, an assistive technology mounting device. The study will provide Blue Sky Designs with outcomes data related to their product, the Mount'n Mover and add to the literature regarding outcomes of assistive technology devices through conference presentations and publication submissions.

4. Description of the Participants

a. Number of participants- There are 1500 users of the Mount'nMover. The anonymous survey will be sent to those who the company can contact by email. Those who complete the survey will then be asked to contact the researchers if they want to participate in the interview also. It is hard to determine the actual number of participants at this time.

b. Salient characteristics of the participants. Participants who already have purchased and use the Mount'n Mover will be asked to participate in the study. Those who are under the age of 18 will be asked to obtain parental permission to participate in the study.

5. Description of Participation; Participants will be asked to complete an online survey addressing their functional independence, well-being, and quality of life after receiving the Mount'n Mover. The survey should take 15-30 minutes to complete.
Once the participants have completed this survey they will be asked to contact the researchers if they would be willing to be interviewed regarding their satisfaction with their performance following the acquisition of the Mount'nMover. The interview will take 45 minutes to an hour to complete.

6. Ethical Issues

a. Risks of Participation: Except for the investment of time and inconvenience there are no foreseeable risks from participating in this research

Informed Consent: See Tear Off Cover Sheet at the end of the application

7. Recruitment Procedure

a. Recruitment procedures

Individuals who have Mount'n Movers for whom BlueSky Designs has email contact information will be invited to participate. The PIADS will be transformed into a format deliverable by Qualtrics. The URL of the survey will be sent to BlueSky Designs who will email it to participants who have purchased the Mount" Mover and have provided the company with their email. When participants complete the survey they will then be invited to contact the researchers if they would like to complete a semi structured interview describing their satisfaction with the device. If they contact the researchers, they will be interviewed using the Canadian Occupational Performance Measure.

b. Inducement to participate

Participants will receive a $25 stipend or gift card from Blue Sky Designs upon completion of the survey and interview. These will be distributed by Lynn Gitlow.

8. Confidentiality/Anonymity

Results provided to BlueSky Designs will not include the subject's name or identifiable information. Anonymous survey results and completed interview forms will be stored in a locked file in Dr. Gitlow's office to insure confidentiality.

9. Debriefing

NA

10. Compensatory Follow-up
Participants will receive a $25 gift card upon completion. To protect confidentiality, Lynn Gitlow will distribute these.

Appendix A – Recruitment Statement

You are being asked to participate in a survey on the use of mounting system the Mount'n Mover. If you are 18 years or older please proceed to this website for the survey. If you are under 18 years of age please have your parents proceed to this website and explain the survey to you. The survey should take between 15 -30 minutes to complete. The only risks associated with this research are the time it takes to complete the survey and interview.
You are free to withdraw from the study at any time without penalty, and to omit answers on questionnaires that you feel uncomfortable answering.
Once the survey is completed you will be asked if you would like to participate in an interview in addition to the survey If so you will receive contact information for Lynn Gitlow or Adam A $25 incentive provided by Blue Sky Designs will be offered to continue with his part of the research. If you have any questions about the study or would like to receive the results of the study please contact Dr. Lynn Gitlow at 607-274-1532 or lgitlow@ithaca.edu

INFORMED CONSENT FORM for Interviews
Measuring the impact of an assistive technology mounting device on users

1. Purpose of the Study
   The purpose of this research is to study the functional and psychosocial benefits of using the Mount'n Mover.

E. Benefits of the Study
   Collection of outcomes data regarding functional performance and psychosocial impact of the Mount'n Mover will provide the designers of the device with information to help them improve it. Additionally the benefits of participating in the research will add to the body outcomes research for assistive devices by being presented at conferences and submitted for publication.
2. What You Will Be Asked to Do
   You will be asked to complete an anonymous online survey reflect their experience after receiving the Mount'n Mover. After completing the survey you will be asked to participate in an interview regarding your experience with the Mount'n Mover. All

participants who complete the survey will be entered into a lottery drawing that will award 10 participants with a $25 Amazon gift card.

3. Risks
   There are no identifiable risks.

4. If You Would Like More Information about the Study
   If you have any questions about the study or would like to receive the results of the study please contact Dr. Lynn Gitlow at 607-274-1532 or lgitlow@ithaca.edu

5. Withdraw from the Study
   You are free to withdraw from the study at any time without penalty, and to omit answers on questionnaires that you feel uncomfortable answering.

How the Data will be Maintained in Confidence
All surveys are anonymous. Names of participants will not be used in reporting the results of the interviews and thus the confidentiality of the participants will be assured.

"The purpose of this research is to study the functional and psychosocial benefits of using the Mount'n Mover. If you are 18 years old or older you may proceed to participate in the study. If you are over the age of 14 written permission must be obtained from your parent or guardian as well as then from you. Those under 13 should have the project explained to them and assent should be indicated. By completing the electronic survey you are agreeing to participate in this research study. You have the right to choose not to participate. Thank you for your help."

_____
Print or Type Name

_____ _____
Signature for participants 14 years or older Date

_____ _____
Signature for those under 14 years old. Date

A copy of this form should be given to each subject. (If more than one page will be used, each page before the signature page should have a line provided at the bottom for subjects to initial.)

Tear-off Cover Page for Anonymous Survey for participants who are 18 or older.

We are Dr. Lynn Gitlow and Adam Kinney. We are helping Blue Sky Designs evaluate their product the Mount'nMover. In particular the purpose of this research is to study the functional and psychosocial benefits of using the Mount'n Mover. If you

are 18 years old or older you may proceed to participate in the study. You will be asked to complete an anonymous online survey reflect their experience after receiving the Mount'n Mover. After completing the survey you will be asked to participate in an interview regarding your experience with the Mount'n Mover.
The only risks associated with this research are the time it takes to complete the survey and interview.
If you have any questions about the study or would like to receive the results of the study please contact Dr. Lynn Gitlow at 607-274-1532 or lgitlow@ithaca.edu
You are free to withdraw from the study at any time without penalty, and to omit answers on questionnaires that you feel uncomfortable answering. By completing the online survey you are providing consent to participate in this survey, Thank you for your help with our research.

Tear-off Cover Page for Anonymous Survey for participants who are under 18 years.

We are Dr. Lynn Gitlow and Adam Kinney. We are helping Blue Sky Designs evaluate their product the Mount'nMover. In particular the purpose of this research is to study the functional and psychosocial benefits of using the Mount'n Mover. . If you are over the age of 14 written permission must be obtained from your parent or guardian as well as then you. Those under 13 should have the project explained to them and assent should be indicated,. You will be asked to complete an anonymous online survey reflect their experience after receiving the Mount'n Mover. After completing the survey you will be asked to participate in an interview regarding your experience with the Mount'n Mover.
The only risks associated with this research are the time it takes to complete the survey and interview.
If you have any questions about the study or would like to receive the results of the study please contact Dr. Lynn Gitlow at 607-274-1532 or lgitlow@ithaca.edu. You are free to withdraw from the study at any time without penalty, and to omit answers on questionnaires that you feel uncomfortable answering. By completing this online survey you are providing consent to participate in this survey, Thank you for your help with our research.

Emailed Contents of HSR Approval Letter for First Research Project

In order to expedite the review process, I have enclosed a copy of a letter that went out today. You should receive the original shortly.
MaryAnn Taylor
Provost's Office

February 15, 2013

Lynn Gitlow, Associate Professor
Department of Occupational Therapy
School of Human Sciences and Human Performance

Re: #0113-04, Measuring the Impact of an Assistive Technology Mounting Device on Users

Thank you for responding to the stipulations made on January 31, 2013 by the All-College Review Board for Human Subjects Research (HSR). You are authorized to begin your project.

This approval will remain in effect for a period of one year from the date of authorization. After you have finished the project (when data collection is complete and there is no further risk to human subjects), please complete the *Notice-of-Completion Form* found on the HSR website. Please note that review/approval of future proposals is contingent upon submission of this form.

Should you wish to continue the approved project beyond the expiration date, you may request an extension by sending an email to hsrlog@ithaca.edu before February 14, 2014. *If the project expires, you must complete a new application online for expedited review.* Also, if there are any adverse events that result from this research, they must be reported to the HSR Board at hsrlog@ithaca.edu.

Sincerely,

Wade Pickren, PhD
Director, Center for Faculty Excellence/Sponsored Research
All-College Review Board for Human Subjects Research

/mat

Emailed Contents of HSR Extension Approval Letter

In order to expedite the review process, I have enclosed a copy of a letter that went out today. You should receive the original shortly.
MaryAnn Taylor
Provost's Office

August 29, 2013

Lynn Gitlow, Associate Professor
Department of Occupational Therapy
School of Health Sciences and Human Performance

Re: HSR #0113-04b: Measuring the Impact of an Assistive Technology Mounting Device on Users – Extension

The All-College Review Board for Human Subjects Research (HSR) authorizes your request for an extension of the above-named proposal.

This approval will remain in effect for a period of one year from the date of authorization. After you have finished the project (when data collection is complete and there is no further risk to human subjects), please complete the *Notice-of-Completion Form* found on the website. Please note that review/approval of future proposals is contingent upon submission of this form.

Also, if there are any adverse events that result from this research, they must be reported to the HSR Board at hsrlog@ithaca.edu.

Sincerely,

Wade Pickren, PhD
Director, Center for Faculty Excellence/Sponsored Research
All-College Review Board for Human Subjects Research

/mat

1st extension in 3-year cycle

Appendix D: Author Guidelines

Author Guidelines for Disability and Rehabilitation: Assistive Technology

The document below was formatted for Microsoft Word from pdf. This pdf can be found at:

http://informahealthcare.com/userimages/ContentEditor/1406889548752/Disability%20and%20Rehabilitation%20Instructions.pdf

Instructions for Authors

Disability and Rehabilitation: Assistive Technology is an international, multidisciplinary, peer reviewed journal devoted specifically to the broad range of technological developments and related supports and issues which enhance the rehabilitation process. New submissions on any aspect of assistive technology, disability and rehabilitation are encouraged and the journal welcomes contributions from a wide range of professional groups, including medical practitioners, occupational therapists, physiotherapists, speech and language therapists, clinical psychologists and those involved in nursing, education, ergonomics and engineering.

Disability and Rehabilitation: Assistive Technology is organised into sections: Literature Reviews; Research Papers, Case Studies, Clinical Commentaries; reports on Rehabilitation in Practice, Products and Devices/Rehabilitation Engineering, Special Issues and specific sections on contemporary themes of interest to the Journal's readership are published. Please contact the Editor for more information.

Submissions

Authors should prepare a complete text with information identifying the author(s)

removed. This should be uploaded as the "Main Document" and will be the version sent to anonymously to referees. Authors should submit a separate title page that contains all contact information for the authors(s) and any acknowledgement information that may contain identifying information. This should be uploaded as a "Title Page" and will not be sent to referees.

Disability and Rehabilitation: Assistive Technology considers all manuscripts at the Editors' discretion; the Editors' decision is final. Please see below for information on the Journal's Appeal Procedure.

Disability and Rehabilitation: Assistive Technology considers all manuscripts on the strict condition that they are the property (copyright) of the submitting author(s), have been submitted only to Disability and Rehabilitation: Assistive Technology, that they have not been published already, nor are they under consideration for publication, nor in press elsewhere. Authors who fail to adhere to this condition will be charged all costs which Disability and Rehabilitation: Assistive Technology incurs, and their papers will not be published. Copyright will be transferred to the journal Disability and Rehabilitation: Assistive Technology and Informa UK Ltd., if the paper is accepted.

All submissions should be made online at Disability and Rehabilitation: Assistive Technology's ScholarOne Manuscripts site:

http://mc.manuscriptcentral.com/drtech.

Papers should be submitted with any tables, figures, or photographs, all of which should be of high quality suitable for reproduction. Submissions should be in English presented in double line spacing. Submissions should include, where

appropriate, a formal statement that ethical consent for the work to be carried out has been given. Photographs of patients should be avoided, but if essential patients' consent in writing must accompany manuscript. It is not sufficient to mask identity by covering the patient's eyes.

New Feature: Implications for Rehabilitation

A new feature of the Journal will be a boxed insert on 'Implications for Rehabilitation'. This box should include between two to four main bullet points drawing out the implications for rehabilitation for your paper. All papers must include this additional feature. This should be submitted separately through Manuscript Central as a 'Supplemental File' on a single side of A4 at the time of submission. If you have any questions, please contact the Editor.

Standardised Reporting Guidelines

We encourage Authors to be aware of, and to take into account standardised reporting guidelines when preparing their manuscripts.

The table below provides information about guidelines for different study types:

Study Type	Name	Source
Case reports	CARE	www.care-statement.org/
Diagnostic accuracy	STARD	www.stard-statement.org/
Observational studies	STROBE	http://strobe-statement.org/
Randomized controlled trial	CONSORT	www.consort-statement.org
Systematic reviews, meta-		

analyses	PRISMA	www.prisma-statement.org/

Whilst the use of such guidelines is supported, given the multi-disciplinary nature of the Journal, it is not compulsory.

Manuscript Preparation

In writing your paper, you are encouraged to review articles in the area you are addressing which have been previously published in the Journal, and where you feel appropriate, to reference them. This will enhance context, coherence, and continuity for our readers.

File Preparation and Types

Manuscripts are preferred in Microsoft Word format (.doc files). Documents must be double-spaced, with margins of one inch on all sides. Tables and figures should not appear in the main text, but should be uploaded as separate files and designated with the appropriate file type upon submission. These should be submitted as "Image" files during submission. References should be given in Council of Science Editors (CSE) Citation & Sequence format (see References section for examples).

Structure of Paper

Manuscripts should be compiled in the following order: title page; abstract; main text; acknowledgments; Declaration of Interest statement; appendices (as appropriate); references; tables with captions (uploaded as separate files); figures with captions (uploaded as separate files).

An introduction should state the purpose of the paper and give a brief account of previous work. New techniques and modifications should be described concisely but in sufficient detail to permit their evaluation; standard methods should simply be referenced. Experimental results

should be presented in the most appropriate form, with sufficient explanation to assist their interpretation; their discussion should form a distinct section. Extensive tabulations will not be accepted unless their inclusion is essential.

Title Page

A title page should be provided comprising the manuscript title plus the full names and affiliations of all authors involved in the preparation of the manuscript. One author should be clearly designated as the corresponding author and full contact information, including phone number and email address, provided for this person. Keywords that are not in the title should also be included on the title page. The keywords will assist indexers in cross indexing your article. The title page should be uploaded separately to the main manuscript and designated as "title page" on ScholarOne Manuscripts. This will not get sent to referees.

Abstracts

Structured abstracts are required for all papers, and should be submitted as detailed below, following the title and author's name and address, preceding the main text.

Purpose: State the main aims and objectives of the paper.

Method: Describe the design, and methodological procedures adopted.

Results: Present the main results.

Conclusions: State the conclusions that have been drawn and their relevance to the study of disability and rehabilitation.

The abstract should not exceed 200 words.

Nomenclature and Units

All abbreviations and units should conform to SI practice. Drugs should be referred

to by generic names; trade names of substances, their sources, and details of manufacturers of scientific instruments should be given only if the information is important to the evaluation of the experimental data.

Copyright Permission

Contributors are required to secure permission for the reproduction of any figure, table, or extensive (more than fifty word) extract from the text, from a source which is copyrighted - or owned - by a party other than Informa UK Ltd or the contributor. This applies both to direct reproduction or 'derivative reproduction' - when the contributor has created a new figure or table which derives substantially from a copyrighted source.

Code of Experimental Ethics and Practice

Contributors are required to follow the procedures in force in their countries which govern the ethics of work done with human or animal subjects. The Code of Ethics of the World Medical Association (Declaration of Helsinki) represents a minimal requirement.

Tables, figures and illustrations

The same data should not be reproduced in both tables and figures. The usual statistical conventions should be used: a value written 10.0 ± 0.25 indicates the estimate for a statistic (e.g. a mean) followed by its standard error. A mean with an estimate of the standard deviation will be written 10.0 SD 2.65. Contributors reporting ages of subjects should specify carefully the age groupings: a group of children of ages e.g. 4.0 to 4.99 years may be designated 4 +; a group aged 3.50 to 4.49 years 4 ± and a group all precisely 4.0 years, 4.0.

Tables and figures should be referred to in text as follows: figure 1, table 1, i.e. lower case. 'As seen in table [or figure] 1...' (not Tab., fig. or Fig).

The place at which a table or figure is to be inserted in the printed text should be indicated clearly on a manuscript:

Insert table 2 about here

Each table and/or figure must have a title that explains its purpose without reference to the text. The filename for the tables and/or figures should be descriptive of the graphic, e.g. table 1, figure 2a.

Tables should be used only when they can present information more efficiently than running text. Care should be taken to avoid any arrangement that unduly increases the depth of a table, and the column heads should be made as brief as possible, using abbreviations liberally. Lines of data should not be numbered nor run numbers given unless those numbers are needed for reference in the text. Columns should not contain only one or two entries, nor should the same entry be repeated numerous times consecutively. Tables should be grouped at the end of the manuscript on uploaded separately to the main body of the text.

Notes on Style

All authors are asked to take account of the diverse audience of Disability and Rehabilitation: Assistive Technology. Clearly explain or avoid the use of terms that might be meaningful only to a local or national audience.

Some specific points of style for the text of original papers, reviews, and case studies follow:

-Disability and Rehabilitation: Assistive Technology prefers US to 'American',

USA to 'United States', and UK to 'United Kingdom'.

-Disability and Rehabilitation: Assistive Technology uses conservative British, not US, spelling, i.e. colour not color; behaviour (behavioural) not behavior; [school] programme not program ; [he] practises not practices ; centre not cen organization not organisation; analyse not analyze, etc.

-Single 'quotes' are used for quotations rather than double "quotes", unless the 'quote is "within" another quote'.

-Punctuation should follow the British style, e.g. 'quotes precede punctuation'.

-Punctuation of common abbreviations should follow the following conventions: e.g. i.e. cf. Note that such abbreviations are not followed by a comma or a (double) point/period.

-Dashes (M-dash) should be clearly indicated in manuscripts by way of either a clear dash (-) or a double hyphen (- -).

-Disability and Rehabilitation: Assistive Technology is sparing in its use of the upper case in headings and references, e.g. only the first word in paper titles and all subheads is in upper case; titles of papers from journals in the references and other places are not in upper case.

-Apostrophes should be used sparingly. Thus, decades should be referred to as follows: 'The 1980s [not the 1980's] saw...'. Possessives associated with acronyms (e.g. APU), should be written as follows: 'The APU's findings that...', but, NB, the plural is APUs.

-All acronyms for national agencies, examinations, etc., should be

spelled out the first time they are introduced in text or references. Thereafter the acronym can be used if appropriate, e.g. 'The work of the Assessment of Performance Unit (APU) in the early 1980s...'. Subsequently, 'The APU studies of achievement...', in a reference ... (Department of Education and Science [DES] 1989a).

-Brief biographical details of significant national figures should be outlined in the text unless it is quite clear that the person concerned would be known internationally. Some suggested editorial emendations to a typical text are indicated in the following with square brackets: 'From the time of H. E. Armstrong [in the 19th century] to the curriculum development work associated with the Nuffield Foundation [in the 1960s], there has been a shift from heurism to constructivism in the design of [British] science courses'.

-The preferred local (national) usage for ethnic and other minorities should be used in all papers. For the USA, African-American, Hispanic, and Native American are used, e.g. 'The African American presidential candidate, Jesse Jackson...' For the UK, African-Caribbean (not 'West Indian'), etc.

-Material to be emphasized (italicized in the printed version) should be underlined in the typescript rather than italicized. Please use such emphasis sparingly.

-n (not N), % (not per cent) should be used in typescripts.

-Numbers in text should take the following forms: 300, 3000, 30 000. Spell out numbers under 10 unless used with a unit of measure, e.g. nine pupils but 9 mm (do not introduce periods with measure). For decimals, use

the form 0.05 (not .05).

Acknowledgments and Declaration of Interest Sections

Acknowledgments and Declaration of interest sections are different, and each has a specific purpose. The Acknowledgments section details special thanks, personal assistance, and dedications. Contributions from individuals who do not qualify for authorship should also be acknowledged here. Declarations of interest, however, refer to statements of financial support and/or statements of potential conflict of interest. Within this section also belongs disclosure of scientific writing assistance (use of an agency or agency/ freelance writer), grant support and numbers, and statements of employment, if applicable.

Acknowledgments Section

Any acknowledgments authors wish to make should be included in a separate headed section at the end of the manuscript preceding any appendices, and before the references section. Please do not incorporate acknowledgments into notes or biographical notes.

Declaration of Interest Section

All declarations of interest must be outlined under the subheading "Declaration of interest". If authors have no declarations of interest to report, this must be explicitly stated. The suggested, but not mandatory, wording in such an instance is: The authors report no declarations of interest. When submitting a paper via ScholarOne Manuscripts, the "Declaration of interest" field is compulsory (authors must either state the disclosures or report that there are none). If this section is left empty authors will not be able to progress with the submission.

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References

References should follow the Council of Science Editors (CSE) Citation & Sequence format. Only works actually cited in the text should be included in the references. Indicate in the text with Arabic numbers inside square brackets. Spelling in the reference list should follow the original. References should then be listed in numerical order at the end of the article. Further examples and information can be found in The CSE Manual for Authors, Editors, and Publishers, Seventh Edition. Periodical abbreviations should follow the style given by Index Medicus.

Examples are provided as follows:

Journal article: [1] Steiner U, Klein J, Eiser E, Budkowski A, Fetters LJ. Complete wetting from polymer mixtures. Science 1992;258:1122-9.

Book chapter: [2] Kuret JA, Murad F. Adenohypophyseal hormones and related substances. In: Gilman AG, Rall TW, Nies AS, Taylor P, editors. The pharmacological basis of therapeutics. 8th ed. New York: Pergamon; 1990. p 1334-60.

Conference proceedings: [3] Irvin AD, Cunningham MP, Young AS, editors. Advances in the control of Theileriosis. International Conference held at the International Laboratory for Research on Animal Diseases; 1981 Feb 9-13; Nairobi. Boston: Martinus Nijhoff Publishers; 1981. 427 p.

Dissertations or Thesis: [4] Mangie ED. A comparative study of the perceptions of illness in New Kingdom Egypt and Mesopotamia of the early first millennium [dissertation]. Akron (OH): University of Akron; 1991. 160 p. Available from: University Microfilms, Ann Arbor MI; AAG9203425.

Journal article on internet: [5] De Guise E, Leblanc J, Dagher J, Lamoureux J, Jishi A, Maleki M, Marcoux J, Feyz M. 2009. Early outcome in patients with traumatic brain injury, pre-injury alcohol abuse and intoxication at time of injury. Brain Injury 23(11):853-865. http://www.informaworld.com/10.1080/02699050903283221. Accessed 2009 Oct 06

Webpage: [6] British Medical Journal [Internet]. Stanford, CA: Stanford Univ; 2004 July 10 - [cited 2004 Aug 12]; Available from: http://bmj.bmjjournals.com

Internet databases: [7] Prevention News Update Database [Internet]. Rockville (MD): Centers for Disease Control and Prevention (US), National Prevention Information Network. 1988 Jun - [cited 2001 Apr 12]. Available from: http://www.cdcnpin.org/

Appeal Procedure

The Editors of both Journals will respond to appeals from Authors relating to papers which have been rejected. The Author(s) should email the Editor outlining the concerns and making a case for why their paper should not have been rejected. The Editor will undertake one of two courses of action:

1: The Editor Accepts the Appeal

I. In this case the Editor will secure a further review making available confidentially the relevant information for the reviewer

II. The Editor on receiving the review will either accept the appeal and therefore invite a resubmission for further review; or reject the appeal and no further action will be taken.

III. If an appeal is rejected there will be no further right of appeal within the jurisdiction of the Journal.

2: The Editor does not uphold the Appeal

I. If the Editor does not accept the appeal and is not prepared to secure further review the decision will be referred to the Editor of the relevant affiliated Journal for independent consideration. In the case of Disability and Rehabilitation, the Editor of Disability and Rehabilitation: Assistive Technology will be contacted, and if an appeal is not upheld by the Editor of Disability and Rehabilitation: Assistive Technology, the Editor of Disability and Rehabilitation will be consulted.

II. The Editor will either confirm the decision or recommend that a further review be obtained.

III. Therefore, if both Editors agree that the appeal should not be upheld there will be no further right of appeal within the jurisdiction of the Journal.

Dave Muller, Editor in Chief, Disability and Rehabilitation

Marcia Scherer, Editor, Disability and Rehabilitation: Assistive Technology