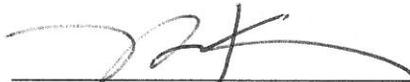


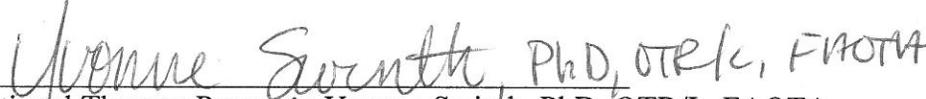
The use of everyday technology in occupational therapy practice for clients with acquired brain
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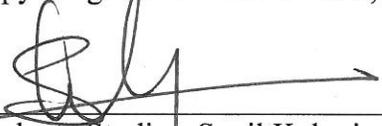
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Abstract

The purpose of this descriptive study was to investigate how occupational therapists use everyday technology (ET) in their evaluation and treatment of adults with acquired brain injury (ABI). Questions included (1) the type of client therapists believed most likely to benefit from using technology, (2) current patterns of technology use with clients, including type of technology and frequency of use (3) the extent to which therapists think ET was effective, and (4) the supports for and barriers against using ET in practice. A survey was completed by 40 occupational therapists who were members of the Physical Disabilities, Technology, or Home and Community Health Special Interest Sections (SIS) of the American Occupational Therapy Association (AOTA). The findings indicated that occupational therapists tend not to ask questions about ET, evaluate its use formally or informally, may make assumptions about client's ability to use ET, and not consider work related interventions. Many clinicians report ET to be useful, but tend not to use it in practice, possibly due to barriers impacting therapists' use of ET, such as, access to and knowledge about ET. ET use should be considered in the future development of standardized assessments, occupational therapy education, and research.

The use of everyday technology in occupational therapy practice for clients with acquired brain injury

An acquired brain injury (ABI) can be a result of conditions such as a stroke or a traumatic brain injury (TBI). Strokes are the leading cause of severe, long-term disability in the U.S. (American Stroke Association, 2014) and TBI is the leading cause of disability in adults under 44 years of age (Brain Trauma Foundation, n.d.). In 2010, 2.5 million individuals experienced a TBI (Centers for Disease Control and Prevention, 2014) and approximately 800,000 people experience a stroke each year (American Heart Association, 2013). Individuals with ABI often experience difficulties performing everyday tasks due to cognitive limitations (Bar-Haim Erez, Rothschild, Katz, Tuchner, & Hartman-Maeir, 2009; Powell, Temkin, Machamer, & Dikmen, 2007). Occupational therapy (OT) has the potential to help individuals with ABI increase their participation in everyday tasks through interventions focused on cognition. Interventions are ultimately focused on improving a client's engagement in occupations, including ADL, IADL, rest and sleep, education, work, leisure, and social participation (American Occupational Therapy Association [AOTA], 2014a).

One tool that can be used to help individuals with ABI complete everyday tasks and participate in their chosen occupations is everyday technology (ET). ET includes high tech devices commonly used by the general population, such as smartphones, tablets, and computers. Individuals with ABI may be able to specifically benefit from the use of these devices. Given that 75% of households in the U.S. reported having a computer in 2011 (File & Ryan, 2014), 58% of adults in the U.S. have a smartphone, and 42% of adults in the U.S. own a tablet computer (Pew Research Internet Project, 2014), utilizing the technology in an individual's

current life as part of OT intervention may be an inexpensive and easily accessible solution to help those with ABI compensate for cognitive deficits.

The first step for therapists when designing intervention plans is to evaluate the current status of the client. ET can be integrated into OT evaluations in several ways, including asking questions about ET during the occupational profile, examining occupational performance using ET (M. B. Holm, personal communication, January, 2014), as well as specifically assessing a client's ability to manage ET (Malinowsky, Nygård, & Kottorp, 2011). ET can also be incorporated into individualized occupation-based interventions as a method of improving the occupational performance and satisfaction of individuals with ABI (Lindén, Lexell, & Larsson Lund, 2011). To successfully incorporate ET into the OT process, occupational therapists need to employ activity analysis and evaluate the fit between the person, task, and ET selected (Covington & Kim, 2014; Engstrom, Lexell, & Larsson Lund, 2010; Larsson Lund, Nygard, & Kottorp, 2014). Occupational therapists may need to provide extensive and prolonged support to train individuals with severe memory impairments how to use ET (Boman, Lindberg-Stenvall, Hemmingsson, & Bartfai, 2010). This suggests that the effectiveness of ET may be contingent on the severity of the cognitive difficulties (Boman et al., 2010), the fit between the person's abilities and the demands of the technology (Covington & Kim, 2014; Engstrom et al., 2010; Larsson Lund et al., 2014), the ability of the therapist to correctly match the person with the technology (Covington & Kim, 2014), and the amount of support the occupational therapist is able to provide (Boman et al., 2010).

Very little is known about how therapists make decisions regarding the use of ET with individuals with ABI and the factors that influence that decision making. It is necessary to gain a greater understanding of occupational therapists' clinical reasoning when using ET in practice.

This includes discovering the reasons why occupational therapists choose to use or not use ET in practice with individuals who have ABI, how ET is currently used in OT evaluations and interventions, the extent to which therapists think ET is useful, and the barriers and supports therapists may encounter when using ET in practice. Understanding the occupational therapists' clinical reasoning may also provide insight into how the use of ET is relevant or irrelevant to the skills the occupational therapists address with their clients.

Considering that ET has the potential to positively influence the lives of people with ABI (Lindén et al., 2011), research investigating the current use of ET in OT practice can fill a gap in current literature. Prior research has only focused on the therapist's perspective of specialized technology or ET used in conjunction with specialized technology (Chen & Bode, 2011; Hart, O'Neil-Pirozzi, & Morita, 2003), which suggests that further research is needed in regards to the occupational therapist perspective of ET used on its own. A recent qualitative study at the University of Puget Sound was completed on the perspectives of occupational therapists who were experts on the use of ET with clients with brain injury (Covington & Kim, 2014). Comparing the findings from that study with a larger sample would help inform the profession about clinical practice in this important area.

Background

Acquired brain injury. ABI is defined as an injury to the brain that is not hereditary, congenital, or degenerative, which includes TBI and brain injuries due to a stroke (Brain Injury Association of America, 2012). A TBI can occur when an individual experiences a severe blow to the head, is shaken, or when an object penetrates the brain (AOTA, 2014b). Individuals with ABI often experience difficulties with everyday life activities (Bar-Haim Erez et al., 2009), such as home management (Powell et al., 2007). Many of these challenges are due to cognitive

deficits, particularly executive functioning skills (Bar-Haim Erez et al., 2009) and memory impairments (Fleming, Shum, Strong, & Lightbody, 2005). Executive functioning deficits may include limitations in planning, flexibility in thought processing, organization, problem solving, and self-regulation (Toglia, Golisz, & Goverover, 2014). These cognitive limitations can cause individuals to experience decreased participation in occupations due to personal limitations, environmental restrictions, or an inability to meet the demands of the activities (Toglia et al., 2014).

Evaluation and ET. In OT practice the evaluation process includes completing an occupational profile and the analysis of occupational performance based on client factors, performance patterns, and performance skills. The occupational profile is often created through an interview, which provides an understanding of the client's occupational history and experiences, patterns of daily living, interests, values, and needs (AOTA, 2014a). With regard to ET use, the occupational profile allows the therapist to gather information about clients' prior and current uses of technology to determine if it is appropriate to use ET in evaluations and interventions. The therapist also uses the occupational profile to identify any occupational challenges that may be supported by the use of ET and identify clients' environmental supports. For example, many jobs today require the use of a computer and the client's ability to return to work may be dependent upon the ability to effectively use computers again. After creating the occupational profile the therapist can better determine if further examination of occupational performance should incorporate the use of ET..

The analysis of occupational performance consists of observation during occupation and/or utilizing assessment tools to measure factors that may support or hinder occupational performance (AOTA, 2014a). Of the assessment tools commonly used to evaluate the cognitive

function or IADL skills of individuals with ABI, only a few are starting to incorporate ET, even when the task they are assessing is increasingly performed by individuals in the general population using ET. For example, the Kohlman Evaluation of Living Skills (KELS) and the Executive Function Performance Test (EFPT), both assessments of cognitive skills, require individuals to locate contact information in a physical phone book and manage money on paper (Gary, 2011; Thomson, 1992). The Performance Assessment of Self-Care Skills (PASS), a commonly used assessment of IADL skills, is starting to consider the use of ET. In a recent presentation by M. B. Holm (personal communication, January, 2014), one of the creators of the PASS, she stated that therapists can allow clients to look things up on the Internet instead of using a phone book when administering this assessment. This recommendation is not specifically mentioned in the PASS manual, so many therapists may not use ET with the PASS currently. An assessment tool that focuses specifically on evaluating the ability to use ET has been developed by the University of Utah called the Functionally Simulated Technology Task (FSTT) that is scored according to the PASS protocol to assess executive function performance during online-based IADL such as online bill pay and shopping (Cardell, Swain, & Burnett, 2013). Overall, most of the commonly used assessments for cognitive and IADL skills don't currently include an option for ET.

In addition to using ET to assess a client's cognitive functioning during activity, there is one assessment tool designed to specifically assess individuals' abilities to manage ET. The Management of Everyday Technology Assessment (META), developed by Malinowsky et al. (2011), specifically assesses clients' abilities to manage ET. Performance skill items in the META include following instructions given by an automatic telephone service, choosing the correct buttons to press on the telephone, and managing different types of technology. The

META was originally designed and tested with older adults (Malinowsky et al., 2011) and was found to have an acceptable rating scale, intra-rater reliability, and person response validity, but unacceptable internal scale validity. The META was later tested with individuals with ABI (Malinowsky, Kassberg, Larsson-Lund, & Kottorp, 2014) and preliminary evidence of acceptable test–retest reliability was found. However, it is unclear how many clinicians are aware of this measurement tool or how frequently they use this tool in clinical practice.

Intervention and ET. Through skilled interventions, occupational therapists can help individuals with ABI continue to participate in their everyday occupations by compensating for and remediating limitations, including cognitive deficits. To address cognitive impairments, occupational therapists may use the dynamic interactional approach to create client centered interventions (Toglia et al., 2014). This approach allows occupational therapists to consider how changes to the interaction between the person and the demands of the environment and task can impact performance (Toglia et al., 2014). Interventions using the dynamic interactional approach may also address metacognition, which increases individuals' awareness of their own cognitive processes (Radomski & Giles, 2014). An example of an intervention used to increase metacognition includes asking clients to predict their performance ability before the task and reflect on their performance afterwards. Other dynamic interactional approach interventions include developing cognitive strategies (Toglia et al., 2014), such as the use of a memory book, which can help clients compensate for memory impairments by providing strategies to remember steps in a task or appointments (Amini, 2012).

These interventions may include ET such as mobile phones (Stapleton, Adams, & Atterton, 2007), paging systems (Wilson, Emslie, Quirk, & Evans, 2001), and other electronic aids (Boman et al., 2010) to compensate for memory impairments. The most widely researched

application of ET use has been for people with ABI who have memory impairments. Intervention strategies that help compensate for memory impairments often involve utilizing brief written messages to remind individuals to do a task, which can be accomplished using an electronic device (Stapleton et al., 2007; Wilson et al., 2001).

Effectiveness of ET interventions. A multiple case study examining ten participants discovered that individualized interventions using commonly available ET that focused on compensating for cognitive difficulties can yield positive outcomes for individuals with ABI (Larsson Lund, Lövgren-Engström, & Lexell, 2011; Lindén et al., 2011). The study found that interventions with ET can be effective for improving performance with orientation in unknown environments, being timely for appointments and tasks, and recalling information (Larsson Lund et al., 2011; Lindén et al., 2011). Specific outcomes reported by participants included finding that technology made their daily lives easier, compensated for difficulties in task performance, improved the self-perception of their occupational performance, and relieved pressure on their significant others/caregivers (Larsson Lund et al., 2011; Lindén et al., 2011). Given the limitations of this study design, there is potential that the positive outcomes of this study may be a placebo effect due to the many interactions with occupational therapists throughout the study and not as a direct result of ET. In addition, the 10 participants in this study were recruited from one hospital in Sweden, which may limit the generalizability of these findings to client populations elsewhere (Larsson Lund et al., 2011; Lindén et al., 2011). Another study examined the effectiveness of a ‘reminders’ function on mobile phones to compensate for memory impairments and found reminders to be helpful in increasing target behaviors of individuals with TBI (Stapleton et al., 2007). However, given that this single case ABAB reversal design study used a convenience sample from one geographic location, the results are also hard to generalize.

A randomized control crossover study, including 130 people, ranging from eight to 83 years old with ABI and 13 people who had developmental or unknown conditions, also investigated the effectiveness of technology to compensate for memory impairments. These researchers discovered that 80% of participants significantly increased their success in performing everyday occupations after a 16 week trial using a paging system to compensate for memory and planning impairments (Wilson et al., 2001). Since this study only investigated a specific paging system, it is difficult to know if the same results would be found with other systems.

Finally, a pilot study with 14 participants found that other electronic memory aids such as a daily schedule on a computer, home control panels, and kitchen alarms may also be helpful in compensating for the memory difficulties of individuals with severe memory impairments (Boman et al., 2010). However, extensive and prolonged support from an occupational therapist was necessary for clients to show improvements (Boman et al., 2010). This might suggest that the effectiveness of OT interventions may be dependent on the amount of time the therapist is able to train individuals who have severe memory impairments.

Supports to ET use. Successful implementation of ET may be related to goodness of fit between the person, task, and environment (Engstrom et al., 2010; Larsson Lund et al., 2014). For example, a good fit may occur when an individual is paired with technology they are familiar with and have the cognitive skills to utilize. Consideration of fit requires a thorough understanding of the client's abilities, in addition to an understanding of the activity demands that using technology creates. All occupational therapists have the skills to gain an understanding of the activity demands needed to use ET through activity analysis, which can highlight the client factors needed for an individual to be successful with ET (Covington & Kim, 2014). Several

factors need to be considered during this process, for example, occupational therapists need to gather information about individuals' use of ET prior to their injury and evaluate the degree of their cognitive deficits to determine if ET could be used effectively as an intervention tool (Covington & Kim, 2014).

Barriers against ET use. ET is not always utilized during OT sessions (Hart et al., 2003), even though many individuals with ABI used ET prior to injury and occupational therapists are trained in the necessary skills to maximize the right fit between the person, task, and ET. There are many factors which may lead to ET not being used with individuals with ABI in OT practice, including factors related to the client's ability or desire to use technology and factors related to the therapists' confidence levels with technology.

Using ET in therapy may not be the best choice for all clients due to financial constraints of the client (Chen & Bode, 2011; Covington & Kim, 2014; Hart et al., 2003), the severity of the clients' disabilities (Boman et al., 2010; Kassberg, Malinowsky, Jacobsson, & Larsson Lund, 2013), the client's familiarity (Engstrom et al., 2010), or interest in technology (Chen & Bode, 2011). Research has shown that the severity of clients' disabilities is correlated with their ability to successfully manage ET (Kassberg et al., 2013) and clients with severe memory impairments may only be able to manage ET with extensive and prolonged training from an occupational therapist (Boman et al., 2010), which may not always be a realistic option in most therapy situations. Hart et al. (2003) from the Netherlands surveyed a variety of clinicians working with individuals with TBI, including 17 occupational therapists of a total of 81 participants (other disciplines included physical therapy, speech therapy, psychology, recreation therapy, and vocational counselling), and found that one of the most common barriers clinicians reported relating to the use of everyday or assistive technology, such as computers and portable electronic

devices, by individuals with TBI were the learning and memory demands required to operate the devices.

Research has shown that individuals with ABI who have trouble finding the needed functions on their computer or mobile phones have not always experienced success with interventions using ET (Engstrom et al., 2010), which may be due to lack of familiarity with ET. A survey of 1,326 occupational therapists, physical therapists, and speech language pathologists' from a wide variety of practice settings working with different populations in the U.S discovered that client's lack of interest in new technology, such as robotic devices and advanced prosthetic technology, is a barrier affecting the therapists decision whether or not to use this technology with their client (Chen & Bode, 2011). This lack of interest may be specific to new technology, but it may also be a barrier for use of ET. However, interest in technology may also be a support, especially as the use of ET becomes an integral part of life. More research is needed to answer this question.

While these barriers mainly apply to client use of technology, they do not necessarily apply to the barriers clinicians may personally encounter using technology in practice. In a survey of multiple rehabilitative disciplines who treat clients with TBI by Hart et al. (2003) discovered that while 67% of clinicians reported using computers for therapeutic purposes, only 30% reported feeling pretty confident (25%) or extremely confident (5%) using technology in practice. This suggests that confidence level may be a barrier to technology use by clinicians in therapy. However, it is impossible to tell if these results are representative of occupational therapists in particular because the study didn't analyze each specific professional group. A qualitative study focusing on OT found that constantly changing technology is a barrier for clients with cognitive difficulties and occupational therapists alike (Covington & Kim, 2014).

Current research in the use of ET for individuals with ABI in OT practice has focused primarily on the ability of technology to compensate for cognitive difficulties (Boman et al., 2010; Larsson Lund et al., 2011; Lindén et al., 2011; Stapleton et al., 2007; Wilson et al., 2001) and factors that influence the client's ability or desire to use technology (Chen & Bode, 2011; Covington & Kim, 2014; Boman et al., 2010; Engstrom et al., 2010; Hart et al., 2003; Kassberg et al., 2013). Prior survey research that focused on the therapists' perspective of technology only looked at specialized technology or ET combined with specialized technology and investigated many disciplines as a group rather than each individual discipline (Chen & Bode, 2011; Hart et al., 2003). These studies suggest that further research is needed specifically addressing occupational therapists' perspective of ET. In addition, Covington and Kim (2014), who investigated expert clinicians using ET in practice for clients with ABI, indicated that subject recruitment was difficult, which suggests that many occupational therapists may not be utilizing ET. More research needs to be done to discover how many occupational therapists use ET and how occupational therapists determine if ET is a good modality to use in the client's treatment. Thus, the purpose of this study was to investigate how occupational therapists use ET in their evaluation and treatment of adults with ABI, including (1) the type of client therapists believe is most likely to benefit from using technology, (2) current patterns of technology use with clients, including type of technology and frequency of use (3) the extent to which therapists think ET is effective, and (4) the supports for and barriers against using ET in practice.

Method

Research Design

A descriptive study design was chosen because the purpose of this study was to obtain information about occupational therapists' current practices and experiences without

manipulating any variables in their current environments. Since the information desired could be self-reported by occupational therapists, information was collected through a survey. The largest and most geographically diverse sample could be obtained in the most efficient way using a survey (Stein, Rice, & Cutler, 2013). This allowed the findings to be generalized to the largest number of occupational therapists practicing in the U.S as possible given the sample size.

Participants

The population of interest for this study was occupational therapists practicing in the U.S. The most effective way to contact occupational therapists throughout the U.S. was through purchasing mailing addresses from the AOTA. We obtained 250 randomly selected participants from AOTA who subscribed to the Physical Disabilities Special Interest Section (SIS), Home and Community Health SIS, or Technology SIS. These selections were chosen to target occupational therapists who work with individuals with ABI. Participants were asked to send back the survey based on the inclusion criteria of having worked with a client with ABI in the last six months.

Instrumentation

The questionnaire included five multiple-choice questions, 54 Likert-type scale questions with an “other” option provided as appropriate, and one open-ended comment box so that participants could include any other information they deemed relevant. A copy of the complete survey is found in the Appendix. On the front page of the questionnaire the term ET was defined for participants as, “High tech devices commonly used by the general population and includes devices such as smartphones, tablets, and computers.” The questionnaire included five sections and was two pages double sided. Section one included questions regarding participants’ demographics, such as how long they have worked with individuals with ABI. Section two

included questions regarding current patterns of ET use with clients with ABI in evaluations and interventions, with a specific focus on cognitive rehabilitation. This section included questions asking clients questions about ET, what type of ET (if any) the therapist uses with clients, and how frequently ET is used in practice. These questions were based on the widespread use of ET in everyday activities and the limited number of assessments that currently incorporate ET. Section three included questions regarding the types of clients therapists believe are most likely to benefit from using ET. These questions were based on past research that determined client factors may impact clients' ability to benefit from ET (Boman et al., 2010; Engstrom et al., 2010; Kassberg et al., 2013). Section four included questions regarding the extent to which therapists think ET is effective for their clients. Section five included questions regarding the supports for and barriers against using ET in evaluations and treatments. Some of the potential barriers and supports were identified by the Covington and Kim (2014) study and Chen and Bode (2011) study. An online survey was then created and was identical to the paper survey.

Procedures

This research study was approved by the University of Puget Sound Institutional Review Board (IRB). Following IRB approval, the questionnaire was reviewed by two professors of OT at the University of Puget Sound who have extensive knowledge of survey research, technology use in OT practice, and working with individuals with ABI. A pilot questionnaire was then given to three occupational therapists to review for content and clarity. Revisions regarding clarity were made based on feedback from the OT professors and pilot participants.

After research committee approval the questionnaire was sent out on February 20, 2015 to 250 occupational therapists whose mailing addresses were purchased from the AOTA. The envelope sent to participants included a cover letter explaining the purpose of the study, the

questionnaire, and a postage paid business reply envelope. The cover letter contained the phrase, “Return of this survey will indicate your consent to participate in this study.” Also included was information required to complete the online survey option through SurveyMonkey.com. When paper questionnaires were received they were immediately separated from their coded reply envelopes to protect confidentiality. Then the envelope was destroyed. Participants who used SurveyMonkey.com entered the code from their cover letter and their data including the code were never stored with identifying information. Data collected from the questionnaires were entered into IBM SPSS Statistics version 22 (SPSS) and saved as a document on a password protected account.

Data Analysis

Data were organized according to the purpose statement including, the type of client therapists believe is most likely to benefit from ET, current patterns of use with clients with ABI, the extent to which the therapists think ET is effective for clients with ABI, and the supports for and barriers against using ET in practice. These data were analyzed using descriptive statistics such as frequency to reveal the distribution of responses from participants. To discover subgroup differences among demographic variables and participant responses, Mann Whitney U tests were performed. Due to the number of participants, acute care, inpatient rehab, and skilled nursing facilities were grouped into an institutional practice setting and home health, outpatient rehab, and other settings were grouped into a community practice setting. Number of years as an occupational therapist and years working with individuals with ABI (all participants fell into the same group for both categories) were also grouped into two groups, 11 or more years of practice or 10 or less years of practice.

Results

Response Rate

The survey recipients returned a total of 63 surveys to the investigators, 41 of which met the inclusion criteria of having worked with a client with ABI in the last six months. Nine of these surveys were returned through the online form, seven of which met the inclusion criteria. The 22 recipients did not meet the inclusion criteria for this study did not complete the entire survey. One unopened survey was returned to the investigators because it could not be delivered to the recipient. Five survey recipients returned their surveys after data collection had ended. Taking the excluded recipients, unopened returned survey, and late respondents into account, the new sample size was 222. With 41 respondents meeting the inclusion criteria, the response rate was 18.5%. One respondent who fit the inclusion criteria only filled out the demographic information and wrote in the comment box that “ET use is too advanced...or already resumed via gains in rehab.” It is possible that this respondent did not complete the questionnaire due to lack of experience with ET or only sometimes treating clients with ABI.

Demographics of Participants

Of the 40 respondents who met the inclusion criteria and filled out the survey, the largest groups of occupational therapists had been practicing for either 16 or more years (42.5%) or less than five years (35%) (Table 1). The most frequently reported primary practice setting was inpatient rehab (25%) and acute care (25%), followed by home health (17.5%) and outpatient rehab (17.5%) (Table 2). Only one participant’s primary practice setting was in an assistive technology facility. The majority of respondents (52.5%) reported that they had worked with individuals with ABI for over 11 years (Table 3). Participants most frequently reported that they worked with clients with ABI occasionally (45%) or most of the time (40%) (Table 4).

Type of Client Most Likely to Benefit from Using ET

Participants were asked questions regarding the type of client they thought would benefit from using ET. The majority of participants (59.5%) reported that they believed that the youngest population benefits very well from using ET in OT evaluations and interventions (Table 5). Conversely, the largest group of participants (41.7%) reported that they believed that clients over 75 years old benefit very little from ET use (Table 5). All participants reported that clients with past ET experience are able to benefit fairly well, quite well, or very well from using ET in OT sessions (Table 5). In comparison, 43.2% of participants reported that those without past experience benefit very little from ET use (Table 5). The majority of participants (52.6%) reported that clients with high cognitive ability benefit quite well from ET use compared to only 17.9% of participants who reported clients with low cognitive ability benefit quite well (Table 5). Significant differences were found between therapists working in a community setting and those in an institutional setting in the types of clients they thought would be most likely to benefit from ET. Specifically, clinicians in community settings were more likely to report finding ET useful for clients who were 31 to 45 years old, 46 to 60 years old, and those with no past ET experience (Table 6).

Current Patterns of ET use

Participants were asked about current patterns of use with ET in evaluations and interventions. The largest group of participants (32.5%) reported rarely asking questions about a client's use of ET when creating the occupational profile (Table 7). The majority of the participants (57.3%) also reported never using or having no experience using standardized assessments that include ET (Table 7). With regards to interventions, the largest group of

participants (45%) reported sometimes using ET with clients with ABI (Table 7), including the Internet, computers, smartphones, tablets, and videogames (Table 7). The majority of participants reported using ET sometimes to address executive functioning (57.5%), memory impairments (50%), and leisure goals (50%) (Table 7). The majority of participants (66.7%) reported never or rarely incorporating ET into interventions focused on addressing work (Table 7). Participants working in a community setting versus those working in an institutional setting were significantly more likely to ask questions about ET, observe ET during evaluations, and use standardized assessments that include ET (Table 8). No participants disagreed or strongly disagreed with using ET when a client already uses it or requests it in therapy (Table 9). However, several participants disagreed or strongly disagreed with using ET when a client doesn't already use it (32.5%) or doesn't request it in therapy (20.5%) (Table 9).

Effectiveness of ET

The questionnaire asked participants several questions about their perceptions of the effectiveness of ET use in evaluations and treatments for their adult clients with ABI. The largest group of participants (25%) stated that they agree that ET is an effective tool for evaluating cognitive impairments, however, almost a quarter of participants stated that they don't use ET in this way (Table 10). Around a third of participants (30%) stated that they don't use ET with standardized assessments and of those who do only around a quarter stated that they agree that ET is an effective tool when used in standardized assessments (Table 10). Half of participants agreed or strongly agreed that ET use in evaluations led to positive outcomes (Table 10). The majority of participants (55%) agreed that ET is an effective tool in treatment of memory and executive functioning impairments (Table 10). The majority of participants also agreed that ET use in treatments led to positive outcomes (Table 10). The largest group of participants stated

that they agree that clients find ET to be effective in helping them with their limitations and continue to use ET outside of therapy (Table 10).

Supports and Barriers to ET use

The questionnaire asked participants several questions about their perceptions of the supports and barriers to their ET use in practice. Three participants commented that they didn't have enough time to use ET in an acute care setting. The majority of participants reported familiarity, comfort level, and access to the Internet as supports for their ET use in practice (Table 11). There was a bimodal distribution for the following supports/barriers: access to computers, smartphones, tablets, videogames, clients' access after discharge, clients' desire, and clients' premorbid familiarity (Table 11). The largest group of participants (42.5%) agreed they would use ET in the future if access wasn't a problem or if they had more personal knowledge (Table 12). The largest group of participants (35%) also strongly agreed that they would use ET more in the future if they received professional training about its use (Table 12).

Discussion

The purpose of this study was to investigate how occupational therapists use ET in their evaluation and treatment of adults with ABI, including (1) the type of client therapists believe would most likely benefit from using technology, (2) current patterns of technology use with clients, including type of technology and frequency of use (3) the extent to which therapists think ET is effective, and (4) the supports for and barriers against using ET in practice. This study set out to fill the gap in the research to gain a better understanding of the extent to which occupational therapists use ET and their clinical reasoning with ET use with clients with ABI. Forty one respondents met the inclusion criteria, the response rate was 18.5% which was less than the 26.27% average mailed survey response rate (Cobanoglu, Moreo, & Warde, 2001).

Evaluation: The Importance of ET

Occupational therapists in this study rarely asked clients questions regarding ET during evaluations (Table 7) and may have been partially influenced by practice setting (Table 8). One potential reason for this may be the limited amount of time occupational therapists in acute care settings have available to work with their clients. Asking a simple question or two about ET use in the initial evaluation is important for discovering how clients use ET in their daily life and how occupational therapists can help them with their chosen occupations. By asking these questions early on in the client's continuum of care, subsequent therapists can plan and use their time more effectively and efficiently. These questions could be included in such a way as to become standard questions, similar to those usually asked about ADL/IADL. One way this goal could be achieved is for OT programs to educate future therapists about the importance of asking about ET use during the occupational profile interview.

A quarter of occupational therapists who work with adults use standardized assessments less than once a year (Piernik-Yoder & Beck, 2012). The current study's findings were consistent with this, with an even larger percentage of the participants reporting that they don't use standardized assessments with ET (Table 7) and many don't find standardized assessments with ET to be effective (Table 10). This may also be influenced by the practice setting in which a clinician works, with community based therapists reporting that they were more likely to assess ET use with a standardized assessment (Table 8). It was expected that many participants would state that they never used standardized assessments that include ET since most of the common assessments of cognitive skills don't currently include ET (Gary, 2011; Thomson, 1992) and assessments that do use ET may not be well known (Cardell et al., 2013; Malinowsky et al., 2011; Malinowsky et al., 2014). The lack of standardized assessment use with ET for clients with

ABI may be due to numerous factors, including occupational therapists' lack of knowledge, access, familiarity, or desire. For complete, consistent, and accurate evaluation of ET use, it would be beneficial for more standardized assessments to be developed and used.

Addressing Return to Work: Promoting a Renewed Focus with ET

The majority of the participants reported never or rarely using ET with interventions focused on work (Table 7). This is consistent with prior research (Wolf, Baum, & Connor, 2009) that discussed U.S. rehabilitation programs not being organized to serve the needs of clients beyond self-care, including in areas such as work. Work is a source of identity and is a financial necessity for many individuals, which can contribute significantly to quality of life after stroke (Wolf et al., 2009). It is a very important area for occupational therapists to address as a result. One study found that of 7,740 people with CVA, nearly half were under the age of 65 years old and thus within working age (Wolf et al., 2009). Because 60% of U.S. employees use Internet in the workplace (Madden & Jones, 2008), occupational therapists need to address ET with interventions focused on work if they are to be effective in assisting clients in returning to work. Many individuals with ABI have poor return to work rates, as seen in a Canadian study which showed that out of 64 stroke survivors only 13 returned to work (Teasell, McRae, & Finestone, 2000). These findings indicate that occupational therapy interventions need to go beyond ADL/IADL and address other areas of occupation, including work, which, for many, includes the use of ET. One barrier may be that occupational therapists have difficulty accessing clients' work environments, including the ET they may use for their job. It is therefore important to include questions in the client interview, not only about personal ET use, but also work-specific ET.

ET: The Underutilized Tool

Occupational therapists in the current study reported that use of ET during treatments to address memory and executive functioning impairments with clients with ABI can lead to positive outcomes (Table 10). This is consistent with prior research that showed that ET use focusing on cognitive difficulties (Larsson Lund et al., 2011; Lindén et al., 2011), such as memory (Boman et al., 2010; Stapleton et al., 2007; Wilson et al., 2001), can be effective and lead to positive outcomes.

Occupational therapists from this study were also generally familiar and comfortable with ET (Table 11), which is contrary to the Hart et al. (2003) survey study from the Netherlands which discovered that only a third of clinicians reported feeling confident using computers for therapeutic purposes. This discrepancy may be due to the 12 year difference from 2003 when the Hart et al. (2003) study was completed to 2015 when this study was completed during which technology can become increasing more common. The discrepancy may also be due to the types of clinicians surveyed, as Hart et al. (2003) surveyed a variety of clinicians and this study only surveyed occupational therapists. However, even though occupational therapists in this study are comfortable, familiar, and see the benefit of ET, many still reported that they do not incorporate it into their evaluations or treatments (Table 7). This may be due to barriers of ET use clinicians face in practice (Table 11). These barriers may be able to be overcome; participants stated they would use ET more if access wasn't a problem, if they had more personal knowledge about ET, and if they had professional training in using ET clinically (Table 12). Some participants also commented that they would like to see more apps on the market and receive more education about smartphone and tablet apps that are appropriate for individuals with ABI.

This implies that occupational therapists may be willing to alter their practice to include more ET if provided with more support. One idea to overcome these barriers is for occupational therapists to partner with software developers to create more apps that are appropriate for individuals with ABI. Another idea is for OT programs to educate future and current therapists at conferences and through education classes about currently available ET, strategies to find new ET that may be relevant to their clients, and ways to collaborate with software developers to increase the amount of ET available for clients with ABI.

Finding the Just Right Fit of ET

In order to successfully use ET in interventions it is necessary that occupational therapists use their skills in activity analysis to find the just right fit between ET and the abilities of clients with ABI (Covington & Kim, 2014). Participants in this study reported that a client's desire to use ET and premorbid familiarity with ET could be either a support or a barrier (Table 11), contrary to prior research which found that client's lack of familiarity (Engstrom et al., 2010) or interest in technology (Chen & Bode, 2011) was specifically a barrier to use. This suggests that clients have individual experiences and desires which likely influence the use of ET. To ensure the right fit of the person to ET, occupational therapists can gather information about a client's premorbid patterns and desires regarding ET use during the evaluation.

One factor that seemed to influence fit, in these therapists' opinion, was the cognitive functioning of the client. Overall, participants in this study believed that lower cognitive abilities were more significant to ET use than lower physical abilities (Table 5). This may be due to the complexities of some types of ET requiring high level cognitive processing or the many adaptations available for various physical abilities. These findings are consistent with prior research which state that individuals with ABI often experience cognitive impairments such as

executive functioning (Bar-Haim Erez et al., 2009) and memory impairments (Fleming et al., 2014), both of which may impact their ability to learn and benefit from ET. Engstrom et al. (2010) discussed difficulties finding needed functions on computers and mobile phones as a barrier for clients and hypothesized that this was related to familiarity. Barriers to ET use for clients may also be related to the learning and memory demands of technology. This was, in fact, reported as the most common barrier to using everyday or assistive technology by Hart et al. (2003). In order to assess fit, occupational therapists need to analyze the client's abilities while using ET to determine what type of ET, if any, is appropriate for individual clients. Clients with low cognitive abilities may be able to use certain types of ET and occupational therapists shouldn't assume that they can't without skilled observation of the client using technology.

Avoid Making Assumptions Regarding ET

While the majority of participants reported that 18 to 45 year olds and those with past ET experience benefit most from using ET in OT evaluations and interventions (Table 5), it is possible that this is an assumption that may or may not be fully warranted. In making this assumption about a client the occupational therapist may not be providing the most relevant and client-centered care to all client populations. In fact, ET use is becoming increasingly common for older adults as well. The U.S. Census reported that in 2013, 65% of homes with the primary householder aged 65 or above had a computer in the home (File & Ryan, 2014), which may mean that ET, such as computers, is an important part of older clients' daily life. Different client groups may use ET in different ways. For example, the comments on this survey suggested that participants believed that older populations may use ET for leisure or social activities to stay connected with family and friends. This suggests that clients of any age with ABI may be familiar with ET enough to benefit from using it in OT evaluations and interventions. Even if

they are not familiar with ET, clients may have the potential to learn to use ET if provided with the opportunity. It is important that occupational therapists ask all clients with ABI about ET no matter their age and be open to using ET with all clients.

Implications for OT

As the use of technology continues to grow, more and more individuals with ABI will likely desire OT services that use ET. It is important that all occupational therapists working with clients who have ABI are equipped with the knowledge, tools, and confidence needed to address ET related concerns and use ET as a therapeutic tool to make therapy more relevant and enjoyable for their clients. Occupational therapists in all practice settings should include questions during the evaluation regarding clients' ET use in order to identify appropriate interventions with ET that can target clients' impairments. For example, occupational therapists in acute care settings can ask a quick question to clients during the initial evaluation that can be included in the discharge plan for the next clinicians in the continuum of care, where there may have time to address ET use. More standardized assessments utilizing ET need to be developed and taught in OT programs to increase availability and knowledge of ET use in evaluations and increase the relevance of OT standardized assessments in today's technology focused world. More education is needed in OT programs to inform entry-level occupational therapists on the importance of evaluating ET use. In addition, as more working age individuals are coping with ABI it is important that occupational therapists address work-related goals and help the client return to work which is likely to involve ET such as a computer. Occupational therapists should take client factors into consideration when selecting ET to ensure that the device or application will be a good fit for the individual, without making assumptions. OT programs should also

educate future therapists about using ET during interventions, with a special focus on work and finding the just right fit.

Limitations

One limitation of the current study's questionnaire was the predominance of closed ended questions, which may have restricted responses. The researchers were also not able to send reminder letters due to budget constraints which may have decreased the number of surveys received. The low number of participants, limited sample to only AOTA members, and likelihood of respondents having strong opinions regarding the subject matter may have limited the generalizability of this study. The distribution of responses to some questions contradicted the distribution of responses to other questions, which indicates that some questions may have been confusing for participants. For example, only two participants stated that they never use ET in interventions in the beginning of the survey, but at the end of the survey only six to ten participants stated that they already use ET. Another question included a double negative, using the words "don't" and "didn't" in the same sentence, which may have confused participants. Participants may also have answered questions based on their opinions or assumptions instead of their actual clinical experience due to the lack of repetition of the lead in statement requesting questions to be answered based off of their experience. Another limitation of this study is that the supports and barriers the researchers chose to focus on for the survey may not have encompassed supports and barriers of all participants. For example, three participants mentioned not having enough time with clients in an acute care setting to use ET and time was not included as a barrier on the survey.

Future Research

As technology is continuing to advance and become more commonplace (File & Ryan, 2014), occupational therapists need to utilize their specialized skills of activity analysis to increase their use of ET with clients with ABI. The field of OT may benefit from future research that focuses on how occupational therapists are evaluating a client's use of ET to help guide developers of standardized assessments to create or modify assessments to include ET for effective and efficient use in practice. Future research should also further examine practice setting differences of ET use among occupational therapists to help determine the impact of time and practice setting on ET use. This may also help educators target OT populations most in need of ET education. Further research is also needed regarding use of ET in work related rehabilitation by occupational therapists to help determine if clinicians that do focus on work use ET in practice. Further exploration of the supports and barriers of ET use by occupational therapists would also be useful including assessing the impact of the severity of client's cognitive functioning and time with client. Allowing participants to write in responses may identify further supports or barriers not previously identified in the literature.

Conclusions

The results of the current study indicated that occupational therapists are not usually addressing ET use during evaluations. Occupational therapists in this study report rarely asking questions about a client's use of ET in evaluations and even fewer used standardized assessments with ET options. This may be due to the limited number and awareness of assessments using ET that are currently available. Occupational therapists in this study tended not to use ET in treatments focusing on work, which is consistent with the limited focus on work in this area of practice, as reported elsewhere in the literature (Wolf et al., 2009). Participants of this study

tended to believe ET was effective and felt comfortable and familiar with it, but didn't always use it, which may be due to barriers they face in practice. When able to overcome these barriers, it is important for occupational therapists to find the just right fit between their clients and ET, which may involve considering cognitive abilities and prior ET experience. However, assumptions about clients' abilities to use ET should be avoided and occupational therapists should instead observe clients using technology to help determine just right fit. In conclusion, with the growing number of technology users in the U.S. (File & Ryan, 2014), individuals with ABI requiring help with the ability to use ET will also continue to grow, making the role of OT in this field of the utmost importance. Future research, education, and national association events for occupational therapists should continue to focus on the use of ET in OT practice to keep OT evaluations and treatments relevant and useful for clients with ABI.

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Appendix

Everyday Technology Questionnaire

This questionnaire includes five sections and takes approximately 20 minutes.

“Everyday technology (ET) is defined as high tech devices commonly used by the general population and includes devices such as smartphones, tablets, and computers.”

Acquired brain injury (ABI) includes stroke (CVA) and traumatic brain injury (TBI)

Demographics:

1. How many years have you worked as an OT?
 - 0-5 years
 - 6-10 years
 - 11-15 years
 - 16+ years
2. What is your primary practice setting? (Choose **ONE**.)
 - Acute care
 - Inpatient rehab
 - Outpatient rehab
 - Skilled nursing facility
 - Home health
 - Other: _____
3. Have you worked with individuals who have had an ABI in the last 6 months?
 - Yes
 - No → **STOP HERE, FOLD THIS SURVEY, SEAL IT IN THE PROVIDED RETURN ENVELOPE, AND SEND IT BACK TO US. THANK YOU FOR YOUR TIME.**
4. How many years have you worked with individuals who have had an ABI?
 - 0-1 year
 - 2-5 years
 - 6-10 years
 - 11+ years
5. How often do you work with individuals who have had an ABI?
 - Rarely
 - Sometimes
 - Most of the time
 - Always

Current patterns of ET use with ABI in evaluations & interventions

When I work with individuals who have had an ABI, I...	Never or No Experience	Rarely	Sometimes	Most of the Time	Always
Ask questions about ET use when creating the occupational profile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Observe use of ET during the evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use standardized assessments that include ET	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use smartphones in any manner in interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use computers in any manner in interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use tablets in any manner in interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use videogame consoles in any manner in interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use the Internet in any manner in interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I work with individuals who have had an ABI, I...	Never or No Experience	Rarely	Sometimes	Most of the Time	Always
Use ET in interventions focusing on executive functioning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on memory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on motor limitations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on ADL	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on IADL	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on leisure activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET in interventions focusing on social participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When I work with individuals who have had an ABI, I...	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Use ET when the client already uses it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Don't use ET when the client didn't use it before the ABI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET because it has functions/applications that are helpful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use ET when the client asks about it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suggest the use of ET when the client doesn't ask about it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Type of client to benefit from using ET

In my experience, people with ABI who benefit from ET use are...	Not at all	Very little	Fairly well	Quite well	Very well
18 to 30 years old	<input type="radio"/>				
31 to 45 years old	<input type="radio"/>				
46 to 60 years old	<input type="radio"/>				
61 to 74 years old	<input type="radio"/>				
Over 75 years old	<input type="radio"/>				
In my experience, those with ABI who will benefit from ET are...	Not at all	Very little	Fairly well	Quite well	Very well
Clients with past ET experience	<input type="radio"/>				
Clients with no past ET experience	<input type="radio"/>				
Clients with high cognitive ability	<input type="radio"/>				
Clients with low cognitive ability	<input type="radio"/>				
Clients with high physical ability	<input type="radio"/>				
Clients with low physical ability	<input type="radio"/>				

Effectiveness of ET in OT

In my experience, for individuals who have had an ABI ,..	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	I don't use ET in this way
ET is an effective tool in evaluating for cognitive impairment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ET is an effective tool when used in standardized assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ET is an effective tool in treatment for memory impairment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ET is an effective tool in treatment for executive functioning impairment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ET use in evaluations leads to positive outcomes for clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ET use in treatments lead to positive outcomes for clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clients find ET to be effective in helping them with their limitations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clients continue to use ET outside of therapy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Supports and barriers with ET in evaluations & interventions

In your experience, are the following a support or barrier when working with clients who have had an ABI ?	Extreme Barrier	Moderate Barrier	Neither a Barrier or Support	Moderate Support	Extreme Support
Access to computers at my place of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to smart phones at my place of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to tablets at my place of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to the Internet at my place of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to videogame consoles at my place of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My familiarity with ET	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My comfort level using ET	<input type="radio"/>				
Client’s access to ET after discharge	<input type="radio"/>				
Client’s desire to use ET	<input type="radio"/>				
Client’s premorbid familiarity with ET	<input type="radio"/>				

Future ET use with clients who have had an ABI

I would use ET with clients who have had an ABI in the future if...	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	I already use ET!
Access to ET wasn’t a problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had more personal knowledge about ET.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I received professional training on using ET with this population.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Any additional comments:

Thank you for your time!

Please fold this survey, seal it in the provided return envelope, and send it back to us.

Table 1

Demographics of respondents: Years as an occupational therapist

Number of Respondents, $n = 40$ (%)	
0-5 years	14 (35)
6-10 years	5 (12.5)
11-15 years	4 (10)
16+ years	17 (42.5)

Table 2

Demographics: Primary practice setting

	Number of Respondents, <i>n</i> = 40 (%)
Acute care	10 (25)
Inpatient rehab	10 (25)
Outpatient rehab	7 (17.5)
Skilled nursing facility	4 (10)
Home health	7 (17.5)
Other	2 (5)

Table 3

Demographics: Years worked with individuals who have had an ABI

Number of Respondents, $n = 40$ (%)	
0-1 year	3 (7.5)
2-5 years	11 (27.5)
6-10 years	5 (12.5)
11 + years	21 (52.5)

Table 4

Demographics: Frequency of working with clients who have had an ABI

	Number of Respondents, <i>n</i> = 40 (%)
Rarely	3 (7.5)
Sometimes	18 (45)
Most of the time	16 (40)
Always	3 (7.5)

Table 5

Type of client to benefit from using ET

	Number of Respondents, $n = 40$ (%)				
	Not at all	Very little	Fairly well	Quite well	Very well
18-30 years old ($n = 37$)	0 (0)	0 (0)	5 (13.5)	10 (27)	22 (59.5)
31-45 years old ($n = 37$)	0 (0)	0 (0)	8 (21.6)	20 (54.1)	9 (24.3)
46-60 years old ($n = 36$)	0 (0)	2 (5.6)	14 (38.9)	16 (44.4)	4 (11.1)
61-74 years old ($n = 36$)	1 (2.8)	15 (41.7)	15 (41.7)	5 (13.9)	0 (0)
75+ years old ($n = 36$)	8 (22.2)	15 (41.7)	11 (30.6)	2 (5.6)	0 (0)
Past ET experience ($n = 39$)	0 (0)	0 (0)	1 (2.6)	20 (51.3)	18 (46.2)
No past ET experience ($n = 37$)	1 (2.7)	16 (43.2)	15 (40.5)	5 (13.5)	0 (0)
High cognitive ability ($n = 39$)	0 (0)	0 (0)	3 (7.7)	17 (43.6)	19 (48.7)
Low cognitive ability ($n = 39$)	0 (0)	14 (35.9)	18 (46.2)	7 (17.9)	0 (0)
High physical ability ($n = 38$)	0 (0)	0 (0)	8 (21.1)	20 (52.6)	10 (26.3)
Low physical ability ($n = 38$)	1 (2.6)	5 (13.2)	14 (36.8)	15 (39.5)	3 (7.9)

Table 6

Contrast of practice setting and type of client likely to benefit from ET use

	Institutional					Community					Mann Whitney U	P
	Number of Respondents, <i>n</i> = 20 to 23					Number of Respondents, <i>n</i> = 16						
	A	B	C	D	E	A	B	C	D	E		
18-30 years old	0	0	4	6	11	0	0	1	4	11	135.5	.256
31-45 years old	0	0	7	11	3	0	0	1	9	6	103.0	.028
46-60 years old	0	2	11	6	1	0	0	3	10	3	79.0	.005
61-74 years old	1	10	7	2	0	0	5	8	3	0	117.0	.138
75+ years old	7	6	7	0	0	1	9	4	2	0	120.5	.182
Past ET experience	0	0	1	13	9	0	0	0	7	9	149.0	.254
No past ET experience	1	12	6	2	0	0	4	9	3	0	104.0	.033

Note. Institutional practice setting includes acute care, inpatient rehab, and skilled nursing facility. Community practice setting includes outpatient rehab, home health, and other. A = Not at all; B = Very little; C = Fairly well; D = Quite well; E = Very well.

Table 7

Current patterns of ET use with ABI in evaluations & interventions

	Number of Respondents, <i>n</i> = 40 (%)				
	Never or no experience	Rarely	Sometimes	Most of the time	Always
Ask questions about ET	4 (10)	13 (32.5)	10 (25)	9 (22.5)	4 (10)
Observe ET use during the evaluation	7 (17.5)	15 (37.5)	13 (32.5)	4 (10)	1 (2.5)
Use standardized assessments that include ET	23 (57.5)	13 (32.5)	2 (5)	1 (2.5)	1 (2.5)
Use ET in interventions	2 (5)	12 (30)	18 (45)	6 (15)	2 (5)
Use smartphones in interventions	10 (25)	8 (20)	18 (45)	4 (10)	0 (0)
Use computers in interventions	6 (15)	7 (17.5)	18 (45)	8 (20)	1 (2.5)
Use tablets in interventions	13 (32.5)	5 (12.5)	18 (45)	4 (10)	0 (0)
Use videogames in interventions	13 (32.5)	9 (22.5)	15 (37.5)	3 (7.5)	0 (0)
Use Internet in interventions	8 (20)	6 (15)	19 (47.5)	5 (12.5)	2 (5)
Use ET focused on executive functioning	4 (10)	7 (17.5)	23 (57.5)	6 (15)	0 (0)
Memory	7 (17.5)	9 (22.5)	20 (50)	4 (10)	0 (0)
Motor limitations	10 (25)	10 (25)	18 (45)	2 (5)	0 (0)
ADL	20 (50)	12 (30)	7 (17.5)	1 (2.5)	0 (0)

IADL	11 (27.5)	13 (32.5)	13 (32.5)	3 (7.5)	0 (0)
Work (<i>n</i> = 39)	14 (35.9)	12 (30.8)	11 (28.2)	2 (5.1)	0 (0)
Leisure	6 (15)	9 (22.5)	20 (50)	5 (12.5)	0 (0)
Social Participation	10 (25)	17 (42.5)	10 (25)	3 (7.5)	0 (0)

Table 8

Contrast of practice setting and frequency of ET use

	Institutional					Community					Mann Whitney U	P
	Number of Respondents, <i>n</i> = 24					Number of Respondents, <i>n</i> = 16						
	A	B	C	D	E	A	B	C	D	E		
Ask questions about ET	4	9	6	3	2	0	4	4	6	2	117.0	.032
Observe ET use during the evaluation	6	10	6	2	0	1	5	7	2	1	123.0	.045
Use standardized assessments that include ET	17	6	1	0	0	6	7	1	1	1	121.5	.027
Use ET in interventions	1	9	10	4	0	1	3	8	2	2	155.0	.276

Note. Institutional practice setting includes acute care, inpatient rehab, and skilled nursing facility. Community practice setting includes outpatient rehab, home health, and other. A = Never or No Experience; B = Rarely; C = Sometimes; D = Most of the Time; E = Always.

Table 9

Current patterns of ET use with ABI in evaluations & interventions: Characteristics of clients with ABI

	Number of Respondents, $n = 40$ (%)				
	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Client uses ET	0 (0)	0 (0)	3 (7.5)	28 (70)	9 (22.5)
Client doesn't use ET	1 (2.5)	12 (30)	11 (27.5)	13 (32.5)	3 (7.5)
Helpful functions/ applications	0 (0)	0 (0)	8 (20)	26 (65)	6 (15)
Client request	0 (0)	0 (0)	2 (5)	30 (75)	8 (20)
Client doesn't request ($n = 39$)	2 (5.1)	6 (15.4)	6 (15.4)	24 (61.5)	1 (2.6)

Table 10

Effectiveness of ET use in OT practice

	Number of Respondents, $n = 40$ (%)					
	Doesn't Use	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Evaluation of cognition	8 (20)	0 (0)	2 (5)	11 (27.5)	14 (35)	5 (12.5)
In standardized assessments	12 (30)	0 (0)	3 (7.5)	17 (42.5)	6 (15)	2 (5)
Treatment for memory	3 (7.5)	0 (0)	0 (0)	5 (12.5)	22 (55)	10 (25)
Treatment of executive functioning	2 (5)	0 (0)	1 (2.5)	6 (15)	22 (55)	9 (22.5)
Use in evaluations lead to positive outcomes	9 (22.5)	0 (0)	0 (0)	15 (37.5)	10 (25)	6 (15)
Use in treatments lead to positive outcomes	2 (5)	0 (0)	0 (0)	8 (20)	20 (50)	10 (25)
Clients find ET effective	2 (5)	0 (0)	0 (0)	7 (17.5)	21 (52.5)	10 (25)
Clients continue use outside of therapy	2 (5)	0 (0)	1 (2.5)	8 (20)	19 (47.5)	10 (25)

Table 11

Supports and Barriers ET use in OT practice

	Number of Respondents, $n = 40$ (%)				
	Extreme Barrier	Moderate Barrier	Neutral	Moderate Support	Extreme Support
Access to computers at work	3 (7.5)	10 (25)	6 (15)	14 (35)	7 (17.5)
Access to smart phones at work	5 (12.5)	9 (22.5)	9 (22.5)	13 (32.5)	4 (10)
Access to tablets at work	8 (20)	9 (22.5)	8 (20)	10 (25)	5 (12.5)
Access to the Internet at work	3 (7.5)	3 (7.5)	8 (20)	15 (37.5)	11 (27.5)
Access to videogame consoles at work	6 (15)	6 (15)	11 (27.5)	13 (32.5)	4 (10)
Familiarity with ET	0 (0)	4 (10)	7 (17.5)	18 (45)	11 (27.5)
Comfort level using ET	1 (2.5)	4 (10)	7 (17.5)	17 (42.5)	11 (27.5)
Client's access after discharge	5 (12.5)	13 (32.5)	8 (20)	11 (27.5)	3 (7.5)
Client's desire to use ET	1 (2.5)	13 (32.5)	7 (17.5)	15 (37.5)	4 (10)
Client's premorbid familiarity with ET	1 (2.5)	15 (37.5)	7 (17.5)	13 (32.5)	4 (10)

Table 12

Future ET use in OT practice

	Number of Respondents, $n = 40$ (%)					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Already use ET
Access	0 (0)	1 (2.5)	1 (2.5)	17 (42.5)	11 (27.5)	10 (25)
Personal knowledge	0 (0)	1 (2.5)	6 (15)	14 (35)	8 (20)	11 (27.5)
Received professional training	0 (0)	1 (2.5)	6 (15)	13 (32.5)	14 (35)	6 (15)

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