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The match between everyday technology in public space and the ability of working-aged people with ABI to use it

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Abstract:

Introduction: In today's society, the access to and use of everyday technology (ET), such as cell phones and Internet-based services, can be claimed as conditions for participation in many tasks in everyday life. This study aims to determine and compare levels of perceived access to and perceived difficulties in the use of common ETs in the public space among people with acquired brain injury (ABI) compared with controls. **Methods:** The perceived access to and difficulty in the use of 14 ETs were investigated in a sample with ABI (n=59, returned to work (RTW, n=28)/not returned to work (NRTW, n =31) and matched controls (n=52) using the Everyday Technology Use Questionnaire. **Findings**: Perceived access to the ETs was generally high. The potential to use each of the ETs independently or with minor difficulties significantly differed between controls and persons with ABI in eight of the fourteen ETs. Particularly, difficulties were found among those with ABI-NRTW.
Conclusion: People with ABI perceive access to ETs commonly used in public space, but the ET difficulty is not always satisfactory matched to their ability to use ET. To enable participation in society, it is important to consider both the accessibility and usability of ET.

Introduction

Occupational justice, described as an evolving paradigm for human rights, advocates that equal opportunities and resources for participation in occupations, i.e., the daily activities that the individual finds meaningful, is a matter of justice (Townsend and Wilcock 2004, Nilsson and Townsend 2010, Durocher, Gibson et al. 2013). The concept of occupational justice emanates from the notion that occupations are essential and contributory to people's health and well-being. Barriers to participation in occupations are considered to be injustices when the barriers are an outcome of social policies and structures (Townsend and Wilcock 2004, Hammell and Iwama 2012). The development of the information society has implied that people need to use technology in the performance of most tasks in everyday life (Bühler, Engelen et al. 2011). Therefore, everyday technology (ET), defined to include electronic, mechanical and technological artefacts and services (Nygard and Starkhammar 2007), can be claimed to be a vital resource and its use a condition for occupational justice in the information society. In line with this, European (European Comission 2012) and Swedish (Socialdepartmentet 2011) policies emphasise the importance of a sustainable information society to enable participation and inclusion of all people. Much societal effort in this area has focused on e-accessibility, by increasing access to specific ETs such as computers, the internet and internet-based services (European Comission 2012). However, the ability of potential users to utilise this ET has largely been taken for granted.

When the possibility for people to be engaged in their desired occupations is deprived or restricted by external factors, such as when access to ET is limited or the ET is too challenging for their abilities, the use of technology might lead to occupational injustice rather than increased participation and inclusion in society. This, in turn, leads to occupational marginalisation and/or occupational alienation (Townsend and Wilcock 2004). Therefore, it is important to gain knowledge about the access to ET and how well-matched the abilities of different user groups are to the level of difficulty of commonly used ETs in today's information society. Such knowledge is urgently needed, as recent research shows that different groups of users with disabilities have a decreased ability to use ET compared with healthy people (Malinowsky, Almkvist et al. 2010, Fallahpour, Nygard et al. 2014).

Literature review

Acquired brain injury (ABI) is one of the leading causes of disability in the world. Common consequences after the injury include participation restrictions, activity limitations, (Cicerone 2004, Haggstrom and Lund 2008), failure to return work (Saltychev, Eskola et al. 2013) and social isolation (Morton and Wehman 1995, McLean, Jarus et al. 2013). Moreover, working age people afflicted with ABI both have the desire and are expected to study, work and participate in other activities in the community, outside of their homes, i.e., in the public space. Therefore, participation and integration into the community have been put forward as vital goals in the rehabilitation after ABI (Reistetter and Abreu 2005). As activities involving ET are increasingly present in public spaces, such as shops and public transportation, new demand is placed on being competent in performing these tasks in order to participate. In addition, recent research (Brorsson 2013) suggests that the public space includes not only the space outside of the home but also activities within the home and on the internet. This is because ET is increasingly used for banking and online shopping, as well as in communication with health care services, authorities and private companies. Consequently, these ETs are also considered to be a part of the public space. Therefore, it is important to understand how the challenges associated with using different ETs in the public space match with the abilities of people with ABI to use these ETs.

Recent research has shown that working-aged people who are more impaired after their ABI perceive the use of ET more difficult than those with good recovery (Kassberg, Malinowsky et al. 2013) and healthy controls (Fallahpour, Nygard et al. 2014). In addition, those who returned to work perceive fewer difficulties using ET compared with those unable to return to work (Larsson Lund, Nygard et al. 2013). Moreover, difficulties in ET use are associated with limitations in the performance of everyday tasks in the home, the community and the workplace (Kassberg, Malinowsky et al. 2013, Larsson Lund, Nygard et al. 2013). The results of these studies show the importance of considering ET use in relation to people with ABI as well as the potential variations in the ability to use ET in sub-samples that reflect different levels of functional recovery following ABI. Previous studies of people with ABI have focused solely on their ability to use ET (Kassberg, Malinowsky et al. 2013, Fallahpour, Nygard et al. 2014). The same focus is observed in studies of other groups, e.g., elderly people with and without cognitive impairments (Rosenberg, Kottorp et al. 2009, Malinowsky, Kottorp et al. 2013). Other studies on elderly people have focused on factors that make the ET more or less demanding to use (Patomella, Kottorp et al. 2013). This implies that either the ability of the user or the demand of the ET has been the forefront of focus in previous research. Moreover, these studies have focused on various types of ET, e.g. ETs used in household activities, for personal care and for accessibility, not specifically focused on ET used in public spaces. Consequently, the level of difficulty of use of different ETs in public spaces *in relation* to the abilities of the users has received less attention.

To summarise, from the perspective of justice, there is a need for increased knowledge about whether the access to and the use of ET differs between healthy people and people with ABI. More knowledge about how well matched ET and users with ABI are can be useful in the design of an accessible and inclusive (information) society and, also, in understanding the influence of ET on possibilities to participation and occupational justice. The specific aims were as follows:

a) To explore the levels of perceived difficulties in the use of ET in working-aged people with ABI with different functional outcomes after ABI (those who have returned to work or not) and, also, in people without known impairments (controls) and to compare their perceived difficulties in relation to the perceived difficulty of different ETs commonly used in the public space.

b) To determine whether any differences exist between the perceived access to and difficulties in the use of different ETs commonly used in the public space between controls and people with ABI, as well as between two sub-groups with different functional outcomes after ABI: those who have returned to work and those who not have not.

Methods and materials

The data in this cross-sectional study originated from data generated collected in an earlier study. This former study investigated (only) the perceived difficulty(person measures) of ET use in general in everyday life among people with ABI and controls (Fallahpour, Nygard et al. 2014). In the present study, a secondary analysis was performed to investigate the perceived access to and the perceived level of difficulty of 14 ETs commonly used in public spaces and the match to the perceived abilities to use these ETs in people with ABI and controls. Additionally, this analysis compared two sub-groups of people with different functional outcomes after ABI: those who have returned to work and those who have not.

Selection of participants

In a previous study (Fallahpour, Nygard et al. 2014), the participants with ABI were selected from a database of clients in a rehabilitation medicine clinic in northern Sweden. All clients in the database who met the inclusion criteria over the period of 2003-2010 were invited to participate in the study. The inclusion criteria were as follows: (a) ABI diagnosis, (b) 18-64 years old (working age), (c) living in one of the two municipalities in which the study was performed, (d) no aphasia, and (e) without other diseases that could impact their use of ET, e.g., dementia. Of the 215 clients that fulfilled the inclusion criteria, 81 persons with ABI agreed to participate in the study, 91 declined participation and 43 did not respond to the invitation. The control group subjects were recruited using a snowball sampling technique. Because variation in experiences using ET was sought, participants of different ages with different occupations and marital status and from different contexts (e.g., urban and rural) were included. Before the controls were recruited to the study, it was ensured that they did not have any known impairments that could impact their use of ET. In total, 80 persons were included in the control group. All of the participants received written information about the study and gave written informed consent prior to their participation. Before initiation, approval from the Regional Board of Research Ethics at Umeå University, Sweden was obtained: UmU Dnr 2010-235-3) [journal number].

Instruments

The Everyday Technology Use Questionnaire (ETUQ) was used to identify perceptions of difficulty in using ETs, such as computers, automatic telephone services, TVs and elevators, that they perceive access to (Rosenberg, Nygård et al. 2009). The ETUQ, which is administered as a 30- to 45-minutes interview, includes 92 items, i.e., technological artefacts and services. To simplify the interview for persons with ABI, the short version of the ETUQ

(S-ETUQ) (Kottorp and Nygard 2011) was used for data collection. The S-ETUQ was developed from the items in the ETUQ using a Rasch measurement model. The S-ETUQ consists of 33 items covering less, as well as more, challenging ETs from the ETUQ. The person measures of perceived difficulty in ET use generated from the S-ETUQ have been shown to be statistically similar to person measures generated from the ETUQ (Kottorp and Nygard 2011). The measures of the person's perceived difficulty using ET generated from the ETUQ and the S-ETUQ can also be expressed as the persons's perceived ability to use ET. The term used in this article will primarily be perceived ability to use ET. The psychometric properties of the ETUQ and S-ETUQ have been evaluated in different populations and have been found to be acceptable (Rosenberg, Nygård et al. 2009, Kottorp and Nygard 2011). A six-step category scale, A-F, is used in both the ETUQ and S-ETUQ to register the perceived difficulty of use for each of the items relevant to the person (Rosenberg, Nygård et al. 2009, Kottorp and Nygard 2011) (A= Does not use the ET anymore or has not started to use it even if it is available and perceived as relevant, B= Always uses the ET together with another person, C= The ET is sometimes used together with another person, D= Uses the ET without another person, but with frequent/major perceived difficulties, E= Uses the ET without another person, but with minor perceived difficulties, F= Uses the ET without another person and without perceived difficulties)It has been found that some steps in the scales cannot clearly be statistically differentiated from each other based upon the clients' responses, so these steps were collapsed in the analyses in the present study, as recommended in the literature (Linacre 2004). A and B, as well as C and D), were collapsed into A/B and C/D. Further on in the analysis, the categories were dichotomised into two categories: "With frequent/major difficulties or sometimes together with another person" (categories A/B and C/D) and "Independent or with minor difficulties" (categories E and F) to distinguish between people able to competently use the assessed technologies and those who potentially could not.

The Glasgow Outcome Scale – Extended (GOS-E) (Wilson, Pettigrew et al. 1998), that have . satifactorily pychometric properties (Wilson, Pettigrew et al. 1998, Wilson, Pettigrew et al. 2000), was used to describe the distribution of the severity of disability of the sample.

Data-gathering procedures

The data from people with ABI were collected by three experienced occupational therapists, while the data from controls were collected by occupational therapy students in their last semester of their undergraduate education. Data were collected either in the participants' homes or at another location, according to the preference of the participant. Before data collection occurred, all data collectors participated in the same one-day training regarding how to follow the standardised procedure of administering and scoring the ETUQ/S-ETUQ (Nygård 2012).

Preparatory data analysis to establish the final sample

Before the analysis was performed, the sociodemographic variables were compared between the persons with ABI (n=81) and the controls (n=80) using t-tests and chi-squared (X^2) tests. This was done to control for factors that could possibly confound the data on the use of ET (Olson, O'Brien et al. 2011). The tests indicated statistically significant differences between age groups. However, because gender can also influence the use of ET, the two samples were matched in terms of age and gender. Additionally, because one of the main aims was to investigate differences in the access to and potential use of ET between those with ABI who had returned to work (RTW) and those who had not returned to work (NRTW), four individuals who retired early due to pension assurance were removed from the ABI sample. After removing the individuals with assurance pension from the ABI sample and then matching the ABI sample and the controls for age and gender, the final sample comprised 111 persons: 59 persons with ABI (28 RTW/31 NRTW) and 52 controls. Table 1, shows that no significant differences in sociodemographic variables were found between the participants with ABI and the controls..

Insert Table 1 about here

Data analysis

To explore the relationship between the perceived access to ETs that are important for inclusion in the information society and the perceived abilities in using these ETs among people with ABI and controls, the analysis was performed in three steps:

1) Among the technological artefacts and services included in both the ETUQ and S-ETUQ, 14 technologies commonly used in the public space were selected. The public space was defined to concern the space outside as well as inside the home (Brorsson 2013). Examples of ETs included in the analyses are automatic check-in at airports, elevators, internet banking and automatic telephone services. Examples of technologies excluded, due to not being considered an outcome of social policy and practice (Townsend and Wilcock 2004), include coffee makers, stereos and radios. The percentages of persons in the samples who perceived currently having access to these 14 technologies were then calculated (Table 2).
2) To compare the match between the perceived difficulty of ETs in the public space to the perceived ability to use ETs, the raw data from the ETUQ/S-ETUQ interviews (with the dichotomised scale) were analysed using a Rasch measurement model with the software program Winsteps, version 3.75.1 (Linacre 2013). In the Winsteps analysis, the ordinal raw scores from the ETUQ/S-ETUQ are converted into abstract intervals (logits) through logistic transformation, illustrating the linear relationship between persons and items (i.e., ETs). The Winsteps procedure generates person

measures in logits of perceived abilities in ET use for each person as well as item measures of the level of perceived difficulty for each ET. In addition to the person and item measures, the analyses generate goodness-of-fit statistics, expressed as MeanSquare (MnSq) (Bond and Fox 2001). To calculate acceptable goodness-of-fit statistics for each ET, the criteria were set as an infit MnSq less than 1.4 associated with a *z*-value less than 2. All 14 ETs demonstrated acceptable goodness-of -fit statistics to the Rasch measurement model according to the criteria set and were therefore included in further analyses. The included ETs were considered to fit with other ETs in the ETUQ/S-ETUQ, providing further supporting evidence of the unidimensionality of the scale (i.e., all ETs support a single underlying construct). The perceived level of difficulty of use for each of the 14ETs was compared in relation to the sample persons' ability measures by placing the technologies along a scale where there was a 50/50 probability of receiving a score for using the specific ET: independently/with minor difficulties versus with frequent/major difficulties/sometimes with another person (Figure 1).

3) To further explore patterns and differences among the controls and persons with ABI (as well as within the two sub-groups of the ABI sample), the samples were compared using Fisher's exact tests. In these tests, the differences between samples regarding whether they passed/did not pass the e-health technologies cut-offs (i.e., independently/with minor difficulties versus with frequent/major difficulties/sometimes with another person) were investigated, with the level of significance set at $p<0.05$ (Table 3).

Results

Perceived access to ET commonly used in the public space

The calculations of proportions of persons perceiving access to ETs commonly used in public space show that in all samples, 70 % or more of the persons perceived access to a majority of the ETs (Table 2). However, the perceived access to automatic check-in at airport, automatic vending machine and door opener with code was low in all samples, specifically in the persons with ABI-NRTW, for whom the perceived access to these ETs was as low as 32-52 %. Furthermore, the perceived access was somewhat higher in persons with ABI than controls for four ETs, but among persons in the ABI-NRTW group, only access to internet banking and automatic telephone services was perceived to be higher compared with the control group.

Insert Table 2 about here

Perceived level of difficulty in the use of ET commonly used in the public space in relation to perceived person ability

In Figure 1, the distribution of the group-wise person measures (ABI-RTW, ABI-NRTW and controls) of perceived abilities in using the ETs are placed parallel to the distribution of the measures of the level of perceived difficulty for using the 14 ETs. It is shown that a majority of the person measures are above the most difficult ET among controls, while a majority of the person measures are below the most difficult ET among the ABI-NRTW group. Thus, the match between the perceived ability to use ET and the level of difficulty of ETs is highest in controls, followed by persons with ABI-RTW and then persons with ABI-NRTW. However, there are overlaps between the samples, i.e., the person ability in the controls may match the ET level of difficulty to a lesser extent than in individuals in the ABI-NRTW sample and vice versa. Automatic check-in at airport and internet banking are found to be among the more difficult ETs, while elevators and cell phones (call and answer) are found among the less difficult ones.

Insert Figure 1 about here

Group-wise differences in the perceived difficulty of ETs in relation to the person's perceived abilities

Table 3 demonstrates that the potential to use each ET independently or with minor difficulties significantly differed between the controls and persons with ABI in eight of the 14 ETs. The controls would, to a higher degree than persons with ABI, have the potential to use the ETs either independently or with minor difficulties. However, between the controls and persons with ABI-RTW, the only significant difference in the potential to use ET was found regarding the use of Automatic check-in at airport (p=0.003). The differences between the groups regarding the rest of the ETs were not significant. On the other hand, the controls and persons with ABI-NRTW significantly differed in the potential to use nine of the 14 ETs either independently or with minor difficulties (see Table 3).

Insert Table 3 about here

Discussion

This study empirically demonstrates that working-aged persons with ABI (RTW and NRTW) as well as age- and gender-matched controls perceive access to a number of ETs commonly used in the public space. Individuals in all groups also have the potential ability to use several of these ETs. However, in persons with ABI, specifically the ABI-NRTW group, potential limitations and difficulties in ET use were identified, compared with the controls. This is in line with a recent Swedish study showing thatcontrols had a higher potential to competently use ET related to common e- health services compared with elderly with cognitive impairments (Malinowsky, Nygård et al. 2013). Together, these findings indicate that the ability to use ET cannot be taken for granted in different groups of people with disabilities. Taking this ability for granted neglects the potential difficulties that threaten people's participation in society. To maintain the possibilities for people to engage in their desired occupation in the public space, it is important to consider and support their access to, as well as their ability to understand and use, the technologies required. Moreover, the findings indicate that the level of difficulties of ETs used in public space and the ability of the ABI-NRTW group to use these ETs is not always well-matched. This issue should, therefore, be considered when designing and providing more easy-to-use ET on a societal level. It is important to reflect on the societal responsibility of the challenges ET pose for some users. From an occupational justice perspective, it could be argued that the findings illustrate that people with ABI, specifically the ABI-NRTW group, may experience occupational injustice due to difficulties in ET use, as consequences of societal structures (Townsend and Wilcock 2004, Hammell and Iwama 2012). Not having the ability to use ET matched to the level of ET difficulty may lead to occurrences of occupational marginalisation and/or occupational alienation.

On the other hand, at the group level, persons with ABI-RTW showed the potential to use ETs at almost the same level as the controls. This agrees with earlier studies showing that the use of ET may differ among persons with different functional outcomes after ABI (Kassberg, Malinowsky et al. 2013, Larsson Lund, Nygard et al. 2013). Nevertheless, on an individual level, the findings demonstrate variation in perceived abilities in all sub-groups, e.g., some people in the NRTW group had higher abilities than the controls. Therefore, we agree with the suggestion that conclusions about a person's potential to use ET should not be solely based on the functional outcome of ABI. Consequently, in the rehabilitation of people with ABI, their potential to use ETs must be assessed on an individual level.

In both people with ABI and controls, more than seven out of ten individuals perceive access to a majority (11/14) of ETs. The lowest perceived access, evident in all samples, was to automatic check-in at airport, automatic vending machine and door opener with code. This may be the case because the participants, for some reason, did not perceive these ETs as relevant to use in everyday life or that these ETs were not available to the participants in everyday life. Still, even if a generally high perceived access to ET is described as positive, the *access to an ET* does not tell us about the *actual usability of the ET*. This study shows that people, specifically in the ABI-NRTW group, may have difficulty using ET even though they do perceive access to ET. The people with ABI in this study could be described as having e-accessibility (Socialdepartmentet 2011, European Comission 2012), but not all of them may be able to actually use the necessary technology and, therefore, may be at risk of not achieving e-inclusion. A high perceived access to and relevance of ET might also imply that these ETs are often used in everyday occupations. However, because people with ABI have previously been shown to have difficulties in using ET (Kassberg, Malinowsky et al. 2013, Fallahpour, Nygard et al. 2014), frequent ET use might generate increased difficulties in participation and engagement in desired occupations. This indicates that more effort is needed to create a sustainable information society enabling participation for all.

This study provides information about which ETs used in the public space might be most challenging to use for people with ABI (Figure 1). It can be assumed that the demonstrated perceived difficulties in using the ETs may cause problems for participating in activities including transportation, communication shopping and administration. This could, in turn, cause restrictions in participation in society, including return to work (Larsson Lund, Nygard et al. 2013),. Furthermore, within healthcare, the use of e-Health services (Jung and Loria 2010) such as online health guides, e-prescriptions and disease management support, are increasingly utilised. Thus, the study has implications for many services that are now more commonly provided by the Internet, cell phones and computers by authorities in society.

Methodological considerations

This study is conducted in a Swedish context, with a rather small sample size emanating from a non- randomised selection procedure, which may have an impact on the findings. Therefore, generalisations based on this study should be made with caution. Because this study is based on data using the newly developed ETUQ and S-ETUQ, it was not possible to estimate the sample size beforehand by power analyses. However, to match the ABI sample and the controls regarding aspects that could impact on ET use (i.e. age and gender), was one way to overcome differences between the samples which could have biased the findings. In this study, the perceived abilities in ET use were investigated, but observed abilities were not considered. However, an earlier study demonstrated a strong correlation between the perceived and observed abilities in using ET among persons with ABI (Malinowsky and Larsson Lund 2014). From a clinical perspective, the client's perception of his/her difficulties is an important in designing client-centred interventions (Fisher 2009). During the interviews, clarifying questions were also posed to the persons with ABI to increase the validity by ensuring that they had understood the ETUQ/S-ETUQ-questions. To make the scoring of the ETUQ/S-ETUQ -interviews as equal as possible between the data collectors, all of them participated in the same one-day education about the standardised procedure of administering and scoring the ETUQ/S-ETUQ.

Conclusion

The perceived access of ETs commonly used in public is high in this sample of working-aged people with ABI as well as in controls. Additionally, numerous people in the groups showed the potential to use several of the ETs. However, specifically among people in the ABI-NRTW group, potential difficulties in the use of the ETs were identified. These difficulties in ET use could potentially cause occupational injustice, as the difficulties would impact these people's possibilities for engagement in desired occupations as well as for participation and inclusion in society.

Key findings

- People with ABI and controls perceive high access to ETs used in the public space.
- The demand of ET used in public space is not well-matched to people with ABI who have not returned to work.

What the study has added

To support occupational justice for people with ABI, the issue of the ability to use ETs in public spaces needs to be added to the information regarding access to the ETs.

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Table 1. Characteristics of the participants

	Controls (n=52)	ABI (n=59)	ABI-RTW (n=28)	ABI-NRTW (n=31)	Comparisons
Sex, n(%)					Controls – ABI NS (chi^2 0.789)
Men	26(50)	31(52.5)	12(43)	19(61)	
Women	26(50)	28(47.5)	16(57)	12(39)	
Age, year					Controls – ABI NS (t-test 0,233)
m (sd)	50.50 (10.57)	52.81 (9.61)	48.68 (9.96)	56.55 (7.68)	
range	19-64	23-64	23-62	29-64	
Marital status, n (%)					Controls – ABI NS (chi^2 0.403)
Cohabiting	39(75)	40(68)	20(71)	20(64.5)	
Single	13(25)	19(32)	8(29)	11(35.5)	
Education, n (%)					Controls – ABI NS (chi^2 0.975)
Elementary School	8(15)	9(15)	18(64)	98299	
High School	30(58)	33(56)	1(4)	14(45)	
University	14 (27)	17(29)	9(32)	4(13)	
Occupational groups, n (%)					Controls – ABI NS (chi^2 0.509)
Professional	9(18)	15(25)	8(29)	7(22.5)	
Skilled	29(57)	33(56)	13(46)	20(64.5)	
Manual labour	13(25)	11(19)	7(25)	4(13)	
(former occupational level for the ABI sample)	1 missing data				
Glasgow Outcome Scale, n(%)	Not applicable				
Severe disability		14 (23.5)	1(4)	13(42)	
Moderate disability		28 (47.5)	11(39)	17(55)	
Good recovery		17 (29)	16(57)	1(3)	

Table 2. Proportions of individuals in the groups currently perceiving access to the technologies in the ETUQ/S-ETUQ commonly used in the public space. The technologies are presented in a hierarchical order from more to less difficult.

Technologies in ETUQ/S-ETUQ	**Proportions of individuals in the samples currently having perceived access to the technologies**	
	Controls, n=52	**ABI, n=59** **ABI-RTW, n=28** **ABI-NRTW, n=31**
Automatic check-in airport	Controls, 58 %	ABI, 68 % ABI-RTW, 86 % ABI-NRTW, 52 %
Internet banking	Controls, 73 %	ABI, 83 % ABI-RTW, 93 % ABI-NRTW, 74 %
Cell phone: *text message*	Controls, 98 %	ABI, 93 % ABI-W, 100 % ABI-NRTW, 87 %
Auto vending machine	Controls, 71 %	ABI, 46 % ABI-RTW, 61 % ABI-NRTW, 32 %
Computer: *word processor*	Controls, 94 %	ABI, 88 % ABI-RTW, 93 % ABI-NRTW, 84 %
Auto telephone services	Controls, 71 %	ABI, 92 % ABI-RTW, 100 % ABI-NRTW, 84 %
Payment card: *code*	Controls, 94 %	ABI, 95 % ABI-RTW, 100 % ABI-NRTW, 90 %
Door opener: *code*	Controls, 79 %	ABI, 51 % ABI-RTW, 68 % ABI-NRTW, 35 %
ATM	Controls, 98 %	ABI, 98 % ABI-RTW, 96 % ABI-NRTW, 97 %
Auto tap/drier: *public toilet*	Controls, 98 %	ABI, 88 % ABI-RTW, 93 % ABI-NRTW, 84 %
Bell push: *bus*	Controls, 100 %	ABI, 78 % ABI-RTW, 82 % ABI-NRTW, 74 %
Cell phone: *call*	Controls, 100 %	ABI, 100 % ABI-RTW, 100 % ABI-NRTW, 100 %
Elevator	Controls, 100 %	ABI, 100 % ABI-RTW, 100 % ABI-NRTW, 100 %
Cell phone: *answer*	Controls, 100 %	ABI, 100 % ABI-RTW, 100 % ABI-NRTW, 100 %

Table 3. Presentation and comparisons of proportions of individuals in the samples currently perceiving independent use or minor difficulties in the use of each of the ETs. The technologies are presented in a hierarchical order from more to less difficult.

ET	Controls (n=52) n(%)	ABI (n=59) n(%)		Comparison Fisher's exact test
		ABI-RTW (n=28) n(%)	ABI-NRTW (n=31) n(%)	
Auto. check-in airport	50 (96 %)	26 (44 %)		Controls – ABI *p*<0.001 Controls – ABI-RTW *p*=0.003 Controls – ABI-NRTW *p*<0.001
		20 (79 %)	6 (19 %)	
Internet banking	51 (98 %)	38 (64 %)		Controls – ABI *p*<0.001 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		26 (93 %)	12 (39 %)	
Cell phone: *text message*	52 (100 %)	43 (73 %)		Controls – ABI *p*<0.001 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		28 (100 %)	15 (48 %)	
Auto. vending machine	52 (100 %)	43 (73 %)		Controls – ABI *p*<0.001 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		28 (100 %)	15 (48 %)	
Computer: *word processor*	52 (100 %)	45 (76 %)		Controls – ABI *p*<0.001 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		28 (100 %)	17 (55 %)	
Auto. telephone services	52 (100 %)	48 (81 %)		Controls – ABI *p*<0.001 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		28 (100 %)	20 (65 %)	
Payment card: *code*	52 (100 %)	51 (86 %)		Controls – ABI *p*<0.007 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		28 (100 %)	23 (74 %)	

Door opener: *code*	52 (100 %)	52 (88 %)		Controls – ABI *p*=0.014 Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.001
		28 (100 %)	24 (77 %)	
ATM	52 (100 %)	55 (93 %)		Controls – ABI NS Controls – ABI- RTW NS Controls – ABI- NRTW *p*<0.017
		28 (100 %)	27 (87 %)	
Auto. tap/drier: *public toilet*	52 (100 %)	58 (98 %)		NS
		28 (100 %)	30 (97 %)	
Bell push: *bus*	52 (100 %)	58 (98 %)		NS
		28 (100 %)	30 (97 %)	
Cell phone: *call*	52 (100 %)	58 (98 %)		NS
		28 (100 %)	30 (97 %)	
Elevator	52 (100 %)	59 (100 %)		NS
		28 (100 %)	31 (100 %)	
Cell phone: *answer*	52 (100 %)	59 (100 %)		NS
		28 (100 %)	31 (100 %)	

Measure (logits)	**Controls (n=52)**	**ABI – RTW (n=28)**	**ABI – NRTW (n=31)**	**Technologies**
	More perceived ability	More perceived ability	More perceived ability	More difficult technologies
90	XXXX			
	XXX			
80				
		XXXX		
	XXX	X	X	
	X			
70				
		X		
	XX		XX	
	XXXX			
60	XXXXXX	X	X	
	XXXXXXXXXXXXX	X		
	XXXXXXXXXXX	XXXXXXXXX	X	
	XXXX	XXXXXXXXXX	XXXXXXX	Auto. check-in airport/Internet banking
50	X	XX	XXXXXXXX	Cell phone: *text mess*/Auto.vending machine/Computer: *word proc*/Auto. tel. services
			XXXXX	Payment card: *code/* Door opener: *code*
			XXXX	ATM
			XX	Auto. tap, drier public toilet /Bell push: *bus/*Cell phone: *call/ /* Elevator
40				Cell phone: *answer*
	Less perceived ability	Less perceived ability	Less perceived ability	Less difficult technologies

Figure 1. Perceived person difficulty in ET use and ET difficulty (according to the ETUQ/S-ETUQ) presented in logits. Every X represents one person.