technologies

MDPI

Article

Ready for eHealth. Older Swedes' Perceptions of eHealth Services: Using the PIADS Scale as a Predictor for Readiness

Sarianne Wiklund Axelsson * and Anita Melander Wikman

Division of Health and Rehabilitation, Department of Health Sciences, Luleå University of Technology, Luleå 971 87, Sweden; anita.melander-wikman@ltu.se

* Correspondence: sarwik@ltu.se; Tel.: +46-920-493-298

Academic Editor: Jeffrey W. Jutai

Received: 1 July 2016; Accepted: 1 September 2016; Published: 7 September 2016

Abstract: Introduction: Relevant determinants of adoption of eHealth are needed in order to understand future usage. **Aim:** To investigate the anticipated psychosocial impact of present and future eHealth services and discuss how psychosocial factors can impact the readiness for eHealth services among older Swedes and reflect upon instruments for measuring eHealth acceptance. **Method:** The Psychosocial Impact of Assistive Device Scale (PIADS) measured the psychosocial impact of eHealth services as illustrated in pictures of a set of events of eHealth services that may reasonably occur in the present and the future. The PIADS scale and the scenarios were administered via a randomly selected sample from the Swedish population aged 55–105. **Results and Discussion:** Older Swedes have, from a psychosocial perspective, positive expectations regarding eHealth services. The PIADS scale could be a useful supplement to acceptance measurements in the context of eHealth. Using animated illustrations to depict eHealth services, together with the PIADS scale, can generate findings that are generalizable across technologies. The dimensions adaptability, competence and self-esteem could be relevant determinants of adoption of eHealth.

Keywords: adoption; eHealth; ICT; older persons; psychosocial impact; readiness

1. Introduction

eHealth is expected to improve the quality of life and empower individuals to control their own health [1]. The Swedish vision for eHealth 2025 emphasizes the use of eHealth to support people to achieve good and equitable health and welfare. eHealth aims to develop and strengthen people's own resources for increased independence and participation in society [2,3]. Examples of eHealth services are that patients can directly share personal data such as blood pressure, diet, and sleep with health professionals via mobile applications. It also means that patients can meet with professionals via video-conferencing and book appointments via the Internet. They can also be supervised in their homes through digital assistive technology [3]. Sweden faces the same challenges as the rest of Europe. It has a growing proportion of the elderly, and the elderly are expected to use eHealth as a support for their increased need for health care [4,5]. Therefore, it is important to understand the relevant determinants of the adoption decision of eHealth services among older persons and to develop eHealth services that they perceive as useful support and beneficial for quality of life (QoL).

The concepts of technology acceptance and adoption have been explained by several theories and models. The technology acceptance model (TAM) states that technology usage is affected by two key beliefs—perceived usefulness and perceived ease of use—factors of acceptance that impact the adoption of a technology [6,7]. This model is the leading model in health information and communication technologies (ICT) analysis [8]. Although attitudes towards technologies may

be positive, this is not necessarily connected to a readiness for usage, i.e., adoption among older adults [9]. In the context of health care, it has been reported that, compared to younger persons, older adults have a more positive attitude with respect to technologies, such as sensors in clothes, home laboratories, computer-aided rehabilitation exercises, and short message service (SMS) appointment reminders. However, older adults have a less positive attitude concerning their intention to use such applications [10,11]. The Unified Theory of Acceptance and Use of Technology (UTAUT) model was developed as a comprehensive synthesis of prior technology acceptance research [12]. In UTAUT social influence (the degree to which an individual believes that important others believe he or she should use the system) [12] and facilitating conditions (the degree to which an individual believes that technical and organisational structure exists to support use of the system) was added to perceived ease of use and perceived usefulness [12].

The adoption of ICT has been studied from a variety of perspectives, but studies among older persons' readiness of eHealth services are rare. A recent systematic review [13] studied an initial set of 2035 studies and found that two studies out of 41 were related to health care. The others were related to general ICT usage and outcomes.

Ramtohul [14] did a comprehensive analysis of the adoption setting of eHealth from the user's perspective and found that the user's readiness and health literacy influenced future adoption decisions. Several reviews describing evaluations of e-health services from the patients' perspectives using self-reported measures show a low effect on psychosocial outcomes [15]. Contextual factors, beyond psychosocial factors, steer the level of technology use among older persons ageing in place [16]. The expected psychosocial impact of technology usage may be seen as a key factor for adoption of eHealth services. It could reflect an expected meaningfulness of the technology from a quality of life perspective [9,17]. The aim of this study was to investigate the anticipated psychosocial impact off present and future eHealth services and discuss how psychosocial factors can impact the readiness for eHealth service. We discuss the use of the PIADS scale as an acceptance measurement in relation to readiness of eHealth services.

2. Materials and Methods

This paper is part of a cross-sectional survey study approved by the regional review board in Umeå, Sweden (Ref. No. 2594-10). The cross-sectional study was designed to explore prerequisites for mobile health-related ICT support among older persons in Sweden from different perspectives. The perspectives were the degree of ICT usage to retrieve health information (diet, physical activity level, general health information), ICT usage to communicate with health services during the last year, and the anticipated psychosocial impact of mobile health-related ICT.

2.1. Participants

From the official identity registry for Swedish residents, 650 participants aged 55–105 were randomly selected [18]. The total respondents of the cross-sectional survey were 154 persons aged 55–91, with a mean age of 71.9. Of this sample 52% were female and 32% were living alone. They were equally distributed by education level (primary school, college, and university). Most of the participants had a monthly income of 8.000–18.000 SEK (47%). Self-rated health on the visual analogue scale in the EQ-5D [19]. Visual analogue scale (VAS) (VAS 0–100) [19] had a mean of 72.5 (n = 58).

2.2. Instruments

To predict the acceptance and readiness for eHealth, we selected the instrument Psychosocial Impact of Assistive Devices Scale (PIADS) [20]. The PIADS scale is a self-reported questionnaire designed to assess the experienced effects or the expected impact, prior to use, of an assistive device, prosthesis or medical procedure on independence, well-being and quality of life [20]. The PIADS scale consists of 26 items based on three dimensions: competence, adaptability, and self-esteem. The adaptability subscale (six items) includes questions on topics, such as participation, willingness to

take chances, eagerness to try new things, and the ability to take advantage of opportunities. The competence subscale (12 items) includes questions about competence, productivity, usefulness, performance and independence. The self-esteem subscale (eight items) includes questions on topics such as self-esteem, security, sense of power and control, and self-confidence [20].

The adaptability subscale is derived by adding the values corresponding to six items belonging to the domain and dividing the total by six. The competence subscale is derived by adding the values corresponding to eleven items belonging to the domain and subtracting the value of one item (item five) and dividing the total by 12. The self-esteem subscale is derived by adding the values corresponding to six items belonging to the domain and subtracting the value of two items and dividing the total by eight (see Manual) [20]. Together with the PIADS scale, two animated illustrations of situations with a person using eHealth services that occur now and in the future were used. The present illustration depicted SMS reminders, face-to-face communication over the Internet, and a reporting of self-tests. In addition to the illustrated animated pictures an explanatory text was attached [21]:

"Today and within the next few years you can/are able to, if necessary:

(1) Renew your prescriptions and book appointments at the health care centre on the Internet,
(2) Receive SMS appointment reminders;
(3) Receive advice from the online Medical Counselling Service;
(4) Contact health care staff by email;
(5) Take your blood pressure, ECGs, and blood tests at home by yourself and send the results via the Internet to the health care centre;
(6) Talk to health care staff about your test results using a web camera".

The future illustration of eHealth services was depicted wearing glasses with reminders, sensors in the clothes for automatic reporting medical conditions to health care services, sensors in the shoes to prevent falls, the use of a smart walking stick, and a global positioning system (GPS) for orientation in the environment. In addition to the illustrated pictures, explanatory text was attached [21]:

"In the future, you will be able to, if necessary:

(1) Be in constant contact with a health professional via sensors that will alert your health care centre if they detect any problems with a measured value;
(2) Track your fitness improvement by measuring walking distance, pulse, and blood pressure automatically;
(3) Recognize people and receive assistance in remembering their names with the help of special spectacles;
(4) Wear a personal safety alarm that can determine your exact position in the event of a fall outdoors that requires assistance;
(5) Use a walking stick that shows you the way;
(6) Use sensors in your shoes to obtain better balance".

We collected information about the participants age, sex, education level, habitual status, monthly income, and self-reported health (VAS 0–100) [19] during the past year. A logbook was used to write spontaneous comments from the participants during the telephone interviews.

2.3. Procedure

The PIADS scale and the illustrations of present and future eHealth services were distributed by post in batches of 100 to 650 randomly selected older persons from the official identity and address registry in Sweden [18]. After each batch was distributed, the persons were contacted by telephone, and they directly gave their consent to participate in the survey. This procedure was repeated until 650 randomly selected older persons were reached. Each respondent was asked to study the animated illustrations in the survey of present and future eHealth services and at the same time answer verbally by telephone how they thought these eHealth services would impact their lives according to each of the 26 items in the PIADS scale. During the "telephone interviews" all spontaneous comments from

the participants were noted in the logbook. Those who declined to participate were asked to provide their age. When recipients could not be reached after five attempts by telephone, the PIADS scale, illustrations, and glossary of the items were distributed by post again. Those who did not reply by post or phone had age data collected through birthday.se.

2.4. Data Analysis

The Wilcoxon signed-rank text was used when analysing the difference in PIADS scores between present and future eHealth services (Table 1). Variables were analysed non-parametrically since since they were at either nominal or ordinal levels, or, as in the case of PIADS scores, presented a slightly skewed distribution. For analyses of statistical inference of differences between two groups, Mann-Whitney U-test was used. (Tables 2 and 3). Correlations between PIADS total scores and parametric and ordinal scale variables were analysed by the nonparametric Spearman's rank correlations (see Tables 2 and 3) All analyses followed standard procedures and considerations [22], and the significance level was set at 5%.

3. Results

As shown in Table 1 the respondents valued eHealth services positively regarding both present and future illustrated-health services. The picture that illustrated future eHealth services was rated higher than illustrated present eHealth services regarding both total PIADS scores and sub-scores for the three dimensions, competence, adaptability and self-esteem. Adaptability was the highest rated dimension of the three dimensions in both present and future eHealth services. As shown in Table 1, even first quartile values were consistently positive. Only 19 respondents (12%) reported negative total PIADS scores for the present scenario, and 14 (9%) for the future scenario (data not shown). More importantly, both total PIADS score and sub-scores were significantly higher for the future eHealth services than for the present. Among all scores, the adaptability sub-score showed the highest values.

Table 1. PIADS total scores and sub-scores for eHealth services in the present and the future.

Variable	Present [1] Md (q_1, q_3) [3]	Future [2] Md (q_1, q_3) [3]	*p*-Value
Total score (n = 147/150)	0.81 (0.27, 1.23)	1.00 (0.46, 1.54)	<0.001
Adaptability sub-score (n = 150/150)	0.84 (0.34, 1.50)	1.17 (0.50, 1.83)	<0.001
Competence sub-score (n = 149/150)	0.75 (0.29, 1.34)	1.00 (0.42, 1.52)	0.002
Self-esteem sub-score (n = 149/150)	0.75 (0.13, 1.13)	0.88 (0.38, 1.50)	0.001

[1] Present: an illustration of present eHealth services that will be used; [2] Future: an illustration of future eHealth services that will be able to be used; [3] Md; q_1: lowest quartiles; q_3: the highest quartiles.

Table 2. Associations between PIADS total score for eHealth service illustrations in present and respondents' profile variables (n = 147).

Independent Variable	Mean Rank Difference	r_s	*p*-Value
Age		−0.217	0.008
Sex (female/male)	−4.5		0.520
Living alone/together with someone	−7.9		0.292
Education level		0.056	0.502
Income		0.113	0.174
Self-rated health (VAS 0–100)		0.110	0.184

r_s: Spearman's rank correlation coefficient; *p*-value: statistical significance.

Table 3. Associations between PIADS total score for eHealth service illustrations in future and respondents' profile variables (n = 150).

Independent Variable	Mean Rank Difference	r_s	p-Value
Age		−0.212	0.009
Sex (female/male)	2.1		0.763
Living alone/together with someone	−4.0		0.600
Education level		0.002	0.984
Income		0.107	0.192
Self-rated health (VAS 0–100)		0.186	0.022

r_s: Spearman's rank correlation coefficient; p-value: statistical significance.

Age was significantly related to the total PIADS scores regarding both present and future eHealth services (see Tables 2 and 3), while gender, marital or cohabitation status, income, and educational levels were not. Self-rated health was associated with the anticipated psychosocial impact for the future eHealth services but not for the present.

From the logbook, comments about the animated illustration were categorised. Overall, the comments were positive and showed optimism towards new technology within health care services. "*It would be fantastic if I could get that kind of help if I needed it*"; "*Do you really mean that this is being developed?" and "Yes, it would be helpful.*" One of the participants commented that he hoped that health care would not develop in this high-tech way. He wanted the personal contact instead, as he was used to it.

4. Discussion

The aim of this paper was to investigate the anticipated psychosocial impact of present and future eHealth services, and discuss the use of PIADS scale as acceptance measurement in relation to readiness of eHealth services and in relation to other technology acceptance models and theories. Experiences from administration and use of PIADS scale are discussed.

4.1. The Impact of Psychosocial Factors on Readiness for eHealth Services

For both animated illustrations in the survey, a pattern of positive anticipation of the psychosocial impact of using eHealth services is clear [21]. Future eHealth services resulted in a higher anticipated psychosocial impact versus present e-health services. Contrary to our expectations, respondents did not rate the anticipated psychosocial impact of the present eHealth services higher despite being familiar with its descriptions of services currently available in Sweden [23]. Future eHealth services could be interpreted to suggest situations of independence and sociability because the animation illustrates the transition of e-health services toward mobility and self-management.

Adaptability received the highest PIADS sub-score for both animated illustrations—particularly for future eHealth services [21]. Such a result suggests that these tools are related more closely to the environment in the sense that future eHealth can serve as adapters to liberate users and enable them to pursue activities in daily life. Independence was imperative among older adults and is, in the sense of control and choice, of great importance when older persons use e-health services [24]. Older persons with functional limitations reported that they were afraid of losing control and that control was strongly connected to feelings of independence [25].

The correlation between increased age and lower anticipated psychosocial impact may be expected. Previous research has shown that most of the older persons not have had their communication with health services through personal visits or by making calls on a land-line telephone, and less communication with health services via ICT [26]. The decreased psychosocial anticipations with increased age might be because older persons in the pre-usage stage (not used ICT) were worried about their capability of using ICT [16]. The oldest may not have had a possibility of using new technical ICT solutions earlier, whether in private or in professional contexts. According to the conceptual model by Peek et al. [16] it is important to see beyond psychosocial factors as contextual factors steer the level of

technology use among older persons ageing in place. This paper investigates psychosocial factors in relation to a given context with illustrated situations.

4.2. PIADS Scale as A Predictor for Readiness of eHealth

Adaptability was the highest rated score on the PIADS scale in both illustrations [21]. This was interpreted as eHealth services are and will be enabling and liberating. This result indicates that older persons in Sweden have a readiness from a psychosocial perspective to use eHealth services because these services are perceived to positively affect the quality of life. The PIADS scale assesses the experienced effects or the expected impact, prior to use, and can predict a use or a rejection [20]. Earlier research show that psychosocial aspects have been impacted when persons use assistive technology as an outdoor powered wheelchair, electronic aids, or assistive speech recognition software [27–29]. These aspects involve independence and regain control. This empowers the patient. This is an important aspect among older adults [30–32].

Rantohul [14] showed that increased autonomy and improved quality of life played an important role within the decision-making process to adopt eHealth services. The PIADS scale is based on users' opinion of how assistive devices (wheelchairs, hearing aids) impact the quality of life [25–28]. The PIADS scale could, therefore, be used as a predictor for the adoption of eHealth as the scale is based on several quality of life aspects [33] measuring

Our goal was to assess the readiness for adoption of eHealth services among older person and, therefore, we could have used the Technology Readiness Index (TRI) scale [34]. This scale measures people's technology readiness by assigning the questions to drivers (optimism and innovativeness) and inhibitors (discomfort and insecurity) towards technology-based services. The PIADS scale is explicitly constructed to measure quality of life aspects [35] and is, therefore, more suitable for our aim. The UTAUT is criticised for missing essential predictors of technology use and is specific for older persons, including biophysical, psychological, and contextual factors [16]. In the area of eHealth and particularly telemedicine, the UTAUT has been extended to include experience and habit [36], doctor's opinion, computer anxiety, perceived security, etc. [37], because healthcare requires more constructs to explain the behavioural intention underlying technology use. To the best of our knowledge, there are no instruments to evaluate psychosocial outcomes in the area of eHealth. We consider the PIADS scale to be a valid instrument for this purpose because it evaluates technologies that support personal health [27,28]. The PIADS scale is usable as a predictor for acceptance and usage of eHealth services since PIADS scale is designed to assess the expectation of devices regarding the dimensions adaptability, competence, and self-esteem—dimensions that could be looked upon as relevant determinants of eHealth adoption.

4.3. Methodological Considerations

The internal validity was strengthened by survey pre-tests, low internal data losses, a glossary explaining the PIADS scale items, and a standardized procedure during interviews. During recruitment not all of the randomly selected individuals were reached by telephone. Therefore, two alternative methods were used. In the telephone interviews, the participants answering on each items verbally. All items were explained in a defied way by the investigator if needed. In the altered case, the PIADS scale and a glossary with explanations of each item was sent out by mail—the person filled in the PIADS scale at home and sent it back by post. The manual for PIADS scale states that the investigator shall ask verbally without a glossary. This difference is a limitation in the validity and reliability.

The participants answered all 52 items (both animated illustrations) at a single sitting. The participants found this to be too many items. The following comments were noted in the log-book: "*I am too old to answer so many questions*", "*this was so many questions*", and "*how many minutes is this going to take?*"

As in our paper, Rantohul [14] also used pictures to illustrate eHealth services as a way to make the interviewees familiar with eHealth services if they could not relate to any. Using illustrated

animated pictures is a way to describe what people can do with systems [21,38]. Most of the studies of technology acceptance by older persons are focused on one specific technology rather than generating findings that are generalizable across technologies in a given context [16]. The illustrations helped explain the context of the study and are suggested if the PIADS scale is used as an instrument prior to actual usage or in stages of prototype development. More research is needed to explore if and how the PIADS scale can be a part of an extended model or theory for acceptance of eHealth.

Acknowledgments: The authors would like to thank all participants of the study. A special thanks to Ingvor Pettersson, Örebro University, for the Swedish translation of PIADS and her shared experiences of using the instrument.

Author Contributions: The authors Anita Melander Wikman and Sarianne Wiklund Axelsson contributed to the preparation of the manuscript and approved the final version.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. eHealth Action Plan 2012–2020: Innovative Healthcare for the 21st Century. Available online: https://ec.europa.eu/digital-single-market/en/news/ehealth-action-plan-2012-2020-innovative-healthcare-21st-century (accessed on 1 June 2016).
2. ICT for Everyone—A Digital Agenda for Sweden. Available online: http://www.government.se/reports/2011/12/ict-for-everyone---a-digital-agenda-for-sweden/ (accessed on 1 June 2016).
3. Vision e-Hälsa 2025. Available online: http://www.regeringen.se/informationsmaterial/2016/04/vision-e-halsa-2025/ (accessed on 2 June 2016).
4. The Future Population of Sweden 2016–2060: Significant Population Increase Is Expected. Available online: http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Population/Population-projections/Population-projections/Aktuell-Pong/14505/Behallare-for-Press/402291/ (accessed on 16 June 2016).
5. Ageing and Health. Available online: http://www.who.int/mediacentre/factsheets/fs404/en/ (accessed on 6 June 2016).
6. Davis, F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quart.* **1989**, *13*, 319–340. [CrossRef]
7. Davis, F.D. User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *Int. J. Man Mach. Stud.* **1993**, *38*, 475–478. [CrossRef]
8. Holden, R.J.; Karsh, B.T. The technology acceptance model: Its past and its future in health care. *J. Biomed. Inform.* **2010**, *43*, 159–172. [CrossRef] [PubMed]
9. Renaud, K.; van Biljon, J. Predicting technology acceptance and adoption by the elderly: A qualitative study. In Proceedings of the 2008 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists on IT Research in Developing Countries. Riding the Wave of Technolog, Pretoria, South Africa, 6–8 Octoble 2008.
10. Arning, K.; Holzinger, A.; Miesenberger, K. Different perspectives on technology acceptance: The role of technology type and age. *HCI Usabil. E Incl.* **2009**, *5859*, 20–41.
11. Hughes, L.D.; Done, J.; Young, A. Not 2 old 2 TXT: There is potential to use email and SMS text message healthcare reminders for rheumatology patients up to 65 years old. *Health Inform. J.* **2011**, *17*, 266–276. [CrossRef] [PubMed]
12. Venkatesh, V.; Morris, M.G.; Dabis, G.B.; Davis, F.D. User acceptance of information technology: Toward a unified view. *MIS Q.* **2003**, *27*, 425–478.
13. Khosravu, P.; Ghapanchi Hossein, A. Investigating the effectiveness of technologies applied to assist seniors: A systematic literature review. *Int. J. Med. Inform.* **2016**, *85*, 17–26. [CrossRef] [PubMed]
14. Ramtohul, I. The adoption of e-health services: Comprehensive analysis of the adoption setting from the user's perspective. *Health Policy Technol.* **2015**, *4*, 286–293. [CrossRef]
15. Cartwright, M.; Hirani, S.P.; Rixon, L.; Beynon, M.; Doll, H.; Bower, P.; Bardsley, M.; Steventon, A.; Knapp, M.; Henderson, C.; et al. Effect of telehealth on quality of life and psychological outcomes over 12 months (Whole systems demonstrator telehealth questionnaire study): Nested study of patient reported outcomes in a pragmatic, cluster randomised controlled trial. *Br. Med. J.* **2013**, *346*. [CrossRef] [PubMed]

16. Peek, S.T.M.; Luijkx, K.G.; Rijnaard, M.D.; Nieboer, M.E.; van der Voort, C.S.; Aarts, S.; van Hoof, J.; Vrijhoef, H.J.M.; Wouters, E.J.M. Older adults' reasons for using technology while aging in Place. *Gerontology* **2016**, *62*, 226–237. [CrossRef] [PubMed]
17. Belsi, A.; Papi, E.; McGregor, A. Impact of wearable technology on psychosocial factors of osteoarthritis management: A qualitative study. *BMJ Open* **2016**, *6*. [CrossRef] [PubMed]
18. Swedish Population Register, SPAR. Available online: http://www.statenspersonadressregister.se/Om-SPAR/In-English.html (accessed on 10 May 2011).
19. Brooks, R.; Rabin, R.; de Charro, F. *The Measurement and Valuation of Health Status Using EQ-5D: A European Perspective*, 1st ed.; Springer Netherlands: Dordrecht, The Netherlands, 2003; p. 299.
20. Day, H.; Jutai, J.; University of Western Ontario, London, ON, Canada. Psychosocial Impact of Assistive Devices Scale (PIADS) Manual, 2003.
21. Wiklund Axelsson, S.; Nyberg, L.; Näslund, A.; Melander Wikman, A. The anticipated positive psychosocial impact of present web-based e-health services and future mobile health applications: An investigation among older Swedes. *Int. J. Telemed. Appl.* **2013**, *2013*. [CrossRef] [PubMed]
22. Dawson, B.; Trapp, R.G. *Basic & Clinical Biostatistics*, 4th ed.; Lange Medical Books/McGraw-Hill: New York, NY, USA, 2004.
23. Internet Use in Household and by Individuals 2012. Available online: http://ec.europa.eu/eurostat/documents/3433488/5585460/KS-SF-12-050-EN.PDF (accessed on 1 May 2016).
24. Bowes, A.; McColgan, G. Telecare for older people promoting independence, participation, and identity. *Res. Aging* **2013**, *35*, 32–49. [CrossRef]
25. Melander Wikman, A.; Fältholm, Y.; Gard, G. Safety vs. privacy: Elderly persons' experiences of a mobile safety alarm. *Health Soc. Care Community* **2008**, *16*, 337–346. [CrossRef] [PubMed]
26. Wiklund Axelsson, S.; Melander Wikman, A.; Näslund, A.; Nyberg, L. Older people's health-related ICT use in Sweden. *Gerontechnology* **2013**, *12*, 36–43. [CrossRef]
27. Pettersson, I.; Ahlström, G.; Törnquist, K. The value of an outdoor powered wheelchair with regard to the quality of life of persons with stroke: A follow-up study. *Assist. Technol.* **2007**, *19*, 143–153. [CrossRef] [PubMed]
28. Jutai, J.; Rigby, P.; Ryan, S.; Stickel, S. Psychosocial impact of electronic aids to daily living. *Assist. Technol.* **2000**, *12*, 123–131. [CrossRef] [PubMed]
29. DeRosier, R.; Farber, R.S. Speech recognition software as an assistive device: A pilot study of user satisfaction and psychosocial impact. *Work* **2005**, *25*, 125–134. [PubMed]
30. Steele, R.; Lo, A.; Secombe, C.; Wong, Y.K. Elderly persons' perception and acceptance of using wireless sensor networks to assist healthcare. *Int. J. Med. inform.* **2009**, *78*, 788–801. [CrossRef] [PubMed]
31. Gabriel, Z.; Bowling, A. Quality of life from the perspectives of older people. *Ageing Soc.* **2004**, *24*, 675–691. [CrossRef]
32. Walker, A. European perspective on quality of life in old age. *Eur. J. Ageing* **2005**, *2*, 2–12. [CrossRef]
33. Day, H.; Jutai, J. Measuring the psychosocial impact of assistive devices: The PIADS. *Canadian J. Rehabil.* **1996**, *9*, 159–168.
34. Parasuraman, A. Technology readiness index (Tri) a multiple item scale to measure readiness to embrace new technology. *J. Serv. Res.* **2000**, *2*, 307–320. [CrossRef]
35. Jutai, J.; Day, H. Psychosocial impact of assistive devices scale (PIADS). *Technol. Disabil.* **2002**, *14*, 107–111.
36. Venkatesh, V.; Thong, J.Y.L.; Xu, L. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Q.* **2012**, *36*, 157–178.
37. Chimperman, M.; Brencic, M.M.; Trkman, P. Analysing older users' home telehealth services acceptance behaviour- applying and Extended UTATU model. *Int. J. Med. Inform.* **2016**, *90*, 22–31. [CrossRef] [PubMed]
38. Jarke, M.; Bui, X.T.; Carroll, J.M. Scenario management: An interdisciplinary approach. *Requir. Eng.* **1998**, *3*, 155–173. [CrossRef]