
Older Adults' Interaction with Mobile Devices in Ireland: A Survey

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Abstract

Mobile Devices can be beneficial for older adults (OAs) if used effectively. Yet current research suggests a low level of take-up. We investigated the extent to which OAs use mobile devices to identify their likes, dislikes and expectations in order to find new ways to increase their interaction. We conducted a survey with 202 OAs (aged 50-86). Many OAs are using mobile phones for communication and information seeking technology. However, without asking a direct question, privacy concerns were raised as a potential barrier towards adoption. When designing mobile apps, privacy must be a primary consideration and built in feature.

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Author Keywords

Older adults; mobile devices; privacy; survey.

ACM Classification Keywords

H.5. m. Information interfaces and presentation (e.g., HCI): Collaborative and social computing systems and tools: social networking sites.

Introduction

Virtually every country in the world is experiencing growth in the number and proportion of OAs [15]. Similarly, in Ireland, there has been a 19.1% rise in the population of OAs since 2011 and the 50+ group are now larger than any other age group [9]. In our research, we have set 50 years as the threshold at which someone is termed an OA as defined by the World Health Organization [17]. Also, it is after this age that lifestyle changes are observed, such as family members moving away, number of friends decreasing, age discrimination within the workplace, early retirement and bereavement [16]. The increase in longevity is to be welcomed, but with it come responsibilities. As a community, we need to ensure this segment of the population remain healthy and engaged [1]. A problem with OAs is social Isolation and loneliness, which can be detrimental to their physical and mental health [4], eventually leading to a low quality of life [5].

1. Define the Research

Question: Through studying existing research, we defined one high level research question: "How do older adults in Ireland interact with mobile devices?" Our rationale is the need to build on existing knowledge rather than expect people to change and learn new tools and functionality. We also wanted to highlight OAs' likes, dislikes and expectations from such devices.

2. Define Sample and

Variables: We used an opportunistic approach to selecting our sample. Our unit of analysis was the older adult. Some of the common characteristics of participants include aged over 50, living in a community, having access to internet and a basic knowledge of technology. The independent variables analyzed were residence, education and living arrangements. Dependent variables included, usage, likes and dislikes.

Mobile devices such as mobile phones and wearables provide a potential solution to the problem of social isolation. They can help OAs stay connected and encourage active lifestyles [11, 12]. We noted during our review of the literature on social network systems (SNSs) for OAs [2], several barriers to technology adoption such as difficulty in operation, lack of purpose and confidentiality with privacy on the top of the list. "Privacy is a major concern and should be managed in any system developed for OAs [13,18]". The review notes that OAs are very sceptical about SNSs and are concerned that their personal information may be accessed by someone other than the intended person. A considerable amount of research has been undertaken to understand the interaction of OAs with computational technologies [7], with a focus on social media [8], websites [10] or apps [3]. Yet, what remains unclear is the actual up-take of mobile devices by OAs [6, 14,]. We, therefore, have conducted an online survey (<http://bit.do/seniormobiledeviceuse>) with OAs from Ireland. Our six-step research process used to explore mobile phone usage of OAs is explained in the sidebar. The next section sheds light on how OAs use their mobile devices.

Results

The ratio of participants in our sample is 60/40 for females and males and most fall between the ages of 60 to 70. Figure 1 depicts the smoothed kernel density estimation (KDE) curves that estimate the distribution of hours per week spent by OAs on using mobile phones. If someone reported a range - e.g., "4 to 6 hours" - their vote is scaled down and evenly distributed over that time range. We used three independent variables to check their correlation with mobile phone adoption - residence, education and living

arrangements. Interestingly, OAs without a qualification spent less time each week using a mobile phone compared with someone possessing any level of schooling or degree. The majority of the OAs spend 0 to 2 hours on their mobile phones, while the number of OAs using the mobile phone for 4-6 hours is less. The number of OAs spending 8 to 10 hours on their mobile device increases, as depicted in Figure 1. Interestingly, we also note that this increase is irrespective of the education level. This leads us to infer that there are two main categories of OAs: - those who use mobile phones minimally for communication, and those whose mobile phones are an integral part of their lives. One unexpected finding was that younger OAs living in rural areas are using mobile phones more in comparison with those younger OAs living in cities. This could be due to the lack of physical access to other people in towns. In addition, people living with extended families are spending significantly longer amounts of time on mobile devices when compared with other groups. As shown in Figure 3, OAs in our sample are using android-based mobile devices more than any other type of mobile phone. In addition, Figure 4 reveals the top mobile phone activities which OAs of different ages perform are: calling, texting, group chatting, sharing photos and videos and managing daily activities. The majority (76%) of OAs have access to the internet on their mobile devices, which is helpful when using wearable technology such as keeping track of OAs' activities. But, there are still very few OAs (Figure 2) who are familiar with wearables such as Fitbit. To understand why and the implications of this, we need to follow this up with further research. The positive view of this is that 61% of OAs have shown interest in such devices. We also asked OAs about any additional comments which they would like to make about our mobile-based system

3. Collect Data: The survey was conducted online using Google Forms which is open source, free and supports automatic collation of data in a spreadsheet. The questionnaire had 13 demographic questions, and 17 survey questions. 202 completed questionnaires were returned.

4. Code Data: Qualitative responses to open questions were coded to create themes in respect of our variables studies (e.g. likes, dislikes). The coding was conducted manually, and two researchers were involved.

5. Analyze Data: The quantitative results (Likert scale responses), were aggregated in Microsoft Excel. We aggregated the demographic responses to gain a picture of our sample.

6. Report Results: The results are reported using both descriptive and inferential statistics based on the research question.

which we are developing. They understood its importance and expressed an interest in this. But, they highlighted privacy as their primary concern even without prompting, as indicated in the literature [2]. An OA said *"I'd have privacy concerns about an app that went deep into health and fitness!"*

Discussion

The findings of this survey will help practitioners develop effective mobile-based applications for OAs. They need to incorporate the most liked features by OAs such as information-seeking and communication along with the key non-functional requirement, privacy. This is in line with literature [2, 13, 18], which states privacy concerns of OAs relating to mobile devices as: constant monitoring, collection and dissemination of private information, proliferation of unregulated apps in the market and lack of self-efficacy of OAs to use these devices. Currently, the wearables and devices deployed in OA homes gives them a sense of continuous monitoring and can cause distress and resistance to use. This can be addressed by making these devices work for a fixed duration and location where OAs are comfortable. The license agreement should be short and written in clear language informing OAs about how their data will be used, instead of the current format which is long and complex. Unregulated apps are the biggest threats to data breach, which can be resolved by providing OAs with information and devising new standards. One to one sessions should be conducted with OAs as well to enhance their self-efficacy, so that they manage their privacy on their own whilst using mobile devices. The inherent heterogeneity of this age group also needs attention whilst developing any kind of system for them. Also, as a start, android platforms

should be considered as they are inexpensive and widespread as indicated by our cohort. In our project, we are following these findings to develop an exemplar mobile-based social networking system that suggests volunteer opportunities to OAs within the community. The objective is to keep people connected with communities and avoid problems of social isolation by using this form of technology as a mediator.

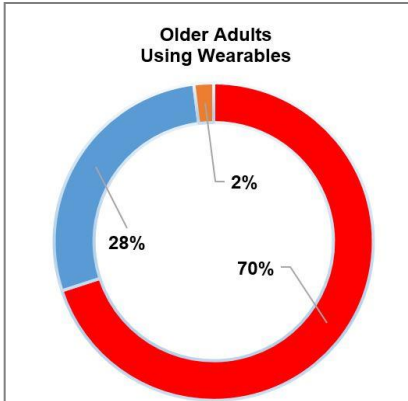
To mitigate external validity, we used a convenience sampling approach i.e. participants are from Ireland, have access to the internet, already familiar with technology and are interested in volunteering. So, the results are not generalizable for the whole OA population. Similarly, to mitigate internal validity, the majority of the questions helped us extract the intended information, even though, some OAs weren't able to understand some questions.

Conclusion

This study revealed the current practices, preferences and expectations of OAs from mobile devices especially mobile phones and wearables. Several inferences were also made concerning mobile phone usage based on variables such as education, residence and living arrangements. In conclusion, a vast majority of OAs possess mobile devices with data plan. They are willing to use new applications and systems if they are designed for and with them by ensuring privacy.

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■ No ■ Yes ■ NA

Figure 2: Percentage of older adults using wearables like Fitbit

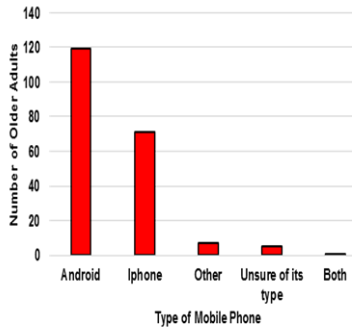


Figure 3: Type of mobile phone used by older adults

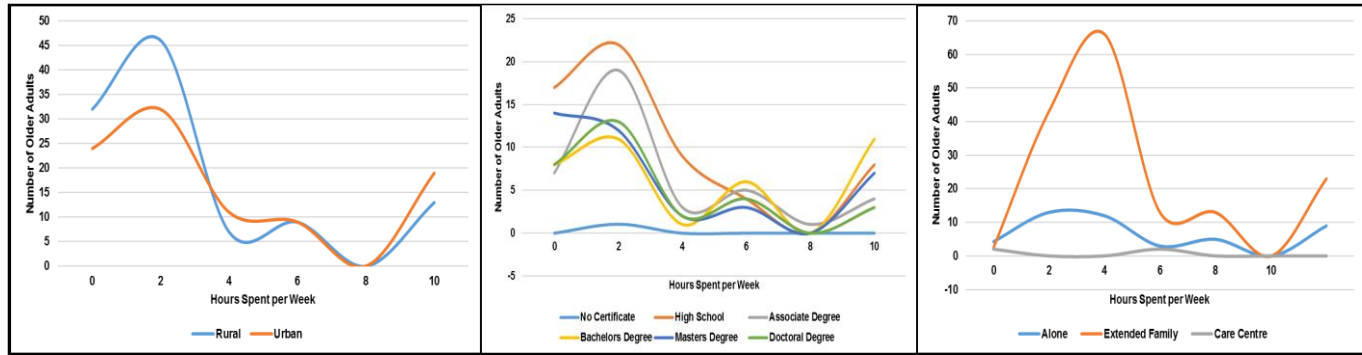


Figure 1: Correlation of residence, education and living arrangements with mobile phone adoption

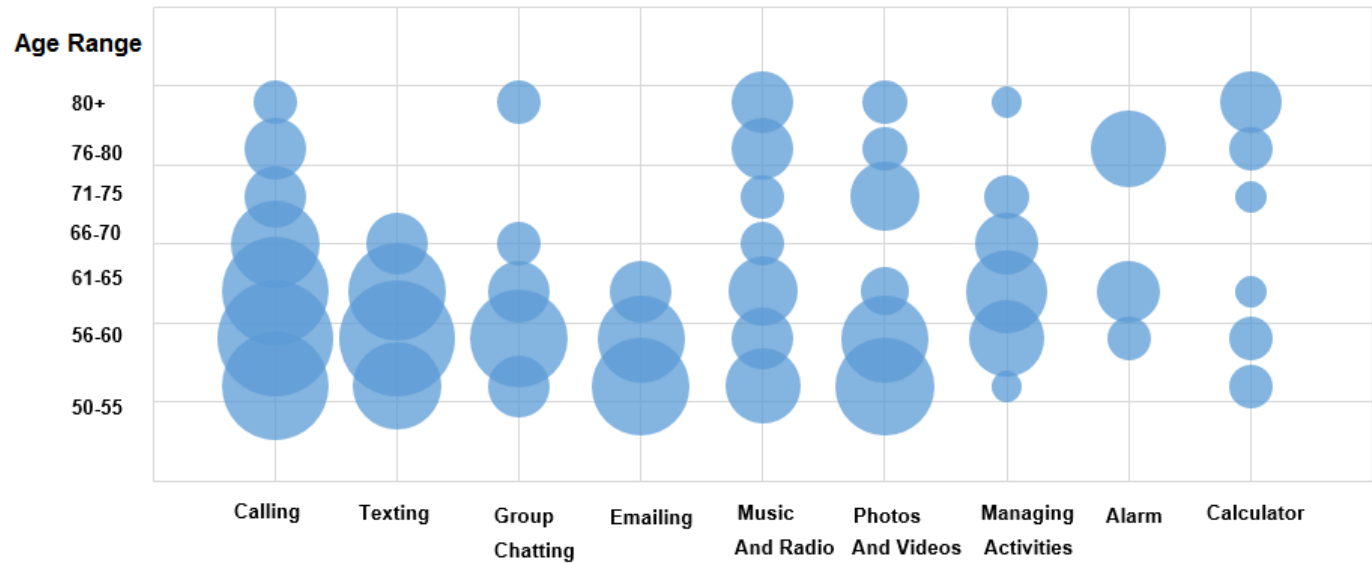


Figure 4: Frequency of top mobile phone activities by older adults of different ages

References

1. Ageing Well Network 2012. The New Agenda on Ageing: To Make Ireland the Best Country to Grow Old In.
2. Ahmad, B., Richardson, I. and Beecham, S. 2017. A Systematic Literature Review of Social Network Systems for Older Adults. Product-Focused Software Process Improvement. Springer International Publishing. 482–496.
3. Arreola, I., Morris, Z., Francisco, M., Connelly, K., Caine, K. and White, G. 2014. From Checking on to Checking in. Proceedings of 32nd ACM conference on Human factors in computing systems.
4. Brunette, K., Eisenstadt, M., Pukinskis, E. and Ryan, W. 2005. Meeteetse: Social Well-being through Place Attachment. CHI '05 extended abstracts on Human factors in computing systems.
5. Burmeister, O. 2012. What Seniors Value About Online Community. The Journal of Community Informatics. 8, 1 (Feb. 2012).
6. Chen, K., Chan, A.H. and Tsang, S.N. 2013. Usage of Mobile Phones Amongst Elderly People in Hong Kong. The 2013 IAENG International Conference on Industrial Engineering Special Session: Human Factors, Ergonomics, and Safety.
7. Guo, P.J. 2017. Older Adults Learning Computer Programming. Proceedings of 2017 CHI Conference on Human Factors in Computing Systems.
8. Hope, A., Schwaba, T. and Piper, A.M. 2014. Understanding Digital and Material Social Communications for Older Adults. Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14 (2014).
9. <http://www.cso.ie/en/csolatestnews/pressreleases/2017pressreleases/pressstatementcensus2016resultprofile3-anageprofileofireland/>. Accessed: 2018-06-20.
10. Latulipe, C., Gatto, A., Nguyen, H.T., Miller, D.P., Quandt, S.A., Bertoni, A.G., Smith, A. and Arcury, T.A. 2015. Design Considerations for Patient Portal Adoption by Low-Income, Older Adults. Proceedings of ACM Conference on Human Factors in Computing Systems.
11. Leung, R., Tang, C., Haddad, S., Mcgrenere, J., Graf, P. and Ingriany, V. 2012. How Older Adults Learn to Use Mobile Devices. ACM Transactions on Accessible Computing. 4, 3 (Dec. 2012), 1–33.
12. Mohadisdudis, H.M. and Ali, N.M. 2014. A Study of Smartphone Usage and Barriers Among the Elderly. 2014 3rd International Conference on User Science and Engineering (i-USER) (Sep. 2014).
13. Nef, T., Ganea, R.L., Müri, R.M. and Mosimann, U.P. 2013. Social Networking Sites and Older Users – A Systematic Review. International Psychogeriatrics. 25, 7 (Apr. 2013), 1041–1053.
14. Plaza, I., Martín, L., Martín, S. and Medrano, C. 2011. Mobile Applications in an Aging Society: Status and trends. Journal of Systems and Software. 84, 11 (Nov. 2011), 1977–1988.
15. United Nations 2002. World Population Ageing: 1950–2050. Department of Economic and Social Affairs.
16. Van Tilburg, T. 1998. Losing and Gaining in Old Age: Changes in Personal Network Size and Social Support in a Four-Year Longitudinal Study. The Journals of Gerontology: Psychological Sciences and Social Sciences. 53B, S313–S323.
17. World Health Organization 2014. Definition of an Older or Elderly person. <http://www.who.int/healthinfo/survey/ageingdefnolder/en/index.html>
18. Xie, B., Watkins, I., Golbeck, J. and Huang, M. 2012. Understanding and Changing Older Adults' Perceptions and Learning of Social Media. Educational Gerontology. 38, 4 (Apr. 2012), 282–296.