

Original Research

An Exploratory Study of How Mobile Devices are Used by Older Adults

Susan E. Reid ^{1,*}, Bessam Abdulrazak ², Tianqi Xiao ²

1. Williams School of Business, Bishop's University, Sherbrooke, Québec H3G 1Z7, Canada; E-Mail: sreid@UBishops.ca
2. AMI-Lab, University of Sherbrooke, Sherbrooke, Québec J1K 2R1, Canada; E-Mails: bessam.abdulrazak@usherbrooke.ca; Tianqi.Xiao@USherbrooke.ca

* **Correspondence:** Susan E. Reid; E-Mail: sreid@UBishops.ca**Academic Editor:** Paul M. Valliant**Special Issue:** [Positive Aging a Two-Way Street: Healthy Lifestyle and Attitudes of Others](#)*OBM Geriatrics*

2022, volume 6, issue 4

doi:10.21926/obm.geriatr.2204209

Received: August 08, 2022**Accepted:** September 27, 2022**Published:** October 17, 2022

Abstract

Despite the increase in use and interest in mobile devices by older adults, to date, there is still limited research carried out to better understand older adults' usage and needs as they relate to such devices. As such, this research examined the use of two types of mobile devices, smartphones, and tablets, by older adults (i.e., age 65+), as well as the use of a new interface, developed for research purposes, called "PhonAge". This study was exploratory, and utilizes frequency data and tables, in order to get a sense of older adults' usage patterns with this interface. Specifically, this research focused on older adults' use of the different features and functions of both the PhonAge interface as well as older adults' usage of the smartphones and tablets themselves.

Keywords

Senior consumers; mobile devices; applications; device attributes; usage patterns; PhonAge



© 2022 by the author. This is an open access article distributed under the conditions of the [Creative Commons by Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium or format, provided the original work is correctly cited.

1. Introduction

Until the 1980's, with the exception of the medical/biopharmaceutical industry, older adults were not seen as an important component of the consumer population due to their relatively smaller number in comparison to the rest of the population and also, due to a lack of discretionary income [1]. Things have changed dramatically, however, as older adults are becoming a much larger demographic with a lot more spending power. Indeed, according to the World Health Organization, the global population of older adults (65+) is predicted to double by 2025 [2], and by 2050, the UN predicts that "one in six people in the world will be over 65, an increase from one in 11 in 2019" [3]. In addition to their continued increasing growth as a percentage of the global population, older adults are also continuing to penetrate the market in terms of their use of both mobile devices and the Internet. According to the Pew Research Center [4], there has been a steady surge in internet usage among older adults. In 2000, when the center began surveying internet use among older adults, adoption sat at 14%, but as of 2016, this statistic had moved to 67%, showing enhanced adoption of internet and related technologies (sometimes referred to as 'ICT' or 'information and communications technologies'). Even more recently, usage rates of ICT have continued to surge as the global COVID-19 pandemic has impacted the way people communicate and for many was the only way to facilitate socialization during the period. As noted by The American Association of Retired Persons [5], "more older adults (44%) view tech more positively as a way to stay connected than they did before COVID-19. In addition, 4 out of 5 adults age 50+ rely on technology to stay connected and in touch with family and friends." As such, the market for mobile devices for older adults is becoming an increasingly significant one. In parallel to the increasing adoption of ICT by older adults and its related impact on industry, there has been a large interest in academia as to how to best facilitate adoption and ability to use devices and related software, in safe and effective ways. For example, a strong research stream investigating older adults' adoption of ITC is evidenced by active participation at key conferences such as the International Conference on Smart Living and Public Health (ICOST) and Requirements Engineering for Well-Being, Aging, and Health (REWBAH) which are striving to address such issues.

In order to best understand adoption and ability to use mobile devices by older adults, it is useful to compare types of devices such as smartphones and tablets, and to understand typical 'usage scenarios' (i.e., "how" older adults are utilizing such technology) to best assist and facilitate development and education.

Despite the fact that the total mobile device market has been estimated at 185 billion US dollars globally [6] and the current 14.02 billion devices in the world is predicted to jump to 18.22 billion by 2025 [7], surprisingly little has been done to date to address the different needs of the variety of potential customer segments, including the older adults' market segment, which is clearly growing in importance.

Saracchini et al. [8] note that there are certain limitations that come with aging, however, 90% of Canadian older adults plan to live in their own homes, autonomously, for as long as possible. Additionally, research in gerontology points overwhelmingly to the fact that independence and aging well lead to a variety of positive economic and social outcomes. Put simply, active aging has its benefits. As such, knowledge of how to effectively use mobile devices and related applications can facilitate support mechanisms for older adults [9].

In order to better provide effective mobile device platforms for older adults and thereby enable better active aging, there needs to be a focus on how older adults' actually use mobile devices and applications to understand what is both desired and needed by the senior population and what is required in order to educate the segment in line with their interests and needs. Inherently, increasing numbers of older adults will require social applications allowing them to better communicate and become active participants in our digital society [10]. As such, the current research aims at uncovering the actual usage patterns of older adults regarding mobile devices and the applications installed on them. Specifically, this research enabled an exploratory assessment of needs and motives, using the social/informational/experiential framework developed by Reid et al. in 2017 [11], to consider in future research and development of ubiquitous mobile devices and related applications for older adults. This framework breaks down usage of devices into three major categories based on user motivation and related to mode of use including the ability to actively communicate with others, including use of personal contacts (i.e., 'social activities'), as well as daily information gathering tasks (i.e., 'informational activities') and simplification and enhancement of day-to-day tasks like online shopping (i.e., 'experiential activities').

2. Literature Review

Until recently, with the exception of certain technologies related to health and accessibility services ([12] *in* [10]), despite academic research on the topic, most mobile applications have not taken account of senior's needs during the design process. This lack of focus has resulted in the use of interfaces by older adults which were not designed with their needs in mind and biases towards younger consumers desiring state-of-the-art features and technologies ([13] *in* [10]). There are also several factors which create barriers or discourage the use of mobile devices by older adults including: low quality interfaces [14], design of the devices/complexity of interfaces [15], lack of education, and reluctance to change habits [16]. Also, health issues such as visual, auditory and motor control issues can affect usage tendencies [17] as well as confidence issues [18]. 'Preference' or tolerance for trial-and-error also decreases as people age [19]. Additionally, economic considerations may slow down the adoption process [20]. Indeed, in summary, both human barriers and engineering barriers create multiple barriers for older adults [21].

Given all of the factors which may hinder adoption in the case of older adults adopting and using mobile devices, surprisingly little attention in research has focused on such fundamental issues as activity context and information representation [9] as ways to better enhance usage for this population. Enabling older adults use of devices is important because there are a variety of reasons older adults may find the use of mobile devices appealing and beneficial, including better communication, memory aid, entertainment, fulfilling digital shopping needs and information management.

All-in-all, limited work has been carried out related to the specific perceptions and attitudes held by older adults related to mobile attributes and applications of the devices currently on the market. In order to respond to this, our previous research aimed at creating a framework to investigate the motivations and interests of senior consumers. In that research, we examined user types or 'consumer typologies' to synthesize motivational differences ([22-27]). In more recent years, these have been considered using a framework that divides these factors into two: extrinsic user motivations (i.e., informational needs as a means to an end) and intrinsic user motivations (i.e., such

as experiential and social needs) [28]. In general, users with intrinsic motives are seeking to derive richer, fuller experiences from activity.

Based on this understanding of what drives users – informational, experiential and social motivations, in previous research [11, 29] we developed a more recent typology specific to older adult users, which is relevant for choices of applications and how mobile devices are used to facilitate:

- communication with others (“social activities”),
- daily information gathering tasks (information activities), and
- enhancement of day-to-day tasks and activities like game playing and online shopping (experiential activities).

These extrinsic/intrinsic motivation studies further revealed that both socially- and informationally-motivated users showed lower adoption of mobile devices than their experientially-motivated counterparts. However, results of the study also suggested that for older adults, adoption of such devices and related apps might be encouraged through simplification, lowering of price and education, training, and support [11]. Even more specifically, as noted by Traxler and Vosloo [30], pedagogical issues such as those related to content, training and support are considered important not only to ensure that older adults adopt mobile devices and technologies but use them on a regular basis.

As such, simplification became a major focus for the current study in terms of the specific interface which would be developed to support the research with older adults. This focus was largely a result of the Reid et al. findings [29], based on 103 participants, pointing to the primary motivator and accelerator of use for older adults being ‘ease of use’ whether this was related to easy to understand, ability to start quickly, easy user guide or long battery life. As a result, over the course of approximately 2 years, a new interface called “PhonAge” was developed for senior’s use on tablets and smartphones, as will be described in the Research Method section.

3. Propositions

To uncover the behaviours of older adults whilst utilizing mobile apps, we formulated 2 key propositions, as follows:

P1: Older adults differ in their usage behaviors between tablets and phones. This may be a result of the ability to sit using tablets and therefore focus on longer-term or more complex or involved activities (i.e., experiential such as playing games such as Sodoku, reading books or internet search on Chrome), those which require larger screens and buttons (i.e., informational and experiential such as internet search on Chrome, using shopping apps and websites) or those which require a video interaction (i.e., social such as social media or zoom-style interactions). In the case of phones, they may be preferred to enable those activities conducted on the fly (i.e., experiential such as taking or showing photos), in a social situation where you might want input from others (i.e., social such as add contact) or because it is strongly related to the main function of the mobile device (i.e., informational such as phone calling, using contact).

P2: Older adults experience different motives related to their use of various applications on mobile devices: a) primarily informational and b) primarily related to user experience whether it be on their own or in a social context (e.g., social, experiential) and these in turn influence their interest

levels and use of mobile applications. Hence, P2 aims to investigate whether and how different motives influence the use of various mobile applications by older adults.

4. Research Method

In total, 32 participants completed this exploratory study. There were essentially 2 phases of data collection during this “PhonAge” study. Phase I: During April/May 2018, recruitment was carried out at 2 older adult residences with 37 initial recruits; 19 of these withdrew thereby leaving 18 participants that participated to the end of the complete study. Phase II: During September 2018 to January 2019 an additional 23 participants were recruited; 9 of these withdrew, thereby leaving 14 participants from this third residence. Devices were collected back from participants in May 2019. Therefore, from a total of 60 recruits, 32 participants completed the study. Due to the periodic recruitment, only data from January to April 2019 (4 months) were utilized from the 32 completed participants for this paper’s analysis, so that data would be comparable. Information was used from the first phase of the study in order to enhance training and education, add new features that were requested by the first cohort and continue to improve the interface. In addition, the technical team created additional short “how to” videos for all participants using the interface in order to help with some of the most frequently asked questions on the helpline. Data were collected directly from the devices to a server. Individual data is not presented; only amalgamated together in order to understand the overall tendencies of usage.

Frequency tables are utilized in the results section in order to illustrate the frequency (Tables 1-6) and percentage (Figures 1-9) of time participants spent using various aspects of PhoneAge and apps which were designed within PhoneAge and also those which were accessed outside of the PhoneAge interface using the internet and downloaded by participants themselves onto their devices (measured through analysis of the number of times clicked over the 4-month measurement period).

Table 1 Frequency table for phone use by activity.

Supra-category	Application	Frequency by Application	Frequency by Supra-category
Action	Call	67	
	Time Check	42	
	Date Check	4	
	Exit PhonAge	1	
	Use Contact	974	
	Manage Apps	95	1330
	Use Favorite	87	
	Use First Contact	2	
	Use WiFi	30	
	Send EMAIL	6	
	Send SMS	22	
Add App	Add PhonAge App	11	92
	Add External App	81	

Add Contact	Add Contact	79	79
Add Contact Data	Add Contact SMS	12	
	Add Contact Address	16	49
	Add Contact Email	12	
	Add Contact Phone	9	
Calendar App	Calendar	1	1
Game App	Block Puzzle	0	
	Candy Crush	10	
	FreeCell	0	
	Jewel Quest	0	
	Solitaire	2	210
	Spider Solitaire	0	
	Sudoku	3	
	Solitaire Gratuit Francais	175	
	Word Challenge	20	
Internet App	Chrome	56	63
	Google	7	
Mail App	Gmail	27	27
Music App	Musique relaxante	1	1
News App	La Presse	2	
	RC Info	3	5
	Journal de Montréal	0	
Photo App	Camera	8	51
	Photos	43	
SMS App	SMS	22	22
Shopping App	Best Buy	1	
	Kijiji	2	42
	Metro	1	
	Play Store	38	
Social App	Facebook	0	0
	Hangouts	0	
Video App	Youtube	19	19
Weather App	Meteo Media	10	
	Meteo Quotodienne	1	65
	Weather	38	
	WeatherEye	16	
Total Count			2056

Table 2 Frequency table for tablet use by activity.

Supra-category	Application	Frequency by Application	Frequency by Supra-category
Action	Call	0	
	Time Check	131	
	Date Check	1	
	Exit PhonAge	7	
	Use Contact	522	
	Manage Apps	60	815
	Use Favorite	46	
	Use First Contact	1	
	Use WiFi	41	
	Send EMAIL	1	
	Send SMS	5	
Add App	Add PhonAge App	18	101
	Add External App	83	
Add Contact	Add Contact	45	45
Add Contact Data	Add Contact SMS	15	
	Add Contact Address	0	25
	Add Contact Email	8	
	Add Contact Phone	2	
Calendar App	Calendar	0	0
Game App	Block Puzzle	1	
	Candy Crush	12	
	FreeCell	3	
	Jewel Quest	8	
	Solitaire	60	199
	Spider Solitaire	3	
	Sudoku	73	
	Solitaire Gratuit Francais	1	
	Word Challenge	38	
Internet App	Chrome	85	85
	Google	0	
Mail App	Gmail	42	42
Music App	Musique relaxante	0	0
News App	La Presse	11	
	RC Info	8	27
	Journal de Montréal	8	
Photo App	Camera	26	49
	Photos	23	
SMS App	SMS	3	3

Shopping App	Best Buy	3	70
	Kijiji	1	
	Metro	0	
	Play Store	66	
Social App	Facebook	25	28
	Hangouts	3	
Video App	Youtube	22	22
Weather App	Meteo Media	6	34
	Meteo Quotodienne	0	
	Weather	4	
	WeatherEye	24	
Total Count			1545

Table 3 Frequency table for total use by activity.

Supra-category	Application	Frequency by Application	Frequency by Supra-category
Action	Call	67	2145
	Time Check	173	
	Date Check	5	
	Exit PhonAge	8	
	Use Contact	1496	
	Manage Apps	155	
	Use Favorite	133	
	Use First Contact	3	
	Use WiFi	71	
	Send EMAIL	7	
	Send SMS	27	
Add App	Add PhonAge App	29	193
	Add External App	164	
Add Contact	Add Contact	124	124
Add Contact Data	Add Contact SMS	27	74
	Add Contact Address	16	
	Add Contact Email	20	
	Add Contact Phone	11	
Calendar App	Calendar	1	1
Game App	Block Puzzle	1	409
	Candy Crush	22	
	FreeCell	3	
	Jewel Quest	8	
	Solitaire	62	
	Spider Solitaire	3	
	Sudoku	76	

	Solitaire Gratuit Francais	176	
	Word Challenge	58	
Internet App	Chrome	141	148
	Google	7	
Mail App	Gmail	69	69
Music App	Musique relaxante	1	1
News App	La Presse	13	32
	RC Info	11	
	Journal de Montréal	8	
Photo App	Camera	34	100
	Photos	66	
SMS App	SMS	25	25
Shopping App	Best Buy	4	112
	Kijiji	3	
	Metro	1	
	Play Store	104	
Social App	Facebook	25	28
	Hangouts	3	
Video App	Youtube	41	41
Weather App	Meteo Media	16	99
	Meteo Quotodienne	1	
	Weather	42	
	WeatherEye	40	
Total Count			3601

Table 4 Frequency table for phone use by motivation.

Motivation Type	Application	Frequency by Application	Frequency by Motivation Type
Informational	Calendar	1	71
	La Presse	2	
	RC Info	3	
	Journal de Montréal	0	
	Meteo Media	10	
	Meteo Quotodienne	1	
	Weather	38	
	WeatherEye	16	
Experiential	Add PhonAge App	11	322
	Add External App	81	
	Block Puzzle	0	
	Candy Crush	10	
	FreeCell	0	
	Jewel Quest	0	

	Solitaire	2	
	Spider Solitaire	0	
	Sudoku	3	
	Solitaire Gratuit Francais	175	
	Word Challenge	20	
	Musique relaxante	1	
	Youtube	19	
	<hr/>		
	Add Contact	79	
	Add Contact SMS	12	
	Add Contact Address	16	
	Add Contact Email	12	
	Add Contact Phone	9	
Social	Gmail	27	228
	Camera	8	
	Photos	43	
	SMS	22	
	Facebook	0	
	Hangouts	0	
	<hr/>		
	Chrome	56	
	Google	7	
Hybrid	Best Buy	1	105
	Kijiji	2	
	Metro	1	
	Play Store	38	

Table 5 Frequency table for tablet use by motivation.

Motivation Type	Application	Frequency by Application	Frequency by Motivation Type
	Calendar	0	
	La Presse	11	
	RC Info	8	
Informational	Journal de Montréal	8	61
	Meteo Media	6	
	Meteo Quotodienne	0	
	Weather	4	
	WeatherEye	24	
	<hr/>		
	Add PhonAge App	18	
	Add External App	83	
Experiential	Block Puzzle	1	322
	Candy Crush	12	
	FreeCell	3	
	Jewel Quest	8	

	Solitaire	60	
	Spider Solitaire	3	
	Sudoku	73	
	Solitaire Gratuit Francais	1	
	Word Challenge	38	
	Musique relaxante	0	
	Youtube	22	
Social	Add Contact	45	
	Add Contact SMS	15	
	Add Contact Address	0	
	Add Contact Email	8	
	Add Contact Phone	2	
	Gmail	42	192
	Camera	26	
	Photos	23	
	SMS	3	
	Facebook	25	
	Hangouts	3	
Hybrid	Chrome	85	
	Google	0	
	Best Buy	3	155
	Kijiji	1	
	Metro	0	
	Play Store	66	

Table 6 Frequency table for total use by motivation.

Motivation Type	Application	Frequency by Application	Frequency by Motivation Type
Informational	Calendar	1	
	La Presse	13	
	RC Info	11	
	Journal de Montréal	8	132
	Meteo Media	16	
	Meteo Quotodienne	1	
	Weather	42	
	WeatherEye	40	
Experiential	Add PhonAge App	29	
	Add External App	164	
	Block Puzzle	1	
	Candy Crush	22	644
	FreeCell	3	
	Jewel Quest	8	
	Solitaire	62	

	Spider Solitaire	3	
	Sudoku	76	
	Solitaire Gratuit Francais	176	
	Word Challenge	58	
	Musique relaxante	1	
	Youtube	41	
	<hr/>		
	Add Contact	124	
	Add Contact SMS	27	
	Add Contact Address	16	
	Add Contact Email	20	
	Add Contact Phone	11	
Social	Gmail	69	420
	Camera	34	
	Photos	66	
	SMS	25	
	Facebook	25	
	Hangouts	3	
	<hr/>		
	Chrome	141	
	Google	7	
Hybrid	Best Buy	4	260
	Kijiji	3	
	Metro	1	
	Play Store	104	
	<hr/>		

Phone Use Totals

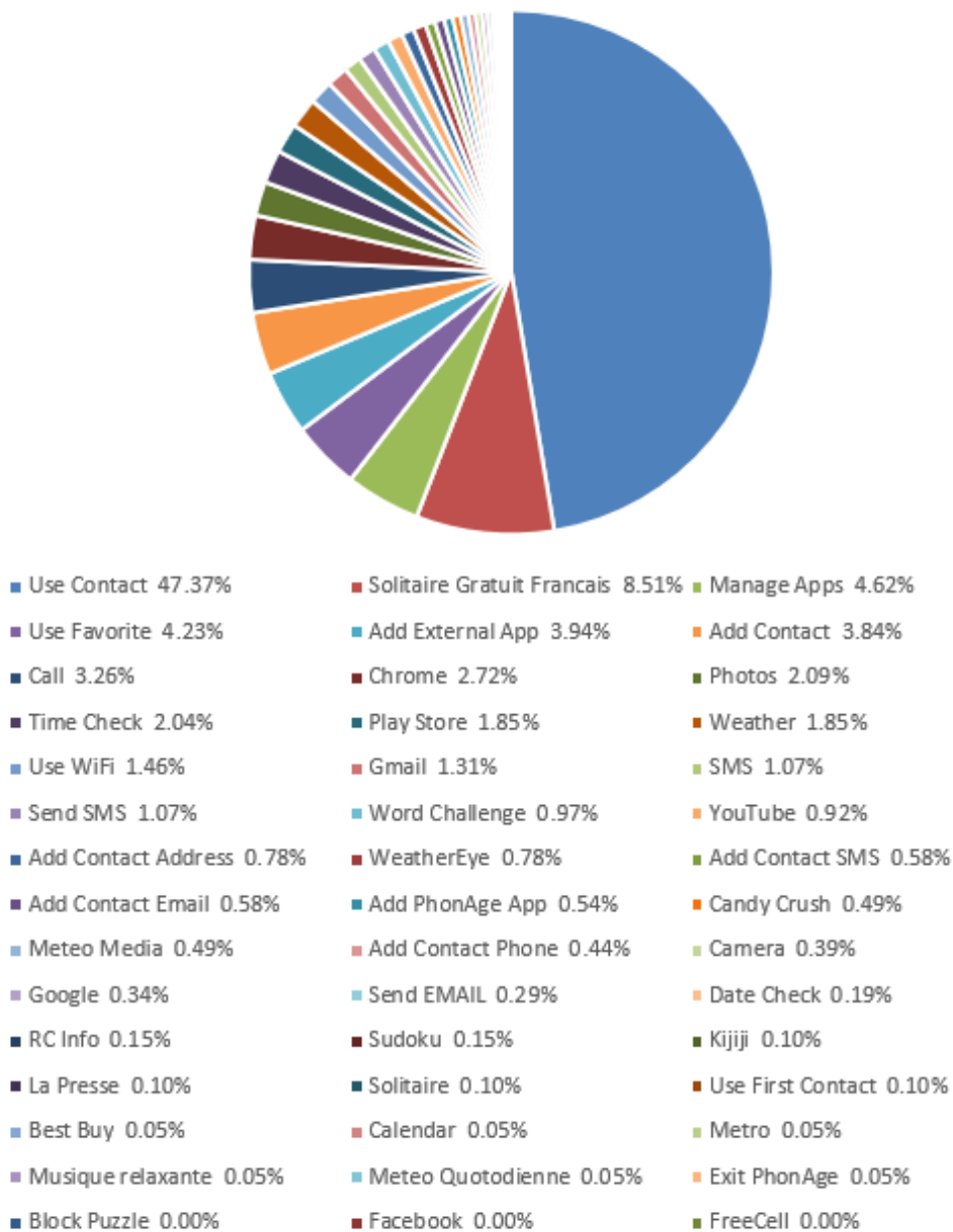


Figure 1 Frequency for phone use by activity.

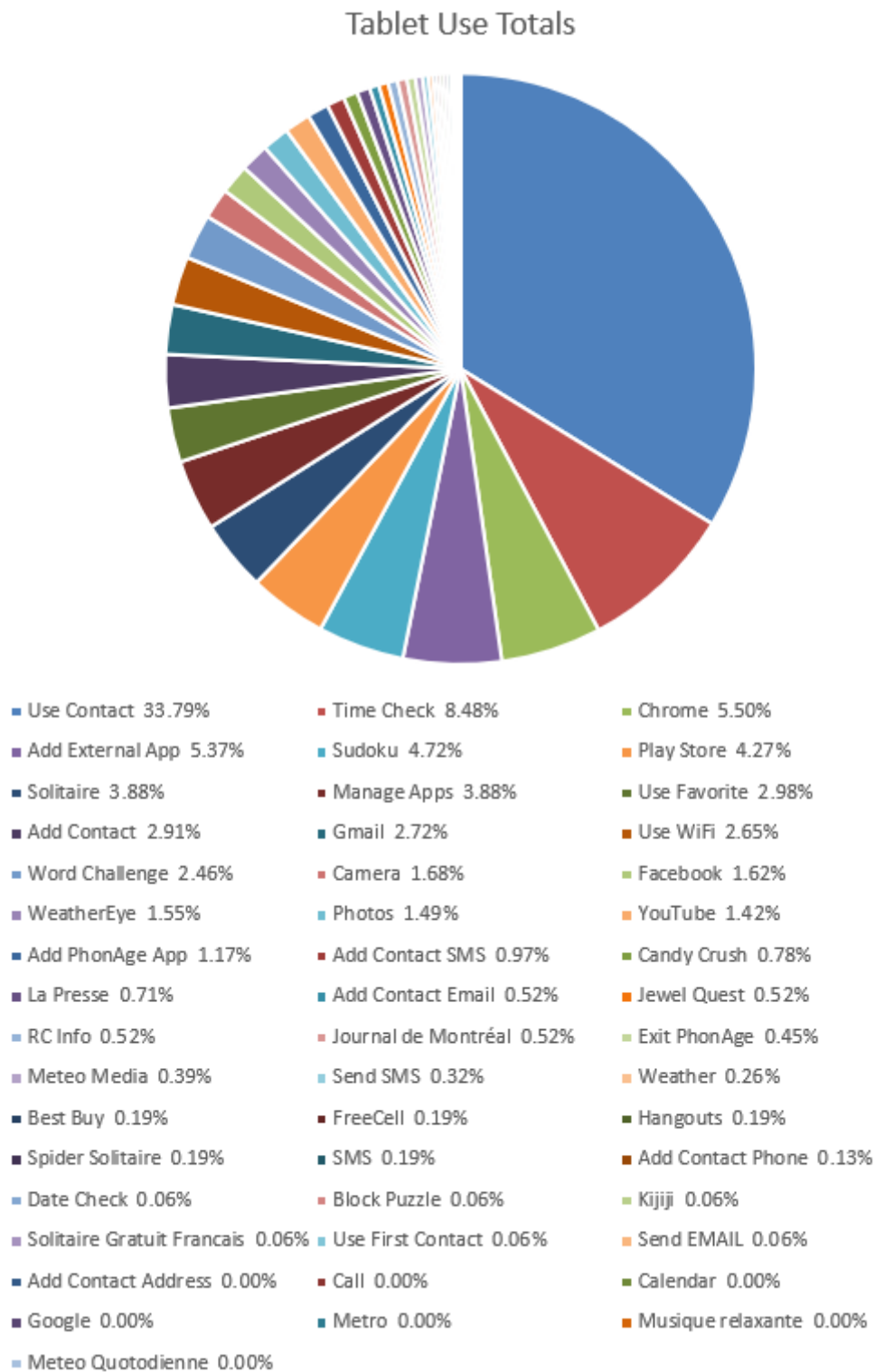


Figure 2 Frequency for tablet use by activity.

Total Count By Sub-Category

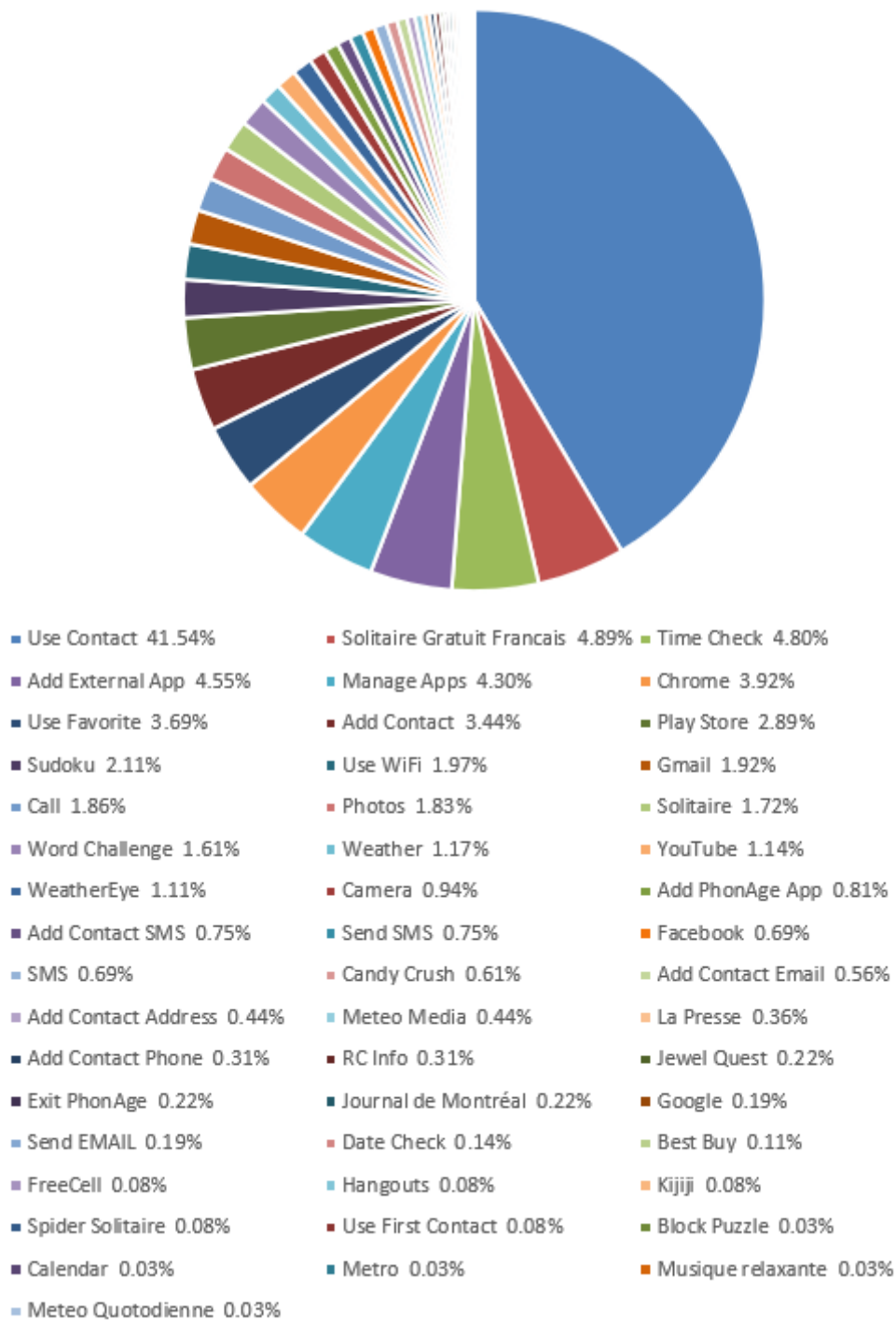


Figure 3 Frequency for total use by activity.

Phone App Use Totals

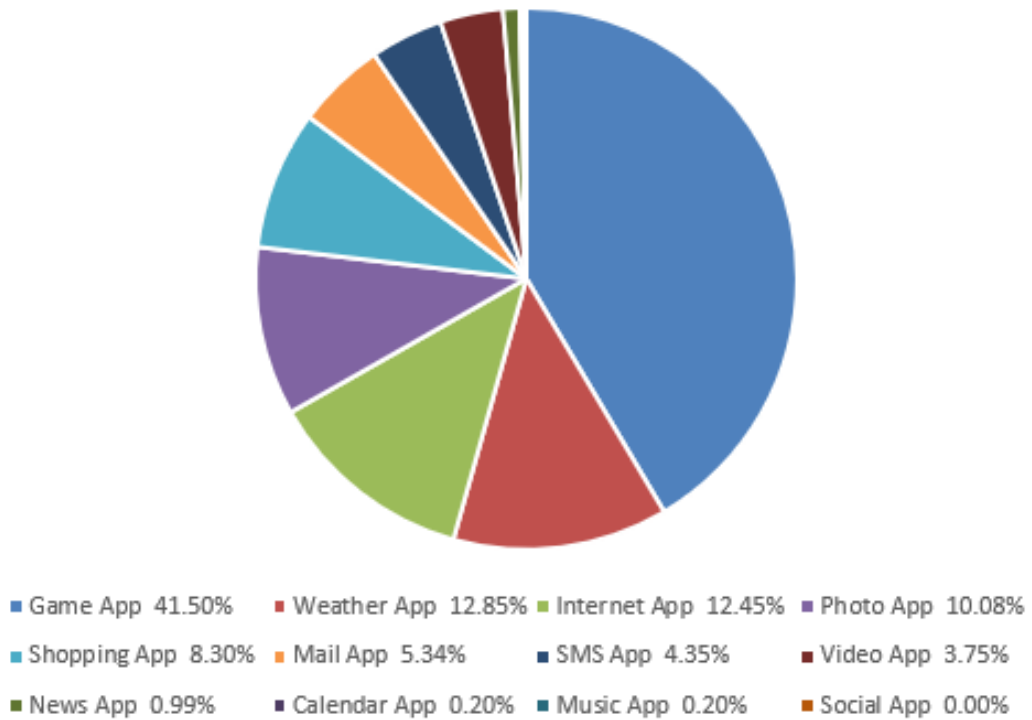


Figure 4 Frequency for phone app use.

Tablet App Use Totals

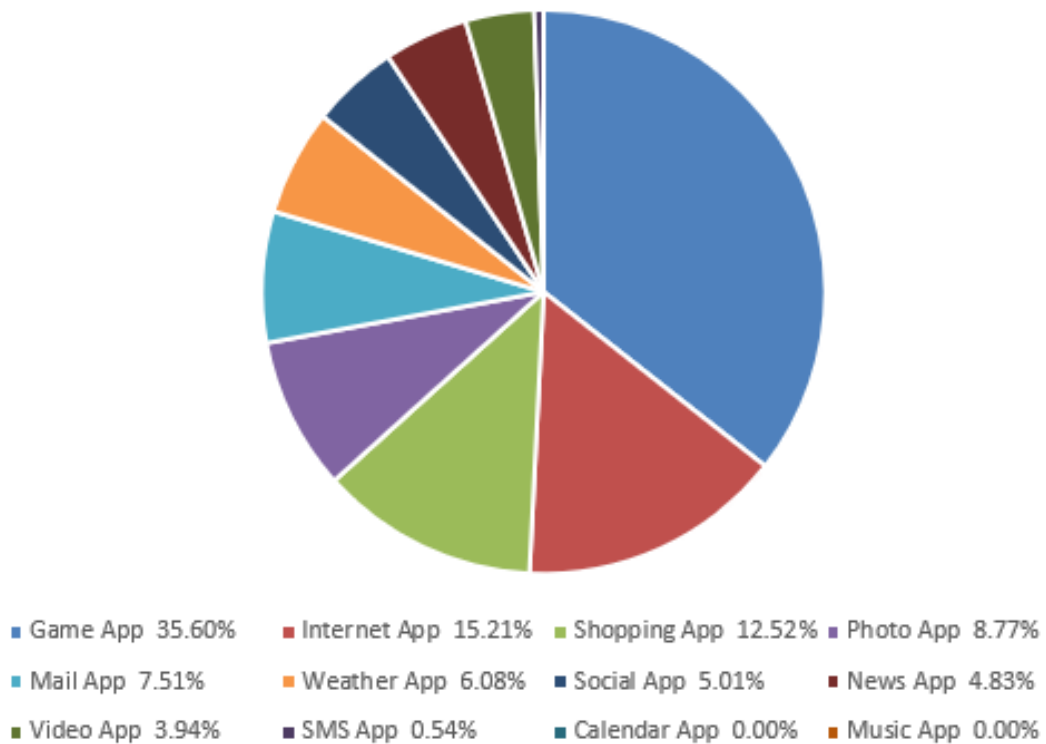


Figure 5 Frequency for tablet app use.

Total Count By Supra-Category (App Use)

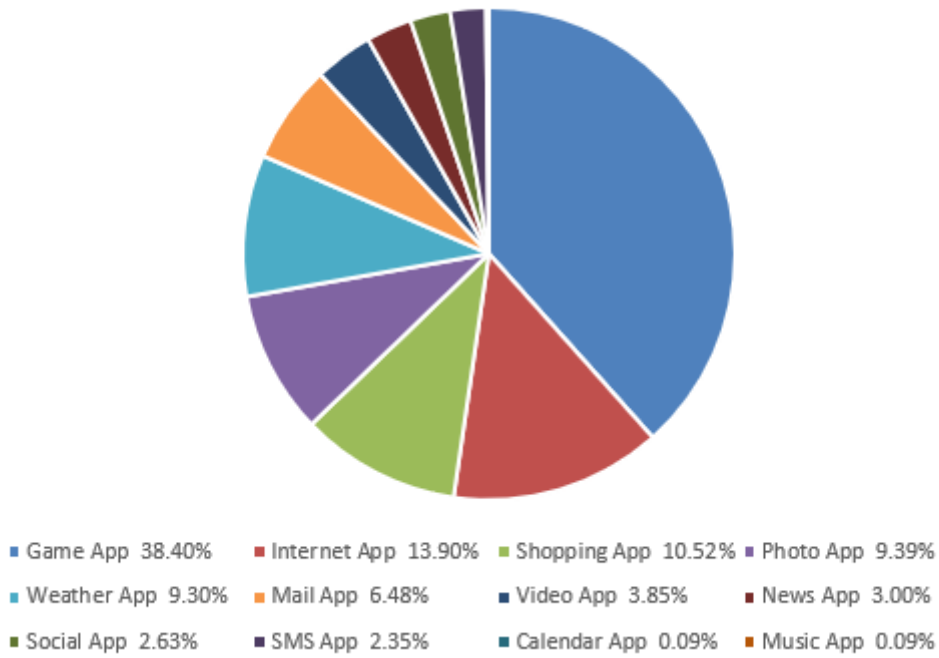


Figure 6 Frequency for total app use.

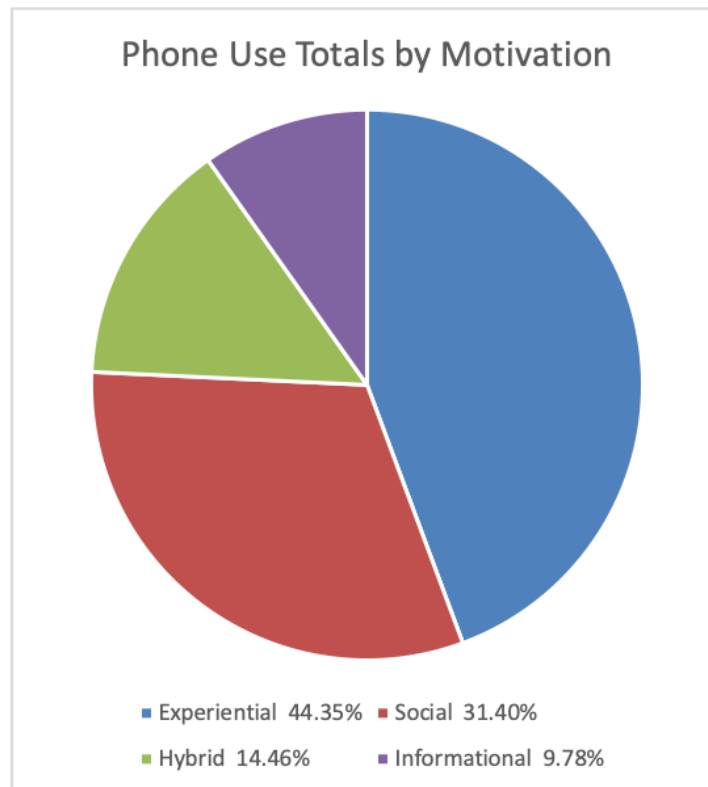


Figure 7 Phone use.

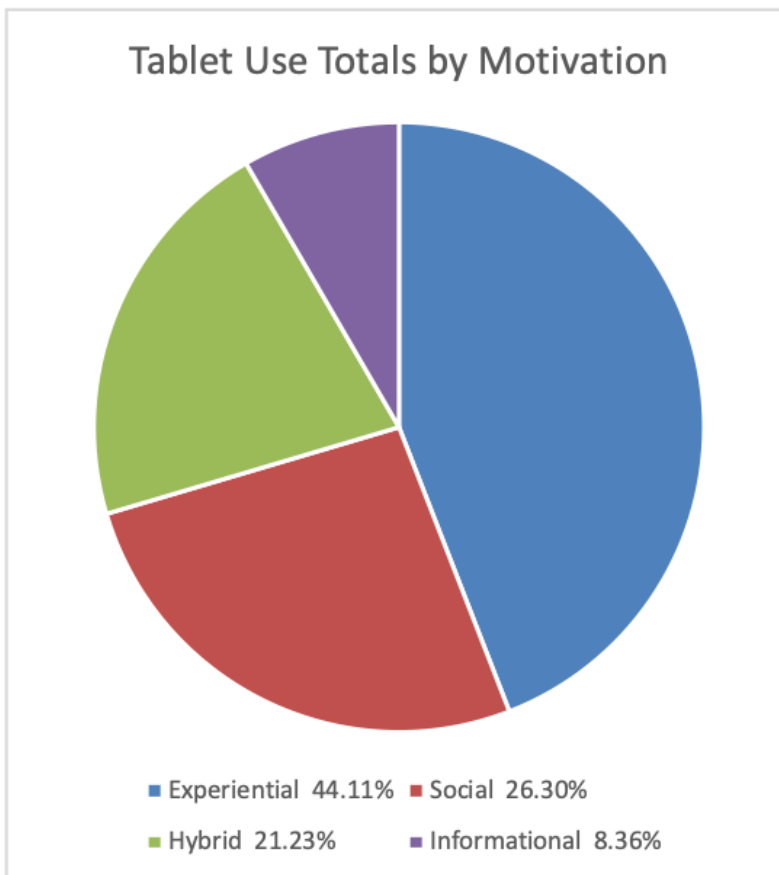


Figure 8 Tablet use.

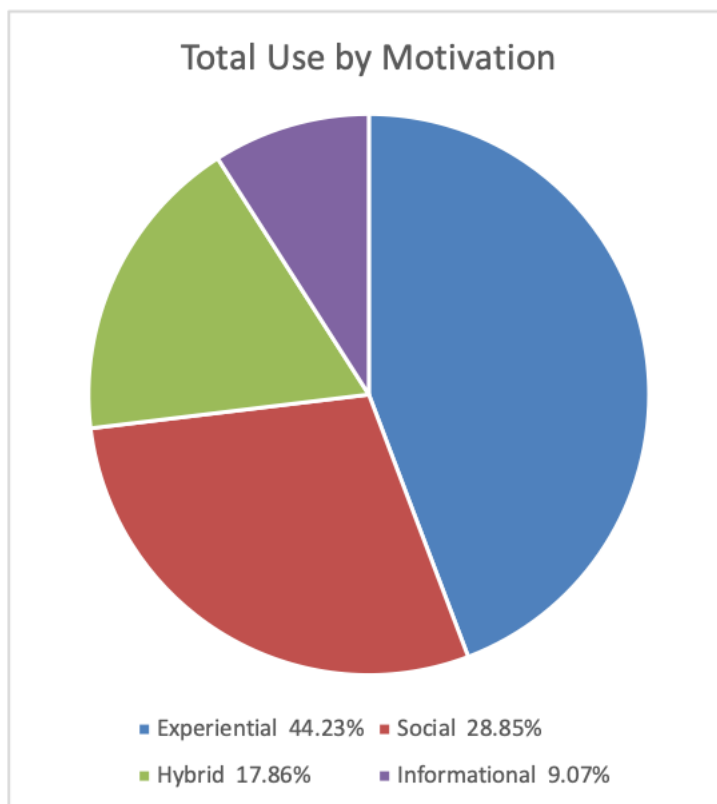


Figure 9 Total use.

Note: Only “Apps” (sub-categories and supra-categories) are included in Tables 4-6 and Figures 4-9. Supra-categories “Action”, “Add App”, “Add Contact” and “Add Contact Data” and related sub-categories are only shown in the overall frequency and percentage tables (Tables 1-3 and Figures 1-3). As such, the total frequency for Tablets and Phones together is noted as “3601” but the total “Apps”-related frequency for Tablets and Phones together (minus actions and adds) is “1456”. For Tablets alone the comparison is “1545” to “730” and for Phones alone the comparison is “2056” to “726”.

5. Results

This study contributes to the literature by identifying the interests of older adults in terms of the applications and attributes of mobile devices which they actually use in a real context with the new “PhonAge” interface [31] and then by relating the various usage contexts to the [11] ‘informational/ social/ experiential’ motivation framework.

An additional issue which was of interest in the current study was how much time overall was spent on tablets compared to phones and whether app use might vary depending on which type of device was being used. Research conducted by the Pew Research Center [32] indicates that smartphone use and tablet use among older adults has been consistent at around 30% for smartphones and 32% for tablet use by older adults 65+. We were interested in seeing, with our sample, what percent of our overall sample would use the devices at all and whether there was a distinction between smartphone use and tablet use and, if so, for which functions and features/apps. For example, Voumvakis found that iPad use by older adults was often related to social media and reading books [33]. We believed this would make sense given that tablets might better facilitate longer-term or more complex activities or those requiring larger screens or buttons while phones might better facilitate activities typically conducted outside of the house, while moving, or in physical social situations.

Frequency statistics (Figures 1 through 9) are used for illustrative purposes however, comparative statistics cannot be employed due to the small sample size. Still, from the numbers we can see some meaningful comparisons and tendencies that provide insights on an exploratory level and support the categorization of uses proposed in the previous study on a sample with 103 participants, where it was possible to utilize ANOVA statistics to show the existence of the 3 categories (social, experiential and informational apps) which we use to categorize the various apps plugged into the PhoneAge interface.

5.1 Proposition 1

The results of this exploratory usage study provide initial support for the proposition that there is (a) a difference in use both between total phone and tablet use as well as (b) the apps that these are used for.

(a) Overall, by comparing the number of interactions between participants and two types of devices, we observe that participants favoured using phones (57.10%) slightly over tablets (42.90%).

(b) As proposed, the nature of the apps usage by participants varied by device. In terms of tablet use, indeed, while game apps overall were actually used slightly more often on phones (35.6% for tablets vs 41.5% for phones - a skew which may be related to the free solitaire app available on the phone and which is a little quicker to play ‘on the fly’), more complex experiential games such as

Sudoku were seen to have a higher level of play on tablets (4.72% on tablets vs 0.15% on phone). Similarly, the larger buttons and screens facilitated by tablets may have led to more involvement with internet search ('Chrome' in this study) (15.21% for tablets compared to 12.45% for phones) and use of shopping apps (12.52% for tablets vs 8.30% for phones). Social/experiential interactions involving video were also slightly more common on tablets (3.94% on tablets vs. 3.75% on phones). As regards informational activities, those which would require more time, or which might have an experiential aspect showed higher use on tablets. For example, news apps showed 4.83% use on tablets compared to 0.99% use on phones.

In the case of phone use, there was more prevalent use to enable those activities conducted on the fly (i.e., experiential such as taking or showing photos), (10.08% on phones vs. 8.77% on tablets). That said, the difference here was not large, indicating a desire to not only take and show photos on the fly, but to also be able to see them 'on their own time' in a seated environment, which might be better facilitated with a tablet. In social situations where you might want input from others (i.e., social such as add contact), this feature was distinctly utilized much more on phones (3.84% on phones vs 2.91% on tablets). Finally, informational use of phones was clearly strongly related to the main function of phones as a mobile device to enable phone calling (3.26% on phones vs 0% on tablets) and using contacts (47.37% on phones vs. 33.79% on tablets). Informational use requiring shorter time periods/with less complex information, such as the weather app, showed higher access rates through phones (12.85% on phones compared to 6.08% on tablets).

5.2 Proposition 2

In our previous research [11], in a study based on the data from 103 participants, as proposed, we found early support for the proposition that the use of mobile applications is driven by 3 motives: social, experiential and informational. 'Social' motive/apps include applications such as 'add contact', 'add contact data', 'mail app', 'photo app', 'SMS app' and 'social app'. Secondly, older adults are using experiential applications that enable them to 'stay informed and amused' in their environment. These applications include 'game app', 'music app', 'video app' and 'add app'. The third category corresponds to informational or 'practical' motive/type of applications. These include apps such as 'calendar app', 'news app' and 'weather app'. Finally, there were some apps which appear to draw on multiple motivations, so we called these 'hybrid': 'shopping app' and 'internet app'.

Interestingly, we see the 'experiential' app use is not only the highest across the board, but very similar between phone and tablet use (44.35% for phone use and 44.11% for tablet use; 44.23% total). The dominance of the experiential motive for mobile device use by older adults is a theme which resonates with our past research [11]. The second highest use was for socially-motivated activities and this basis for utilization was stronger with phones (31.4% versus 26.3% for tablets). While informational use of devices was fairly similar across the two types, phone use was slightly more preferred (9.78% for phones vs 8.36% for tablets). Finally, hybrid activities – shopping and internet use - held a stronger command with tablets (21.23% vs 14.46% for phones).

6. Discussion and Implications

Our results show that, in terms of mobile applications desired by the older adult market, there are three key needs/motivations which have been identified: experiential, social and informational.

This typology related to device use with older adults was first suggested by Reid et al. in 2017 [11] and the current study, while exploratory in nature, adds further backing to these findings.

7. Conclusions

This study demonstrates that older adults' interest in and use of mobile applications is linked to the nature of the devices they are using, and the devices on which they use specific apps.

The usage patterns of older adults show a marked use of social and experiential applications as opposed to those more purely informational such as news or weather search. In particular, experiential applications showed more overall 'time' usage than social ones, which is a particularly interesting finding. Playing games on the devices was something that older adults asked for specifically, which had not really been foreseen by the researchers. Once added to the devices, these became the number one time use on both devices, and this was a result we had not initially anticipated.

Acknowledgments

The authors would like to acknowledge the generous financial support of the Fonds de recherche du Quebec nature et technologie (FQRNT), awarded through the INTER research team, the University of Sherbrooke, Bishop's University (as well as for the donation of devices to participants at the end of the study), The Canadian Foundation for Innovation, and NSERC. Finally, the authors would like to thank the Reseau and their staff for their role in assisting with participation in the study.

Author Contributions

Susan Reid and Bessam Abdulrazak: Project Development, Data Collection and Article Writing. Tianqi Xiao: Data Analysis and Presentation.

Competing Interests

The authors have declared that no competing interests exist.

References

1. Mason JB, Bearden WO. Satisfaction/dissatisfaction with food shopping among elderly consumers. *J Consum Aff.* 1979; 13: 359-369.
2. World Health Organization. World health report 2013: Research for universal health coverage [Internet]. Geneva: World Health Organization; 2013. Available from: https://www.afro.who.int/sites/default/files/2017-06/9789240690837_eng.pdf.
3. U. N. DESA. World population prospects 2019 [Internet]. New York: United Nations, Department of Economic and Social Affairs; 2019. Available from: <https://www.un.org/development/desa/pd/news/world-population-prospects-2019-0>.
4. Pew Research Center (Monica Anderson and Andrew Perrin). Tech adoption climbs among older adults [Internet]. Washington, DC: Pew Research Center; 2017 [cited date 2021 December

- 1st]. Available from: <https://www.pewresearch.org/internet/2017/05/17/tech-adoption-climbs-among-older-adults/>.
5. The American Association of Retired Persons. Tech usage among older adults skyrockets during pandemic [Internet]. Washington, DC: The American Association of Retired Persons; 2021 [cited date 2021 November 28th]. Available from: <https://press.aarp.org/2021-4-21-Tech-Usage-Among-Older-Adults-Skyrockets-During-Pandemic>.
 6. Gurtner S, Reinhardt R, Soyez K. Designing mobile business applications for different age groups. *Technol Forecast Soc Change*. 2014; 88: 177-188.
 7. The Radicati Group. Forecast number of mobile devices worldwide from 2020 to 2025 (in billions) [Internet]. New York: Statista Inc.; 2021. Available from: <https://www.statista.com/statistics/245501/multiple-mobile-device-ownership-worldwide/>.
 8. Saracchini R, Catalina C, Bordoni L. Tecnología asistencial móvil, con realidad aumentada, para las personas mayores. *Comunicar*. 2015; 22: 65-74.
 9. Ni Q, Garcia Hernando AB, De la Cruz IP. The elderly's independent living in smart homes: A characterization of activities and sensing infrastructure survey to facilitate services development. *Sensors*. 2015; 15: 11312-11362.
 10. Luna-Garcia H, Mendoza-Gonzalez R, Alvarez-Rodriguez FJ. Design patterns to enhance accessibility and use of social applications for older adults. *Comunicar*. 2015; 23: 85-94.
 11. Reid SE, Abdulrazak B, Alas M. The underlying motivations for mobile device use by seniors. *J Health Sci*. 2017; 5: 152-157.
 12. Páez DG, Ascanio JR, Giráldez I, Rubio M. Integrating personalized health care and information access for elder people. In: *Ambient intelligence-software and applications*. Heidelberg: Springer; 2011. pp. 33-40.
 13. Arfaa J, Wang YK. A usability study on elder adults utilizing social networking sites. In: *International conference of design, user experience, and usability*. Cham: Springer; 2014. pp. 50-61.
 14. Abascal J, Civit A. Universal access to mobile telephony as a way to enhance the autonomy of elderly people. *Proceedings of the 2001 EC/NSF workshop on Universal accessibility of ubiquitous computing: Providing for the elderly*; 2001 May 22nd; Alcácer do Sal Portugal. New York, NY, USA: Association for Computing Machinery. pp. 93-99.
 15. Petrovčič A, Fortunati L, Vehovar V, Kavčič M, Dolničar V. Mobile phone communication in social support networks of older adults in Slovenia. *Telemat Inform*. 2015; 32: 642-655.
 16. Ling R. Should we be concerned that the elderly don't text? *Inf Soc*. 2008; 24: 334-341.
 17. Eek M, Wressle E. Everyday technology and 86-year-old individuals in Sweden. *Disabil Rehabilitation Assist Technol*. 2011; 6: 123-129.
 18. Mitzner TL, Boron JB, Fausset CB, Adams AE, Charness N, Czaja SJ, et al. Older adults talk technology: Technology usage and attitudes. *Comput Hum Behav*. 2010; 26: 1710-1721.
 19. Leung R, Tang C, Haddad S, Mcgrenerre J, Graf P, Ingriany V. How older adults learn to use mobile devices: Survey and field investigations. *ACM Trans Access Comput*. 2012; 4: 1-33.
 20. Ferreira KD, Lee CG. An integrated two-stage diffusion of innovation model with market segmented learning. *Technol Forecast Soc Change*. 2014; 88: 189-201.
 21. Krishnaswami A, Beavers C, Dorsch MP, Dodson JA, Masterson Creber R, Kitsiou S, et al. Gerotechnology for older adults with cardiovascular diseases: JACC state-of-the-art review. *J Am Coll Cardiol*. 2020; 76: 2650-2670.

22. Angell R, Megicks P, Memery J, Heffernan T, Howell K. Understanding the older shopper: A behavioural typology. *J Retail Consum Serv.* 2012; 19: 259-269.
23. Arnold MJ, Reynolds KE. Hedonic shopping motivations. *J Retail.* 2003; 79: 77-95.
24. Megicks P, Memery J, Williams J. Influences on ethical and socially responsible shopping: Evidence from the UK grocery sector. *J Mark Manag.* 2008; 24: 637-659.
25. Stone R. Linear expenditure systems and demand analysis: An application to the pattern of British demand. *Econ J.* 1954; 64: 511-527.
26. Westbrook RA, Black WC. A motivation-based shopper typology. *J Retail.* 1985; 61: 78-103.
27. Williams RH, Painter JJ, Nicholas HR. Policy-oriented typology of grocery shoppers. *J Retail.* 1978; 54: 27-42.
28. Deci EL, Ryan RM. The "what" and " why" of goal pursuits: Human needs and the self-determination of behavior. *Psychol Inq.* 2000; 11: 227-268.
29. Reid SE, Abdulrazak B, Alas M. An exploratory framework assessing intrinsic and extrinsic motivators related to mobile device applications and attributes for the canadian seniors. *Proceedings of the International Conference on Computers Helping People with Special Needs; 2016 July 13th-15th; Linz, Austria.* Cham: Springer.
30. Traxler J, Vosloo S. Introduction: The prospects for mobile learning. *Prospects.* 2014; 44: 13-28.
31. Abdulrazak B, Malik Y, Arab F, Reid S. PhonAge: Adapted smartphones to assist elderly in age friendly cities. *Proceedings of the 11th International Conference On Smart homes and health Telematics (ICOST); 2013 June 19th-21st; Singapore.*
32. Pew Research Center. Mobile technology fact sheet [Internet]. Washington, DC: Pew Research Center; 2016 [cited date 2021 July 28th]. Available from: <https://www.pewresearch.org/internet/fact-sheet/mobile/>.
33. Voumvakis MJ. Examination of the usability of the ipad among older adult consumers. London: The University of Western Ontario; 2014.



Enjoy *OBM Geriatrics* by:

1. [Submitting a manuscript](#)
2. [Joining in volunteer reviewer bank](#)
3. [Joining Editorial Board](#)
4. [Guest editing a special issue](#)

For more details, please visit:

<http://www.lidsen.com/journals/geriatrics>