Exploratory Mobile Application Use by Category and Frequency

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Abstract

The research presents an exploratory study of mobile application use in terms of application category and frequency of use. Given the growth in the number and capabilities of mobile applications, such an investigation has the potential to add significant value. Data collected for the study used a questionnaire distributed electronically to students enrolled in one of three business courses at a medium-size university in the United States. The results from the respondents showed that the most commonly found app on respondents' smartphones were in the category of Social Networking. The respondents also provided responses regarding their most frequently used application and least frequently used application. The most and least frequently used applications were both from the Social Networking category. Furthermore, the specific social networking applications reported were consistent across the most and least frequently used applications. The remaining broad categories for these applications were consistent between most frequently and least frequently used applications. However, there was little or no consistency regarding the specific applications across the most frequently used and least frequently used applications. Additionally, respondents reported an average of almost 4.5 hours of mobile application use daily, 61% of which was on the respondent's most frequently used application. These results provide the basis for the presented discussions, conclusions, and implications.

Introduction

Due to the growth in the number and capabilities of smartphones, mobile applications (apps) have become ubiquitous in society [1, 2]. As a result, understanding the degree of app use by individuals in terms of frequency and type is a meaningful undertaking. For those who develop or manage apps, the answers to these questions help define the market and the viability for these apps. The purpose of the research presented below is to initiate an exploration of these issues, beginning with the target population of frequent app users, in this case university students in the United States. Specifically, this target population is studied for their relatively high degree of app use, the types of apps used on their smartphones, and the apps they frequently and infrequently use.

The context making such an investigation important is grounded in increased smartphone and mobile application availability. Time Magazine reported in 2014 that users were only using the apps that came pre-loaded on their device [3]. However, this has changed in recent years. Individuals interact with 10 apps a day on their device and download on average five apps per

month [6]; [4]; [5]. In terms of app availability, iTunes and Google app stores provide over 2.8 million apps with revenues from the use and sale of apps increasing significantly. The 2017 projected revenue for apps is around $138 billion in gross consumer spending [6, 7]. In this environment of potential revenue and market opportunity, understanding an individual's app use and most and least frequently used apps has value [8, 9].

Data Collection

Research participants were asked to complete an online questionnaire accessed by a link sent via email. The participants were undergraduate students enrolled in business courses at a medium-sized university in the western United States. Undergraduate students typically fall in the age range of 18 to 22 years old, which is advantageous as they have the highest percentage of smartphone users in the U.S. with 94% [1]. The students were enrolled in one of three business courses. The first course was an introduction to business course with most of the students being in their freshman or first year of college. These students accounted for 21% of the sample respondents. The second course was a required business course with students typically in their junior or third year of college. These students accounted for 49% of the sample respondents. The third course was a required course for certain business majors and an elective course for other majors with students typically in their junior or third year of college. These students accounted for 30% of the sample respondents. Students were only allowed to complete one questionnaire, even if they were enrolled in more than one of these three courses. On the questionnaire, the participants were asked to complete four fill-in type questions. First, respondents were asked to record the percentage of apps on their phone by broad category. Second, they were asked for their hours of app use overall and hours of use on their most frequently used app. The third and fourth questionnaire items asked respondents to provide their most frequently and least frequently used apps, respectively. The results from the responses are displayed in Tables 1-4.

Results

Based on the means reported in Table 1, the Social Networking category had the greatest percentage of apps at 32%. This was followed by the Entertainment category at 16%. The least common category reported was Travel at 2.70%. Respondents reported their remaining categories of apps from just over 4% to almost 11%. Table 2 displays the daily hours of respondent use of all their apps and the hours spent on their most frequently used app each day. The respondent reported over 4 hours a day using all apps. In comparison, these respondents reported just over 2.5 hours each day using their most frequently used app.

Table 3 shows respondents' most frequently used app by broad category and, within these categories, specific application names. Seventy-four percent of the respondents reported their most frequently used app as being in the category of Social Networking. The second most common app category was the Entertainment category at 10%. The Business Productivity category followed at just over 9%. The remaining categories all had 2.6% or less of the respondents selecting these as containing their most frequently used mobile app. Similarly, Table 4 reports the respondents' least frequently used apps by these same categories. Just over 24% of the respondents' least frequently used app was in the Social Networking category. The Entertainment apps were just over 20%, Business Productivity apps followed at just over 15%.

The Shopping apps category was reported by almost 12% of the respondents. The remaining least frequently used apps by category were Travel at over 8%, Medical and Fitness at over 6%. The "catch-all" category of Other was selected by almost 7% of the respondents. All the remaining categories had less than 3% of the respondents' least frequently used app.

Discussion

In terms of percentages of mobile application use, the respondents' most commonly downloaded app category was Social Networking at 32%. The second most commonly reported app group fell into the category of Entertainment at 16% of the respondents. Not only were these two categories the most commonly reported frequently used app, these were also reported as the least frequently used app categories. These results imply that these two categories are dichotomous in regard to the respondents' frequency of app use. At least in this target population, the sample respondents either significantly used an app in these categories or made relatively little use of such apps.

Social Networking apps made up 74% of the frequently used apps and 24% of the least frequently used apps. There was also consistency among the specifically named Social Networking apps for both frequently used and infrequently used apps. The common apps listed for both levels of use were Snapchat, Instagram, Facebook, Twitter, and Messaging Apps. Entertainment apps made up 10% for the most frequently used apps and 20% of the responses in the least frequently used category. However, unlike the Social Networking category, there was little to no consistency between the specific apps named as most frequently used and least frequently used. Examples of the specific most frequently used apps are Spotify and YouTube, while for the least frequently used apps these examples include iBook, iTunes, Netflix, and Pinterest.

The next two categories by number of apps on the respondents' phones, were Business Productivity at just less than 11% and Games at almost 9%. Business Productivity apps were listed as 9% for the most frequently used apps and 15% of the least frequently used apps. The most commonly listed specific frequently used apps were web browsers and email programs. Web browsers and stock apps dominated the list of least frequently used Business Productivity apps. It was the case that the Games category was on the most frequently used app list at 2% of these apps and on the least frequently used app list at just under 3%. The intervening categories on the least frequently used app list were Shopping at slightly less than 12%, Travel at slightly more than 8%, and Medical and Fitness at slightly less than 6%. Because the participants were college students, apps in the Shopping and Travel category may be less frequent behaviors during college and the participants behavior may change post-college.

Data regarding the participants' daily use of apps was also collected and is reported in Table 2. The participants reported almost 4.5 hours of app use per day across all their applications. Over 2.5 hours of this app use was on the participants' most frequently used app. This means that 61% of the participants' time spent using apps in a day was on their most frequently used app, on average. Considering the amount of time participants spend on apps in a day, it is important to contemplate this result related to app development. If the app is provided for free, advertisements and in-app purchases could be added. An app developer would need design the app to

accommodate advertisements and purchases. If a business is considering developing an app, determining the appropriate social networking app or a unique aspect of social networking for the target population could be advantageous.

Conclusions

There is consistency among the first three categories of apps across the percentage of apps on the participants' phones, as well as their reported most frequently used apps and least frequently used apps. Besides the most reported app category of Social Networking, there was little consistency in the specific apps reported across the most frequently and least frequently used applications by broad category. Based on the reported hours of app use it appears that these participants spent the majority of their time using apps on their most frequently used app.

International and Managerial Implications

The empirical results provide some guidance to app developers and merchandisers. Given the target population of participants, who are frequent mobile app users, the results indicate the types of apps that may be viable in the marketplace. Furthermore, these results can indicate the competitive intensity in these various market segments. From an international perspective, it should be remembered that the target population is from a single country. Additionally, the target population has a rather narrow segment of potential participants dominated by 18 to 21 year old university students. It would be of interest to see how these results vary across international boundaries and cultures as well as in wider target populations.

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Table 1. Percentage of Mobile Applications on Respondents' Phone by Category

Category	n	Mean	Standard Deviation	Min	Max	Lower Quartile	Median	Upper Quartile
Social Networking	152	32.03	23.25	0.00	90.00	11.50	30.00	50.00
Entertainment	150	16.20	13.22	0.00	70.00	5.00	15.00	20.00
Business Productivity	152	10.52	13.53	0.00	80.00	0.50	5.00	10.00
Games	152	8.77	9.40	0.00	40.00	0.00	5.00	14.50
News	152	5.99	9.80	0.00	85.00	0.00	4.00	10.00
Shopping	152	5.18	5.73	0.00	30.00	0.00	5.00	10.00
Food & Drink	150	4.29	7.18	0.00	70.00	0.00	2.00	5.00
Medical & Fitness	151	4.26	6.11	0.00	40.00	0.00	3.00	5.00
Travel	152	2.70	4.18	0.00	25.00	0.00	0.00	5.00

Table 2. Hours of Respondent Mobile Application Use Daily

App	n	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile
Most Frequently Used App	150	2.59	2.85	1	2	3
All Apps	147	4.28	3.00	2	3	5

Table 3. Respondents' Most Frequently Used Applications by Category (n=150)

Category	Application	Number	Percentage Within Category	Percentage of Category
Social Networking		111		74.00%
	Snapchat	36	32.43%	
	Instagram	28	25.23%	
	Facebook	26	23.42%	
	Twitter	13	11.71%	
	Messaging Applications	6	5.41%	
	Facetime	1	0.90%	
	Whatsapp	1	0.90%	
Entertainment		15		10.00%
	Spotify	6	40.00%	
	YouTube	5	33.33%	
	Music	1	6.67%	
	Pandora	1	6.67%	
	Soundcloud	1	6.67%	
	Gallery	1	6.67%	
Business Productivity		14		9.33%
	Web Browser: Safari	3	21.43%	
	Web Browser: Chrome	2	14.29%	
	Outlook	3	21.43%	
	Robinhood	2	14.29%	
	Slack	1	7.14%	
	i-Phone Stock	1	7.14%	
	Bank of America	1	7.14%	
	Wells Fargo Banking	1	7.14%	
Games		3		2.00%
	Discord	2	66.67%	
	Clash Royale	1	33.33%	
News		4		2.67%
	Reddit	2	50.00%	
	ESPN	1	25.00%	
	New York Times	1	25.00%	
Shopping		1		0.67%
	eBay	1	100.00%	
Food & Drink		0		0.00%
Medical & Fitness		1		0.67%
	Fitbit	1	100.00%	
Travel		0		0.00%
Other: Educational		1		0.67%
	Duolingo	1	100.00%	

Table 4. Respondents' Least Frequently Used Applications by Category (n=143)

Category	Application	Number	Percentage Within Category	Percentage of Category
Social Networking		35		24.48%
	Snapchat	3	8.57%	
	Instagram	5	14.29%	
	Facebook	3	8.57%	
	Twitter	6	17.14%	
	Messaging Applications	5	14.29%	
	Facetime	1	2.86%	
	Whatsapp	1	2.86%	
	Linkedin	1	2.86%	
	Skype	3	8.57%	
	Find My Friends	2	5.71%	
	Steam	1	2.86%	
	Tumblr	1	2.86%	
	VSCO	1	2.86%	
	Bitmoji	1	2.86%	
	Layout	1	2.86%	
Entertainment		29		20.28%
	i-Tunes	3	10.34%	
	YouTube	1	3.45%	
	Music	1	3.45%	
	Shazam	2	6.90%	
	ABC TV	1	3.45%	
	Soundcloud	1	3.45%	
	Amazon Kindle	2	6.90%	
	iBooks	4	13.79%	
	Fandango	1	3.45%	
	iMovie	1	3.45%	
	Netflix	3	10.34%	
	NFL Mobile	1	3.45%	
	Podcast	1	3.45%	
	Daily Horoscope	1	3.45%	
	Garage Band	1	3.45%	
	GoPro	1	3.45%	
	Guitar Tuner	1	3.45%	
	Pinterest	3	10.34%	
Business Productivity		22		15.38%
	Web Browser: Safari	4	18.18%	
	Google+	1	4.55%	
	Calculator	1	4.55%	
	Stocks	5	22.73%	
	US Bank	1	4.55%	

	Calendar	1	4.55%	
	Photoshop	1	4.55%	
	Hot Schedules	1	4.55%	
	House Party	1	4.55%	
	Instasize	1	4.55%	
	Kalliope	1	4.55%	
	Keynote	2	9.09%	
	Mint	1	4.55%	
	Tips	1	4.55%	
Games		4		2.80%
	Candy Crush	1	25.00%	
	Juggling Game	1	25.00%	
	QooApp	1	25.00%	
	Zedge	1	25.00%	
News		4		2.80%
	Reddit	1	25.00%	
	News	2	50.00%	
	Newsstand	1	25.00%	
Shopping		17		11.89%
	Book Scouter	1	5.88%	
	Apple Wallet	2	11.76%	
	Cash App	1	5.88%	
	iPhone Wallet	1	5.88%	
	Rent Payment	1	5.88%	
	Samsung Pay	1	5.88%	
	Wallet	3	17.65%	
	GOAT	1	5.88%	
	Lbotta	1	5.88%	
	Kidizen	1	5.88%	
	QR Code Reader	1	5.88%	
	SNKRS	1	5.88%	
	Venmo	1	5.88%	
	Wish	1	5.88%	
Food & Drink		1		0.70%
	Tapingo	1	100.00%	
Medical & Fitness		9		6.29%
	Fitbit	1	11.11%	
	Health	5	55.56%	
	My Fitness Pal	1	11.11%	
	Run Keeper	1	11.11%	
	Watch	1	11.11%	
Travel		12		8.39%
	Alaska Airlines	2	16.67%	
	Delta Airlines	2	16.67%	
	Southwest Airlines	1	8.33%	

	Uber	3	25.00%	
	Maps	1	8.33%	
	Drive Mode	1	8.33%	
	Compass	2	16.67%	
Other		10		6.99%
Educational		2	20.00%	
	Blackboard Learn	1		
	TopHat	1		
Weather		2	20.00%	
	Weather	2		
Security		1	10.00%	
	Duo Mobile	1		
Timer		1	10.00%	
	Countdown	1		
House Management		4	40.00%	
	iHome	1		
	LG Smartworld	1		
	Smart Switch	1		
	Our House	1		