Understanding Personal Digital Music Collections

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ABSTRACT
In this paper we present preliminary results from a study to understand how people use and manage personal digital music collections. We conducted a survey of a cross-section of a university community including students, faculty, and staff. Our preliminary findings show that the music collections in our sample follow an exponential distribution curve both in terms of number of songs and collection size in gigabytes. Over 50% of the participants in our survey owned more than one portable music player and many of these were Apple iPods (68%). A majority of respondents (82%) listened to music on their mobile player 2-3 times per week or more, but the frequency of synchronizing mobile devices was more evenly distributed across time.

Keywords
Digital music, personal archiving, digital collections

INTRODUCTION
Much attention has been given to the social and legal issues of music sharing (e.g. P2P file sharing services), but less is understood about the collection building and management of individuals' digital music collections and their use across multiple devices on a day-to-day basis (Bentley et al. 2006).

Size is an important factor in how a collection may be managed. However, few prior studies have reported on music collection sizes (Sease and McDonald, 2009). Furthermore, digital music collections may be synchronized with portable devices and we are not aware of any studies that have specifically looked at this aspect of management.

Sease and McDonald (2009) report on participants with both physical and digital collections and classify a "small" digital collection as less than 1000 songs (7 of 20 participants in their study), "medium" as 1001-5000 (2/20), "large" as 5001-10000 (4/20), and "extra large" as over 10000 (7/20).

Other research on music collections has explored organization and sharing issues. Cunningham, Jones, & Jones (2004) reported participants who distributed their physical collection of CDs across several different listening areas based on their musical preferences for that location. Bentley et al. (2006) report a range of organization schemes from neat to messy, and note "personal categorization schemes" that associate music with personal events, emotions, and themes. Sease and McDonald (2009) found separated, merged, and partially shared collections within a household and noted that some participants used their mobile MP3 players to store a "personalized selection" from a shared digital collection. In a broader study of personal digital archives, Marshall (2006) found that people use external disk drives, writeable optical media (CDs, DVDs), and email attachments for the purposes of music storage and transfer.

METHOD
We designed and conducted a survey to investigate how people manage their music across multiple devices and what backup and recovery methods they use. In this paper, we present preliminary results about the size of participants' collections, the portable music players used, and how often music was synchronized with devices.

The survey was conducted on-line and was designed to take about 10 to 15 minutes to complete. Participants were recruited in mid-March 2010 from our university through a campus-wide, opt-in mass email service. A total of 184 respondents completed the survey. Respondents varied in age from 18 to 67 years (mean=33.7) and were 61% female and 39% male. University staff made up 40% of the respondents, undergraduates 18%, graduate students 24%, faculty 9%, and 18% indicated "other" as their affiliation.

RESULTS

Personal Music Collection Size
To gain perspective on the size of music collections people use and manage, we asked respondents to report the number of songs in their music collection and the amount of disk space in gigabytes occupied by their collection. For both questions, we asked participants to check their collection if possible to help ensure accuracy.
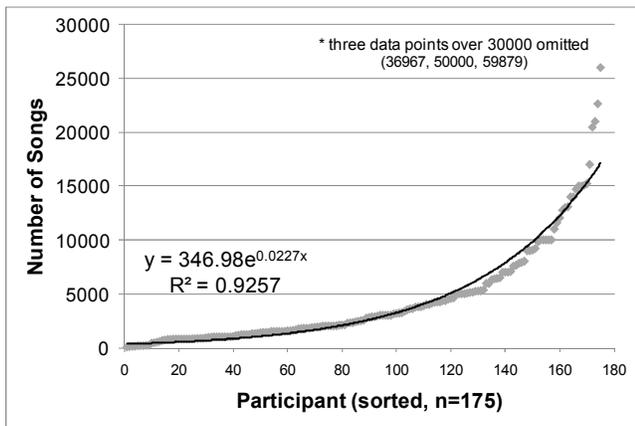
Figure 1. Number of Songs in Respondents' Collections

Figure 1 shows the number of songs in respondents' collection. The y-axis indicates the number of songs in a given collection and the x-axis indicates the participants, sorted by increasing number of songs in their collection (n=175 answered the question). Three outlying data points over 30000 songs (36967, 50000, and 59879) were omitted from this graph to increase the resolution of the data points shown. Two-thirds of the participants reported having collections of 4,500 songs or less, but 10% reported having more than 12,000 songs. We fitted an exponential trend line – shown as the solid black line in Figure 1 – to the data, with an equation, $y = 346.98e^{0.0227x}$, and an R-squared value of 0.92, indicating a good fit. Collection size in gigabytes followed a similar curve.
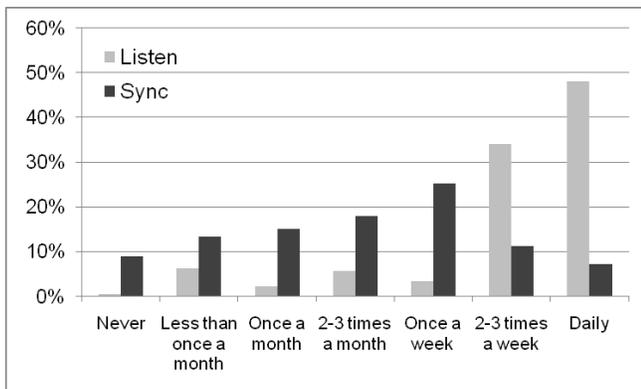

Figure 2. Listening and Synchronization Frequency of Mobile Devices

Portable Music Devices

We asked participants to list "mobile mp3 players" that they own, and provided space to enter up to three devices. Out of 184 respondents, a total of 308 devices were listed for an average of 1.67 devices per respondent: 46% listed only one device, 32% entered two devices, 19% three, and 3% none. Of the 308 devices, 68% were Apple iPods, 13% were Apple iPhones, 10% were MP3 players by other manufacturers, 8% were cell phones by other manufacturers, and 1% were other devices such as e-book readers and handheld video game systems.

Listening and Synchronization Frequency

Figure 2 shows the results of two survey questions. The first question asked how often participants played music on the *first mobile mp3 player* they listed. The second question asked how often they synchronized this device with their music collection. A large majority of respondents (82%) listened to music on their mobile player 2-3 times per week or more, with 48% listening daily. Frequency of synchronization was more evenly spread out, with no response category being indicated by less than 7% or more than 25% of the participants.

DISCUSSION AND FUTURE WORK

The results presented here help establish a better understanding of several factors that play a role in how music collections are used and managed. We found an exponential distribution of collection sizes in our sample, indicating that handful of our participants had very large collections, but that most (66%) had 4,500 songs or less. A large majority (82%) of our participants reported listening to music on a portable MP3 device at least 2 to 3 times per week. However, the frequency at which participants synchronized mobile devices with their music collections was more evenly distributed across the participants, suggesting that there may be synchronization "triggers" that vary from person to person such as needing to change what music is stored on the player for a specific event or use (e.g. before taking it on a vacation), or when new music is purchased.

These preliminary results presented are only a start in our efforts to better understand how people use, manage, synchronize, and backup their music collections. In future analysis, we plan to examine data collected from this survey regarding how and why people perform synchronizations, how they select music to store on devices and computers, and how they deal with music losses and backup/recovery.

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