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MUSIC INFORMATION BEHAVIORS AND SYSTEM PREFERENCES OF UNIVERSITY STUDENTS IN HONG KONG

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ABSTRACT

This paper presents a user study on music information needs and behaviors of university students in Hong Kong. A mix of quantitative and qualitative methods was used. A survey was completed by 101 participants and supplemental interviews were conducted in order to investigate users' music information related activities. We found that university students in Hong Kong listened to music frequently and mainly for the purposes of entertainment, singing and playing instruments, and stress reduction. This user group often searches for music with multiple methods, but common access points like genre and time period were rarely used. Sharing music with people in their online social networks such as Facebook and Weibo was a common activity. Furthermore, the popularity of smartphones prompted the need for streaming music and mobile music applications. We also examined users' preferences on music services available in Hong Kong such as YouTube and KKBox, as well as the characteristics liked and disliked by the users. The results not only offer insights into non-Western users' music behaviors but also for designing online music services for young music listeners in Hong Kong.

1. INTRODUCTION AND RELATED WORK

Seeking music and music information is prevalent in our everyday life as music is an indispensable element for many people [1]. People in Hong Kong are not an exception. Hong Kong has the second highest penetration rate of broadband Internet access in Asia, following South Korea[1]. Consequently, Hong Kongers are increasingly using various online music information services to seek and listen to music, including iTunes, YouTube, Kugou, Sogou and Baidu[2]. However, our current understanding of their music information needs and behaviors are still lacking, as few studies explored user populations in Hong Kong, or in any non-Western cultures.

Hong Kong is a unique location that merges the West-ern and Eastern cultures. Before the handover to the Chinese government in 1997, Hong Kong had been ruled by the British government for 100 years. This had resulted in a heavy influence of Western culture, although much of the Chinese cultural heritage has also been preserved well in Hong Kong. The cultural influences of Hong Kong to the neighboring regions in Asia were significant, especially in the pre-handover era. In fact, in the 80s and throughout the 90s, Cantopop (Cantonese popular music, sometimes referred to as HK-pop) was widely popular across many Asian countries, and produced many influential artists such as Leslie Cheung, Anita Mui, Andy Lau, and so on [2]. In the post-handover era, there has been an influx of cultural products from mainland China which is significantly affecting the popular culture of Hong Kong [8]. The cultural history and influences of Hong Kong, especially paired with the significance of Cantopop, makes it an interesting candidate to explore among many non-Western cultures.

Of the populations in Hong Kong, we specifically wanted to investigate young adults on their music information needs and behaviors. They represent a vibrant population who are not only heavily exposed to and fast adopters of new ideas, but also represent the future workforce and consumers. University students in Hong Kong are mostly digital natives (i.e., grew up with access to computers and the Internet from an early age) with rich experience of seeking and listening to digital music. Additionally the fact that they are influenced by both Western and Eastern cultures, and exposed to both global and local music make them worthy of exploring as a particular group of music users.

There have been a few related studies which investigated music information users in Hong Kong. Lai and Chan [5] surveyed information needs of users in an academic music library setting. They found that the frequencies of using score and multimedia were higher than using electronic journal databases, books, and online journals. Nettamo et al. [9] compared users in New York City and those in Hong Kong in using their mobile devices for music-related tasks. Their results showed that users' envi-

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[1] http://www.itu.int/ITU-D/ICTEYE/Reporting/Dynamic ReportWizard.aspx

[2] http://hk.epochtimes.com/b5/11/10/20/145162.htm

ronment and context greatly influenced their behaviors, and there were cultural differences in consuming and managing mobile music between the two user groups. Our study investigates everyday music information behaviors of university students in Hong Kong, and thus the scope is broader than these studies.

In addition to music information needs and behaviors, this study also examines the characteristics of popular music services adopted by university students in Hong Kong, in order to investigate their strengths and weaknesses. Recommendations for designing music services are proposed based on the results. This study will improve our understanding on music information behaviors of the target population and contribute to the design of music services that can better serve target users.

2. METHODS

A mix of quantitative and qualitative methods was used in order to triangulate our results. We conducted a survey in order to collect general information about target users' music information needs, seeking behaviors, and opinions on commonly used music services. Afterwards, follow-up face-to-face interviews of a smaller user group were conducted to collect in-depth explanations on the themes and patterns discovered in the survey results. Prior to the formal survey and interviews, pilot tests were carried out with a smaller group of university students to ensure that the questions were well-constructed and students were able to understand and answer them without major issues.

2.1 Survey

The survey was conducted as an online questionnaire. The questionnaire instrument was adapted from the one used in [6] and [7], with modifications to fit the multilingual and multicultural environment. Seventeen questions about the use of popular music services were added to the questionnaire. The survey was implemented with Lime-Survey, an open-source survey application, and consisted of five parts: demographic information, music preference, music seeking behaviors, music collection management, and opinions on preferred music services. Completing the survey took approximately 30 minutes, and each participant was offered a chance to enter his/her name for a raffle to win one of the three supermarket gift coupons of HKD50, if they wished.

The target population was students (both undergraduate and graduate) from the eight universities sponsored by the government of Hong Kong Special Administrative Region. The sample was recruited using Facebook due to its popularity among university students in Hong Kong. Survey invitations were posted on Facebook, initially through the list of friends of the authors, and then further disseminated by chain-referrals.

2.2 Interviews

Semi-structured interviews were conducted after the survey data were collected and analyzed, in order to seek in-depth explanations to support the survey findings. Face-to-face interviews were carried out individually with five participants from three different universities. The interviews were conducted in Cantonese, the mother tongue of the interviewees, and were later transcribed and translated to English. Each interview lasted up to approximately 20 minutes.

3. SURVEY DATA ANALYSIS

Of the 167 survey responses collected, 101 complete responses were analyzed in this study. All the survey participants were university students in Hong Kong. Among them, 58.4% of were female and 41.6% of them were male. They were all born between 1988 and 1994, and most of them (88.1%) were born between 1989 and 1992. Therefore, they were in their early 20s when the survey was taken in 2013. Nearly all of them (98.0%) were undergraduates majoring Science/Engineering (43.6%), Social Sciences/Humanities (54.0%) and Other (2.0%).

3.1 Music Preferences

In order to find out participants' preferred music genres, they were asked to select and rank up to five of their favorite music genres from a list of 25 genres covering most Western music genres. To ensure that the participants understand the different genres, titles and artist names of example songs representative of each genre were provided. The results are shown in Table 1 where each cell represents the number of times each genre was mentioned with the rank corresponding in the column. Pop was the most preferred genre among the participants, followed by R&B/Soul and Rock. We also aggregated the results by assigning reversely proportional weights to the ranks (1st: 5 points, and 5th: 1 point). The most popular music genres among the participants were Pop (311 pts), R&B/Soul (204 pts), Rock (109 pts), Gospel (88 pts) and Jazz (86 pts).

	1st	2nd	3rd	4th	5th	Total	Total (%)
Pop	43	14	9	4	5	75	74.2%
R&B	7	29	11	7	6	60	59.4%
Rock	6	9	10	3	7	35	34.7%
Gospel	9	6	2	4	5	26	25.7%
Jazz	6	8	3	5	5	27	26.7%

Table 1. Preferences on music genres

Moreover, as both Chinese and English are official languages of Hong Kong, participants were also asked to rank their preferences on languages of lyrics. The five options were English, Cantonese, Mandarin, Japanese and Korean. The last three were included due to popularity of songs from nearby countries/regions in Hong Kong, including mainland China and Taiwan (Mandarin), Japan (Japanese), and Korea (Korean). As shown in Table 2, English was in fact highly preferred, followed by Cantonese. Mandarin was mostly ranked at the second or third

place, while Korean and Japanese were ranked lower. We also aggregated the answers and found that the most popular languages in songs are English (394 points), Cantonese (296 points), and Mandarin (223 points).

	1st	2nd	3rd	4th	5th	Total	Total (%)
English	46	27	16	3	2	94	93.1%
Cantonese	31	20	15	7	2	75	74.3%
Mandarin	13	23	20	2	2	60	59.4%
Korean	6	15	6	16	14	57	56.4%
Japanese	5	5	10	16	16	52	51.5%

Table 2. Preferences on languages of song lyrics

3.2 Music Seeking Behaviors

When asked about the type of music information they have ever searched, most participants indicated preferences on audio: MP3s and music videos (98.0%), music recordings (e.g., CDs, vinyl records, tapes) (94.1%), and music multimedia in other formats (e.g., Blue-ray, DVD, VHS) (88.1%). Written forms of music information were sought by fewer respondents: books on music (73.2%), music magazines (69.3%), and academic music journals (63.4%). Approximately one out of three participants even responded that they have never sought music magazines (30.7%) or academic music journals (36.6%).

As for the frequency of search, 41.6% of respondents indicated that they sought MP3s and music videos at least a few times a week, compared to only 18.8% for music recordings (e.g., CDs, vinyl records, tapes) and 24.8% for music multimedia in other formats (e.g., Blue-ray, DVD).

Moreover, 98.0% of participants responded that they had searched for music information on the Internet. Among them, almost all (99.0%) answered that they had downloaded free music online, and 95.0% responded that they had listened to streaming music or online radio. This clearly indicates that participants sought digital music more often through online channels than offline or physical materials. However, even though 77.8% of respondents had visited online music store, only 69.7% of them had purchased any electronic music files or albums. Not surprisingly, participants preferred free music resources.

Music was certainly a popular element of entertainment in the lives of the participants. When asked why they sought music, all participants included entertainment in their answers. Also, a large proportion (83.0%) indicated that they sought music for entertainment at least a few times a week. Furthermore, 97.0% of respondents search for music information for singing or playing a musical instrument for fun. This proportion is significantly higher than the results from the previous survey of university population in the United States (32.8% for singing and 31.9% for playing a musical instrument) [6]. In addition, 78.2% of our respondents do this at least two or three times a month. We conjecture that this is most likely due to the popularity of karaoke in Hong Kong.

Known-item search was the most common type of music information seeking; nearly all respondents (95.1%) sought music information for the identification/verification of musical works, artist and lyrics, and about half of them do so at least a few times a week. Obtaining background information was also a strong reason; over 90% of the participants sought music to learn more about music artists (97.0%) as well as music (94.1%), and approximately half of them (53.5% and 40.6%, respectively) sought this kind of music information at least two or three times a month.

When asked which sources stimulated or influenced their music information needs, all 101 participants acknowledged online video clips (e.g. YouTube) and TV shows/movies. This suggests that the influence of other media using music is quite significant which echoes the finding that associative metadata in music seeking was important for the university population in the United States [6]. Also over 70% of the participants' music needs were influenced by music heard in public places, advertisement/commercial, radio show, or family members'/friends' home.

As for the metadata used in searching for music, performer was the most popular access point with 80.2% of positive responses, followed by the title of work(s) (65.3%) and some words of lyrics (62.4%). Other common types of metadata such as genre and time period were only used by a few respondents (33.7% and 29.7%, respectively). Particularly for genre, the proportion is significantly lower than 62.7% as found in the prior survey of university population in the United States [6]. This is perhaps related to the exposure to different music genres in Hong Kong, and the phenomenon that Hong Kongers music listeners tend to emphasize an affinity with friends while Americans (New Yorkers) are more likely to use music to highlight their individual personalities [9]. Moreover, participants responded that they would also seek music based on other users' opinions: 57.4% by recommendations from other people and 52.5% by popularity. The proportion for popularity is also fairly larger than the 31% in [6]. This shows that the social aspect is a crucial factor affecting participants' music seeking behaviors.

Of the different types of people, friends and family members (91.1%) and people on their social network websites (e.g. Facebook, Weibo) (89.1%) were the ones whom they most likely ask for help when searching for music. In addition, they turned to the Internet more frequently than friends and family members. Thirty-nine percent of them sought help on social network websites at least a few times a week while only 23.8% turned to friends/family members at least a few times a week.

On the other hand, when asked which physical places they go to in order to search for music or music information, 82.18% said that they would find music in family members' or friends' home, which was higher than going to record stores (75.3%), libraries (70.3%), and academic

institutions (64.4%). Overall, these data show that users' social networks, and especially online networks are important for their music searching process.

3.3 Music Collection Management

More participants were managing a digital collection (40.6%) than a physical one (25.7%). On average, each respondent estimated that he/she managed 900 pieces of digital music and 94 pieces of music in physical formats. This shows that managing digital music is more popular among participants, although the units that they typically associate with digital versus physical items might differ (e.g., digital file vs. physical album).

We also found that students tended to manage their music collections with simple methods. Over half of the respondents (50.0% for music in physical formats and 56.1% for digital music) manage their music collection by artist name. Participants sometimes also organized their digital collections by album title (17.7%), but rarely by format type (3.9%) and never by record label. More participants indicated they did not organize their music at all for their physical music collection (19.2%) than their digital music collection (2.4%). When they did organize their physical music collection, they would use album title (11.5%) and genre (11.5%). Overall, organizing the collection did not seem to be one of the users' primary activities related to music information.

3.4 Preferred Music Services

Respondents gave a variety of responses regarding their most frequently visited music services: YouTube (51.5%), KKBox (26.7%), and iTunes (14.9%) were the most popular ones. KKBox is a large cloud-based music service provider founded in Taiwan, very popular in the region and sometimes referred to as "Asian Spotify." YouTube, which provides free online streaming music video, was almost twice as popular as the second most favored music service, KKBox. The popularity of YouTube was also observed in Lee and Waterman's survey of 520 music users in 2012 [7]. Their respondents ranked Pandora as the most preferred service, followed by YouTube as the second.

The participants were also asked to evaluate their favorite music services. Specifically, they were asked to indicate their level of satisfaction using a 5-point Likert scale on 15 different aspects on search function, search results and system utility. Table 3 shows the percentage of positive (aggregation of "somewhat satisfied" and "very satisfied) and negative (aggregation of "somewhat unsatisfied" and "very unsatisfied") ratings among users who chose each of the three services as their most favored one.

For those who selected YouTube as their most frequently used service, they indicated that they were especially satisfied with its keyword search function (74.5%), recommendation of keywords (70.6%), variety of available music information (60.8%) and attractive interface

(56.9%). Only a few respondents (9.8%) were unsatisfied with certain features of YouTube such as advanced search, relevance of search results, and navigation. It is surprising to see that five respondents rated YouTube negatively on the aspect of price. We suspect they might have associated this aspect with the price of purchasing digital music from certain music channels on YouTube, or the indirect cost of having to watch ads. However, we did not have the means to identify these respondents to verify the reasons behind their ratings.

		YouTube		KKBox		iTunes	
		P	N	P	N	P	N
search function	keyword search	74.5	7.8	29.6	7.4	13.3	0.0
	advanced search	54.9	9.8	44.4	18.5	46.7	6.7
	content-based search	51.0	7.8	44.4	29.6	66.7	13.3
	auto-correction	49.0	7.8	29.6	29.6	20.0	33.3
	keywords suggestion	70.6	3.9	40.7	25.9	20.0	53.3
search results	number of results	52.9	7.8	40.7	22.2	6.7	33.3
	relevance	47.1	9.8	48.1	18.5	13.3	33.3
	accuracy	49.0	7.8	44.4	18.5	33.3	26.7
utility	price of the service	39.2	9.8	25.9	25.9	33.3	20.0
	accessibility	52.9	7.8	22.2	37.0	26.7	20.0
	navigation	52.9	9.8	18.5	29.6	6.7	20.0
	variety of available music information	60.8	7.8	22.2	22.2	26.7	13.3
	music recommendation	52.9	7.8	33.3	22.2	53.3	20.0
	interface attractiveness	56.9	3.9	33.3	7.4	40.0	20.0
	music sharing	47.1	3.9	40.7	7.4	40.0	20.0

Table 3 User ratings of three most preferred music services ("P": positive; "N": negative, in percentage)

The level of satisfaction for KKBox was lower than that of YouTube. Nearly half of the participants who use KKBox were satisfied with its relevance of results (48.1%), advanced search function (44.4%) and content-based search function (44.4%). The aspects of KKBox that participants did not like included the lack of accessibility (37.0%), content-based search function (29.6%), and auto-correction (29.6%). Interestingly, the content-based search function in KKBox was controversial among the participants. Some participants liked it probably because it was a novel feature that few music services had; while others were not satisfied with it, perhaps due to fact that current performance of audio content-based technologies have yet to meet users' expectation.

Only 15 participants rated iTunes as their most frequently used music service. Their opinions on iTunes were mixed. Its content-based search function and music recommendations were valued by 66.7% and 53.3% of the 15 participants, respectively. The data seem to suggest that audio content-based technologies in iTunes performed better than KKBox, but this must be verified with a larger sample in future work. On the other hand, over

half of the respondents gave negative response to the keyword suggestion function in iTunes. Moreover, the auto-correction, number of search results, and relevance of search results also received negative responses by one third of the respondents. These functions are related to the content of music collection in iTunes, and thus we suspect that the coverage of iTunes perhaps did not meet the expectations of young listeners in Hong Kong, as much as the other two services did.

4. THEMES/TRENDS FROM INTERVIEWS

4.1 Multiple Music Information Searching Strategies

Interviewees searched for music using not only music services like YouTube or KKBox, but also general-purpose search engines, such as Google and Yahoo!. Most often, a simple keyword search with the song title or artist name was conducted when locating music in these music services. However, more complicated searches such as those using lyrics and the name of composer are not supported by most existing music services. In this case, search engines had to be used. For example, if the desired song title and artist name are unknown or inaccurate, interviewees would search for them on Google or Yahoo! with any information they know about the song. The search often directed them to the right piece of metadata which then allowed them to conduct a search in YouTube or other music services. As expected, this does not always lead to successful results; one participant said *"when I did not know the song title or artist name, I tried singing the song to Google voice search, but the result was not satisfactory."*

4.2 Use of Online Social Networks

Online social network services are increasingly popular among people in Hong Kong. According to an online survey conducted with 387 Hong Kong residents in March 2011[3], the majority of the respondents visited Facebook (92%), read blogs (77%) and even wrote blog posts (52%). Social media provides a convenient way for people to connect with in Hong Kong where maintaining a work-life balance can be quite challenging.

University students in Hong Kong are also avid social media users. They prefer communicating and sharing information with others using online social networks for the efficiency and flexibility. Naturally, it also serves as a convenient channel for sharing music recommendations and discussing music-related topics. Relying on others was considered an important way to search for music: *"Normally, I will consider others' opinions first. There are just way too many songs, so it helps find good music much more easily.", "I love other people's comments, especially when they have the same view as me!"*

4.3 24/7 Online Music Listening

Participants in this study preferred listening to or watching streaming music services rather than downloading music. Downloading an mp3 file of a song usually takes about a half minute with a broadband connection and slightly longer with a wireless connection. Interviewees commented that downloading just added an extra step which was inconvenient to them.

Apart from the web, smart mobile devices are becoming ubiquitous which is also affecting people's mode of music listening. According to Mobilezine[4], 87% of Hong Kongers aged between 15 and 64 own a smart device. According to Phneah [10], 55% of Hong Kong youths think that the use of smartphones dominates their lives as they are unable to stop using smartphones even in restrooms, and many sleep next to it. As expected, university students in Hong Kong are accustomed to having 24/7 access to streaming music on their smartphones.

5. IMPLICATIONS FOR MUSIC SERVICES

5.1 Advanced Search

A simple keyword search may not be sufficient to accommodate users who want to search for music with various metadata, not only with song titles, but also performer's names, lyrics, and so on. For example, if a user wants to locate songs with the word "lotus" in the lyrics, they would simply use "lotus" as the search keyword. However, the search functions in various music services generally are not intelligent enough to understand the semantic differences among the band named Lotus and the word "lotus" in lyrics, not to mention which role the band Lotus might have played (e.g., performer, composer, or both). As a result, users have to conduct preliminary searches in web search engines as an extra step when attempting to locate the desired song. Many users will appreciate having an advanced search function with specific fields in music services that allow them to conduct lyric search with "lotus" rather than a general keyword search.

5.2 Mood Search

Participants showed great interests in the feeling or emotion in music, as they perceived the meaning of songs were mostly about particular emotions. Terms such as "positive", "optimistic", and "touching" were used to describe the meaning of music during the interviews. Therefore, music services that can support searching by mood terms may be useful.

Music emotion or mood has been recognized as an important access point for music [3]. A cross-cultural study by Hu and Lee [4] points out that listeners from different cultural backgrounds have different music mood judgments and they tend to agree more with users from the

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same cultural background than users from other cultures. This cultural difference must be taken into account when establishing mood metadata for music services.

5.3 Connection with Social Media

Social media play a significant role in sharing and discussing music among university students in Hong Kong. YouTube makes it easy for people to share videos in various online social communities such as Facebook, Twitter and Google Plus. Furthermore, users can view the shared YouTube videos directly on Facebook which makes it even more convenient. This is one of the key reasons our participants preferred YouTube. However, music services like iTunes have yet to adopt this strategy. For our study population, linking social network to music services would certainly enhance user experience and help promote music as well.

5.4 Smartphone Application

Many participants are listening to streaming music with their smartphones, and thus naturally, offering music apps for smart devices will be critical for music services. Both YouTube and iTunes offer smartphone apps. Moreover, instant messaging applications, such as WhatsApp, is found as the most common reason for using smartphones among Hong Kongers [10]. To further improve the user experience, music-related smartphone apps may consider incorporating online instant messaging capabilities.

6. CONCLUSION

Music is essential for many university students in Hong Kong. They listen to music frequently for the purpose of entertainment and relaxation, to help reduce stress in their extremely tense daily lives. Currently, there does not exist a single music service that can fulfill all or most of their music information needs, and thus they often use multiple tools for specific searches. Furthermore, sharing and acquiring music from friends and acquaintances was a key activity, mainly done on online social networks. Comparing our findings to those of previous studies revealed some cultural differences between Hong Kongers and Americans, such as Hong Kongers relying more on popularity and significantly less on genres in music search.

With the prevalence of smartphones, students are increasingly becoming "demanding" as they get accustomed to accessing music anytime and anywhere. Streaming music and music apps for smartphones are becoming increasingly common. The most popular music service among university students in Hong Kong was YouTube due to its convenience, user-friendly interface, and requiring no payment to use their service. In order to further improve the design of music services, we recommended providing an advanced search function, emotion/mood-based search, social network connection, smartphone apps as well as access to high quality digital music which will help fulfill users' needs.

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