

# SURVEY OF MUSIC INFORMATION NEEDS, USES, AND SEEKING BEHAVIOURS: PRELIMINARY FINDINGS

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## ABSTRACT

User studies focusing upon real-life music information needs, uses and seeking behaviours are still very scarce in the music information retrieval (MIR) and music digital library (MDL) fields. We are conducting a multi-group survey in an attempt to acquire information that can help eradicate false assumptions in designing MIR systems. Our goal is to provide an empirical basis for MIR/MDL system development. In this paper, we present our preliminary findings and analyses based on the 427 user responses we have received to date. Two major themes have been uncovered thus far that could have a significant influence the future development of successful MIR/MDL systems. First, people display “public information-seeking” behaviours by making use of collective knowledge and/or opinions of others about music such as reviews, ratings, recommendations, etc. in their music information-seeking. Second, respondents expressed needs for contextual metadata in addition to traditional bibliographic metadata.

Keywords: context metadata, relational metadata, associative metadata, public information-seeking

## 1. INTRODUCTION

This survey is being conducted as part of the Human Use of Music Information Retrieval Systems (HUMIRS) project [7]. The primary goal of the HUMIRS project is the acquisition of real-world user data so that an empirically justifiable framework can be developed within which the scientific evaluation of MIR/MDL systems can take place. It is within this framework that we hope to create the TREC-like evaluation scenarios discussed in [7].

What MIR/MDL development and evaluation requires is a set of properly conducted “user needs and uses” studies as defined by Wilson [11]. The ultimate goal of any needs and uses study is the capturing of real-world expressions of users’ actual information-seeking behaviours unmediated by any particular set of technologies. Using a variety of techniques including

surveys, ethnographic observation, qualitative text analysis, etc., needs and uses studies provide the information necessary to avoid creating the unbridgeable divides between system features and performance, and user expectations and skills that make system use untenable [2].

Only a small handful of needs and uses studies have been conducted in the MIR/MDL domain. Thus, existing MIR systems have been designed and evaluated largely based on anecdotal evidence of user needs, intuitive feelings for user information-seeking behaviour, and a priori assumptions of typical usage scenarios [4]. Some work has been done in the area of transaction log analysis of online music catalogs which can provide rich information on user behaviours of a specific system or database. However, these queries are already limited by the functions of specific systems so they cannot accurately represent the real music needs of users [3]. Qualitative, grounded theory studies have looked at music-related online forums, mailing-lists, and communities, and investigated various music search questions posted in natural language [1], [5]. The categories of needs and uses descriptions presented in [1], [5], and [6] provided a starting point for designing our survey questions asking about people’s music and music information needs.

## 2. SURVEY DESIGN AND IMPLEMENTATION

### 2.1. Study Population, Sampling and Sample Size

There are two population groups examined in our survey. Group I comprises the UIUC campus community and Group II comprises the general population of those over 18 years old. In this paper, we present preliminary data from the responses received thus far from Group I.

To ensure the generalizability of our results, we adopted a stratified random sampling approach to select candidate respondents from our Group I pool. Group I comprises the 77,532 members of the UIUC campus population including undergraduates, graduate students, faculty and staff. We randomly selected a set of email addresses based upon stratification by sex and academic/professional status (six strata in all). Email invitations were sent out in three batches starting on April 9, 2004. We have collected 427 responses from our sample of 2,100 as of April 30, 2004. This represents a response rate of 20.3%. The number of responses is large enough to achieve a 95% confidence

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level, with  $\pm 5\%$  margin of sampling error in generalizing the results to our study population.

## 2.2. Issues of Methodology

A Web-based survey method was chosen because electronic communications have become the primary and official communication medium at UIUC. We concede that people who responded to our survey are potentially more interested in music than the ones who did not. However, these are the people who would be the first to use the MIR/MDL systems we develop and therefore it seems appropriate to start with this group's music information needs, uses, and seeking behaviours.

## 2.3. Questionnaire

The survey questionnaire was designed based on consultation with Dr. Brechin, Professor of Sociology at UIUC, who specializes in survey methods. The survey consists of four major parts: Demographic information; Respondent's characteristics; Needs and uses; Search behaviours.

# 3. DATA ANALYSIS AND DISCUSSION

## 3.1. Introduction

In this section, we will discuss the responses from Group I, the UIUC campus population. Our analysis includes a review of preliminary findings, possible interpretations of findings, and implications for MIR system design.<sup>1</sup>

## 3.2. Respondents' Characteristics

The top-ranked music genres among the respondents were Rock, Pop, Classical and Alternative. The open-ended "other" responses include Korean, Japanese Pop, old Hindi, Italian, traditional Irish, etc. This is not surprising given the multicultural makeup of UIUC.

73.1% of respondents said they were avid listeners, and 36.3% said they were "Musically passionate." With regard to music literacy and musical ability, 63.6% replied they can read sheet music "OK" to "Very well" and 64% expressed their singing ability is average or above. Also 74.5% answered they can play a musical instrument.

## 3.3. Music Information Needs

*Finding 1. Descriptive metadata and extra-musical information have important commercial and experience enrichment aspects for users.*

The top three categories in Table 1 are "Title of work(s)" (90%), "Lyrics" (81.0%), and "Artist information" (74.6%). Each of these is either metadata

<sup>1</sup> In our survey, we asked questions about both *music* and *music information*. However, for the purpose of the following discussion, we will use *music information* as a broad term for any music-related items or information, including recordings, printed and electronic materials, multimedia and computer applications, etc. We will also use the term *extra-musical information* to refer to information which is "about" music or music objects such as reviews, biographies, histories, etc.

or extra-musical information. The commercial aspects come to the fore when one looks at the 67.4% positive response for "Sample tracks for listening," the 60.7% positive responses to "Price of item," the positive response rate of 67.2% to "Learn about item before purchase" (Table 2) and the 47.1% positive expression for "Review/rating" information. The "Artist information" numbers along with "Information on genre" (49.1%), the "Influences among artists" (42.6%), and the "Background information" (39.1%) responses all suggest that users are deliberately seeking information to enhance their experience of the music they listen to.

Response	Positive	Negative	Don't know
	%	%	%
Music information			
Title of work(s)	90.1	7.4	2.5
Lyrics	81.0	15.4	3.6
Artist information	74.6	23.7	1.7
Sample tracks for listening	67.4	27.3	5.3
Track listing	60.7	33.8	5.5
Price of item	51.7	41.5	6.8
Information on genre	49.1	46.3	4.6
Review/Rating by others	47.1	47.3	5.6
Influences among artists	42.6	52.6	4.8
Background information (history, theory, etc.)	39.1	55.4	5.6
Information on different version(s) of work(s)	37.3	55.7	7.0
Artwork/Album cover	30.8	62.8	6.5
Links to related websites	29.7	62.2	8.0
Released date	21.5	71.2	7.3
Record label	15.0	77.9	7.0

Table 1. Responses to "How likely are you to seek the following music information?"<sup>2</sup>

## 3.4. Reasons for Searching Music information

*Finding 2. Users seek music as an auditory experience.*

*Finding 3. Users seek information to assist in the building of collections of music.*

*Finding 4. Users seek music information for verifying or identifying works, artists, lyrics, etc.*

Most of the respondents (94.5%) search for music to listen to for entertainment which provides a strong argument for actually delivering the sought-after audio versions of the music in a simple and timely manner. The strongly positive "Build collection" data, at 89.1%, strikes us as significant for they suggest MIR/MDL uses beyond mere single-item identification. Notwithstanding this finding, the data also show that a large percentage (73.9%) of respondents search for music information, not to obtain an actual item or material, but to have enough information for "Verifying or identifying a work, artist, lyrics, etc." for which "name that tune" would be one appropriate strategy.

<sup>2</sup> Response categories collapsed as follows—Positive: [very likely + somewhat likely]; Negative: [not very likely + not at all likely]

The “Learn about artists (70.5%) and music” (54.5%)” data again suggest the important role extra-musical information plays in enriching the music experiences of users.

Response Reason	Positive				Total	Total
	Frequency (times per month)			Total		
	≤ 1	2-4	≥ 5			
	%	%	%			
Listen for entertainment	18.0	33.4	43.1	94.5	5.5	
Build collection	28.5	39.7	20.9	89.1	10.9	
Verify or identify work, artist, lyrics	30.9	31.1	11.9	73.9	26.1	
Learn about artists	34.4	27.8	8.3	70.5	29.4	
Learn about item before purchase	32.9	26.4	7.9	67.2	32.7	
Listen for work or study purposes	15.7	21.7	22.1	59.5	40.5	
Learn about music	31.8	16.0	6.7	54.5	45.5	
Use for special occasions	27.3	11.9	1.4	40.6	59.4	
Learn about instrument(s)	23.0	10.5	4.0	37.5	62.4	
Perform with a musical instrument	18.2	9.1	5.5	32.8	67.2	
Karaoke/Sing for entertainment	16.2	8.5	7.2	31.9	68.2	
Use for gadgets (ringtone, etc.)	19.5	9.1	1.9	30.5	69.6	
Play at certain places (café, etc.)	15.5	7.9	2.6	26.0	74.0	
Use in teaching/instruction	12.6	3.8	1.1	17.5	82.5	
Academic research	8.6	3.8	1.6	14.0	86.0	
Sing professionally	4.5	2.4	1.7	8.6	91.4	

Table 2. Responses to “How often do you seek music or music information for the following reasons?”

### 3.5. Music-Related Online Activities

*Finding 5. Users value online music reviews, ratings, recommendations, and suggestions.*

92.7% of respondents answered that they have used the Internet to search for music information. Among these respondents, reading music information including news, reviews, etc., purchasing recordings and listening to online radio were the most popular activities. About 1 out of 4 respondents (25.4%) said they listen to online radio “A few times a week” to “Almost every day.” 74.7% responded that they search for “Electronic music files” (Table 4), but only 39.4% actually make purchases, while 74.9% looked for free music files.

Response Activity	Positive				Total	Total
	Frequency (times per month)			Total		
	≤ 1	2-4	≥ 5			
	%	%	%			
Read any kind of music information	29.4	36.7	16.9	83.0	17.0	

Purchase music recordings (cd, etc.)	60.4	17.2	0.3	77.9	22.1
Listen to streaming/online radio	26.2	26.2	25.4	77.8	22.1
Download free music files	27.4	29.2	18.3	74.9	25.1
Visit music stores	39.6	22.1	7.6	69.3	30.7
Purchase music files	18.1	15.0	6.3	39.4	60.6
Download scores	23.8	5.1	1.8	30.7	69.2
Visit music forum, community, etc.	14.9	9.8	5.8	30.5	69.4
Read/Subscribe to music listservs	9.1	5.1	4.6	18.8	81.2

Table 3. Responses to “How often do you do the following activities online?”

People gave a variety of responses regarding their favourite music-related websites and the reasons they liked them. Respondents clearly chose different websites that are suitable for different purposes. The website mentioned the most was Amazon.com (24 responses). Easy searching, useful extra-musical features such as reviews, ratings, recommendations and Listmania were some of the reasons they liked the website. Amazon.com’s popularity is expected as it definitely meets most of the music needs mentioned in Table 1 except for such things as lyrics, genre and background information, etc. Allmusic.com was the second-most-mentioned website (another site rich in extra-musical information). Even though the counts were much lower, respondents expressed very strong fondness for the site.

### 3.6. Music-Related Materials Sought

*Finding 6. Users prefer online resources for extra-musical information.*

Response Material	Positive				Total	Total
	Frequency (times per month)			Total		
	≤ 1	2-4	≥ 5			
	%	%	%			
Music recordings (CD, vinyl, etc.)	38.9	36.5	11.6	87.0	13.0	
Electronic music files (mp3, etc.)	24.0	30.0	20.7	74.7	25.2	
Music multimedia (VHS, DVD, etc.)	33.5	24.4	7.2	65.1	34.9	
Music news or entertainment news	24.2	25.4	14.1	63.7	36.3	
Music-related software	27.9	9.3	2.4	39.6	60.5	
Music magazines	21.9	10.9	2.9	35.7	64.3	
Books on music	26.0	7.1	0.7	33.8	66.2	
Sheet music/Scores	22.1	8.8	1.7	32.6	67.5	
Academic journal articles	12.1	3.6	0.2	15.9	84.0	

Table 4. Responses to “How often do you search for the following items both online and offline?”

A majority of the respondents answered that they search for “Music recordings” (87%), “Electronic music files” (74.7%), “Music multimedia” (65.1%) and “Music and entertainment news” (63.7%). Traditional paper-based books or journal articles that are the main sources of scholarly information were not sought as much. Even though more than half of the respondents said they search for music information to “Learn more about artists (70.5%) and music (54.5%)” from Table 2, only 33.8% search for “Books on music” and 15.9% search for “Academic journal articles.”

### 3.7. Places Visited for Music Information Search

*Finding 7. Users have definite preferences regarding where they physically go to seek music information.*

“Record store” (77.5%) and “Acquaintance’s/Friend’s place” (76.6%) are the principal physical places where respondents seek music information. These data are consistent with prior research that found the music store is the most significant physical source of music information for many people [4].

Response Place	Positive				Total	Never Total
	Frequency (times per month)			Total		
	≤ 1	2–4	≥ 5			
	%	%	%			
Record store	45.4	29.7	2.4	77.5	22.6	
Acquaintance's/ Friend's place	30.5	39.6	6.5	76.6	23.4	
Library	25.4	9.3	1.2	35.9	64.1	
Academic institution	17.9	6.9	2.7	27.5	72.6	

Table 5. Responses to “How often do you go to the following physical places to search for music or music information?”

### 3.8. Persons Consulted for Music Information Search

*Finding 8. Personal familiarity with search helpers is a key determinant for music information seekers.*

Response Person	Positive				Total	Never Total
	Frequency (times per month)			Total		
	≤ 1	2–4	≥ 5			
	%	%	%			
Friend or family member	27.5	42.4	14.7	84.6	15.4	
Record store staff	32.9	11.6	1.2	45.7	54.3	
Musician	17.3	9.9	4.5	31.7	68.2	
Online community or forum member	11.0	7.4	1.4	19.8	80.1	
Teacher/Instructor	13.9	5.0	0.7	19.6	80.4	
Music librarian	8.6	2.7	0.2	11.5	88.6	

Table 6. Responses to “How often do you ask the following people for help when you search for music or music information?”

A majority of respondents (84.6%) ask friends or family members for help when they search for music information. Beyond mere knowledge of music, the

availability and approachability of the helping person appear to affect respondents’ music searching strategies. We conjecture that a “comfort factor” might be involved in this user behaviour. Music queries can be difficult to express and can involve a certain amount of embarrassment (i.e., inability to sing, exposure of ignorance, etc.). Searchers appear to prefer asking those whom they expect will not judge nor ridicule them.

### 3.9. Sources That Triggered Music Information Searches

*Finding 9. Music information-seeking should be seen as a socially instigated act.*

Response Source	Positive			Total	Never Total
	Frequency (times per month)				
	≤ 1	2–4	≥ 5		
	%	%	%		
Acquaintance's/ Friend's place	31.9	41.8	13.7	87.4	12.5
Radio show	35.6	36.5	9.6	81.7	18.4
TV show, movie, or animation	38.4	33.8	8.6	80.8	19.2
Public places (café, store, bar, etc.)	32.6	30.5	6.9	70.0	30.0
Concert/Recital	41.9	23.8	3.1	68.8	31.2
Advertisement or commercial	37.3	22.4	4.5	64.2	35.8
Special occasion (party, event, etc.)	39.2	13.3	1.9	54.4	45.6
Cultural event	33.3	10.8	2.1	46.2	53.7

Table 7. Responses to “How often do you search for music you heard from the following places or events?”

That “Acquaintance’s or friend’s place”, with its 87.45% positive response rate, was named the most common triggering source for instigating a music information search is quite noteworthy. In conjunction with the “Public places” (70.0%), “Special occasion” (54.4%) and “Cultural event” (46.2%) data, we see a strong contextual association between the social interactions of the seekers and the instigation of their music information searches. Media was also a major source that triggers respondents’ music information-seeking as the positive responses for “Radio show” (81.7%), “TV show, movie, or animation” (80.0%), “Advertisement or commercial” (64.2%) show.

### 3.10. Preferred Search/Browse Options

*Finding 10. Music information seekers employ public knowledge and/or opinions for searches.*

In analyzing the top 10 positive responses from Table 8, regarding “Search/Browse options”, we note that all but one are classified as either metadata or extra-musical information. The “Singing/Humming” option is the exception as it is based in the music itself. Despite the rarity of extant MIR systems providing query by a “Singing/Humming” option, 34.8% said they would still be likely to use it.

We again observe the social side of music information-seeking as 62.2% responded that they are likely to use “Recommendations from other people.” Respondents appear to rely on collective knowledge and/or opinions on music in their seeking processes. This corresponds with our earlier observation of the important role friends and family members play in both the triggering and helping with music information-seeking.

41.9% of respondents said they would search or browse music information by “Associated usage.” This ties in with both the social and media aspects of music information-seeking triggers. This kind of extra-musical information is not traditionally incorporated in MIR systems. This might be a contributing reason why respondents so often consult with friends and family members who could provide this kind of information.

Response	Positive	Negative	Don't know
	%	%	%
Singer/Performer	96.2	2.8	1.0
Title of work(s)	91.7	6.4	1.9
Some words of the lyrics	74.0	22.3	3.6
Music style/Genre	62.7	33.0	4.4
Recommendations	62.2	34.2	3.6
Similar artist(s)	59.3	36.4	4.3
Creator (composer/author)	54.5	40.9	4.6
Similar music	54.2	41.0	4.8
Associated usage (ad, etc.)	41.9	50.9	7.2
Singing/humming	34.8	55.1	10.1
Theme (main subject)	33.4	59.7	7.0
Popularity	31.0	62.8	6.3
Specific version	29.1	60.4	10.6
Mood/Emotional state	28.2	63.5	8.4
Language	23.8	69.0	7.2
Time period	23.8	68.5	7.7
Country	23.6	69.9	6.5
Occasions to use	23.6	68.2	8.2
Instrument(s)	20.8	71.7	7.4
Place/Event where heard	20.7	69.1	10.1
Purchase patterns	20.6	69.3	10.2
Storyline of music	17.9	70.5	11.6
Vocal range/Genders	16.2	74.9	8.9
Tempo	14.2	75.4	10.4
Using keyboard input	13.2	72.5	14.4
Released/Composed year	12.3	80.6	7.2
Record label	11.7	81.5	6.7
Publisher	6.0	85.4	8.6

Table 8. Responses to “When you search for music or music information, how likely are you to use the following search/browse options?”<sup>1</sup>

## 4. CONCLUSION

### 4.1. Public Information-seeking

The survey data illustrate that music information-seeking is not just a private and isolated process, but

also can be a public and shared process. With 47.1-84.6% of respondents showing positive opinions towards reviews, ratings, recommendations from other people, etc. (i.e., extra-musical information), we see a clear indication of the importance of the social and communal side of music information-seeking. Respondents make use of collective knowledge or opinions on music created by other community members in their searching processes. We see these behaviours as a variation on the idea of “collaborative information retrieval” [10]. It is a variation on this theme in the sense that when people are generating or using the collective knowledge in their music information-seeking, it is not always the case that there is a single specific goal or answer that they have in mind and feel necessary to work towards. Rather, this is a more flexible and less directed process of exploration. Future MIR/MDL systems that take this aspect of user behaviour into account should provide a successful service to music information seekers.

### 4.2. Need for Context Metadata

Throughout the survey, we see the importance of extra-musical information and informal social interactions in music information-seeking. The data suggest that we should start developing new types of metadata as access points that take into account the extra-musical and associative kinds of information which contextualize users’ real-world searches. The necessity for access points that link music with external objects or events has already been mentioned in [5]. We suggest that serious work begin on designing “context metadata” frameworks. Context metadata is distinct from “content” metadata in that content metadata is *intrinsic* to an object and relates to what the object is, or contains, whereas context metadata indicates the extrinsic aspects, uses and relationships of an object [9]. To this end, we suggest the following metadata framework that can serve as a guide for future MIR/MDL development:

- **Content Metadata**

- *Musical metadata*: data derived directly from the music itself (e.g., melody, tempo, etc.)
- *Bibliographic metadata*: traditionally-used metadata that describes the item (e.g., title, author, etc.)

- **Context Metadata**

- *Relational metadata*: data about the item’s relationships (artificially created or socially constructed) with other music related items (e.g., genre; indications of similarity, etc.)
- *Associative metadata*: data indicating associations with other works, media or events (e.g., use in TV, movies or commercials; use at special events, etc.)

<sup>1</sup> Response categories collapsed as follows;

Positive: very + somewhat likely, Negative: not very + not at all likely

The need for “relational metadata” was highlighted as more than half of respondents expressed positive opinions towards “Genre” (62.7%), “Similar artist(s)” (59.3%), and “Similar music” (54.2%) as search or browse options. Similarly, the need for “associative metadata” is evident in the data that show the very high percentage of users reporting that their searches were triggered by such things as a “Radio show” (81.7%), a “TV show, movie or animation” (80.8%) or “Advertisement or commercial” (64.2%).

Creating useful context metadata will not be an easy task: they are difficult—perhaps impossible—to generate automatically. Furthermore, context metadata cannot be generated solely from an individual item or at the point of the item’s production or creation. Notwithstanding these difficulties, a possible way to achieve the creation of context metadata might be to include music community members or subject enthusiasts [8] in a form of collective production.

## 5. FUTURE RESEARCH

In this paper, we presented descriptive statistics and analyses of our initial Group I (University of Illinois community) data set. Our future papers will provide detailed inferential statistical analyses and explore the relationship between multiple variables (e.g., level of music literacy, musical ability, favourite genre, etc.) and music information needs, uses, and search patterns. We will also compare the results from both the Group I and II (general adult public) samples to uncover any significant differences between them.

Over the life of the HUMIRS project, we hope to contribute to the success of the next generation of MIR/MDL systems by providing meaningful insights into the music information needs and uses of potential MIR/MDL users.

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