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: music search strategies, 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[9]. 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 [9].

Currently, there exists a paucity of real-world user studies in MIR [3]. Some work has 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[14]. However, these queries are already limited by the functions of specific systems so they cannot accurately represent the real music needs of users [4]. Given this paucity of data, 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 [5]. What MIR/MDL development and evaluation requires is a set of properly conducted "user needs and uses" studies as defined by Wilson [15]. The ultimate goal of any needs and use 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 just the kind of information necessary to avoid creating the unbridgeable divides between system features and performance and user expectations and skills that make system use untenable [2].

Many questions arise in designing MIR/MDL systems: Who are the potential users of the MIR/MDL systems we are building? What kinds of metadata or access points should we provide them? What do they need and expect from our systems? Through this survey, we are attempting to provide essential information by answering the following needs and uses questions.

- What kinds of music information needs do people have?
  - What kind of music information are people most likely to seek?
- What are their music information search strategies?
  - Who do they ask and where do they go to search for music information?
  - What kinds of search/browse methods do people prefer?
- How do people use the music information that they find?
- What sources trigger music information searches?

Only a small handful of needs and uses studies have been conducted in the MIR/MDL domain. Qualitative, grounded theory studies have looked at music related online forums, mailing-lists, communities and investigated various music search questions posted in natural language [1],[7]. Bainbridge et al. analyzed 502 queries seeking musical works or music work information in Google Answers reference service [1].

The categories of needs and use descriptions presented in [1], [7], and [8] provided a starting point for designing our survey questions asking people's music and music information needs.

2. SURVEY DESIGN AND IMPLEMENTATION

2.1. Study Population

There are two population groups examined in our survey. Group I comprises the UIUC campus community including students, faculty and staff. Group II comprises the general population of those over 18 years old. Surveys sent to each group are identical except the Group II version includes a question asking about respondents' professions. Both versions of the survey are still open and we expect to collect more responses over the next several months. In this paper, we present preliminary data from the responses received thus far from Group I.

2.2. Sampling and Sample Size

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 level, with ±5% margin of sampling error in generalizing the results to our study population. For example, 81% of respondents in our survey answered they are likely to seek lyrics; using ±5% confidence interval, it can be stated with 95% certainty that the actual percentage of respondents who are likely to seek lyrics is between 76% and 86%. There were 15 explicit refusals to participate. The main reasons for refusals were lack of interest in music and busy schedule.

2.3. Issues of Methodology

A Web-based survey method was chosen because electronic communications have become the primary and official communication medium at UIUC. We do acknowledge some coverage issues may exist but they should have minimal impact [6]. We are also aware that there remain people who do not have access to the Internet in Group II. Notwithstanding this shortcoming, it seems sensible to survey that population which has basic computer literacy and accessibility, since MIR/MDL systems are computer-based. Also, 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.

2.4. 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 as shown in Table 1.

Category	Variable	Measurement
Demographic information	Sex	Male/Female
	Age	Birth year (open-ended)
	Nationality	Open-ended
	Race/Ethnicity	4 types with Hispanic/ Latino subtype + other
Respondent's characteristics	Favourite music genre	Select and rank by the order of preference: 22 types + other
	Importance/ Exposure of music in person's life	Multiple choices: avid/casual listener, avid/casual performer, musically curious/ passionate + other
	Music related work/profession	10 types + other
	Music literacy: reading music scores	5 point scale: very well ↔ not at all
	Musical ability I: singing	5 point scale: very well ↔ not at all
	Musical ability II: playing musical instruments	3 point scale: yes–with difficulties–no
	Types of instruments played	Multiple choices: 5 types
	Ability to replicate a melody	3 point scale: yes–with difficulties–no
Needs & Uses	Likeliness to seek music/music info	15 types by frequency + other
	Reasons for searches	16 types by frequency + other
Search behaviours	Online music activities	9 types by frequency
	Favourite music related websites	open-ended
	Music related materials sought	9 types by frequency + other
	Places visited for music info search	4 types by frequency + other
	Persons consulted	6 types by frequency + other
	Sources that triggered searches	8 types by frequency + other
	Preferred search or browse options	28 types by frequency + other

Table 1. Questionnaire: variables & measurement ("other" designates open-ended questions)

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 and implications for MIR system design. 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 music 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.

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.

Response / Genre	Ranked #1	Checked as a favourite
	%	%
Rock	18.0	59.0
Pop	10.1	49.6
Classical	8.0	49.2
Alternative	10.8	46.4
Oldies	3.5	41.5
Jazz	2.3	38.2
HipHop/Rap	4.0	37.9
Country	6.1	31.6
Blues	1.4	27.2
Hard rock/Metal	1.4	26.0
R&B/Soul	1.9	25.3
Dance	0.5	24.4
Easy listening	0.9	17.6
Folk	1.4	17.1
Reggae	0.2	15.9
World	1.2	15.7
Latin	1.4	15.0
Opera/Vocal	0.5	14.5
Electronica	2.3	14.1
Other	8.2	14.1
New age	0.9	10.8
Gospel	1.4	10.5
Children's	0.5	6.1

Table 2. Favourite music genre sorted by the percentage of responses

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. Among those, 22.5% said they could replicate a melody on a piano after hearing it, and 40.8% said they can, but "with difficulty." We assume that the respondents' level of music literacy and ability to is higher than that of the general public, since Group I represents the UIUC campus members who generally have higher educational backgrounds. In our future work, we plan to determine if there exist significant differences between Groups I and II on these factors.

Response / Description	Count	%
Avid Listener	312	73.1
Musically Passionate	155	36.3
Casual Listener	91	21.3
Casual Performer	91	21.3
Musically Curious	80	18.7
Avid Performer	50	11.7
Other	16	3.7

Table 3. Importance/Exposure of music in respondent's life

3.3. Music Information Needs

Finding 1. Descriptive metadata and extra-musical information are very important to users.

Finding 2. Descriptive metadata and extra-musical information have important commercial and experience enrichment aspects for users.

The top three categories in Table 4 are "Title of work" (90%), "Lyrics" (81.0%) and "Artist information" (74.6%). Each of these is either music metadata 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 5) 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 / Music information	Positive	Negative	Don't know
	%	%	%
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 other people	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 4. Responses to "How likely are you to seek the following music information?"[1]

3.4. Reasons for Searching Music information

Finding 3. Users seek music as an auditory experience.

Finding 4. Users seek information to assist in the building of collections of music.

Finding 5. Users seek music information for verifying or identifying works, artists, lyrics, etc.

Most of the respondents (94.5%) search for music to listen 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 "Collection building" data, at 89.1%, strikes us as significant for they suggest MIR/MDL uses beyond mere single-item identification (i.e., "name that tune"). 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. The "Learn about artists" (70.5%) and the "Learn about music" (54.5%) data again suggest the important role extra-musical information plays in enriching the music experiences of users.

Response / Reason	Positive				Never
	Frequency (times per month)			Total	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, etc.	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 (wedding, presentation, etc.)	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, computer sound effect, 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 5. Responses to "How often do you seek music or music information for the following reasons?"

3.5. Music-Related Online Activities

Finding 6. 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 8), but only 39.4% actually make purchases, while 74.9% looked for free music files.

Response / Activity	Positive				Never
	Frequency (times per month)			Total	Total
	≤ 1	2–4	≥ 5		
	%	%	%	%	%
Read any kind of music information	29.4	36.7	16.9	83.0	17.0
Purchase recordings (CD, tape, 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 sheet music/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 listserv/ mailing list(s)	9.1	5.1	4.6	18.8	81.2

Table 6. Responses to "How often do you do the following activities online?"

[1] Response categories collapsed as follows; Positive: [very likely + somewhat likely] Negative:[not very likely + not at all likely]

People gave a variety of responses on their favourite music-related websites and the reasons they liked them. The following table shows different categories of websites, reasons for preference, and examples of each category. 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 4 except for a few such 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.

Category	Purpose	Example
Online stores	Easy searching + unique functions, wide selection of inexpensive CDs, track listing, sample tracks	amazon.com
Encyclopedia/ Informational sites	Rich and comprehensive music information, learn more about music/ artists	allmusic.com
News/Media	Updates on new releases	mtv.com
Lyrics sites	Lyrics information	lyrics.com
Scores/Tabs	Guitar tabs	olga.net
Auction/ Used stores	Purchase inexpensive music	ebay.com half.com
Free music sites	Listen to samples, get free music	mp3.com
Online radio	Listen to music streaming	di.fm
Search engines	Get general information on music/artists	google.com
Fan forum, official site of artists	Get more targeted information	Various

Table 7. Favourite music related websites

3.6. Music Related Materials Sought

Finding 7. Users prefer online resources for extra-musical information.

A majority of the respondents answered that they search for recordings (87%), electronic music files (74.7%), multimedia (65.1%) 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 5, only 33.8% search for books and 15.9% search for journal articles. This implies that respondents are obtaining this information from electronic as opposed to print sources.

Response / Material	Positive				Never
	Frequency (times per month)			Total	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 8. Responses to "How often do you search for the following items both online and offline?"

3.7. Places Visited for Music Information Search

Finding 8. Users have definite preferences as to where they physically go to seek music information.

The real-world locations "Record store" (77.5%) and "Acquaintance's/Friend's place" (76.6%) are the principal physical places respondents seek music information. Theses data are consistent with prior research that found the music store as the most significant physical source of music information [4]. Other interesting places included bars, department and electronic stores, jam session, jukebox, church, etc.

Response / Place	Positive				Never
	Frequency n (times per month)			Total	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 9. 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 9. Personal familiarity with search helpers is a key determinant for music information seekers.

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 be affecting people's 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 who they expect will not judge nor ridicule them.

Response / Person	Positive				Never
	Frequency (times per month)			Total	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 10. Responses to "How often do you ask the following people for help when you search for music or music information?"

3.9. Sources That Triggered Music Information Searches

Finding 10. Music information seeking should be seen as a socially instigated act.

Response / Source	Positive				Never
	Frequency n (times per month)			Total	Total
	≤ 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 11. Responses to "How often do you search for music you heard from the following places or events?"

That "Friend's or acquaintance'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. Other sources include churches, sporting events, cars, etc.

3.10. Preferred Search/Browse Options

Finding 11. Music information seekers employ public knowledge and/or opinions for searches.

In analyzing the top 10 positive responses from Table 12, 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.

Data show that traditional metadata such as "Singer/Performer" (96.2%), "Title of works" (91.7%), and "Creator" (54.5%) continue to play a strong role in the music information seeking process. However, some bibliographic metadata such as "Publisher" (6.0%) and "Record label" (11.8%) were among the least popular search/browse options.

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 (Table 11) and helping with (Table 10) 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 / Search/Browse by	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 from other people	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 (movie, ad, TV show, etc.)	41.9	50.9	7.2
Singing/humming	34.8	55.1	10.1
Theme (main subject of	33.4	59.7	7.0

music; money, love, etc.)			
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 (wedding, party, etc.)	23.6	68.2	8.2
Instrument(s)	20.8	71.7	7.4
Place/Event where music 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 12. Responses to "When you search for music or music information, how likely are you to use the following search/browse options?"[1]

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 50-84.6% 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" [13]. 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 by Downie and Cunningham [7]. 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 [12]. 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 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.)

The need for "relational metadata" was highlighted as more than half of respondents expressed positive opinions towards "Genre" (62.7%), "Similar artist" (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. Nor can context metadata 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 [11] in their creation in a form of collective production.

5. FUTURE RESEARCH

In this paper, we presented descriptive statistics and analysis 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

1 Response categories collapsed as follows;
Positive: very likely + somewhat likely
Negative: not very likely + not at all likely

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 MIR/MDL research by uncovering information that could avoid MIR/MDL implementations based upon false assumptions concerning the nature of real-world music needs, uses, and seeking behaviours. By providing meaningful insights into the music information needs and uses of potential MIR/MDL users, we hope to contribute to the success of the next generation of MIR/MDL systems.

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