The Musi*Find* Musical Information Retrieval Project, Phase II: User Assessment Survey

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Abstract

This paper summarizes the findings of the Musi*Find* user assessment survey conducted in August of 1993. This survey examined, through both quantitative and qualitative measures, among other things, the participants' music skills, musical tastes, histories of musical information seeking, as well as preferred query and retrieval methods. Suggestions for system improvement were also sought. Findings indicate a high level of acceptance of the project among the participants and suggest that there is a need for an automated musical information retrieval system. Also garnered were suggestions for future research and project development.

Research Objectives: This study represents the second part of an ongoing research programme, the goal of which is the creation of an ideal full-text music database. By "ideal full-text music database" it is meant that the database under consideration must contain fully searchable encodings of musical works in addition to the more standard bibliographic information. This database must be searchable through a wide variety of methods the most novel of which are singing the query

melody, playing the query melody on an MIDI keyboard, and notating the query in standard musical notation though the use of a mouse or electronic pen. This database must also have a variety of output options, the most novel of which are hearing the selected work, viewing its score and the having the choice of printing the score either in whole or in its constituent parts. For a more complete description of the various input and output options the reader is now directed to consult the original study, *Creating the Ideal Full-Text Music Database* (Downie 1993). The results of the aforementioned study were subsequently presented at the CAIS conference of July 1993, held in Antigonish Nova Scotia, as *Name That Tune!: An Introduction to Music Information Retrieval* (Tague-Sutcliffe, Downie and Dunne 1993).

The purpose of this user assessment survey was two fold. First, we wished to assess the response of potential users of our database to our various input and output methods. As far as it is known, no one else has attempted such a study. We wished to know before we proceeded any further, whether our conception of the ideal database is shared by those for whom it is intended. The second purpose of the study was to glean as many comments, suggestions, and criticisms as possible from those surveyed. The feedback from the surveyed group was intended to help us refine our overall conception of our database by making us aware of possible omissions, problems and new potentials.

Methodology: This study was constructed of two distinct parts. The first part was the lecture/demonstration section. In this section the participants were introduced to the project goals and results to date through a semi-formal lecture that consisted of overheads (system schematic, sample outputs, etc.) and a handout of an article

about a commercial music publishing kiosk called *Notestation* (IBM 1993). After the lecture, a video-taped mock-up of a sample search was presented.

The second part of the study was the open floor question period. As the name implies the floor was opened to all questions and comments. The entire proceedings were tape-recorded. After the question period the participants were invited to complete our twenty-item survey instrument. The survey instrument contained a mixture of quantitative and qualitative questions. There were forty-one completed questionnaires.

Time and Location of Study: This study was conducted over the summer term of 1993, with the bulk of preparation (i.e. creating the video mock-up) done in June/July and the surveying itself completed during August. The lecture/demonstration was presented five times in four different locations. The first was at the IBM Centre for Advanced Studies in North York, Ontario. The second and third were conducted at the Graduate School of Library and Information Science at the University of Western Ontario. The fourth presentation was held at the Faculty of Music at the University of Western Ontario. The London Public Library was the fifth and final location. Turn out for the presentations was generally poor and ranged from five to twenty-five persons. An exact count is impossible given that people were coming and going throughout the presentations. Also, it should be noted that no tape recording of the IBM question period was made out of respect for legitimate security concerns.

Commentary about the Sample: It was necessary to choose what Singleton *et al.* (1988, 153) call "convenience" sampling. The time restraints of the academic

term, the lack of subjects due to the summer holidays and a paucity of financial resources all conspired against the use of random sampling techniques. Convenience sampling is useful for research that is an early stage of development (as is ours) but the reader must be warned that "there is no way of determining to whom, other than the sample itself, the results apply" (Singleton, *et al.* 1988, 153).

Findings and Commentary

Introduction: The questions on the survey instrument can be grouped into four broad categories. The first group (questions 1-6) were designed to ascertain the musical proficiencies of the participants. The second group (questions 7-11) examined the participants' history of music information seeking. Participant views about our database concept were sought in the third group of questions (questions 12-17). The fourth group (questions 18-20) allowed the participants the opportunity to communicate any further ideas, comments and suggestions that they might have. A summary of the quantitative data can be found in the attached appendix.

Musical Proficiencies (Questions 1-6): The first question was designed to give the researcher some indication of the self-described musical skill levels of the participants and was loosely based on a Likert-like continuum from most advanced ("Musicologist") to least advanced ("Musically Curious") (See Appendix: Question 1.). Three categories ("Avid Listener", "Musically Curious" and "Other") can be described as indicative of a more passive relationship to music (i.e. listening as opposed to performing). These "passive" categories were chosen by twenty-three of the forty-one respondents (roughly 51%). Despite whatever skewing caused by

the convenience sampling, this sample does seem to represent a broad range of musical abilities.

The rough 50/50 split between those with a "passive" relationship to music and those with an "active" relationship, held consistently throughout the remaining questions in this group. Twenty-two participants (54%) indicated they could play an instrument or sing (Question 2). The ability to read (18 or 44%) and write music (19 or 46%) is also indicative of the passive/active split (Questions 4-5). One skill that seems to be held by the participants regardless of their categorization as "active" or "passive" is the ability to, at the very least, "plunk out" a melody on a keyboard. A full 78% of the participants (36) indicated this ability (Question 6).

The passive/active split is important for two reasons. First, it would suggest that the "passive" participants would be more interested in finding information "about" musical works (i.e. recordings, titles, etc.) than representations of musical scores (which they would have difficulty reading anyway). Second, it would also suggest that the "passive" participants would prefer to interact with the database in a manner that does not tax their limited musical abilities (i.e. listening to retrieved items over reading retrieved scores, singing queries over notating them, etc.). Notwithstanding the passive/active split, the majority of users would be able to query the database using a MIDI keyboard.

History of Music Information Seeking (Questions 7-11): When asked to give the term(s) that best described their musical interests the participants responded with total of forty-two separate terms (Questions 7-8). Terms used to describe what

some call "serious" or "art music" were individually the most cited terms, namely "classical" (13), "jazz" (6) and "opera" (4). The preponderance of these terms is probably due in large part to the nature of the sample with its higher than normal presence of "musicologists" and music librarians. Other terms ranged from "folk" (3) to the "Ramones" (1). There were five terms given that indicate a preference based upon the place of origin: "Canadian" (1), "South American" (1), "Central American" (1), "African" (1), and "Asian" (1). Arranging the respondents' terms into a proper classification scheme of broader musical categories proved impossible given the ambiguity of such terms as "sad" (1), "lively" (1), "soft" (1) and "melodious" (1).

When asked whether they had ever sought out some musical information (Question 9), twenty-eight respondents (69%) said "Yes" with a further three (7%) indicating "Often" for a total of thirty-one (76%). The range of desired information was remarkably broad. Participants had sought information relating to music from television shows and movies, lyrics and scores, names of composers and songs, recordings of folk dances and even answers to "Trivial Pursuit" questions (Question 10). Of the thirty-one participants who indicated a history of music information seeking, thirty told us whether they were successful in their searches. Of these thirty, nine (30%) were not successful and another ten (33%) had difficulty in locating their answers (Question 11). This suggests that a full 63% of those seeking music information were not well-served by traditional location methods.

Participant Views on our Database Concept (12-17): "Would our full-text music database have been of use to you in your search?" was the question put to the

thirty participants that had indicated a history of music information seeking (Question 12). There were twenty-two respondents (73%) that said it would have been useful while only one (3%) said it would not. Elaborations on this question were again remarkable for the wide range of potential uses described (Question 13). These included comments about how singing the query would have helped, how the system would have saved time, how the database would ease the search for certain passages, themes or lyric fragments and how the database would aid in locating titles and composers. Also noted was the desire to find music relating to television shows and movies. Conspicuous by their absence, however, were comments relating to the database's various output options (i.e. hearing the score, printing the score, etc.). This would suggest that to this group the need to find information "about" a piece of music (i.e. recordings, catalogue information, performer names, etc.) is more important than listening to the music or printing the scores.

There were thirty-four participants who responded to the question "If we made a music database specifically for you, what would you like it to contain?" (Question 14). The answers given strongly reflected the musical interests of the participants as indicated by their answers to Questions 7-8. That is, classical music lovers wanted classical music, guitar players wanted guitar music, and so on. Two new ideas did emerge however. The first was the suggestion that the user could perform "serendipity" searches that would involve taking a melodic fragment and seeing how many other composers had used it in their works. The second suggestion was that the database include the Top 100 hits of the last thirty-five years. These two suggestion lead the researcher to believe that there might be a certain amount of entertainment value to be found in browsing the database.

When asked whether they could ever imagine using our music database, thirty participants responded with twenty-two "Yes" (74%), one "No" (3%) and seven "Do not know" (23%) answers (Question 15a). Elaborations on these answers (Question 15b) were also varied along the lines already established in previous qualitative questions (i.e. Questions 7,8,13 and 14). However, there were some hitherto unmentioned noteworthy potential uses put forth. These included using the database to find music for special occasions, using it in libraries and music stores as a reference tool, and setting it up as a type of online service.

Participant opinions on the various query methods (Question 16) and output options (Question 17) are summarized in Charts 1 and 2 respectively. As one would expect given our exposure to the results of the previous questions the "Composer" and "Title" searches were tied as the most approved query method. Both "Singing" (fourth) and "Music Keyboard" (fifth) had acceptance ratings over 70%. That the "Music Style" search tied for fourth reflects the vast array of tastes represented within this survey (See Questions 7-8). That "Lyric Text" ranked third might be indicative of the strong association "popular" songs have with their lyrics. "Writing Music" ranked an understandable thirteenth given that the respondents indicated a low ability to write music (Question 5). Also not surprising was that "Opus Number" ranked last as several participants even asked what this term meant. One surprise, however, was the high ranking of the "Singing" search in light of the fact that only 26% of participants indicated and ability to sing (See Question 3). In summary, the addition of the "Keyboard" and "Singing Searches" to the traditional query methods seems to have found acceptance amongst the survey group.

Chart 1(Question 16): Opinions on Query Methods

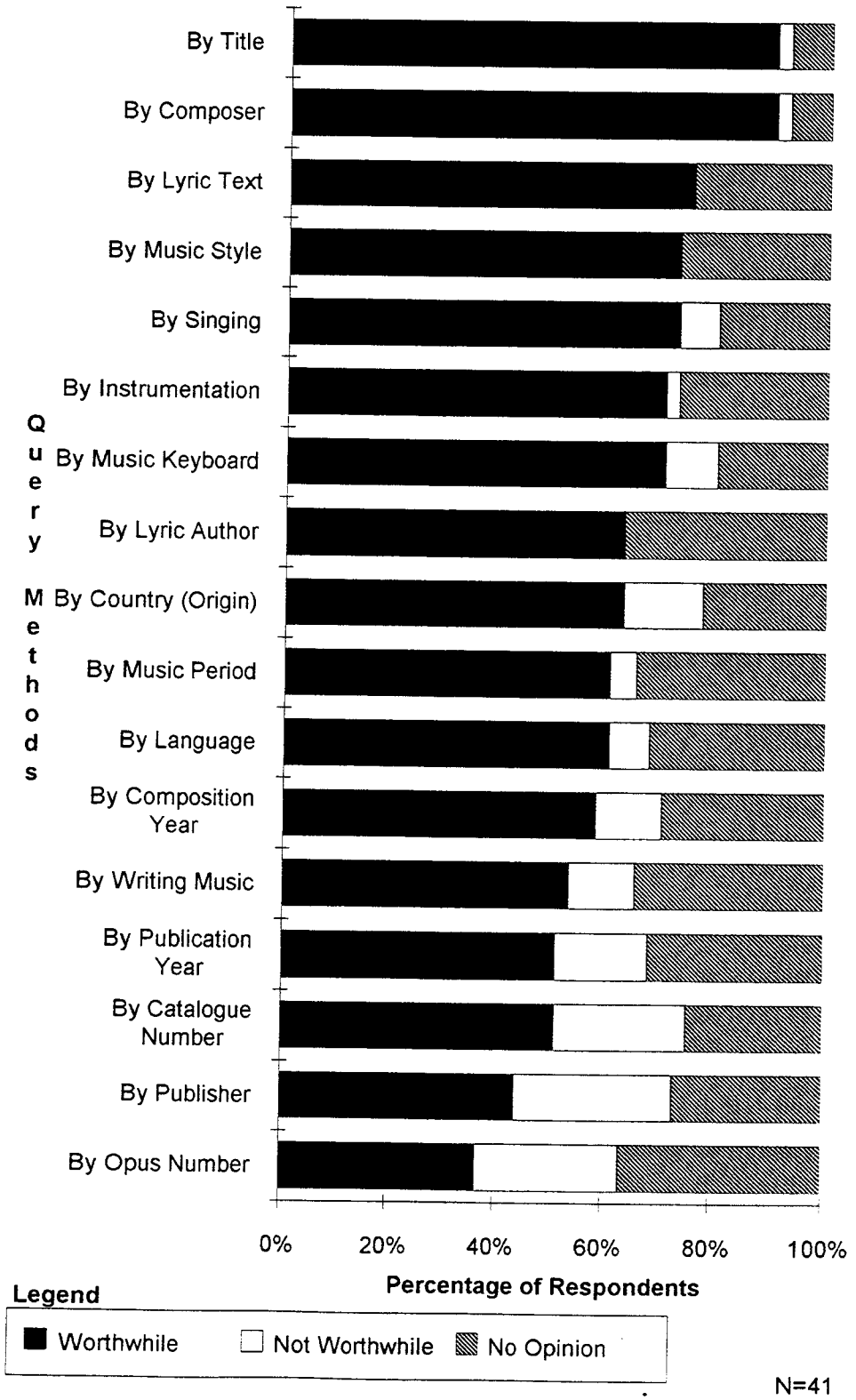
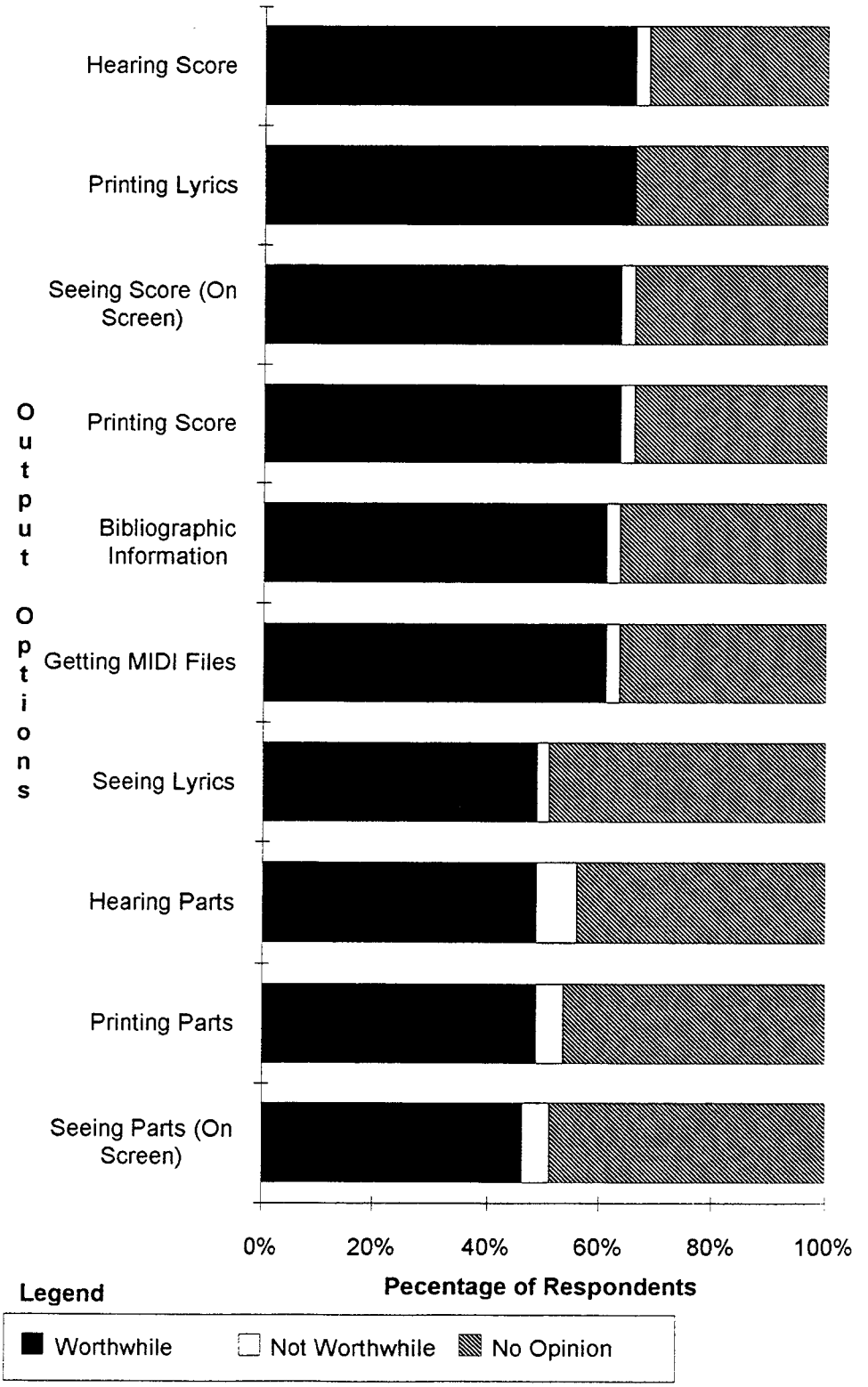


Chart 2 (Question 17): Opinions on Output Options



Overall, the participants' enthusiasm towards the various output options was more muted than that towards the various query methods. The two highest ranking output options, "Hearing Score" and "Printing Lyrics" were both below the 70% acceptance level. Also, the "No Opinion" levels were consistently higher for this question than those for Question 16. This researcher is surprised that "Seeing Lyrics" (fourth) was not ranked identically with "Printing Lyrics" (tied for first). One would have thought that seeing lyrics would go hand-in-hand with the ability to print them. The relative low rankings for "Hearing Parts" (tied for fifth), "Seeing Parts" (sixth) and "Printing Parts" (tied for fifth) again suggests that the survey group conceived the database primarily as a method of locating external recordings and information and thus valued the novel query methods more highly than the novel output options.

Further Comments and Suggestions (Questions 19-20): Question 18 asked the participants whether they found the presentation understandable. With thirty-two "Yes" (79%), one "No" (3%) and 7 "Somewhat" (18%) responses it can safely be assumed that the majority of the survey group's answers were reasonably well informed. Possible reasons for the less-than-perfect understanding include the hectic situations of some of the lecture/demonstrations and the time constraints of some of the participants brought about by their prior commitments.

When asked for further comments and suggestions (Question 19) twenty-five participants responded. There were three important points stressed within the responses to this question. The first point was the idea of creating databases that would be tailor made to suit a particular audience (e.g. "popular", "classical", or guitar databases, etc.). The second issued raised was the possible need for "fuzzy

searches". Several participants were concerned that they would not be able to retrieve the desired work because the might not be able to sing/play the query properly. Third, several group members expressed concern the database would not have enough material in it and thus not be very useful. In a way, this suggestion is related to the idea of creating several specialized databases.

Question 20 asked the participants to construct a potential query. The imaginary queries represented the whole range of uses of the database from analysis to entertainment. All of the more popular query methods were presented (See Question 16 and Chart 1) in similar proportions to their popularity (i.e. emphasis on title, composer, singing and lyric searches). Three of the imaginary searches dealt with a strong association between music and an external object or event (i.e. associations with television shows, movies, weddings, funerals and Christmas). There again seemed to be a stronger emphasis placed on the query methods than the output options. Also, all of the queries seemed to be reflective of the respondents' individual musical tastes, suggesting that these were not simply academic exercises but actually represented sincere desires for music information that had not yet been fulfilled.

Open Floor Question Period: Questions concerning copyright, user costs, MIDI, marketing and query accuracy were asked at every presentation. Concerns about copyright clearance were strongly raised by the participating librarians. Problems with indexing ornamentation and rhythm were discussed, primarily with those identifying themselves as "Musicologists". One librarian suggested that work on the database begin with those composers not currently indexed in the traditional thematic catalogues.

Conclusions

1. There seems to be both a need for (Questions 9-12, 20), and a general acceptance of (Question 15a), the features found in our music database.

2. Practicing librarians seem particularly enthused about the prospects of using our database as a reference resource (Questions 15b and 19).

3. The preferred query methods are (in order): "Title," "Composer," "Lyric Text," "Singing," "Music Style," and "Music Keyboard" (Question 16 and Chart 1).

4. Performance ability does not seem to have an effect on the users' desire to use the "Singing" and "Keyboard" searches (Questions 3 and 16).

5. There does, however, appear to be a relationship between the users' ability to notate music (Question 5) and their acceptance of the "Writing Music" search (Question 16).

6. The output options are not as enthusiastically supported as the various query methods, suggesting that the users wish to use the database as a locating device for external music sources (i.e. recordings) (Question 17 and Chart 2).

7. There seems to be a need for access points that link music with external objects or events, such as television shows, movies or special occasions (e.g. weddings or funerals, etc.).

8. Given the wide range of musical interests (Questions 7-8) our music database would either have to be tailor made to various tastes or be extremely huge so that no special interest is left out.

9. There seems to be as many possible uses for the database as there are users. These uses range from entertainment through to musicological analysis (Question 20).

Suggestions for Further Research

First, it would be very fruitful to note the actual structures of the melodic queries (i.e their lengths, complexities and accuracy). To this end we have requested copies of the query tapes the CBC's *Hum Line* radio show have complied over the course of its production. The producer of the show was kind enough to allow the researcher an afternoon listening to the tapes but so far have been reluctant to release copies of the tapes to us for in-depth analysis. Preliminary analysis of the data garnered during listening indicates that these queries (or a similar set of actual queries) would indeed yield important information that could effect the structure of the database. (See Tague-Sutcliffe, Downie and Dunne 1993, 210)

Second, some research should be done to determine the proper interface for each type of user. Should there be different interfaces for different types of music? Should all of the potential options be available all the time?

Third, some research should be done which explores the ideal way of linking music files to external objects or events (i.e. television shows, movies, etc.). One problem would be to keep the links current and complete.

Upcoming Research and Acknowledgements

This summer the *MusiFind* Project enters Phase III. The researcher, under the supervision of Dr. Jean Tague-Sutcliffe, will begin work on the classification of melodic fragments and empirically testing various melodic indexing schemes.

The author wishes to acknowledge the continued support and guidance of Dr. Jean Tague-Sutcliffe. The author also wishes to thank IBM's Centre for Advanced Studies for its generous financial support of this summer's research.

APPENDIX: Summary of Quantitative Findings

Question #1: Which of the following best describes you? (Select one) [See following table for categories.]

CATEGORY	FREQUENCY	PERCENTAGE
Musicologist	5	12
Music Student (University or college level)	1	2
Advanced Amateur	7	17
Novice Amateur	4	10
Beginner	1	2
Avid Listener	5	5
Musically Curious	14	35
Other	4	10

Question #2: Do you sing or play a musical instrument? (Yes/No)

ANSWER	FREQUENCY	PERCENTAGE
Yes	22	54
No	19	46

Question #3: If you sing or play a musical instrument(s) would you please tell us which?

RESPONSE	FREQUENCY	PERCENTAGE
None	19	47
Piano	12	29
Voice	1	2
Both Piano and Voice	7	17
Only Other (Not Piano or Voice)	2	5

Question #4: Can you read music? (Yes/No/With Difficulty)

RESPONSE	FREQUENCY	PERCENTAGE
Yes	18	44
No	12	29
With Difficulty	11	27

Question #5: Can you write music? (Not compose songs but simply know how to put notes in the proper places.) (Yes/No/With Difficulty)

RESPONSE	FREQUENCY	PERCENTAGE
Yes	19	46 (rounded)
No	19	46 (rounded)
With Difficulty	3	7

Question #6: Can you "plunk out" a melody on a piano? (Yes/No/With Difficulty)

RESPONSE	FREQUENCY	PERCENTAGE
Yes	25	61
No	9	22
With Difficulty	7	17

Question #9: Have you ever had the need, or desire, to seek out some musical information? (Often/Yes/No)

RESPONSE	FREQUENCY	PERCENTAGE
Yes	28	69
No	10	24
Often	3	7

Question #11: If you answered Yes to Question #9, did you find what you were looking for? (Yes/No/With Difficulty)

RESPONSE	FREQUENCY	PERCENTAGE
No Response	11	27
Yes	11	27
No	9	22
With Difficulty	10	24

Question #12: If you answered Yes to Question #9, would our Full-Text Music Database have been of use to you in your search? (Yes/No/Do Not Know)

RESPONSE	FREQUENCY	PERCENTAGE
No Response	11	27
Yes	22	54
No	1	2
Do Not Know	7	17

Question #18: Was today's presentation clear and understandable. (Yes/No/Somewhat)

RESPONSE	FREQUENCY	PERCENTAGE
Yes	32	79
No	1	3
Somewhat	7	18

References

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