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University

**Evaluating mobile music services in Bangladesh: An
exploration in user experience**

Supervised by

Dr. Imran Mahmud
Associate Professor & Head In-Charge
Department of Software Engineering
Daffodil International University

Submitted by

Taskiya Tamima Khan
191-35-2658
Department of Software Engineering
Daffodil International University

To fulfilling the requirement of my Bachelor of Science degree in Software Engineering,
I am submitting this thesis report.

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APPROVAL

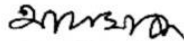
This thesis titled on “Evaluating Mobile Music Apps in Bangladesh: An Exploration in User Experience”, submitted by Taskiya Tamima Khan (ID: 191-35-2658) to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents.

BOARD OF EXAMINERS



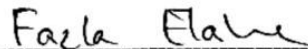
Dr. Imran Mahmud
Head and Associate Professor
Department of Software Engineering
Faculty of Science and Information Technology
Daffodil International University

Chairman



Afsana Begum
Assistant Professor
Department of Software Engineering
Faculty of Science and Information Technology
Daffodil International University

Internal Examiner 1



Dr. Md. Fazle Elahe
Assistant Professor
Department of Software Engineering
Faculty of Science and Information Technology
Daffodil International University

Internal Examiner 2



Mohammad Abu Yousuf , PhD
Professor
Institute of Information Technology
Jahangirnagar University

External Examiner

DECLARATION

I hereby pleased to announce that I have done this thesis under the supervision of Dr. Imran Mahmud, Associate Professor & Head In-Charge, Department of Software Engineering. I also announce that this work has been done by myself for the requirement of degree of Bachelor of Science in Software Engineering. This work or any portion of it has not been submitted for a bachelor's degree or any other graduation before.

Candidate



Taskiya Tamima Khan

ID: 191-35-2658

Department of Software Engineering

Daffodil International University

Certified by



Dr. Imran Mahmud

Associate Professor and Head In-Charge

Department of Software Engineering

Daffodil International University

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ABSTRACT

Music is now a communication system for us. All of us listen to music when we are sad, happy, in love, stressed or while working or cooking. We listen, we sing, we whistled tune and we enjoy. As now technology has developed, so music is easier to explore, share and spread to the world. As a developing country Bangladesh do not have any popular music app. Though most of the country people do listen music through foreign mobile music app. So I have decided to go through user experience and satisfaction side of two most popular apps and give suggestions for developers to improvise unpopular music apps. For that I collect data from user experience via Google form and used Usability Metric for User Experience (UMUX) and a Comprehensive Measure of the Quality of the Website User Experience SUPR-Q method. My target audiences are university and college students. People of different ages, from different institute participated in this survey. I found that users have some great usability experience through those two most popular music apps. So I took apart those result and concluded for better development suggestion for other unpopular music apps

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CHAPTER-1

INTRODUCTION

1.1BACKGROUND

Music is a part of our daily life. All of us listen to music when we are sad, happy, in love, stressed or while working or cooking. We listen , we sing , we whistled tune and we enjoy. No one knows who actually invented music or which is the first song but in today's time we know all the latest music, albums, bands, singer by the blessing of technology within any second from any location of the world. Music is now a communication system for us. |About thousands of years ago people invented music and spread it among all of us by CD, DVD, Music players, radio, Television, mobile phone, computer etc device . Earlier back, People used to download songs for later. It was all a matter of "play, pause, and repeat. "Nothing fancy. Back then people used to listen to songs by some devices like sony Walkman, Sony discman,MP3 players, CDs , portable stereo system , ipod classic etc. Those devices didn't have download options so users used to download it first from another device like computer and input those downloaded songs into mp3 players and other devices. Those devices had limited songs. The Internet was not so available like nowadays to everyone. Smart devices weren't in everyone's hands like these days.

As now technology has developed , so music is easier to explore, share and spread to the world .From 7.837 billion people (worldometer, 2022) of the whole world 7.26 billion people use mobile phones, which is 91.00% of the world's population (bankmycell, 2018).

So In recent times, almost every music service has mobile applications (apps) that facilitate convenient access for users via smartphones.In 2020, the number of smartphone users in Bangladesh was at 170.14 million and more than half of them use mobile music apps.We have mobile on our hands and internet access in our phones so life goes easy with the search of music streaming services.We have thousands of mobile music app available on our mobile store.Not all the apps are user friendly, not all are using by everyone. People have options and they are free to choose which applications are suitable for them. From all these

thousands of mobile music apps the majority of people use some particular music applications.

This paper's goal is to find the insights for online music service providers and system developers in future development and improvement, and contribute to the research on mobile music application design, uses and evaluation.

In user's perspective, one of the most popular music service is YouTube and Spotify. YouTube and Spotify weren't the first music app. The developer copied some feature, added some new and improvised by users test and likes. By analysis this two app's user satisfaction I will find out lackings of unpopular apps and limitations of YouTube and Spotify . Also will contribute to the literature in user-centre evaluation in music information retrieval (MIR) and music digital libraries (MDL), and provides practical insights for music application design, use and evaluation (Hu, 2018). A music application can be developed by the best but without user friendly feature the app is useless

1.2 MOTIVATION OF THE RESEARCH

Music streaming application's primary purpose is to play available music in the databases of the service, compose custom playlists and suggest similar songs. The main elements of music streaming apps are: Discovery. The global music streaming market size was valued at USD 29.45 billion in 2021 and is expected to expand at a compound annual growth rate (CAGR) of 14.7% from 2022 to 2030 (Prisco, 2022). The rising penetration of digital platforms and the growing use of smart devices are anticipated to boost the market growth over the forecast period. Platforms that allow users to listen to audio and podcasts and watch music videos are examples of music streaming services. These platforms are gaining popularity owing to features such as song recommendations, automatic playlist personalization, and hassle-free connectivity on apps and browsers. Moreover, the expanding podcast genres on these portals are propelling the market growth.

Not all music streaming applications are the user's first choice though all the apps have almost all music in the database. The Usability design makes a huge difference among these applications for user friendly. The most using apps have user friendly and unique

features on their design. The purpose of this research is to find and identify the user experience problems and Provide some favorable suggestions regarding this issue. Also Help improve the design of music services and also expand our understanding of user needs so that we can help improvise unpopular music applications developers some suggestions regarding their way to a successful user friendly application

1.3 PROBLEM STATEMENT

As mobile music applications are using by a vast number of people and it makes an impact on our economy, technology etc. So a music streaming application should be developed as per as user's need. In our country we have developed so many music applications as well as others country but comparing to top 10 most popular music applications, we don't have popular apps

As Bangladesh don't have any popular own music app service. YouTube and Spotify is the most popular music app using by Bangladeshis. Our target is to collect user experience of these two app and finding shortcomings & limitations and improvise ideas for upcoming music apps. Want to determine the reason behind not having any popular music app of our own. Our target audience are Bangladeshi University students whom are the active users of these mobile music streaming applications and they can help us investigate briefly to concise the outcome we are expecting.

As the research paper goal is to gather user's experience so I have used questionnaire method and made a survey form to collect data and using UMUX & SUPR-Q I have done my work. This two method will give expecting possible results. So this paper goal is to find limitations of local app, find reasons behind YouTube and Spotify user satisfactory and suggest developers to improvise their mobile music application to gather more listener and user of Bangladesh towards local applications.

1.4 RESEARCH QUESTION

This research goal is to find out:

- RQ1: What is the overall user satisfaction rate of mobile music apps?
- RQ2: How mobile music applications can get more users?
- RQ3: What's the current state of mobile music applications in Bangladesh?

1.5 RESEARCH OBJECTIVES

The research paper objective is to visualize the experience of usability of mobile music applications. Also :

- Find users' most interactive terms of mobile music application in Bangladesh.
- Using most popular and common survey style which is questionnaire.
- Data will be collected from mostly university students and also from people of all age groups.

1.6 RESEARCH SCOPE

This research will cover the user experience part of mobile music application and will focus on users satisfaction . Also the scopes are:

- This study result will help improvise unpopular music app developers to increase their user satisfaction term of their mobile music app.
- To learn about the current state of mobile music applications in Bangladesh and future efficient of music applications.

1.7 THESIS ORGANISATION

From the beginning of this paper the background behind the work, motivation of the research, problem statement, research questions, research objectives, research scope are discussed briefly.

I will attach literature review in the next chapter which is related to my study in the field of usability testing of music application, In the next chapter methodology of the work will be covered where data collection, data processing ,analysis will be done . The result of the paper will be disclose in chapter four. In the last chapter, conclusion will be mentioned and discussed. Whole concept, work processing, description, all things are discussed and covered briefly to understand to connect or engaged to my research work.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

For starting a research work one have to go through previous works, articles, research papers, conference papers, books etc related to the research topic to understand and engage more with the work related paper summarization, determining lacking of previous work and analyzing results for my work are done and captured in this chapter to overcome lacking, limitations and for achieving better result. Also contributes to the literature in user-centered evaluation in music information retrieval (MIR) and music digital libraries (MDL), and provides practical insights for music application design, use and evaluation (Hu, 2018).

2.2 PREVIOUS LITERATURE

Almost all of the mobile music streaming applications has same kind of database but the difference is in applications feature and that's where the big change has made for user's satisfaction. Though many researcher worked with this kind of related topic to increase opportunities for unpopular or less used mobile music applications yet I find some limitations and wants to improvise more to generate this field properly.

Research study of Hassan et al. (2019) shows that the age group of 21-23 are most active users but using pirated content, in their research paper about a music piracy behavioral model in Bangladesh.

In 2016, About Digital Resource Exchange About Music (DREAM): Usability Testing, Upitis et al. (2016) researched and concluded that DREAM can be centralized place for music teachers to keep abreast of digital technologies in education. They used SUS method to solve their calculation of their survey but their paper has limitations about mobile interfaces.

Re-Assessing the Usability Metric for User Experience (UMUX) Scale, Berkman & Karahoca (2016) proved that usability testing is less influenced by number of users, the test environment, user characteristics, usability actions and more by factors. As conclusion, it is critical to consider the psychological factors of users, when conducting usability testing.

In 2018, Xiao Hu (2018) evaluate mobile music applications in china. Explored in user experience field with most popular mobile music apps of china, as china has one of the largest music listeners population in recent times in the world. In the study author evaluated three mobile apps of the most popular Chinese music services from the user's perspective, used usability testing and semi-structured interviews with a sample of active users in China. They examined by Nielsen's 10 user experience heuristics and four criteria in recommender evaluation. Results identified criteria that create a positive user experience, and suggested further improvement. Also contributes to the literature in user-centered evaluation in music information retrieval (MIR) and music digital libraries (MDL), and provides practical insights for music application design, use and evaluation.

About effective classroom performance music app can be deployed in the classroom, Order (2015) studied that paper was preliminary usability testing of apps for the music technology classroom that can have great impact on educational institute, impact on students, impact on society.

A Comprehensive Measure of the Quality of the Website User Experience SUPR-Q, Jeff Sauro (2015) showed that SUPR-Q helps to understand how well a website scores relative to others in the database. It's a method to summarize user's feedback. Usability, Website quality, credibility, loyalty and appearance are measured the essential aspects of a website with this particular method.

About how the design influences user senses of agency, In 2021 Lukof et al. (2021) did survey, analyzed reliability in thematic analysis for social wellbeing, sense of agency of using YouTube. Auto-play mood, recommendation feature and other specific design were briefly researched in this paper about all the YouTube mechanism.

Dheka et al. (2017) published a paper about ZIPT which is Zero-integration Performance Testing of Mobile app design. This paper has some clear view on app design, design

support tools, and also supports diversion in mobile applications as tapping, scrolling, two finger pinch for zoom, keyboard text entry etc.

Function of music in everyday life was being researched by Sloboda et al. (2018). They did an exploration in a study using experienced sampling method for analysis psychological literature, enhance social context. They come to a conclusion that music is a mood changer or enhancer and nostalgic when listening. Also they have limited description of music materials in a way that is free of the assumptions and biases associated in their research paper.

Davy T. K. et al.(2021)shows in their paper Engaging with students in creative music making with musical instrument application in an online flipped classroom that Provides a set of innovative pedagogical approaches to teach students music in an online alternative mode during the difficult times of covid or any other pandemic.

2.3 CONCLUSION

In all these paper they researched about music mobile applications or design of applications or effect of applications on users. Differently presented topics are being solved by several methodology like SUS, SUPR-Q, UMUX, UMUX-lite, ZIPT, PUT, Heuristic evaluation and many more to achieve the ultimate goal of their paper's purpose. In our case, would attempt to improvise usability of music applications.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH METHODOLOGY

For collecting data, there are different types of methods which can be used for this study such as questionnaires, interviews, observation, documents, and so on. This study is descriptive, and it requires quantitative types of data to answer the questions, and for that reason, questionnaires have been chosen as a data collection method. Also I have applied Usability Metric for User Experience (UMUX) and Standardized User Experience Percentile Rank (SUPR-Q) questionnaire methods and made a Google form to collect data from users.

3.2 DATA COLLECTION

This research goal is to test the usability of mobile music application in Bangladesh so I selected most used music app by bangladeshi which is YouTube and Spotify, which are popular and top listed in the world too. Firstly I created a Google survey form by using UMUX and SUPR-Q method questionnaires and share this to my target audience College and University students to collect their opinion and then entered my collected data into an excel spreadsheet (Figure 1). Almost 200 people participated and I got 190 clear and completed data to start the analysis with.

A	B	C	D	E	F	G	H	I
Timestamp	Write your name	E-mail	Gender	Age Range	Institute name	Do you use mobile music	Which mobile music app	How long do you use the
11/19/2022 2:10:05	danvir		Male	20 to 25	Daffodil International Uni	Yes	You Tube	less than 1 hour
11/19/2022 2:10:50	Tamima		Female	20 to 25	Daffodil International Uni	Yes	Spotify	5-8 hours
11/19/2022 2:12:48	bilal		Female	20 to 25	daffodil	Yes	You Tube	less than 1 hour
11/19/2022 2:14:12	Borno		Female	Less than 20	Udayan higher Secondary	Yes	You Tube	less than 1 hour
11/19/2022 2:15:33	Shanfil Islam Noor		Male	20 to 25	Daffodil International Uni	Yes	You Tube	1-4 hours
11/19/2022 2:17:12	Hasin Ishrak Khan		Male	20 to 25	DIU	Yes	You Tube	less than 1 hour
11/19/2022 2:18:40	shanto		Prefer not to say	20 to 25	UIU	Yes	You Tube	less than 1 hour
11/19/2022 2:21:42	Touhid		Prefer not to say	More than 25	DIU	Yes	You Tube	1-4 hours
11/19/2022 2:23:55	Sohan		Male	Less than 20	DIU	Yes	You Tube	less than 1 hour
11/19/2022 2:25:19	Gabriel		Male	More than 25	DIU	Yes	Spotify	less than 1 hour
11/19/2022 2:26:56	Kohi		Male	20 to 25	UIU	No	Spotify	less than 1 hour
11/19/2022 2:27:22	khan		Male	More than 25	National Music Foundati	Yes	You Tube	1-4 hours
11/19/2022 2:28:29	Barshan Sarker		Male	20 to 25	Bangladesh University of	Yes	You Tube	1-4 hours
11/19/2022 2:28:41	Helal		Prefer not to say	20 to 25	AIUB	Yes	You Tube	1-4 hours
11/19/2022 2:31:16	Rakib		Male	More than 25	University of Chittagong	Yes	You Tube	1-4 hours
11/19/2022 2:49:04	Tori Islam		Male	More than 25	Birkbeck, University of L	Yes	You Tube	1-4 hours
11/19/2022 2:53:01	Mhm Nahin		Male	20 to 25	Habibullah Bahar Univer	Yes	You Tube	1-4 hours
11/19/2022 2:58:25	Md Rahatul Haque		Male	More than 25	Khulna University	Yes	You Tube	1-4 hours
11/19/2022 3:00:33	Alvi Mahin		Male	Less than 20	EWU	Yes	You Tube	1-4 hours
11/19/2022 3:03:58	Rifat		Male	20 to 25	Hamdard University	Yes	You Tube	1-4 hours
11/19/2022 3:04:42	Jannatun nur raha		Female	20 to 25	Daffodil International uni	Yes	You Tube	1-4 hours
11/19/2022 3:06:01	Kawsar		Male	Less than 20	Sonargaon College	Yes	Spotify	1-4 hours
11/19/2022 3:07:07	Musavi		Male	More than 25	Narayanganj College	Yes	You Tube	1-4 hours
11/19/2022 3:08:20	shahriar@sarc.edu.bd		Male	Less than 20	Government Shah Abdur	Yes	You Tube	1-4 hours
11/19/2022 3:08:28	Siam		Male	20 to 25	DEW	Yes	You Tube	less than 1 hour
11/19/2022 3:08:36	Sayeed Anwar Faysal		Male	20 to 25	Daffodil International Uni	Yes	Spotify	1-4 hours
11/19/2022 3:09:55	Aarman Ahmed Joseph		Male	More than 25	Joseph	Yes	Spotify	1-4 hours
11/19/2022 3:10:03	Kabid Nawaz		Male	20 to 25	My home	Yes	You Tube	less than 1 hour
11/19/2022 3:55:10	nafew		Male	20 to 25	Daffodil international Uni	Yes	You Tube	5-8 hours
11/19/2022 3:56:35	nadim		Male	20 to 25	Asia Pacific	Yes	You Tube	less than 1 hour
11/19/2022 3:58:11	nafi		Male	More than 25	Daffodil international Uni	Yes	Spotify	5-8 hours
11/19/2022 3:59:48	nasir		Male	Less than 20	Daffodil international Uni	Yes	You Tube	1-4 hours
11/19/2022 4:01:00	nayeem		Male	Less than 20	Daffodil international Uni	No	Spotify	1-4 hours
11/19/2022 4:01:59	rabbi		Male	Less than 20	Daffodil international Uni	Yes	Spotify	1-4 hours
11/19/2022 4:03:01	Islam		Male	More than 25	Daffodil international Uni	No	You Tube	less than 1 hour
11/19/2022 4:04:03	ashik		Male	More than 25	Daffodil international Uni	Yes	You Tube	1-4 hours
11/19/2022 4:05:09	akter		Male	20 to 25	Daffodil international Uni	Yes	You Tube	less than 1 hour
11/19/2022 4:06:05	jakir		Male	More than 25	Daffodil international Uni	Yes	You Tube	less than 1 hour
11/19/2022 4:07:01	rubel		Male	More than 25	Daffodil international Uni	Yes	You Tube	1-4 hours
11/19/2022 4:07:59	rafi		Male	20 to 25	Daffodil international Uni	Yes	Spotify	less than 1 hour
11/19/2022 4:09:07	saddam		Male	Less than 20	Daffodil international Uni	Yes	You Tube	5-8 hours
11/19/2022 4:10:08	johir		Male	More than 25	Daffodil international Uni	Yes	You Tube	less than 1 hour
11/19/2022 4:11:20	salim		Male	20 to 25	Daffodil international Uni	Yes	You Tube	5-8 hours
11/19/2022 4:13:39	raju		Male	20 to 25	Daffodil international Uni	Yes	You Tube	1-4 hours

Figure 1: Raw Survey Data

3.2.1 PARTICIPANTS GENDER

As I am doing an open survey and the survey link was sent to random groups and close associates, I managed to get 190 responses in total. The number of responses is quite similar to what I expected. As the chart demonstrates, around 76% of the respondent was male and 21% of the respondent was female. In number 145 respondent was male 40 respondent was female. Around 3% (5 in number) of the respondent feels not to share their physical gender.

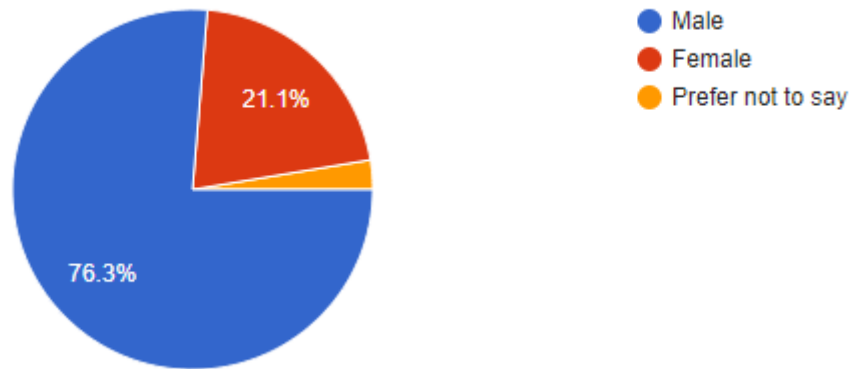


Figure 2: Pie Chart Participants Gender

3.2.2 PARTICIPANTS AGE

My target audience were college and university students . basically their age were between 20-25 for maximum participant. In 190 participants, 108 people are between 20 to 25 which is 56.8% of the total. Secondly 27.4% or 52 people are more than 25 years old . Lastly 30 participants are less than 20 years which is 15.8% of total. Mix ages of participants use mobile music applications. for a better understanding a pie diagram is shown in figure-3

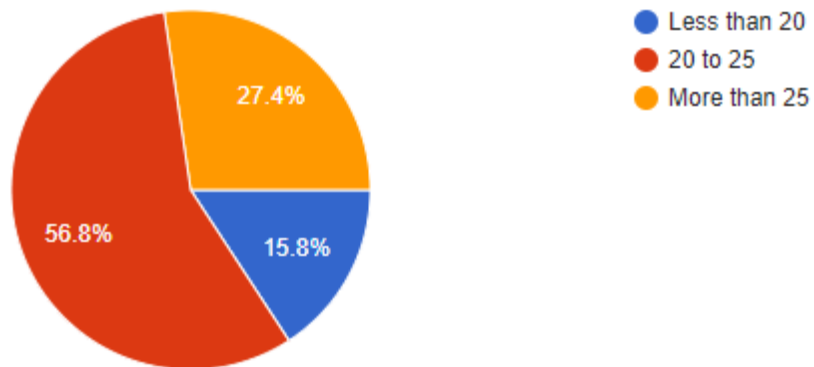


Figure 3: Pie Chart Participants Age

3.2.3 PARTICIPANTS INSTITUTION

As the survey link was sent to random groups and close associates of university and college students, I managed to get 190 responses in total. They were from different institutes. Such as Daffodil International University, Dhaka University, University of Chittagong, Eastern University , Viqarunnisa Girls school , BUBT, BUTEX, AUST , Mohammadpur Kendriya College, Islamiya High School, AIUB, Habibullah Bahar University, Sonargaon College, Jahangirnagar University, NSU, EWU , DIIT, DIC, UIU, BUET, Udayan Higher Secondary School, KUWT , Eden College , Khulna University , Manarat International University, University of London and University of Asia Pacific,

3.3.4 APPLICATION USAGE

Respondents were asked if they use any mobile music app or not. 91.1% of them responded positively. 173 people use music app and 17 people don't use, which is 8.9% of total, shown in figure 4. From them 77.9% (148 respondents) use YouTube and 22.1% (42 respondents) use Spotify shown in figure 5. When the respondents were asked how long they use the selected app in a day they have quite mixed answers. 57% (108 in number) of people answered they use around 1-4 hours a day in a specific music app. 20% (37 in number) of respondents stay in that app for around 5-8 hours. And 20% (39 in number) use the music app for less than 1 hour. Lastly, 3% of the respondents spend more than 8 hours using their chosen music app. So, most of the respondents spend more than 1 hour a day using the music app and significantly 37 people use the music app for more than 5-8 hours. A pie chart is given in figure 6

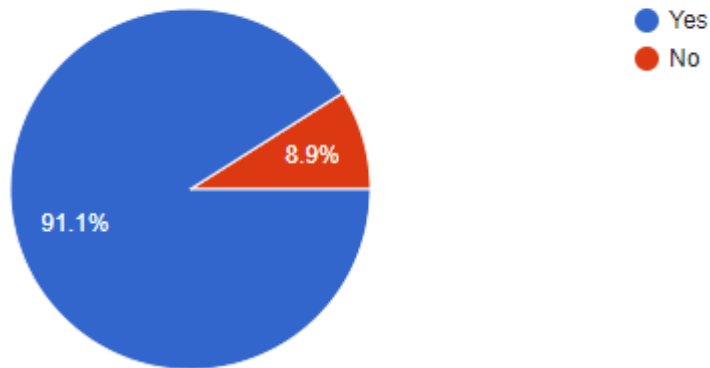


Figure 4: Response of Usage

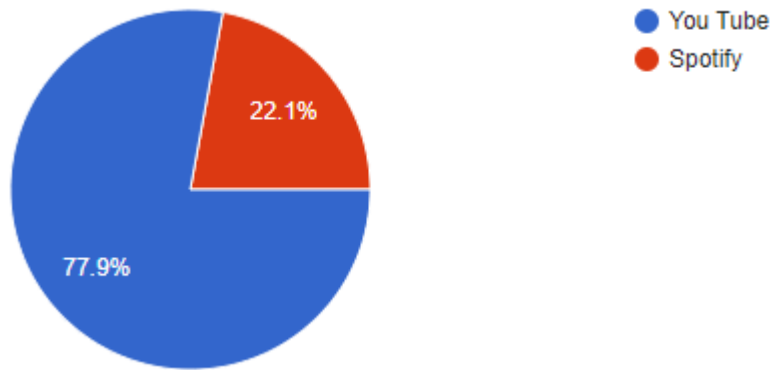


Figure 5: Application Using Rate

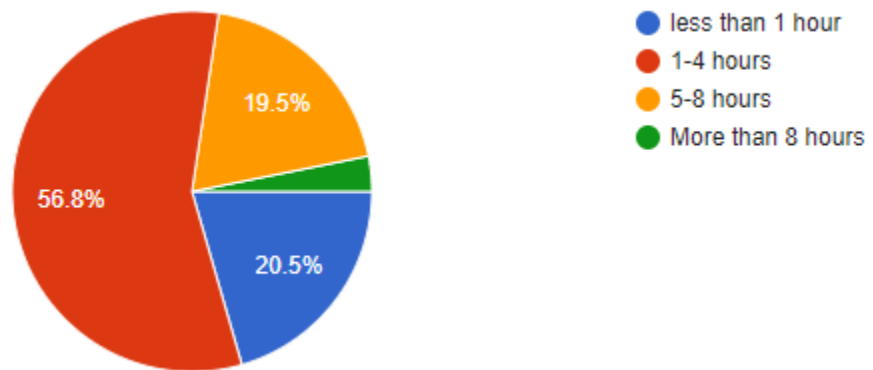


Figure 6: Applications Usages Timing

3.3 DATA PREPROECESSING

After collecting data from survey , I used 190 participants data and organized at excel spreadsheet for two apps differently.I use spss tool as specialized statistical software to calculate mean and standard deviation that I will add in methods procedure. I re-observed the data of 190 participants in four individual Excel sheet. For each application, I had to calculate the method score. And for this, I used statistical software called SPSS.

1. Spotify's capabilities meet my requiremen	2. Using Spotify is a frustrating experien	3. Spotify is easy to u	4. I have to spend too much time correcting things
6	2	6	2
3	2	7	1
7	2	6	6
5	7	7	4
6	2	7	3
2	2	7	7
7	1	7	7
7	2	7	7
7	2	7	7
7	1	7	7
7	1	7	7
7	1	7	7
7	1	7	7
4	6	5	2
7	1	7	7
4	4	4	4
3	3	3	3
3	4	4	4
4	4	4	4
5	4	1	3
6	2	7	5
1	1	6	5
7	7	4	4
3	5	5	3
7	3	5	4
5	3	5	1
6	1	7	1
5	1	5	3
4	4	6	4
4	4	4	5
3	3	3	3
3	2	2	3

Figure 7: UMUX for Spotify

1. You Tube's capabilities meet my	2. Using You Tube is a frustr	3. You Tube is easy to us	4. I have to spend too much t
6	2	6	4
6	1	7	2
7	2	7	5
7	7	7	3
7	1	7	1
7	2	7	3
7	1	7	7
7	2	7	7
7	7	7	7
7	2	7	7
7	1	7	2
6	2	7	3
7	1	7	7
6	2	7	1
7	7	7	7
5	3	7	7
6	2	7	4
7	7	7	7
7	7	7	1
4	5	7	2
4	3	5	4
5	3	7	6
7	2	7	1
7	1	7	4

Figure 8: UMUX for YouTube

1. Spotify is e	2. It is easy to	3. The informa	4. The informa	5. I find Spotif	6. Spotify has	7. I will likely	8. How likely a
3	5	5	3	2	5	3	4
5	5	4	4	4	4	5	5
2	4	5	5	5	5	2	2
5	5	4	5	5	5	5	5
5	4	4	3	5	5	5	4
5	1	5	5	5	5	5	4
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	4	5	3	5	4	5	5
4	3	3	2	4	2	2	2
5	5	5	5	5	5	5	5
1	3	3	3	4	3	3	3
3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3
3	3	3	3	3	3	4	3
1	1	1	1	2	2	2	2
5	1	1	3	3	5	3	3
3	3	3	4	5	5	5	3
5	4	3	3	4	3	3	5
4	4	3	3	4	4	3	1
4	4	4	3	4	3	3	3
4	3	4	5	4	4	4	3

Figure 9: SUPR-Q for Spotify

1. You Tube is	2. It is easy to	3. The informa	4. The informa	5. I find You Tu	6. You Tube h	7. I will likely	8. How likely a
4	3	5	3	2	2	4	4
5	5	2	2	5	3	5	5
5	4	4	5	5	4	5	5
5	5	4	3	4	1	5	5
5	5	5	5	5	5	5	5
5	3	5	5	5	5	5	4
5	5	5	5	5	5	5	5
5	5	2	5	5	2	2	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5
5	4	5	5	5	4	5	5
5	3	3	2	5	5	5	4
5	5	5	5	5	5	5	5
5	5	5	4	5	5	5	5
5	5	5	5	5	5	5	5
4	4	4	2	4	3	4	4
5	5	3	3	5	4	4	4
5	5	5	5	5	5	5	5
5	1	3	1	3	4	4	3
4	3	4	5	5	4	2	5
4	5	4	1	4	5	4	4
5	4	3	2	5	4	4	4
5	5	4	3	5	4	5	5
5	5	5	4	5	4	4	5

Figure 10: SUPR-Q for YouTube

3.4 STATISTICAL SOFTWARE

A statistical software program is a specialized program that is designed to perform complex statistical analysis. They are the tools that aid in the organization, interpretation, and presentation of specific data sets in order to provide scientific insights into patterns and trends. Statistical software implements statistical analysis theorems and methodologies such as regression analysis and time series analysis to perform data sciences (Shrestha, 2022). The best statistical software is the Statistical Package for the Social Sciences (SPSS).

SPSS is the most widely used and powerful software for analyzing complex statistical data. It quickly compiles descriptive statistics, parametric and non-parametric analysis, and generates graphs and presentation-ready reports to help you communicate the findings. Estimation and the discovery of missing values in data sets result in more accurate reports. SPSS is used to analyze quantitative data (Shrestha, 2022). It was first introduced in 1968.

Since its acquisition by IBM in 2009, SPSS has been officially renamed IBM SPSS Statistics, but most users still refer to it as SPSS (SPSS - Quick Overview & Beginners Introduction, n.d.). SPSS is a program for editing and analyzing data. These data can come from almost any source, including scientific research, a customer database, Google Analytics, or even a website's server log files. A variable view sheet is always present in an SPSS data file. It displays the metadata that is associated with the data. Metadata is data that describes the meaning of variables and data values. This is commonly referred to as the "codebook," but in SPSS it is referred to as the dictionary.

Statistical software programs such as SPSS are currently among the best available. Frequently, survey-based research relies on SPSS because of its ease of use in managing complex data. Data analysis for my survey research was performed using SPSS.

3.5 USABILITY METRIC FOR USER EXPERIENCE (UMUX)

For the survey, I used Usability Metric for User Experience (UMUX) questionnaire. UMUX is the best questionnaire method for usability testing. UMUX is a concise qualitative assessment designed to assess a system's overall usability, that constructed in 2010 at Intel by Kraig Finstad and his colleagues as a shorter alternative to the 10-item SUS questionnaire. It was also intended to address the International Organization for Standardization's (ISO) new definition of usability. Unlike SUS, which evaluates perceived usability and learnability, UMUX evaluates usability by evaluating effectiveness, efficiency, and satisfaction (UMUX (Usability Metric for User Experience), 2020).

3.5.1 PROCEDURE

190 Participants in this method are asked to answer four questions, each one with seven response options. That are shown in Figure 10.

The Usability Metric for User Experience Standard Version		Strongly Disagree							Strongly Agree						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	This system's capabilities meet my requirements.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Using this system is a frustrating experience.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	This system is easy to use.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	I have to spend too much time correcting things with this system.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 11: Standard UMUX questionnaire

The UMUX score is calculated using a formula in this method. The formula is given below:

$$\frac{((Q1-1)+(Q2-7)+(Q3-1)+(7-Q4))*100}{24}$$

In this formula, Q1-Q4 represent the responses of the participants to these four questions.

Participants participated for the survey study. The survey items in the Google form were all UMUX questionnaire. After getting data I calculated the UMUX score for these two applications in that formula. Odd items are assigned a score of [user score - 1]. Even items are assigned a score of [7 - user score]. Then I added up these differences and divide the sum by 24 (the highest possible score).After that I Divided quotient by 100. At last I calculated the average of results across all users.

App 1 (Spotify)	App 2 (YouTube)
Umux Score = 10170.83333/190 = 53.53	Umux Score = 11658.33/190 = 61.36

Table 1: UMUX score for all applications

App 1 (Spotify)		App 2 (YouTube)	
Mean value	Standard Deviation value	Mean value	Standard Deviation value
4.11	1.68	4.85	1.78
3.67	1.57	3.47	1.85
4.15	1.82	5.22	1.78
3.74	1.70	3.87	1.80

Table 2: UMUX score chart for all questions

3.6 STANDARDIZED USER EXPERIENCE PERCENTILE RANK QUESTIONNAIRE (SUPR-Q)

SUPR-Q is a validated method for assessing the overall user experience of a website or application. It consists of eight questions divided into four categories: usability, trust/credibility, loyalty, and appearance. NPS is used to measure loyalty in part. Jeff Sauro of measuringU created the SUPR-Q in 2015 (SUPR-Q: Standardized User Experience Percentile Rank Questionnaire, 2021).

The SUPR-Q (Standardized User Experience Percentile Rank Questionnaire) is a set of eight standardized questions that assess users' perceptions of various aspects of a website, including usability, trust and credibility, appearance, and loyalty. The SUPR-Q is scored in two ways. The first is a raw score on a scale of 1-5, with 5 being the highest, averaged across all four categories. The second is a percentile rank score, which can tell you how site compares to hundreds of other websites in the SUPR-Q database. The SUPR-Q also includes a Net Promoter Score (NPS) calculation. The NPS is a separate score that many businesses use to determine whether a user is likely to recommend a website or service. Although the official NPS is calculated differently, you can use the SUPR-Q data to calculate NPS (Cunningham, 2020).

Because it is so widely used in the industry, the SUPR-Q is a reliable indicator of a website's perceived quality. This also means that you can use SUPR-Q results to compare website to hundreds of other sites on the internet, not just own. It is also critical to understand that the SUPR-Q is not intended to diagnose problems, as the simple questionnaire is insufficient to tell you what to fix and why. To determine the why and how of a particular problem, should always rely on more in-depth discovery research, contextual inquiries, and ethnographic studies. This is why we recommend using the SUPR-Q as a benchmarking measure to determine the impact of a design (or redesign).

3.6.1 PROCEDURE

A survey questionnaire is used in this testing method. 190 Participants were asked to answer 8 questions, each with five response options, at the start of the survey. These 10 questions are shown in Figure 12:

CATEGORY	QUESTION	SCORE
Usability	Q1: The website is Easy to use	1-5
	Q2: It is easy to navigate within the website.	1-5
Credibility	Q3. I feel comfortable purchasing from the website.	1-5
	Q4. I feel confident conducting business on the website	1-5
Loyalty	Q5. How likely are you to recommend this website to a friend or colleague?	1-5
	Q6. I will likely return to the website in the future.	1-5
Appearance	Q7. I find the website to be attractive.	1-5
	Q8. The website has a clean and simple presentation.	1-10

Figure 12: SUPR-Q questions

Participants respond based on their own experiences. After collecting data from users, the usability of an application is evaluated by analyzing that data. The SUPR-Q score is commonly used to evaluate applications. This score is calculated using a formula given below:

$$\text{Raw SUPR-Q Score} = \frac{Q1+Q2+Q3+Q4+Q5+Q6+Q7+(1/2*Q8)}{8}$$

The SUPR-first Q's seven questions are scored on a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree. The standard NPS question "How likely are you to recommend...?" is scored from 0 to 10. Average scores for each category to get the raw component scores. Before calculating the average for the loyalty category, divide NPS score by 2 to convert it to the same Likert scale. Simply take the average of the component scores to get raw SUPR-Q score.

App 1 (Spotify)	App 2 (YouTube)
SUPR-Q Score = 599.63/190 = 3.16	SUPR-Q Score = 650/190 = 3.43

Table 3: SUPR-Q score for all applications

Then, I calculated, the mean value and also standard deviation value for each 8 questions in 4 category . By using the means and standard deviations, we can calculate the SUPR-Q score and the subscale scores.

App 1 (Spotify)		App 2 (YouTube)	
Mean value	Standard Deviation value	Mean value	Standard Deviation value
3.26	1.22	3.70	1.33
3.38	1.11	3.71	1.18
3.31	1.07	3.44	1.14
3.36	1.04	3.45	1.09
3.42	1.18	3.77	1.07
3.46	1.16	3.69	1.11
3.37	1.16	3.79	1.13
3.40	1.18	3.67	1.06

Table 4: SUPR-Q score chart for all questions

SUPR-Q is the most basic and widely used questionnaire method for assessing a system's usability. That is why I chose SUS for this study.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

In this chapter, I will describe the current state of mobile music applications in Bangladesh. I have previously described in detail the methods I used for my work after data preprocessing. In this section, I will discuss the results of the methods in detail.

4.2 RESULT DISCUSSION

After implementing SUPR-Q and UMUX on my dataset, I calculated the score, mean, and standard deviation for both methods individually for Spotify and YouTube. Then I compared these scores with the Sauro/Lewis Curved Grading Scale. And, using the standard deviation, I tried to evaluate the usability of both applications.

4.2.1 SUPR-Q RESULT

SUPR-Q method is to identify if the app is meet the trust, loyalty, appearance requirements or not. SUPR-Q method is to identify if the app meet the trust, loyalty, appearance requirements or not. A total of 190 people responded to the survey here, as well as in UMUX provide their feedback of those two applications, Spotify (App 1) and YouTube (App 2) through a google survey form in online. In that survey, 190 participants gave their feedback based on SUPR-Q questionnaire. A total of 190 people responded to the survey here, as well as in SUPR-Q. After getting data, I calculated the SUPR-Q score that shows in Table 3. I explicitly state that the average score of survey response. I got SUPR-Q score 3.16 for Spotify and 3.43 for YouTube.

In survey of user response, Spotify got neutral response for usability, credibility, loyalty & appearance .YouTube got maximum positive response in usability but mixed response in credibility, loyalty and appearance.

4.2.2 UMUX RESULT

My survey got total 190 response of the feedback of those two applications, Spotify and YouTube through a Google survey form in online. From that survey, 190 participants were given their feedback based on UMUX questionnaire I provided.

In order to calculate app ratings, we can use the UMUX score. Table 1 shows the rating variation for UMUX scores. I explicitly state that the average UMUX score for all of the applications got 53.53 for Spotify and 61.36 for YouTube which declared very poor range.

Score Range	Grade	Percentile
84.1-100	A+	96-100
80.8-84.0	A	90-95
78.9-80.7	A-	85-89
77.2-78.8	B+	80-84
74.1-77.1	B	70-79
72.6-74.0	B-	65-69
71.1-72.5	C+	60-64
65.0-71.0	C	41-59
62.7-64.9	C-	35-40
51.7-62.6	D	15-34
0.0-51.6	F	0-14

Table 5: The Sauro/Lewis Curved Grading Scale

According to Table 5, both App 1 (Spotify) and App 2 (YouTube) received a very low grade from participants. App 1 and App 2 is in same position which is Grade F. Even if these two applications have most of the users, they got this poor numbering. Is these applications are over popular? In Table 2, I have shown Standard deviation value for these two applications. For App 1, the lowest score is 1.57 and highest score is 1.82 which are represented by two UMUX questions, 2 and 1, respectively. These low and high value represent some negative sign for App 1 which can be a point to pay attention for unpopular music applications to improve their effectiveness.

For App 2, the lowest score is 1.78 and highest score is 1.85 that values also represent negative sign for this app too. So that I see both application have low users satisfaction, even if they have the most users.

Out of 190, 28% agreed that Spotify meet their requirements and 26.8% agreed to have frustrating experiences

And for YouTube 23.2% strongly agreed that the app meet their requirements and 18.4% strongly disagreed that YouTube is a frustrating app to meet.

CHAPTER 5

CONCLUSION

MUSIC, that made a great impact in our everyday life. In this modern era, we now discover music in a more functional and easier way. Mobile music applications made a trouble-free influence in this field. My papers goal was to find and collaborate to improvise in this field of usability testing of mobile music applications. Among all the existing popular applications, some unpopular apps got underrated. My main focus is to identify how users are giving so much and why to this top rated apps. So I select two most popular app in the world, also top in Bangladesh which are YouTube and Spotify. My main target audience was University and college going students. So I made a survey and got expected number of response of 190 people. Then I proceed those data with UMUX and SUPR-Q method, then calculate with spss tool and come into a conclusion that, Spotify is less user friendly than Youtube. Though our focus is not to compare these two apps. Spotify and YouTube both are easy for users to use. Both app have multiple but easy features to use. Both of the app gained user trust. That's where our local app and all the unpopular apps have lacking even if they have more user friendly features than YouTube and Spotify. Unpopular apps have lackings in Credibility and in user trust that's why local apps are underrated.

I worked with limited data and most of the participants were within 20 to 25 age. If I had chance to work with more participants of several group of ages, might helped to conclude with some more specific results. Also my paper could be more strong with methodology work.

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