Mashup: Playing the Playlist

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ABSTRACT

Mashup is a multiplayer, mobile rhythm game that allows friends to share songs in the form of a turn in the game. Modern music algorithms lack nuance due to their misinterpretation of music as an individual experience, creating user profiles based on their individual actions and patterns. Users are less engaged with such algorithmic recommendations based on accuracy because they do not need to be engaged– every song is good. *Mashup* aims to make music discovery fun by centering the role of social interaction in taste formation through its accessible and engaging gameplay. Compared to existing social features such as Spotify's Blend or Jam, *Mashup*'s active gameplay allows players to share their music taste with less fear of judgement, as they are also able to be judged on their scores. To understand the importance of social engagement in music and the reasoning behind *Mashup*, this paper will establish a conceptual framework for the importance of interaction in music, analyze examples of modern music experiences within that framework, and explain the development process of the *Mashup* project.

Author Keywords

Music recommendation, Music taste, Recommendation algorithms, Rhythm games, Social engagement

INTRODUCTION

Music is a universal language, offering an unparalleled medium for emotional expression, identity formation, and social connection. Its significance extends beyond sound, embedding itself in our memories, relationships, and our identities. Yet, in the digital age, the ways in which people encounter and interact with music have become increasingly mediated by algorithms. Platforms like Spotify use data-driven approaches to generate precisely personalized recommendations for users, prioritizing accuracy over nuance. These systems miss a vital element of music appreciation: the social dimension. Music gains its richest meanings through interaction, whether it is a song tied to a shared memory or one recommended by a trusted friend.

Recognizing this gap, *Mashup* aims to challenge how taste is perceived in the streaming era by emphasizing how users experience music rather than static data points such as how often they listen to music. Rather than trying to quantify taste or mood, *Mashup* proposes that the results of play and social interaction are also points representative of individual taste. *Mashup* invites players to actively engage with the music shared with them, and develop a new dimension of meaning attached to the music through the gameplay and competition. By combining the fun of rhythm games with the functionality of Spotify's user libraries, the project demonstrates how music sharing and discovery can be playful and relational, bridging the gap between algorithmic precision and human spontaneity.

BACKGROUND

What is Music?

Crossley's definition for music is "humanly organized sound", or sounds made by humans for other humans to engage with as music [4]. For example, if an artist releases a song that is a minute of silence, listeners would experience and interpret that silence differently compared to the silences of everyday life. Because the silence was framed as music by the artist, listeners engage with it as music, making it thereby music. While artists are needed to create, music is ultimately dependent on the listener's engagement as listeners turn a soundwave into a song– they are the ones who hit play. Music is defined by how it sounds as much as it is defined by who is listening.

What is Music Taste?

Music taste is not defined by songs we simply like or frequently play; it is defined by the songs that define us. Because music is so entangled in our everyday lives, music has a range of uses. People play music to get pumped at the gym, remind themselves of an ex, lull themselves to sleep, and more. But, what is in a listener's *Beast Mode* playlist differs greatly from what is in their *All The Feels* playlist, and neither playlists are necessarily representative of what the listener would say is their 'music taste' (Fig. 1.). Thus, somebody's music taste is more nuanced than the static points of how frequently we play a song or what we are doing when we play it. Music tastes are instead a representation of ourselves, and how they form reflect that. Songs that remind us of "past episodes, phases, and relations" connect to our lives, and tangentially our identities [8]. It is those songs that usually make up our music tastes, because it is those songs that we can listen to and think 'this is me'.

Fig. 1. Spotify's *Beast Mode* and *All The Feels* playlists.

How Do We Form Music Taste?
Music taste is informed by various experiences and relationships unique to each listener; and as no music taste is the exact same, no music taste is formed in the same way either. For example, a song played during a high school prom would likely influence the music taste of the students more than it would the chaperones, and that influence then varies from student-to-student. Music taste is formed through a network of different influences that disconnects and reconnects as people go through life.

What underscores all music taste formation, though, is social interaction. As established previously, music itself depends on its social interaction between artist and listener. Similarly, music taste depends on the social interactions between the listener and their influences. For the prom example, the students socializing with each other is a major reason for why the event may influence their music taste. What song is the backtrack for the slow dance, the punch spiking, the first kiss, will likely be remembered because of that social scenario it is now tied to. Everyday

interactions with family and friends are also crucial to music taste formation. Their recommendations and exposure are more meaningful to us because the relationship is meaningful to us. From everyday conversations to special occasions, social interactions give music the unique, nuanced meaning that truly informs our music taste.

RELATED WORK
Music interaction on popular recommendation sites highlight personal factors of music taste, rhythm games underline the social factors, and their differences demonstrate music's unique and shared values. Modern music recommendation algorithms are able to generate highly personalized, data-based recommendations for users, prioritizing accuracy in curation. However, recent attempts at integrating more social features include passive interactions used in social media, resulting in users failing to stay engaged. Rhythm games propose a fresh take on music interaction by using music to build intuitive gameplay, prioritizing engagement in its experience.

Recommendation Algorithms
Streaming platforms, like Spotify, use various data layers as the inputs of their music recommendation algorithms; then, that data is filtered to eventually match users and songs as accurately as possible. Spotify firstly collects data on users' "preferences, behaviors, listening history, and interactions", along with individual songs' metadata (ex. artist, album, release date) and sonic characteristics (ex. tempo, key, volume) [13]. User data then goes through a collaborative filtering process, identifying other users with similar preferences and patterns to generate a more holistic sense of their music taste. Similarly, songs go through a content-based filtering process, drawing connections between songs with similar contextual and sonic characteristics to generate a holistic sense of their vibe. The algorithm can then identify songs and profiles similar to each user's taste, and eventually curate infinite recommendations just for them.

Spotify (Jam, Blend, DJ X)
Recent attempts have been made by streaming sites to create more engagement between users, such as Spotify's recently added Jam, Blend, and DJ X features. However, these features' emphasis on sharing and passive interaction fails to achieve the feeling of authentic dialogue between two users. Rather, these features' interaction points more closely resemble those of social media sites where users similarly share stuff about themselves and passively interact with

others' posts. For example, Spotify's Blend feature creates a shared playlist with songs frequently played between up to ten users, giving the group a percent score based on how many songs they have in common, their 'Taste Match' (Fig. 2.). While users only have to share their tastes to a small group of friends, Karakayali's study on Last.fm discusses how users become more conscious of their "self-presentation" when sharing their libraries [10].

Because our listening libraries are not always representative of our music taste, and our music tastes are personal reflections of ourselves, we become scared of being misrepresented or judged when sharing our music tastes.
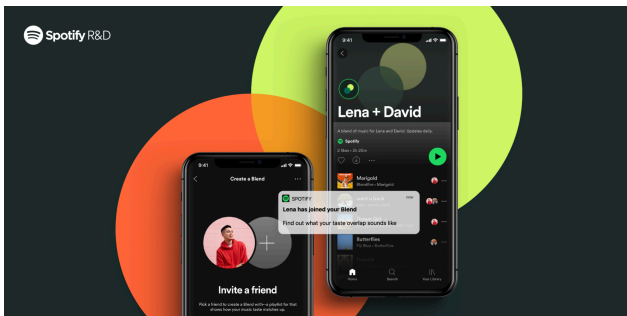

Fig. 2. Spotify's Blend feature

Rhythm Games

Rhythm games have carved out a unique place in the gaming industry and reached past traditional gaming audiences, demonstrating the enduring appeal of combining music with interactive play. Additionally, rhythm games such as *Audiosurf* and *Ape Out* creatively integrate auto-generated music and gameplay, showcasing the feasibility and potential of gamifying algorithms and music.

The core mechanic of most rhythm games is players interacting with a song's "chart", a visual representation of beats in the song players are meant to interact with. Typical interactions include hitting notes by clicking or tapping them on-beat with the song, such as stepping on the arrows as they match up in *Dance Dance Revolution*. Rhythm games are able to vary in difficulty by "overcharting" or adding more complex note patterns, decreasing notes' "judgement windows", and many other tactics that test the player's ability to listen and follow the song [2]. Through their dynamic mechanics, rhythm games provide a unique way for players to engage with music by allowing players to connect with a song's experience rather than its meaning alone.

Titles such as *Guitar Hero*, *Dance Dance Revolution (DDR)*, and *Beat Saber* have become endlessly

popular and continue to appeal to families, casual players, and music enthusiasts alike through their overlap of enga gameplay and cultural/musical relevance. Rhythm games use our inherent sense of rhythm to give gameplay inherent logic, making them easier to pick up and follow along compared to other game genres. Also through the use of music, rhythm games often feel like a performance, a chance for players to emulate their favorite artists or immerse themselves in their favorite songs. Players then feel comfortable playing with others because the game has turned the music experience into something outside of the player. It shifts the conversation from what song you chose to what score you got, allowing players to enjoy the song through how it is experienced, rather than how it is presented.

Audiosurf and *Ape Out* are examples of games that demonstrate the possibilities of procedurally integrating music with game mechanics. Through programmed song analysis and generative beatmaps, *Audiosurf* allows users to upload any song into the game to play. *Ape Out* procedurally generates different aspects of the game's soundtrack according to the player's actions. Actions in the game also add to the soundtrack, with actions' on-screen placement corresponding to the layout of a drum set. Innovative uses of music in games demonstrate the range of rhythm games to be both familiar and new, continuously evolving how we interact with music.

MASHUP

Mashup proposes a new means of music sharing on Spotify and a new take on rhythm games by letting users curate their own experience with a friend. Because of recommendations' accuracy, music discovery feels less rewarding. Often the fun of finding a new song is stumbling across it when least expected, having the satisfaction of listening to a song before it got popular, the building of tension through bad songs and the consequent release of finally finding a good one. *Mashup* aims to create that tension through encouraging authentic social interaction and reflect that tension through casual yet dynamic gameplay.

Accessible Gameplay

Users can begin a 'set', or round, of *Mashup* by selecting a song from their Spotify library and clicking the *Mashup* icon from the drop-down. Then, with the prompt 'You're a DJ. Where are you playing?', players will get to choose a location and name the specific setting of the round, establishing a visual and conceptual theme. Lastly, the

player will be given a link they can send to a friend they want to invite to the round. Each player will have three turns per round, where each turn lasts one minute and consists of playing the game and sending a song back. At the end of the round, both players will be able to see the scores of their turns and who was the 'crowd favorite', or overall winner. *Mashup* balances self-expression with detachment by letting players curate each other's sets rather than their own, as well as emphasizing music's social aspects through turn-based, multiplayer gameplayer.

Each turn's gameplay involves rotating a circular 'record' to match notes in time with the rhythm, with the turn lasting approximately one minute of the chosen song. The main mechanic of the record was made with a mobile-first approach, designed to be simple to execute while the limited space allows for a range of difficulty. The quick gameplay aims to make the game both approachable for a non-gamer audience and non-exhausting for frequent players to continue playing. This design choice reflects the influence of popular mobile games like *iMessage Pool*, which prioritize short, casual interactions over an extended period of time.

Fig. 3. *iMessage Pool*

Also similar to *iMessage Pool*, because the game is both turn-based and multiplayer, the gameplay has to be both easy to learn and easy to relearn. Like how most people already know how to play pool, our innate sense of rhythm serves as the foundation for rhythm games, especially for the frequent users of Spotify. While there is room for changes in difficulty, rhythm games are still grounded by that intuitive sense for rhythm built from listening to music throughout our lives. *Mashup* was intentionally designed to provide players with simple, short, and satisfying gameplay to encourage all players to engage and re-engage.

Social Aspects

Mashup's turn-based, multiplayer aspect is central to the project's core mission of social play. Players can challenge friends to curated matches by sending the link to their set, ideally accessible from the Spotify app. Having players switch turns rather than playing simultaneously on a live server creates more incentive for players to start. As the target audience of *Mashup* is Spotify users rather than avid gamers, the time commitment and planning needed for players to both be on a server simultaneously would be a large barrier for entry for non-gamers. Live servers also create a more stressed, hectic environment, especially when competitive. Turn-based gameplay presents a more casual, low maintenance method of multiplayer gameplay, with the mechanics and intimacy maintaining excitement rather than the pressure of a live server.

Additionally, players sending game links directly to friends to continue the game creates the intimacy of an authentic, relationship-based interaction. By needing to send a link, players will simultaneously foster their relationship with each other through establishing this constant point of contact. This design also encourages players to personalize their experiences based on who they choose to share it with. For instance, a match might revolve around a shared memory such as "High School Prom" or "My 21st Birthday Party", leading to song picks being able to be representative of shared taste rather than personal. Sending a *Mashup* link can be a way of starting a new conversation, connecting with an old friend, or simply sharing a song that reminded you of someone– demonstrating the bonding nature of music.

The social point of *Mashup* avoids the judgement and self-consciousness of social media by providing external context to songs. Through their role in the gameplay, songs are able to be interpreted as many things other than a representation of personal taste. Selected songs can be justified through their difficulty, the theme, and more, because of their external context of being part of the game.

This additional layer of context allows room for misunderstanding and misrepresentation through the establishment of a subjective theme and the fast pace of the round, putting less pressure on players to select a 'good' song. Compared to Spotify's Blend and Jam features, users are able to share songs without the fear of judgement or concern for others' tastes, because they are able to be engaged with more context than the song itself. Players' song selections are still seen as representative of them and their taste; but, they do not have the pressure of being solely representative of a player or consequent pressure of needing to be an accurate one.

METHODOLOGY

Planning
The process for developing *Mashup* was divided into the sections Research, Writing, Design, and Development. I developed a Gantt chart in order to clearly map out the progress of the project on both a macro and micro level. The Gantt chart is divided into groups by section and by week to ensure linear progress through time and task completion. Sections would often span across multiple weeks, as multiple tasks were assigned to a week and individual tasks were assigned to a day.

Fig. 4. Gantt chart used for planning

Additionally, the Gantt chart served as motivation to complete tasks as I could physically mark it as done and visibly see my progress throughout the week. By dividing my progress into sections, weeks, and tasks, I was able to intentionally plan and track the overall and daily progress of the project.

Research and Writing
Research and Writing occurred during Weeks 6 through 8 of the project, and involved finding, reading, and analyzing multiple sources related to the project's ethos. At the beginning of the project, I wanted to demystify the Spotify algorithm by gamifying it through character customization, where different accessory combinations would yield different recommendation results. However, as I began to learn more about the algorithm and demystify it for myself, I recognized the problem was not our understanding of the algorithm but the algorithm's understanding of us.

The research process involved sourcing articles, essays, and videos on what I identified to be the main themes of the project– data, music, music recommendations, tutorials, and rhythm games– resulting in a comprehensive list of sixteen sources. Week 6 was dedicated to solely going through and digesting these sources, letting myself fully absorb the new information and begin to form my opinions on its relation to my project. The Writing section, Week 7 and 8, then involved annotating and summarizing each piece of media pulled in Research, to purposefully find and analyze the most relevant parts of each source. Through this process, what I wanted my project to address evolved as my understanding of music, music taste, and music algorithms grew deeper.

Design
In the Design section, I worked on establishing a user journey, game flow, and general style reflective of the mission of the project and my personal inspirations. The process involved several iterations of paper wireframes, changing as I received feedback and came up with better solutions to those problems.

The biggest design obstacle was balancing functionality with style. The user experience design focused on designing the integration between Spotify and the game that felt like it fit on the Spotify app, yet was unique enough as to not blend in with Spotify's other features. The visual direction of the experience aimed to develop a unique style that balanced the DJ themes' fun vibrancy with Spotify's simplicity and legibility to ensure a smooth, yet exciting user journey.
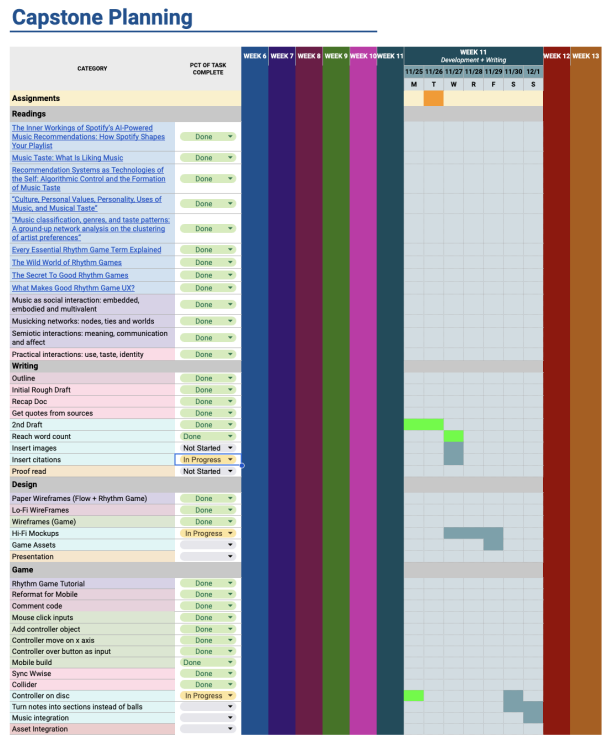
Designing the game relied more on technical limitations as I was committed to the game being mobile and having only one primary mechanic. I also wanted the main mechanic to mimic a legitimate action DJs do when mixing, and for that action to be iconic and recognizable to enhance the player's role as a DJ in the game. After receiving feedback and ideating, dragging the record to 'spin' it received the most positive feedback on being simple, intuitive, and unique. Throughout the whole design process, I worked to balance carrying out my own creative hopes for the game with the practical advice given from playtesters.

Development

The Development section involved building the game's core systems, such as beat-matching, scoring, and player controls. Following the tutorial for *QWOP QWOP Revolution*, I was able to build a simple rhythm game in Unity with Wwise integration [9]. All interactions with the song are added in Wwise. The program shows a timeline of a song and I am able to add 'cues' to that timeline to properly design the beatmap. Each cue indicates a new interaction point, in this case a new note, and they are labelled according to which lane the note should appear in. With proper integration, Wwise seamlessly communicates these cues and their corresponding interactions with the Unity game.

In Unity, there are a series of scripts that facilitate the communication between programs, translating the Wwise cues into gameplay and thus the player. The script NoteHighwayWwiseSync.cs uses callbacks to retrieve information from the note highway mapped in Wwise. This Wwise information is then used to trigger events in the Unity game, creating the interactable game objects.

After establishing a stable dialogue between the two programs, I focused on building the infrastructure of the game itself, specifically a scoring system and a main mechanic. The scoring system is based on the player's accuracy when hitting the note on its respective 'crossing point'. Each note spawns by calculating the time it takes to get to the crossing point minus the time of its corresponding beat. For example, if the note corresponds with a cue set at 0:15, and it takes the note 2 seconds (0:02) to get from its spawn to crossing point; the note will appear at 0:13. A player's accuracy is the time difference between when a note gets to a crossing point and when a player hits the note. The larger the difference, or the further off a player is, the worse the judgement and score they receive.

The size of these judgement windows were heavily influenced by the main mechanic. Players needing to 'spin' the record to hit the notes led to slower response rates compared to only needing to tap the note, as players had to take extra time to get from one note to another. As a result, I increased the judgement windows and space between notes to allow the player more time to move. Throughout development, I continuously tweaked and edited these infrastructural systems because their collective functionality determines the game's functionality.

Challenges

The most challenging aspects of development were the technical aspects of production. I had little to no experience with the C# programming language, adding a layer of difficulty to working with Unity and Wwise outside of the tutorial. The main mechanic was particularly difficult as it is an uncommon form of player controls, making it tricky and complicated to execute as solutions in one aspect would create problems in the other. I initially wanted the control to function as an arced slider, with values mapped to the x-coordinates of cues. I tried line tracing, bezier curves, and mapping circles to allow the player to click and drag along a curve; however, none of these methods ended up giving the desired result.

While I know this mechanic is possible to execute, because of my unfamiliarity with the language and program, it was particularly frustrating to problem-solve while needing to rely on forums and examples of similar functions. As a result, I compromised the functionality of this mechanic and decided on providing a high-fidelity mockup of how it would work instead. Due to technical limitations and time constraints, I often sacrificed the project's functionality for its conceptual clarity and comprehensiveness.

EVALUATION

The primary challenge of the development process was change and having time for change. Each section brought new obstacles I needed to adapt to, and each adaptation brought new improvements, making the project conceptually stronger and making me more passionate about the project as it evolved. However, such iteration takes time– it takes time to find obstacles, and it takes time to make improvements. Especially considering I had to learn many of the skills used in the project, such as using Unity and Wwise, all changes felt like major changes.

The goal for the final product then continuously changed as the strength of my idea increased, but my time to develop it decreased. As a result, I had to make several large compromises on what would be included in the game, including the integration of Spotify and multiplayer aspects. Compounded with major time constraints and requirements of the class, I was not able to develop the *Mashup* game to a satisfactory degree due to the time put into developing it conceptually.

For next steps, I would like to shift focus on creating a game that is enjoyable for players and facilitates music sharing. The first playable demo would likely have a much smaller scope with a limited number of themes and songs. The primary concern for the demo would be creating full beatmaps that correspond with the main mechanic and feel good for the players. Additionally, I would aim to have some type of multiplayer functionality where two scores are received and able to be compared. Because the gameplay is the focus of the project, my main goal would be to ensure the game is fun.

CONCLUSION

Mashup serves as a response to the growing disconnection in music discovery caused by algorithmic recommendation systems, which prioritize data accuracy over the nuanced, human aspects of music appreciation. Drawing from research on music taste formation and the role of social interaction, this project establishes that music is not merely a collection of sounds but a deeply personal and relational experience. A significant problem with algorithms like those on Spotify is that while they excel in curating personalized playlists, they lack the spontaneity and emotional resonance found in shared musical moments with friends or family. *Mashup* aims to fill this gap by emphasizing the fun of music discovery through social interaction, allowing users to send songs as part of an engaging rhythm game that fosters meaningful interactions and shared experiences.

The project combines elements of rhythm games and casual conversation by having players send each other songs in the form of turns, curating each other's musical journeys and game experience. The design emphasizes accessibility, encouraging even non-gamers to engage, while the rhythm-based mechanics create an intuitive, enjoyable interaction with the music. The development process faced challenges, particularly in integrating Spotify's functionality and executing complex gameplay mechanics. Nonetheless, the resulting prototype effectively demonstrates *Mashup*'s potential to reimagine music sharing as a playful and relational activity, offering an alternative to the isolated, algorithm-driven experiences dominating modern music platforms.

Looking forward, Mashup presents opportunities for significant advancements and further study. Further developments included fully developing the game to determine its feasibility, especially in terms of generative beatmaps and the integration of streaming platforms. Additional playtesting would help strengthen the project overall, including its thesis of music's impact on relationships, identity, and community building through shared music experiences. This project sets the stage for innovative approaches to humanizing digital music discovery, reaffirming that the joy of sharing music is as meaningful as the songs themselves.

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