University of South Carolina

Music Application

CSCE 247: Software Engineering

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1. OVERVIEW

This project aims to create a music app that serves as both an interactive learning tool for beginners and an advanced platform for experienced musicians. The app allows users to learn how to play a variety of instruments (such as guitar, piano, and violin) while also teaching them to read and understand sheet music. The app offers personalized learning paths, progress tracking, and engaging tutorials that adapt to the learner's skill level. By incorporating interactive features like real-time feedback, video lessons, and practice modes, it ensures that learning is both effective and enjoyable.

GOALS

The goal is to make music education accessible to anyone, anywhere, at any time, by providing a comprehensive platform for learning to play instruments and read sheet music. The app will target both beginners and intermediate learners, providing them with the tools needed to improve their musical skills in an efficient and fun way.

BUSINESS PROBLEM

The primary business problem this app addresses is the lack of affordable and accessible music education for individuals who want to learn to play an instrument and read sheet music. Traditional music lessons can be expensive and time-consuming, limiting access to many aspiring musicians. This app offers a solution by providing high-quality music education at a fraction of the cost, allowing users to learn at their own pace, anytime and anywhere.

2. STAKEHOLDERS

1. **End Users (Music Learners):**
    - **Role:** The primary users of the app are individuals seeking to learn or improve their musical skills.
    - **Interests:** They are looking for a convenient, accessible, and engaging platform to learn instruments and read sheet music.
    - **Needs:** Easy-to-follow tutorials, personalized learning paths, real-time feedback, and progress tracking.
2. **Content Creators (Music Educators and Instructors):**
    - **Role:** Music professionals who create and upload content, including lessons, tutorials, and sheet music exercises.
    - **Interests:** Ensuring that their content reaches a wide audience and that it is effectively used in the learning process.
    - **Needs:** Tools to easily create, upload, and update educational content, while ensuring the content is easily understood and accessible to users.
3. **App Developers and Designers:**
    - **Role:** The team responsible for designing the user interface, developing the app, and implementing its functionalities.
    - **Interests:** Building a user-friendly and technically robust platform that meets the needs of learners and content creators.
    - **Needs:** Clear project requirements, feedback from users, and the ability to continuously improve the app's features based on user needs.

3. CONSTRAINTS

Schedule Constraints:

- The app must be developed and launched within a 6-month timeframe to meet market demands and competition.
- Regular updates will be needed post-launch to maintain engagement and fix bugs.

Budget Constraints:

- The total budget for the project is $0, which must cover development costs, marketing, and content creation.

Workplace Environment Constraints:

- Limited access to in-person testing may hinder user experience feedback, so user testing will be primarily conducted through virtual surveys and remote focus groups.

Partner App Constraints:

- The app must integrate with third-party platforms like YouTube (for video tutorials) and Spotify (for music streaming).

4. OVERALL DESCRIPTION

System Environment Overview:

The music learning app will operate in a highly interactive and user-driven environment. The platform must be compatible across various devices, including smartphones (iOS and Android), tablets, and desktops to ensure a broad reach. The app will be available via the App Store and Google Play, and it should seamlessly integrate with external platforms to provide users with a holistic music-learning experience.

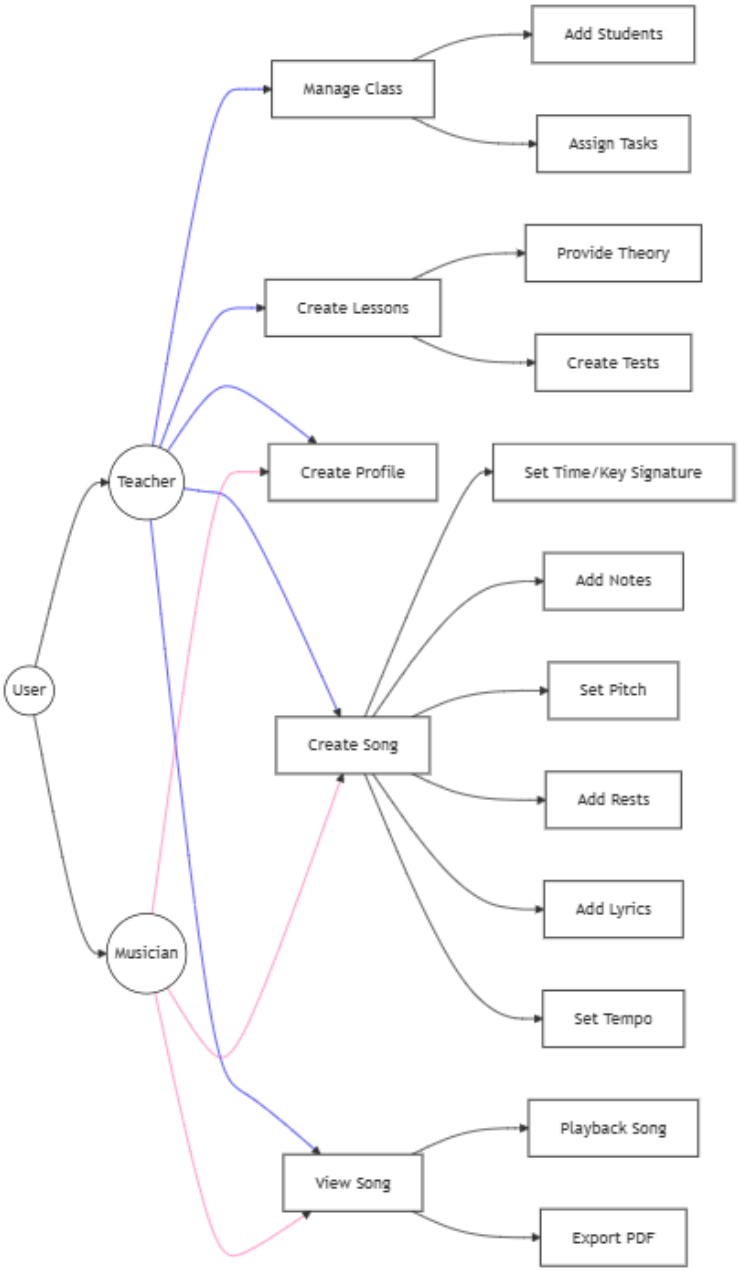
Hardware Requirements:

- **Smartphones/Tablets:** The app must be optimized for both Android and iOS platforms, ensuring smooth functionality across a variety of devices, screen sizes, and operating systems.
- **Desktops/Laptops:** For users who prefer larger screens, the app should be available as a web application that works across all major browsers (Chrome, Safari)

Software Requirements:

- **Backend System:** The app will rely on cloud-based servers for storing user data (e.g., progress tracking, lesson history) and for real-time performance feedback. It will use technologies such as AWS or Google Cloud for scalability.
- **Frontend Interface:** The app's user interface will be designed using React Native or a similar cross-platform framework to ensure it works on both iOS and Android devices with minimal differences in performance.

5. BUSINESS USE CASES



6. FUNCTIONAL REQUIREMENTS

Functional Requirement Spreadsheet

7. NON FUNCTIONAL REQUIREMENTS

Look and Feel Requirements

- The user interface of the system shall be designed for beginner users to easily navigate and understand.
- The system shall provide a clean and organized layout for clear readability of sheet music and music theory content.

Usability Requirements

- The system shall be usable by users with a wide range of musical experience, from beginners to professionals.
- The system shall provide tooltips and tutorials to help users understand features.
- The system shall allow users to customize their experience, including font size and theme settings.

Maintainability and Support Requirements

- The system shall support regular updates without affecting user data.
- The system shall provide online support documentation for troubleshooting.

Security Requirements

- The user's information shall be stored securely using encryption.
- The system shall require authentication for profile access and data modification.
- The system shall protect against unauthorized access to user-generated content.

EMILY HEN

FEMALE
SAN FRANCISCO, CA
30
AUTHOR
$60,000/YEAR

EDUCATION

Bachelor of Arts in History
University of Washington

LANGUAGE

English
Chinese

PERSONALITY

Creative: Emily has a vivid imagination and loves exploring new ideas, whether through writing, design, or music.
Introverted: While she enjoys socializing at her favorite cafés, she finds her true energy in quiet, solo writing sessions.

PAIN POINTS

- Overwhelmed by too many options.
- Struggles with creating her own playlists.

GOALS

Discover easy-to-listen playlists for different moods.
Find music quickly without having to customize too much.

ABOUT ME

Emily Chen is a 24-year-old author and freelance graphic designer living in a cozy apartment filled with books and creativity. She writes contemporary fiction, drawing inspiration from everyday life and the people around her. Emily relies on music to set the tone for her writing sessions, whether it's upbeat indie pop to spark creativity or lo-fi beats to stay in the zone during editing marathons. Her work often explores themes of identity, relationships, and self-discovery. Outside of writing, Emily enjoys café-hopping, reading literary fiction, and perfecting her flat-lay photography for her blog and Instagram.

BEHAVIOR & INTEREST

- Music Preferences:
  - Loves indie, lo-fi beats, and electronic music to set the tone for writing sessions.
  - Enjoys discovering new authors and curating playlists to match the themes of her work.
  - Uses music as a tool for creative inspiration, helping her get into the right headspace for writing.
- Listening Habits:
  - Streams music daily, typically 3-4 hours.
  - Listens while writing, designing, or relaxing at home. Prefers curated playlists that match the mood or vibe of her current project.

APP FEATURES THEY LOVE

- Enjoys music apps with curated playlists that match specific moods or activities, especially those tailored for creative work.
- Appreciates seamless integration with smart devices, allowing her to control her music without interrupting her workflow.

TECHNICAL SKILLS

Writing
Grammer
Proofreading
Analyzing

ALEX MARTINEZ

MALE
AUSTIN, TX
25
JUNIOR GRAPHIC DESIGNER AT A CREATIVE AGENCY
$45,000/YEAR

EDUCATION

Bachelor of Science in Marketing
University of Texas, Austin

LANGUAGE

English
Spanish

PERSONALITY

Traits: Curious, creative, and tech-savvy.
Music Taste Vibe: Open to experimentation, loves "hidden gems."

PAIN POINTS

- Overwhelmed by too many choices; struggles to find truly new music.
- Frustrated when playlists feel repetitive or stale.
- Annoyed when the app consumes too much data during streaming.

GOALS

- Find new music that aligns with specific moods or creative projects.
- Save time by relying on tailored recommendations and pre-made playlists.
- Share favorite tracks easily with friends via social media

ABOUT ME

Alex Martinez has over nine years of experience in the digital marketing industry, excelling both as an individual contributor and a collaborative team player. Guided by the principle of exposure, Alex understands that the core of digital marketing lies in amplifying a product's visibility. He thrives on creating impactful campaigns that connect brands with their audiences, skillfully blending creativity and data-driven insights to maximize reach and engagement.

BEHAVIOR & INTEREST

- Music Preferences:
  - Loves indie, lo-fi hip hop, and electronic music for focus during work.
  - Enjoys discovering underground artists and curating playlists for friends.
  - Uses music as a backdrop for creative inspiration.
- Listening Habits:
  - Streams music daily, averaging 4-6 hours.
  - Listens on the go (mobile) and at home while working on design projects.

APP FEATURES THEY LOVE

- Personalized Discoveries: Weekly updates of curated playlists like "Discover Weekly."
- Mood Playlists: Quick access to "Chill Vibes" or "Focus Boost" playlists.
- Social Sharing: Ability to send playlists and songs directly to friends or post on Instagram Stories.

TECHNICAL SKILLS

Market Analytics
SEO
Copywriting
Web Programming

JAMES DAVIS

MALE
NEW YORK CITY, NY
28
BARISTA
$35,000/YEAR

EDUCATION

Bachelor of Arts in Music
New York City College of Technology

LANGUAGE

English
French

PERSONALITY

Passionate: James pours his heart into his music, constantly exploring new sounds and pushing his creative limits.
Resilient: Despite challenges in gaining recognition, he remains motivated and optimistic about his music career.

PAIN POINTS

- Struggles with gaining visibility for his niche music on mainstream platforms.
- Faces difficulty in connecting with the right audience for his unique sound.

GOALS

- Build an Audience: James aims to increase his visibility in the indie music scene and grow a dedicated fanbase.
- Break into the Music Industry: His ultimate goal is to transition from being an aspiring artist to a recognized musician with opportunities for professional growth.

ABOUT ME

James Davis is a 28-year-old barista from New York City and an aspiring singer-songwriter. By day, he crafts the perfect cup of coffee for customers in his busy city café, and by night, he immerses himself in writing and recording music. James blends acoustic rock, folk, and experimental sounds, often experimenting with new styles to create a unique sound that reflects his urban surroundings. Living in the heart of NYC, he thrives on discovering underground artists and sharing his own music through apps to build a following.

BEHAVIOR & INTEREST

- Works as a barista by day, using his café environment to find inspiration for new music.
- Spends his nights writing, recording, and experimenting with new songs.
- Actively uses music apps to share his tracks and test how they resonate with listeners.
- Enjoys attending open mic nights and collaborating with other musicians to expand his network.
- Thrives in the vibrant and diverse NYC music scene, always looking to connect with like-minded creatives.

APP FEATURES THEY LOVE

- Enjoys acoustic rock, folk, and experimental sounds that blend traditional and modern elements.
- Prefers discovering underground and indie artists to expand his music knowledge.
- Values apps that allow for easy music sharing and collaboration with other musicians.

TECHNICAL SKILLS

Music
Coffee Making
Garage Band
Logic Pro

	forScore
Strengths	The interface is intuitive and designed specifically for musicians, allowing users to import and organize sheet music in PDF format easily. The automatic scrolling feature eliminates the need for manual page-turning during performances. It also offers robust annotation tools for marking sheet music, a built-in metronome, and audio playback synchronization to enhance practice and performance. These features make it suitable for both rehearsals and live settings.
Weaknesses	While forScore has many valuable features, it does not integrate lyrics or visual effects that could make performances more engaging. Additionally, the app requires a one-time purchase, which might deter some users. New users may find the app's wide range of tools overwhelming at first, requiring some time to become proficient with its interface.
Audience/Focus	forScore is designed for musicians of all levels, ranging from students to seasoned professionals, and it caters to individual performers as well as ensembles. It delivers a comprehensive digital solution for managing and performing sheet music, streamlining workflows and optimizing performance experiences.

	Newzik
Strengths	Newzik supports a variety of file formats, including PDF, MusicXML, and text files, making it highly versatile. Its ability to synchronize sheet music with backing tracks creates an immersive practice environment. The app's cloud-based collaboration system enables real-time sharing and editing among performers, making it ideal for groups like orchestras. Additionally, the automatic scrolling mode ensures uninterrupted performances, adding to its practical features.
Weaknesses	The user interface, while powerful, can feel complex and overwhelming for beginners unfamiliar with the extensive functionality. The reliance on cloud storage means users need a stable internet connection to access all features seamlessly. This can be a disadvantage during live performances in areas with poor connectivity. Additionally, some advanced features may come at a higher price point.

Audience & Focus	Newzik targets professional musicians, orchestras, and educators who require collaborative tools for managing and sharing sheet music efficiently. Its emphasis on connectivity and flexibility ensures that both individual performers and groups can optimize their practice and performance experiences.

	Piascore
Strengths	Piascore offers a free and easy-to-use platform for managing and viewing digital sheet music. A unique feature is its gesture-based page-turning, which is especially useful for hands-free use during live performances. The app also includes a built-in music library where users can search and download sheet music, making it highly convenient. Other features, like annotations, a metronome, and audio playback, make it a comprehensive tool for both practice and performance. Its clean design ensures accessibility for users at all levels.
Weaknesses	The app's free model includes advertisements, which can be distracting during use, especially in professional settings. The gesture recognition feature, while innovative, sometimes struggles in low-light conditions, which may frustrate users during performances. Additionally, some advanced tools and customization options are restricted to the premium subscription, limiting functionality for free users.
Audience/Focus	Piascore is designed for both amateur and professional musicians who value affordability and practical features. It provides an accessible and innovative solution for managing digital sheet music, prioritizing ease of use and affordability for casual and professional musicians alike.

Application	Strengths	Weaknesses	Audience/Focus
forScore	+Audio sync +Autoscrolling	-No Lyrics -Paid App	Digital performance Sheet music

Newzik	+Cloud based sharing +File versatility	-Complicated UI -Ads	Collaborative editing Professionals
PiaScore	+Free option +Gesture Controls	-Ads included -Unreliable features	All levels Digital Sheet Music

From this competitive analysis, we have learned a great deal from the successes and failures of similar sheet music apps, and this will go a long way in informing us about our product development. We concluded that our app needed to take the approach of simplicity, efficient scrolling, and seamless integration of performance tools. forScore had a great, user-friendly interface with essential features like auto-scrolling and audio synchronization but lacked advanced visual effects and lyrics integration. Musicians require a less distracting product during performances, so having a clean, direct interface that keeps them focused on the music is very important.

Besides, collaboration and user interaction should be enhanced, as is the case with the cloud-based sharing feature by Newzik. Adding real-time collaboration and file-sharing will bring in great value, especially for ensemble settings. However, simplicity should be balanced with powerful tools to avoid overwhelming the user-a common pitfall, skillfully avoided by Piascore's gesture controls and built-in music library, although it does contain ads that might distract the user.

The idea is to get only the best of these: simplicity in design and intuitive controls, as from forScore, collaboration enhanced by Newzik, and accessibility and free features realized by Piascore. By setting the high level of smooth scrolling, user interaction, and professional-grade performance features, we are trying to provide seamless experiences for solo musicians and ensembles, which support users' concentration on their performances without causing unnecessary distraction.