A Music Education Social Network

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Abstract

Learning music provides countless benefits, but music education is not accessible to students in lower socioeconomic status households. Chase Gastrock and I developed a social platform designed to enable collaboration and provide motivation and feedback for music students. We planned the project with user interface design concepts in consideration and MockFlow, a website design tool, to generate a mockup website. We developed the web application using PHP, JavaScript, CSS, HTML, and SQL. We checked the validity of our HTML with W3C Validator and checked for Section 508 compliance with ANDI. Our final website provides a platform where users can post music recordings and leave feedback on friends' posts. Teachers can assign tasks to students and create groups to organize ensembles. Users can log their daily practice goals and accomplishments in a practice logger and reference past practice sessions. A user's profile page can serve as a portfolio of published work to share with potential employers. The website needs additional work to be fully ready for public use, including more robust testing, additional functionality such as private messaging, and cloud hosting.

1 Introduction

Classical music poses many barriers to entry, including the expense of renting or purchasing and maintaining an instrument, costly private lessons, sheet music purchases, and tuition for music education programs. Stereotypes surrounding classical music involve stories of race and class, as upper-class, white male musicians have historically dominated the genre. Most music education programs focus solely on Western music. Students from lower socioeconomic status households may not be able to afford the same access to resources as other students. The lack of access to music education and community may discourage young students from pursuing or continuing music education, as they fall behind their advantaged peers.

Playing, performing, and listening to music can improve mental health and mood. Music practice can prevent neurological diseases and cognitive decline. Children who study music at a young age tend to perform higher academically in areas such as reading and math. These countless benefits should be available to all students, regardless of income. To make music education more affordable, accessible, and community-based, we created a music hub where music-sharing, constructive feedback, and practice logging could all co-exist in one convenient location.

2 Related Works

New music educational tools help make music education more affordable and accessible. SmartMusic provides accompaniment tracks and feedback indicating whether the musician played the right note at the right time [4]. The subscription cost is significantly cheaper than hiring an accompanist for rehearsal. Musictheory.net provides music theory lessons and interactive practice exercises, all available for free online or in the mobile app [3]. Countless resources are available on YouTube and other websites. Music podcasts, such as Song Exploder [2] and Dissect [1], disseminate music theory knowledge, insight into the music creation process, and in-depth analyses of lyrics and music techniques. Our project aims to make music education more social and collaborative. Many great educational resources are available, but we hope to provide additional

motivation and encouragement through community-building.

3   Project Design

We planned to create a music-oriented social network and practice logger. The user will be able to log practice sessions each day, recording the pieces worked on, tempos, scale times, and any relevant notes. They can also upload recordings of their practice session and attach them to their daily practice log. They will be able to set daily or weekly goals for themselves that will provide visible reminders on the practice log screen. They will be able to look back on previous practice sessions to see helpful notes or listen to old recordings to observe how much progress they have made.

On the home page, the user will be able to make posts containing audio recordings and text. They can post publicly, creating a portfolio of their work on their profile page. Private posts help musicians observe their progress over time. Posts can also be shared only with specific groups, such as a musical ensemble or a private teacher. Users can see a feed of other users' posts and like or comment and join private groups of musical organizations. Private teachers can provide feedback on shared recordings and post homework and objectives for students.

This project has dynamic behavior in which the user inputs practice log information, which updates the interface. Users can log practice sessions, post recordings, and connect with other users. Logging practice sessions helps users stay focused, remember their goals, and motivates them by showing their progress. Posting recordings helps users create a public portfolio that can showcase their work for networking and performing opportunities. Connecting with other users helps musicians grow their abilities through helpful feedback from their connections. Encouragement from friends helps motivate them to practice more.

This website will also be a useful organizational tool for teaching, allowing teachers to assign music to practice, listen to students, and provide feedback all in one place. For students in ensembles, students could practice along with other students' recordings or listen to them to hear how the music should sound.

We add, update, and delete data from a database every time a user logs a practice session, records goals, or posts a recording. The system supports multiple users and multiple sessions. The frontend and backend interact asynchronously when a user enters a new goal or checks a completed goal. All pages are connected and easily reached through the top navigation bar.

We designed the website to be simple and easy to follow. The major components are in expected places for ease of use, with the profile page in the top right and home in the top left. The home page presents the main feed and a glance at the user's practice history. A list of the user's groups appears on the right, and each group links to the page where all group posts will be listed. The practice log can easily be found through the navigation bar and contains a calendar overview, a form for practice session posts, and a list of the user's goals.

Individual practice sessions on the calendar contain links to view details. The profile picture in the top right leads the user to the profile page. This page contains all of a user's posts, name, profile picture, a short description with contact information, and the ability to create a new post. The gear button in the top right opens a small settings menu, and the bell icon opens a drop-down with any notifications, such as friend requests, comments, likes, and group requests. The search bar allows users to search for other users and groups. The upper left corner contains a placeholder for our logo.

Figures 1, 2, and 3 display the initial user interface designs created using MockFlow, a web application for UI design.

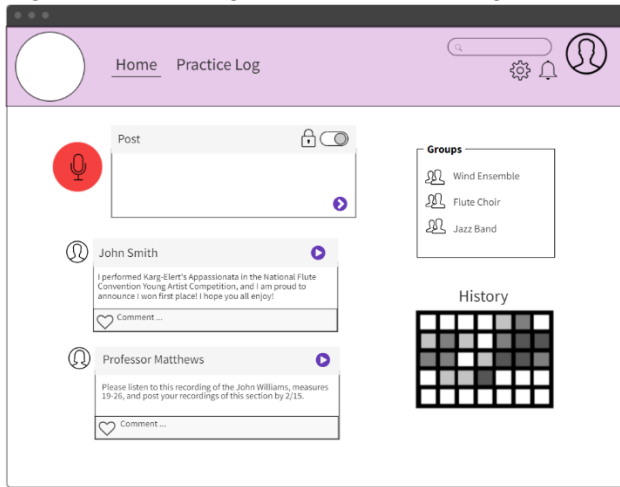Figure 1: Home Page User Interface Design

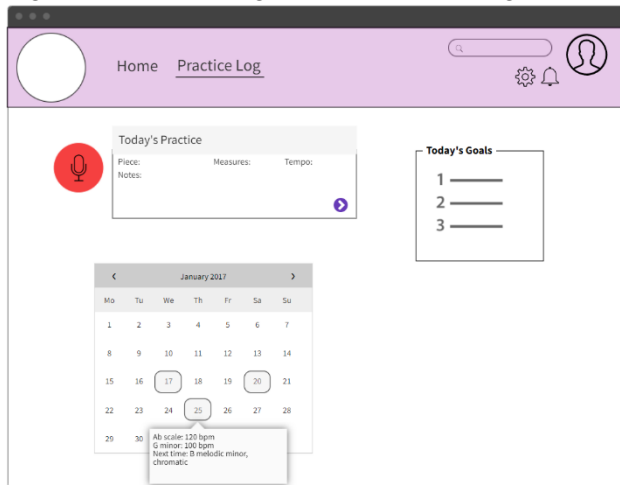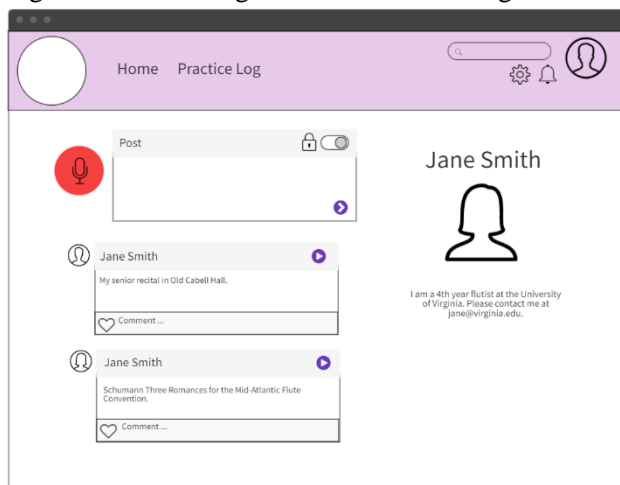Figure 2: Practice Log User Interface Design

Figure 3: Profile Page User Interface Design

We implemented the client-side of the application using HTML for page formatting and components, CSS and Bootstrap for styling and cohesion across web pages, and JavaScript for dynamic interactivity. We implemented the server-side logic with PHP and stored user data in a MySQL database to support multiple sessions. We used cookies and session variables to track user sessions and maintain state across a single user session. We validated user input, including email and password validation, on both the client-side and server-side. We performed AJAX queries for asynchronous interactions between the frontend and backend using JavaScript, PHP, and JSON. We used JavaScript functions and jQuery to update the page and modify the DOM dynamically. Throughout each step of the process, we checked the validity of our HTML with the W3C Validator. We used the ANDI tool to analyze each of our web pages to ensure compliance with Section 508, ensuring the accessibility of our website to all potential users.

4. Results
Our project resulted in a simple, working prototype version of our web application and a 60-second video advertisement for our website. With some additional work, this project could be published for public use and provide a valuable social and educational tool for student musicians. Schools could use this website to organize music ensembles, recordings, and practice assignments in their music education programs. Students could gain motivation by following musicians they admire.

5. Conclusion
This project is one step toward bridging the gap in music education accessibility. Music educational tools are becoming more widespread, and this specific tool combines music education with social connections.

6. Future Work
This project requires more work to be completed and ready for public use. More features need to be added and fully implemented for the desired functionality. More robust testing and security measures are needed to protect users' data and guard against cybersecurity attacks. More functionalities may be helpful, such as private messaging and video sharing. Group pages, the practice log calendar, and file uploading all

require additional work to be fully implemented. We plan to implement filtering and sorting capabilities when searching. A finished version of the project would need to be hosted on a cloud sharing platform on a registered domain name to be available for public use. Marketing would be necessary to attract enough users to build a community of musicians.

7. Acknowledgments

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