Sarah Espinosa

- Bachelor of Music, Horn Performance
- Master of Arts, Music and Worship Ministries
- Master's Student, Learning Design and Technology
- U.S. Navy Veteran, Musician
## Analyze

Analyze how the structure and context of varied musical works inform the response.

**Enduring Understanding:** Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music.

<table>
<thead>
<tr>
<th>Essential Question</th>
<th>How does understanding the structure and context of music inform a response?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novice</td>
<td>Intermediate</td>
</tr>
<tr>
<td>MU:Re7.2.C.ila Analyze aurally the elements of music (including form) of musical works, relating them to style, mood, and context, and describe how the analysis provides models for personal growth as composer, performer, and/or listener.</td>
<td>MU:Re7.2.C.ila Analyze aurally and/or by reading the scores of musical works the elements of music (including form), compositional techniques and procedures, relating them to style, mood, and context; and explain how the analysis provides models for personal growth as composer, performer, and/or listener.</td>
</tr>
</tbody>
</table>

Novice and Intermediate musicians are not being taught music and aural theory.
Aural Music Theory: Tactics and Problems

Historical Precedent

Drill & Practice

New Tools, Same Methods
The Development of Solfege

d o r e m i f a s o l l a s i d o
Drill and Practice Method

It sounds like a Major 3rd to me.
51% 9- to 11-year-olds in the U.S. play Minecraft

Quick Minecraft Stats
- Sandbox Game
- 250 million registered users worldwide
- 90 million monthly users
- 35% located in the U.S.
Note Block Function in Minecraft

Note Block + Redstone =

Image of Note Block, Redstone, and Minecraft scene.
Address lack of music theory exposure

New tool for teachers

Game-based learning

Metacognitive principles

STEAM (adding the arts to STEM)

Minecraft
Target Audience Attributes

18+

Music Majors

Parents and Teachers of students ages 10 to 13

Homeschool Parents

Musicians

Public and Private Music Teachers

Digitally Literate

Military Musicians
Virtual Wireframing Considerations

- Typical website wireframe not recommended for virtual world environment (VWE)
- The VWE should not feel like a website
- The VWE should be built in 3D if possible
Visual Design and Prototype
Visual Design and Prototype
Visual Design and Prototype

![Minecraft Note Block Reference](image)

Colored numbers represent the number of right-clicks needed to set that note.

![Crafting](image)

Note Block
Navigation

Virtual Content Design

User Satisfaction

Created Simulation
- Locus of control within simulation
- One-to-one testing (no multi-player)
- Focus narrowed
Research Questions

1. **Navigation**
   
   How easy or difficult was it to locate the virtual content design areas of the simulation within the virtual learning environment?

2. **Virtual Content Design**
   
   How effective was the virtual content design of the musical mechanisms in the sandbox environment for aural theory training for use with teachers of beginner music students age 10-13?

3. **User Satisfaction**
   
   What was the level of user satisfaction of virtual content design (space presence, involvement, perceived relevance, and appeal) within the virtual learning environment for use in aural theory training for teachers of beginning music students ages 10-13?
The goal of the usability study was to identify issues related to the research questions and improve the simulation through three iterations.
The Crafter’s Ear: Evaluating an Aural Theory Simulation in Minecraft

Are you 18 or older and give music lessons to a child age 10 to 13?

If the answer is YES...

Sarah Epsieosa would like to invite you to participate in a research study.

The purpose of this usability study is to evaluate the navigation, effectiveness of virtual content design and user satisfaction in an aural music theory skills simulation, The Crafter’s Ear, created within the sandbox Minecraft for music teachers to use with their 10-13 year old music students.

- Usability testing (1 interview per participant) will take place online in Zoom and Minecraft.
- Study volunteers will receive the Crafter’s Ear file for personal use as compensation.
- A summary of the results of certain tests performed during the study will be available to study volunteers.

To learn more about the study, please e-mail Sarah Epsieosa at shepsl@howall.edu

Invitation
- E-mail
- Face-to-face
- Social Media

Pre-screening
- Musical aptitude quiz
- Match for target audience
- Varying levels of Minecraft experience
3 Rounds of Usability

18 Participants were invited

13 Participants completed simulation
Tools

- Think-aloud Audio
- Minecraft Account
- Usability Tasks
- Post-Survey
- Informal Interview
Round One: The Crafter’s Ear

“Everything that could go wrong, went wrong”

<table>
<thead>
<tr>
<th>Iteration 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Catastrophic</td>
<td>Minor</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Major</td>
<td>Cosmetic</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

“Please add more “right-click” sign reminders. I kept breaking things when I left clicked.”
Round One

Catastrophic

- No monsters in creative mode
- No death in creative mode
- Teleport was supposed to be outside
“They all died.”

“I keep showing survival mode whenever I click area 4.”
What happens when you add a note block to...
Round Two: Major Issue

“Please fix the note block chart. The colors don’t match the output when you click.”
“It finally, mostly works.”

“The second half was the highlight. Can you turn the first part into a PDF instead?”
Post-survey question:

Choose five descriptive words from this list that best describe your simulation experience.

<table>
<thead>
<tr>
<th>Accessible</th>
<th>Desirable</th>
<th>Gets in the way</th>
<th>Patronizing</th>
<th>Stressful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appealing</td>
<td>Easy to Use</td>
<td>Hard to Use</td>
<td>Personal</td>
<td>Time-consuming</td>
</tr>
<tr>
<td>Attractive</td>
<td>Efficient</td>
<td>High quality</td>
<td>Predictable</td>
<td>Time-saving</td>
</tr>
<tr>
<td>Busy</td>
<td>Empowering</td>
<td>Inconsistent</td>
<td>Relevant</td>
<td>Too Technical</td>
</tr>
<tr>
<td>Collaborative</td>
<td>Exciting</td>
<td>Intimidating</td>
<td>Reliable</td>
<td>Trustworthy</td>
</tr>
<tr>
<td>Complex</td>
<td>Familiar</td>
<td>Inviting</td>
<td>Rigid</td>
<td>Uncontrollable</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>Fast</td>
<td>Motivating</td>
<td>Simplistic</td>
<td>Unconventional</td>
</tr>
<tr>
<td>Confusing</td>
<td>Flexible</td>
<td>Not valuable</td>
<td>Slow</td>
<td>Unpredictable</td>
</tr>
<tr>
<td>Connected</td>
<td>Fresh</td>
<td>Organized</td>
<td>Sophisticated</td>
<td>Usable</td>
</tr>
</tbody>
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Pros

- Flexible
- Exciting
- Empowering
- Attractive
- Easy-to-use
- Inviting
- Personal
- Fresh
- Collaborative
- Appealing
- Organized

Cons

- Inconsistent
- Hard-to-use
- Gets-in-the-way
- Unpredictable
- Uncontrollable
- Confusing
- Too-technical
- Complex
- Intimidating
- Time-consuming
Was it worth it?

Yes and No
“I really appreciated the effort this took. Why are you using Minecraft Java? Wouldn’t Minecraft Education Edition solve a lot of the issues I experienced in the simulation?”
Q 33. On a scale of 1 to 5, with 1 being Very Unlikely and 5 being Very Likely, after participating in the aural theory simulation, how likely would you be to utilize this simulation with your student(s)?

<table>
<thead>
<tr>
<th></th>
<th>Iteration 1</th>
<th>Iteration 2</th>
<th>Iteration 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Very unlikely</strong></td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>2 Unlikely</strong></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>3 Unsure</strong></td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>4 Likely</strong></td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>5 Very Likely</strong></td>
<td>1</td>
<td>0</td>
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Minecraft Education Edition Requested

Lesson plans and online presence an idea for platform change
Future Endeavors

- Platform reevaluation
- Explore Minecraft Education Edition
- Focus only on music
- Launch future research
Questions?