

From Silence to Sound: Engaging Refugee Children in Emotional and Environmental Expression through Extended Viola Technique in 'Vocalizing Hermit Crab'

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ABSTRACT

"Vocalizing Hermit Crab" is a sonic experiment employing the interactive musical game "Viola Sound Safari", designed to immerse refugee children in extended viola techniques. This project emphasizes the viola's capacity to produce diverse sounds, offering participants a transformative musical experience. "Viola Sound Safari" incorporates advanced gamification principles, presenting interactive challenges that prompt children to engage with harmonics, sul ponticello, col legno, and microtonal variations. Live electronics and real-time sound processing extend the viola's sonic, creating intricate soundscapes. This experiment allows refugee children to explore new sounds and transform personal experiences into expressive musical compositions. The game's interactive design promotes spontaneous participation and the instrument. Preliminary findings suggest that this gamified approach enhances creativity and emotional expression, offering valuable insights into how music technology facilitates therapeutic processes. "Vocalizing Hermit Crab" thus stands at the intersection of technology, music, and social impact, proposing a flexible framework for sonic experimentation that can be adapted across diverse settings and participant groups.

1. Introduction

Building upon the success of Viola Sound Safari 1.0, where participants engaged with the viola's sonic capabilities by mimicking animal sounds, the 'Vocalizing Hermit Crab' project introduces 'Viola Sound Safari 2.0'. This iteration extends the previous work by encouraging participants to create individual sounds and complete soundscapes that convey narratives and address environmental concerns. This project is grounded in research on the expressive potential of extended viola techniques, drawing on the work of composers and performers such as Garth Knox his groundbreaking work "Viola Spaces", which demonstrates how techniques such as harmonics, sul ponticello, and col legno transcend traditional boundaries to evoke a wide range of emotions (Bekenova et al., 2020; Götzén, 2004). By manipulating timbre, texture, and dynamics, the viola is made to whisper, shriek, moan, and sing, creating a powerful instrument for emotional expression and storytelling (Dolejší, 1970). 'Viola Sound Safari 2.0' expands on these insights, immersing participants in a multi-layered sonic experience. Through interactive musical games structured around a story of four hermit crabs seeking new homes, participants apply extended viola techniques to express emotions, depict actions, and draw attention to pollution's impact on delicate coastal ecosystems.

By merging music, storytelling, and environmental awareness, the 'Vocalizing Hermit Crab' project aims to offer a transformative experience, enabling participants to find their voices as amateur musicians and advocates for environmental sustainability. This experience encourages them to articulate personal narratives and connect with broader societal issues through sound. This approach aligns with emerging theories that highlight engagement through play and the development of individual abilities via music, proposing that combining sound and storytelling enhances artistic and social interaction outcomes for participants across diverse settings (Kraus et al., 2014; Côte-real, 2011). Furthermore, incorporating soundscapes into the project allows for varied auditory experiences, promoting emotional resonance and fostering a deeper connection with the participants'

surroundings. This method echoes contemporary immersive sound installations that aim to reflect the complexities of the modern world (Rocha, 2019).

1.1 Research Question

1. How do microtonal variations and timbral manipulations, facilitated through extended viola techniques, enable emotional mapping of the "Vocalizing Hermit Crab" narrative among non-viola-playing refugee children?
2. In what ways does the use of group-based extended viola techniques in "Vocalizing Hermit Crab" support socialization and therapeutic benefits among refugee children, specifically fostering environmental awareness and shared emotional engagement?

1.2 Research Objective

1. To analyze how microtonal variations and timbral manipulations, produced through group-based extended viola techniques, are strategically employed to elicit specific emotional responses in non-viola-playing refugee children as they engage with the "Vocalizing Hermit Crab" narrative, thereby enhancing their emotional mapping and storytelling experience.
2. To investigate how implementing group-based extended viola techniques in "Vocalizing Hermit Crab" encourages socialization and supports therapeutic outcomes among refugee children, focusing on how collaborative sonic engagement promotes emotional connection and raises environmental awareness within a supportive community setting.

2. Literature Review

The 'Vocalizing Hermit Crab' Project builds upon existing research examining the intersections of sonic experimentation, group-based extended viola techniques—as exemplified in 'Viola Sound Safari'—and the social impact of musical creation, especially among marginalized communities such as refugee children (Wong & Lee, 2024). Although this foundation offers a framework for understanding the role of musical engagement in therapeutic and social contexts, notable gaps remain, particularly concerning stringed instruments like the viola and group-based sonic creation. These unexplored areas highlight challenges in effectively implementing such techniques with non-expert players and reveal new possibilities for innovative musical pedagogy and social integration. Addressing these gaps may lead to significant advancements in applying musical engagement as a tool for social interaction and emotional expression in displaced communities.

A central aspect of this project is the integration of extended viola techniques in group settings, facilitating collaborative sonic creation (Wong & Lee, 2024). While these techniques are well-established in contemporary music, their application in therapeutic or community environments, particularly among non-viola players, remains unexplored. Research such as Garth Knox's "Viola Spaces" demonstrates the emotional and sonic versatility of the viola through these techniques (Bekenova et al., 2020). However, this work has primarily focused on trained musicians and individual performers, leaving a significant gap in understanding how such techniques can be adapted for group settings, particularly among communities with limited musical training and instrument access. The 'Vocalizing Hermit Crab' project addresses this gap by introducing these techniques to refugee children without prior viola experience, creating a new context for these sonic tools.

Extended techniques on the viola, particularly microtonal variations and unconventional timbres, may offer unique therapeutic benefits due to the viola's frequency range, which closely aligns with the human voice (Wong & Lee, 2024). This connection between sound and voice is especially relevant when working with communities like refugee children, who may have experienced displacement and trauma, often silencing their voices. The viola's ability to produce timbres that mirror the human voice's fragility, resilience, and expressiveness provides a safe, non-verbal outlet for emotional

expression. Research suggests that sound, particularly with narrative, offers a powerful means for processing complex emotions (Leccese et al., 2018). Thus, the ‘Vocalizing Hermit Crab’ project leverages extended viola techniques as a medium and a catalyst for emotional expression. Despite these advantages, a critical examination of the challenges associated with introducing group-based extended viola techniques to non-viola players is necessary. The project’s participants—refugee children from Myanmar’s Burmese, Chin, and Karen communities—face cultural and linguistic barriers as well as the inherent difficulty of learning an unfamiliar instrument. While Belda and Navasquillo (2017) demonstrated the benefits of interactive frameworks like Soundpainting in fostering musical development, limited research addresses how such frameworks can be applied to stringed instruments in non-expert contexts.

The group-based nature of the ‘Vocalizing Hermit Crab’ project warrants further analysis. While group music-making is widely recognized for its social and emotional benefits, applying extended viola techniques in a collective setting remains relatively uncharted. Wong and Lee (2024) highlight the potential of group-based extended techniques to foster a shared sense of emotional resonance, where multiple players contribute to an integrated soundscape. This concept has significant implications for the refugee children involved in the project, allowing them to express personal emotions and engage in a shared experience with peers through sound production. However, this approach raises questions regarding the feasibility of achieving cohesive group expression when many participants have limited experience. Can non-viola players effectively collaborate on extended techniques that even trained musicians find challenging, or will the technical barriers hinder the children’s full engagement in the collective sonic experience?

Another critical consideration is the ecological awareness embedded within the project. By incorporating environmental themes, the project aligns with initiatives promoting ecological literacy through music (Shevock & Bates, 2019). The narrative of hermit crabs seeking refuge in a polluted ecosystem serves as both a metaphor for the children’s experiences and a tool for fostering environmental consciousness. The use of localized soundscapes in the project mirrors contemporary practices in sound installations, where auditory experiences are crafted to deepen listeners’ connection to their environment. However, it remains debatable whether refugee children who are grappling with the immediate challenges of displacement and trauma can effectively engage with such abstract ecological concepts (UNHCR, 2022; UNICEF, 2022). While the project’s ecological message is commendable, there is an argument that its primary focus should remain on transferring the children’s emotional and social interactions into musical output, with environmental awareness as a secondary benefit rather than a central goal.

Viola Sound Safari 2.0’s gamified structure offers a potential solution. The project encourages children to engage with the viola in a playful, low-pressure context by framing the group-based extended techniques within an interactive game. Research supports that gamification can enhance learning and creativity by reducing performance anxiety and encouraging spontaneous exploration (Belda & Navasquillo, 2017). This approach helps mitigate the technical challenges of the viola by prioritizing experimentation over precision within the ‘Vocalizing Hermit Crab’ project. However, whether this gamified approach can fully bridge the gap between technical proficiency and emotional expression remains uncertain. While the game format may make the viola more accessible, there is still a risk that the complexity of the extended techniques may be too daunting for children with no prior musical experience.

In conclusion, the Vocalizing Hermit Crab project represents a bold attempt to integrate extended viola techniques, collaborative sound creation, and narrative-driven musical experiences specifically adapted to the context of refugee children. The project’s design carefully integrates musical pedagogy, performance, and social engagement, using creative approaches to address emotional expression and environmental awareness. Although extensive research on group music-making provides a foundation

for this project, its unique application of extended viola techniques with participants new to this instrument introduces novel challenges and opportunities. Therefore, this project seeks to enhance participants' musical skills and aims to develop a framework for using music as a medium for self-expression and social connection among displaced children. In doing so, it opens up new avenues for understanding the impact of music on community-building and personal resilience in marginalized contexts.

3. Methodology

The 'Vocalizing Hermit Crab' project was implemented through an interactive session that guided refugee children on a journey of sonic creation and ecological storytelling. A qualitative method was employed, using observations, focus group interviews, and video recording for data collection (Lee & Worsley, 2019). Thematic coding analysis was employed for data analysis (Alain et al., 2018). The session incorporated various artistic activities, such as imitating the hermit crabs' conversation through sound, enabling a deeper engagement with themes related to displacement, identity, and environmental awareness (Guruge et al., 2015). The observation session prioritized creating an inclusive environment, ensuring each child felt empowered to share unique perspectives and experiences in creative sound-making. This approach aligns with principles that emphasize authentic participation and the importance of contextual preparation to support diverse voices in collaborative creative processes (Raman & French, 2021).

Twelve participants—boys and girls aged eight to fourteen from a refugee shelter in Selangor, Malaysia—were selected using voluntary sampling. The researcher, the children's music teacher, served as an observer in this study. A refugee teacher voluntarily assisted during data collection to facilitate communication with participants with limited English proficiency. The participants were divided into four groups, each working on vocalizing one of the hermit crab characters. Video and voice recordings were made during the observation, and a focus group interview was conducted after completion.

3.1 Theoretical Framework

This research is grounded in constructivist and gamification theories. By emphasizing active participation and collaboration, these theories underscore the value of hands-on sound creation activities, allowing children to co-create their musical narratives and fostering a sense of ownership and empowerment in their creative journey (Raman & French, 2021). The integration of engaging features, such as the hermit crab story and interactive musical sonic explorations, aligns with studies showing the efficacy of such approaches in enhancing engagement, motivation, and cognitive development (He, 2017; Watt & Smith, 2021; Buday et al., 2021; Kiviniemi, 2017). This engagement captures children's imaginations and enables them to explore and reinterpret their experiences, promoting resilience and identity formation through artistic expression.

3.2 Vocalizing Hermit Crabs Activities

The researcher commenced an ice-breaking session involving twelve participants, randomly assigned to four groups. Following this, the researcher introduced the viola to the participants, demonstrating both traditional and extended techniques and emphasizing contemporary approaches. Participants were encouraged to ask questions about the viola to deepen their understanding of its sonic possibilities. The introductory session was followed by viewing the researcher-prepared slideshow, 'Shell Quest', which served as a segue into a discussion on environmental and ecological issues. After the discussion, each group received a viola and bow to commence experiments to vocalize the hermit crabs using the viola. This session lasted a twenty-minute session of sonic exploration aimed at vocalizing the characteristics of hermit crabs through the viola. At the end of the session, each group presented their interpretative "voice" in a short presentation. The final component of this activity was

a semi-structured focus group interview, during which participants also had an opportunity to inquire further into the research's focus on viola and extended techniques. Figure 1 summarizes the procedure of the *Vocalizing Hermit Crabs* project.

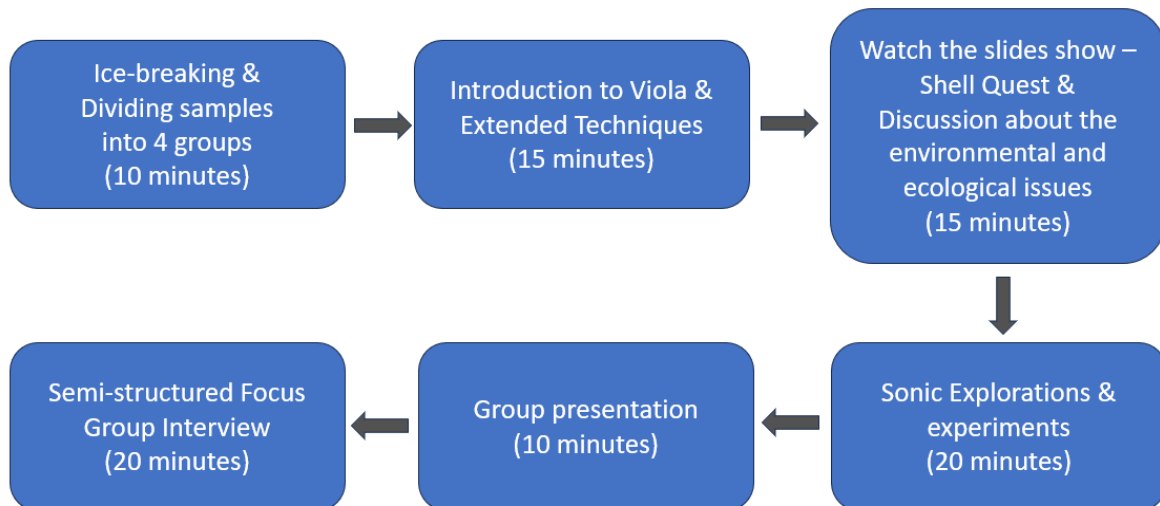


Fig. 1 – Vocalizing Hermit Crabs Project Activities

3.2.1 Shell Quest

This story follows four hermit crabs living on a polluted seashore:

One day, four hermit crabs, Lila, Pa Pe, Ku Ti, and Di Dak, were scouting for their new shells on the shore. Pa Pe, the purple hermit crab, found a new shell and a white plastic bottle cap and happily showed it to his friend, Di Dak. Said Pa Pe, “Good day, Di Dak!!! Look what I found here... My new home...”. Di Dak, the orangey-yellow hermit crab, was amazed by Pa Pe’s new home and expressed, “That’s a pretty cool shell, Pa Pe. My shell is too small for me now... gotta find a bigger one”. Meanwhile, Ku Ti shouted with joy from afar, “Look at mine, look... look... it fits me...”. She found an aluminum bottle cap in green and white. Lila, her friend, found a cool shell too. It was a broken glass bottle that Lila could carry with her around the shore. Lila proudly expressed, “I think mine is the coolest. Haha...”. It’s a successful day of scouting for new homes. Figure 2 shows the slide show of ‘Shell Quest’.

Slide 1



Slide 2



Slide 3

Slide 4



Fig. 2 - Shell Quest – Slide Show

3.3 Findings

1. Integrating microtonal variations and timbral adjustments through group-based extended viola techniques greatly enhanced the children's capacity to convey emotions linked to the Vocalizing Hermit Crab Project narrative. By exploring the viola's distinctive features, participants could create varied soundscapes communicating specific emotional tones. For instance, by altering bow speeds and applying unrestrained strokes across the bridge in a windshield-wiper motion, they generated a metallic tone with rich overtones that intrigued them. Their enthusiasm for expressing the voices of the hermit crabs was further demonstrated as they tapped their fingertips on different parts of different areas of the viola, prompting them to explore a broader range of sounds and emotional expressions. These group-based techniques produced tones more akin to the children's vocal range, enabling emotional expression that might otherwise be difficult to communicate due to language limitations. As they interacted with the narrative, they also conveyed a heightened awareness of environmental concerns, reflected in their varied use of rhythms and dynamics. For instance, when tasked with portraying a moment of loss connected to a technological theme, the children instinctively applied heavier bow pressure and *sul ponticello*, evoking a somber tone that forged a meaningful link between their personal experiences and the narrative.

In contrast, to evoke a joyful atmosphere, the children applied harmonics and *sul tasto* techniques combined with quicker bow strokes, moving back and forth across the strings in a windshield-wiper motion while sliding their fingers along the fingerboard. These actions created a rich, resonant tone symbolizing joy, hope, and transformation, especially in scenes where the hermit crabs finally discover their new homes. By adjusting bow speed, pressure, and direction, they produced multiple harmonics layers, enabling them to explore a broader emotional spectrum and gain control in using sound to reflect their feelings. Tapping different sections of the viola during this "wiper" motion, with the bow's wood lightly brushing the strings, allowed the children to unintentionally create complex harmonic textures beyond what a solo violist would typically achieve with traditional and extended techniques. This approach enabled them to effectively convey their journey and emotions while uncovering novel sonic possibilities with the viola.

Moreover, the project underscored the collaborative dimension of creating multi-layered timbres, allowing children to experiment collectively with extended techniques during group activities. As the soundscapes align with the narrative, they engage in both verbal and musical dialogue, sharing their emotional responses and building on each other's ideas. This collective process enriched the storytelling, enabling them to form a shared understanding of their emotions and experiences. Ultimately, the intentional use of microtonal variations and extended techniques enhances emotional expression and deepens engagement with the narrative, showcasing music's transformative potential as a medium for communication, healing, and personal growth for refugee children unfamiliar with the viola. Table 1 shows the Multi-Sonic Timbre – Pa Pe by Group 1 of this study.

Table 1 – Multi-Sonic Timbres – Pa Pe by Group 1

Timbre	Description	Speed	Dynamic	Remarks
1	Tapping with fingernails on the upper right-hand bout of the viola	Moderate	Moderately soft	Imitating the movements of the hermit crab
2	Wiper bow strokes with bow wood lightly brushing the strings	Fast	Uncontrolled softness with occasional accents	Imitating the words/sound expression
3	Gliding fingers on the fingerboard with heavy and light touches	Variety of speed	-	Imitating the words/sound expression
4	Tapping different parts of the viola (any available space)	Variety of speed	Uncontrolled softness with occasional accents	Creating slight echoes in overall expressions

2. Group-based extended viola techniques in the Vocalizing Hermit Crab project contributed to socialization and therapeutic benefits for refugee children. In this collaborative setting, children engage in sound exploration that encourages teamwork and collective creativity. Through group activities, they shared ideas, allocated roles, and contributed to building soundscapes that reflected their shared emotion and ideas. This process enhanced the children's musical creativity while fostering vital social abilities, including communication, empathy, and teamwork. Through collaboration, they built a sense of community and belonging, strengthening their shared commitment to environmental care—a significant value for children navigating the complexities of refugee life. The collaborative nature of the project helped break down social barriers, facilitating friendships and social interactions essential for their growth and well-being.

The project's emphasis on environmental concerns was a powerful catalyst for fostering social involvement. By engaging with sound, the children explore the themes of ecology and sustainability, developing a collective awareness of environmental responsibilities and the importance of advocacy. This experience fostered a sense of empowerment, enabling them to articulate ecological concerns and inspiring proactive engagement within their communities through creative sound exploration. Here, extended viola techniques offered a medium through which the children could express personal and shared narratives, allowing them to reflect on their surroundings and experiences as refugees. Working with these extended techniques encouraged a supportive, expressive environment where they could convey emotions through sound. By experimenting with diverse sonic textures, these techniques offered a means to express complex emotions that words may not easily capture. The collaborative nature of sound-making fostered a safe and inclusive space where the children could form connections through music, explore complex feelings, and participate in a meaningful sonic dialogue. This experience strengthened social bonds, supported emotional resilience, and fostered community, contributing positively to their well-being and empowerment.

3.4 Discussion

The Vocalizing Hermit Crab project combines extended viola techniques with storytelling and environmental themes to support refugee children from Myanmar's Burmese, Chin, and Karen communities in discovering new modes of expression by mapping emotional responses. v. However, as non-viola players, the children face challenges in managing the complexity of these techniques, which may limit the project's overall impact. The project's group-based approach fosters social interaction, providing a collaborative platform for music-making and meaningful engagement with pressing ecological issues. The gamified structure of Viola Sound Safari 2.0 offers children a chance to explore without the pressure of performance, helping to reduce technical challenges. However, the

gap between the advanced techniques introduced and the children's beginner skill levels raises difficulties in balancing storytelling with the project's overall musical objectives, presenting an area for further refinement.

Building on these insights, further research could examine the cognitive and emotional impact of introducing extended techniques in gamified, non-musician contexts. Studies could investigate how group-based exploration of musical sound promotes creative problem-solving and teamwork, particularly in fostering ecological awareness and addressing other social or personal issues. The impact of engaging in complex techniques within a playful, collaborative setting could also be studied for its potential to support emotional development in young, non-expert musicians. Another potential study area is the adaptability of gamified music projects like Viola Sound Safari 2.0 across different cultural settings, exploring how participants from diverse backgrounds interact with sound and storytelling. Overall, while the Vocalizing Hermit Crab project offers a structured method for promoting emotional and ecological engagement through extended viola techniques, addressing the technical challenges encountered by non-players will be essential for future development.

4. Conclusion

The Vocalizing Hermit Crab project has illustrated the potential of applying extended viola techniques in group settings to foster emotional and ecological awareness among refugee children from Myanmar's Burmese, Chin, and Karen communities. This project provided participants with a therapeutic means of self-expression through music while also serving as an inspiring experience for the researcher in their role as a composer-performer. Exploring distinctive multi-sonic timbres, including previously un-notated multi-harmonic layers, prompted a rethinking of traditional musical notation and paved the way for future compositions incorporating group-based extended techniques with other string instruments. Integrating both conventional and experimental approaches in a group setting offers essential insights into music therapy and collaborative music-making methodologies.

These findings underscore the untapped expressive potential within the viola's sonic range, particularly in a collaborative, non-traditional setting where participants can explore sound without the pressure of technical mastery. Despite the challenges posed by the children's lack of formal training, they are free to explore sound without the pressure of technical mastery. Despite the challenges posed by the children's lack of formal training, the gamified structure of Viola Sound Safari 2.0 facilitated a more accessible and engaging experience, reducing technical obstacles and encouraging creative problem-solving and teamwork. This approach and the exploration of sonic textures fostered a holistic experience that supported emotional and social development while raising critical ecological awareness. Participants gain musical skills and a strengthened sense of community and environmental responsibility by engaging in such innovative projects.

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