Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.2.00224

RESEARCH ARTICLE

"Viola Sound Safari": Engaging Refugee Children in Extended Viola Technique for Timbre Effects through Musical Game

Wong Siew Ngan*[1], Lee Chie Tsang [2]

[1,2]Universiti Malaysia Sabah, Malaysia

ARTICLE INFO

Received: May 2, 2024

Accepted: Aug 24, 2024

Keywords

Contemporary extended Viola technique
Timbre effects
Musical game
Fun factors
Refugee children

***Corresponding Author:**

siewngan@gmail.com

ABSTRACT

Contemporary extended viola techniques have long posed challenges for classically trained violists. Existing research predominantly focuses on expanding the range of new sounds achievable through extended viola techniques, employing instructional and conventional sound experimental methods. The "Viola Sound Safari" is a musical game designed to enhance music learners' motivation and enjoyment in producing diverse timbres and sounds on the viola. The participants used viola techniques, including glissandi, harmonics, and vibratos, in a treasure hunt for specific timbres/sounds. Data collection encompassed focus group and individual semi-structured interviews, observation, and participant feedback surveys. Participants were refugee children (aged 9 – 15) engaged in recreational music learning and playing. This musical game additionally aims to foster social interaction, teamwork, and enjoyable learning within confined spaces of the viola's timbre and sound production capabilities. Integrating play elements, fun activities, and interactive approaches in enhancing timbre sound productions for viola technique learning, the outcome of this research addresses a positive, effective, and enjoyable experimenting process through musical games for refugee children.

INTRODUCTION

Contemporary viola compositions have challenged many classically trained violists (Knipper & Kreutz, 2013). A disconnect persists between contemporary composers and classically trained violists stemming from the latter's limited experience with extended techniques crucial for achieving diverse sound projections and effects (May 2022; Chang, 2007). Traditionally, viola etudes have been adapted from violin or cello etudes, despite the viola's distinct physical characteristics compared to these instruments (Gebrian, 2012). As a result, techniques effective on the violin or cello may not always transfer seamlessly to the viola. Contemporary viola solo works often necessitate extended techniques for diverse sound productions, including timbre and microtonal effects. The scarcity of literature and pedagogical resources, such as etudes, addressing these extended techniques further complicates violists' ability to perform contemporary viola pieces and meet composers' expectations effectively. The extended viola technique enhances the spectrum of viola sound including timbre and microtonal variations. These timbre and microtonal variations are similar to the language tones and timbre used for expressions (Andreeva et al., 2019).

In Asian languages, timbre and microtonal inflection variations can alter words' meaning (Reid, 2003). In the Myanmar Ching Tribe dialect, the word "Ma" pronounced with a rising pitch signifies "mother". However, when pronounced with a glissando or falling pitch contour, ending with a slightly heavier timbre, it means "horse". The average pitch range of children's speed and various expressions (between the age of 8 – 14) falls between 220 – 480 hertz (Hunter, 2009). These pitches, corresponding roughly to the piano notes A3 to A4, align with the viola's middle strings (G and D),

enabling a versatile pitch range for diverse creative and emotional expressions. The viola's range closely mirrors the pitch of children's speech, rendering it well-suited for conveying children's emotions, creative impulses, and musical ideas. Experimenting with new and unconventional sounds, techniques, timbres, and microtonal variations on a musical instrument can stimulate both cognitive and creative faculties, fostering an awareness of children's inherent creativity when exploring an unfamiliar instrument. In this process, children actively engage in cognitive transition, transforming their envisioned sounds and interpretations into concrete sonic representations. The primary goals of these sound experimental activities are to facilitate the exploration of new timbres and microtonal variations while providing refugee children with an avenue for self-expression through an instrument resonating with their natural voice range. Thus, the objective is not to cultivate the next virtuoso violist or instrumentalist but to nurture heightened personal expressivity through sound creation.

The researcher selected Myanmar refugees who were attending music classes taught by volunteer teachers at a learning center in Selangor, Malaysia. These refugee children have endured lives marked by confined living spaces, irregular routines, and challenging experiences (Loganathan et al., 2022; UNHCR, 2022; UNICEF, 2022). Even though musical creations and expressions are found to express adult refugees' voices through songs and instrumental pieces, children's musical expressions and voices are limited. These children are mainly from the Myanmar Ching Tribe and are musically talented. While musical creations and expressions have been documented as a means for adult refugees to voice their experiences through songs and instrumental pieces, the musical voices of children remain relatively unexplored. They learned to sing in choir class and play the ukulele, guitar, piano, and various percussion instruments using the instruments donated to the learning center. They frequently sing songs composed by others, and some express themselves through humming their own melodies. Their unheard voices, expressions, and unique modes of articulation piqued the researcher's curiosity. The language barrier prevented a deeper understanding of the children's innate artistic expression. The research devised a musical game to unlock and showcase the children's inherent musical talents and voices to bridge this gap. Additionally, the research aimed to document their creativity and musical creations engagingly and enjoyably.

Statement of Problem

Violists often struggle to adapt the contemporary extended viola techniques due to the divergence in sound projections and effects from conventional training (May 2022; Chang, 2007). The traditional viola repertoires, including technical works like etudes, are largely adapted or borrowed directly from the violin, cello, or viola da gamba repertoires. Consequently, these materials may not optimally suit the viola technique, given the distinct physical properties of the viola compared to the violin, cello, and viola da gamba (Gebrian, 2012). Contemporary extended viola techniques exacerbate this challenge, as the traditional practice of adapting techniques from other instruments does not always translate into the creation and sound production of diverse timbre and microtonal variations (Kwok, 2018). With these challenges, the fun factors are dimmed in new sound explorations. Leung and McPherson (2011) noted that having fun is essential in motivating musicians and learners. Children's musical enjoyment and engagements are the springboards to their musical creativities (Koops, 2017). These musical creativities allow them to express and interpret their ideas and emotional output through musical activities such as playing and experimenting with new sounds on a musical instrument; children who live with challenges and traumas, such as refugee children (UNHCR, 2022, Loganathan et al., 2022) can bridge their emotions through music (Marsh, 2017) and to output new unheard and non-expressed sound using a musical instrument that is close to their voice range. Even though musical activities are believed to impact children's well-being positively, studies on experimenting with new timbre and microtonal variations using extended viola techniques to enhance fun factors in music creations are limited.

1.2 Research Questions

1. How does the VIOLA SOUND SAFARI impact the acquisition of extended viola techniques among primary school refugee children who are not viola players?

2. What benefits do VIOLA SOUND SAFARI offer in introducing contemporary extended viola techniques to individuals who do not typically play the viola?

1.3 Research Objectives

The primary objective of this research is to investigate and analyze the impact of the fun factors in VIOLA SOUND SAFARI on creating new timbres through extended viola techniques and their subsequent influence on primary school refugee children.

2 MATERIALS AND METHODOLOGY

This is a case study using the qualitative method. The research reviewed journals and articles on extended viola techniques, gamification, and the application of theories relevant to new sound creation activities for children. Two supporting theories, gamification and constructivist theory, are included in this research.

2.1 Application of Gamification Theory

Gamification theory utilizes game-design elements in non-game environments to promote motivation and engagement. Gamification, when applied to exploring new extended viola techniques, fosters a more inviting and engaging learning environment by encouraging exploration and problem-solving through enjoyable activities (Sanchez et al., 2020), which is daunting for non-viola players. However, gamification can stimulate creative thinking, and integrating gamification in exploring new viola techniques encourages a non-conventional approach to sound discovery. Moreover, gamification offers a practical method for fostering positive attitudes and sustained engagement in players as they strive to achieve their objectives and goals (Dichev & Dicheva, 2017). Within the realm of contemporary extended viola techniques, gamification expands the experimentation with new timbre and microtonal variations to individuals who are not traditionally viola players. This approach renders the exploration of new timbre and microtonal variations techniques more appealing, enjoyable, and time-effective, as the participants are allocated a specific time frame to complete each task within the game.

This experiment uses gamification to engage non-viola players alongside motivations with multidisciplinary perspectives encompassing the social comparison and self-efficacy theory (Sanchez et al., 2020). Communicative expressions and creativity using gamification foster innate creativity (Wong, 2020) and motivate instrumental playing and learning experiences (Birch & Woodruff, 2017). The *Viola Sound Safari* applies simple game-design elements, including 1) rules and regulations – to serve the sound experimental gaming process and to guide the participants towards proper handling of the viola, 2) creative thinking - using the viola, bow or hands to create a sound of the participants' choice, 3) problem-solving processes - search for the right sound and effects using untaught extended viola techniques that include other unconventionally seen or explored techniques 4) group engagement to perform the outcome and 5) winners are rewarded. The application of gamification links to the Constructivist Theory, in which the participants are building new knowledge using extended viola techniques using their ideas and explorations.

2.2 Constructivist Theory

In alignment with constructivist principles, VIOLA SOUND SAFARI fosters active sound exploration by immersing participants in hands-on musical scenarios that utilize contemporary extended viola techniques to manipulate timbre. Non-viola players experimented with various untaught and unconventional playing styles and techniques, sparking musical curiosity and leading to the

discovery of new sounds. Incorporating Vygotsky's (1978) social constructivism framework, the game fosters social interaction and collaboration, enabling refugee children to engage with peers and the researcher in a motivating and enjoyable process of sound exploration of viola (Chong, 2019). Through discussions of strategies, sharing insights, and exchanging feedback, participants develop a deeper practical understanding of contemporary viola techniques and their resultant timbre effects. Integrating gamification further enhances the reflective process, promoting attentive listening and identifying specific sounds and timbres within the broader context of sound exploration (Demirtas & Özçelik, 2021).

Applying constructivist theory to the sound experiment with extended viola techniques cultivates a dynamic and engaging learning environment. This environment promotes active exploration, builds upon prior knowledge, fosters social interaction, and encourages participants to reflect and actively construct new understandings of extended viola techniques. Participants can construct new knowledge and interpretations of previously unfamiliar contemporary extended viola techniques within a designated timeframe through their experiential learning. Through multifaceted engagement in experimentation, reflection, problem-solving, and creating new timbres within a collaborative setting, participants are empowered to approach and master advanced extended viola techniques that might have initially seemed beyond their reach. The interaction with the audience provides participants with immediate feedback on their creations, facilitating real-time adjustments and enhancements to their musical outcomes.

2.3 5E Instructional Model (Engage, Explore, Explain, Elaborate, Evaluate)

This model was initially developed by the Biological Sciences Curriculum Study (BSCS) under the leadership of Dr. Roger W. Bybee to enhance science education. The 5E Model – Engage, Explore, Explain, Elaborate, and Evaluate – incorporates constructivist principles and gamification techniques within physical musical games. This integration fosters active engagement, hands-on exploration, understanding, application, and reflection (Bybee, 2006; 2014). The five objectives of the 5E model are: 1) Engage – spark participants' interest and curiosity in the viola; 2) Explore – enable hands-on exploration of extended viola techniques; 3) Explain – facilitate the acquisition and application of new knowledge regarding extended viola techniques; 4) Elaborate – encourage experimentation and exploration of new sounds and timbres through the application of learned techniques; and 5) Evaluate – provide feedback from peers and facilitators to reinforce understanding and mastery of the techniques.

Implementing the 5E Instructional Model within a sound experiment focused on extended viola techniques provides a structured yet adaptable framework for exploration. The approach aids participants in understanding complex techniques, fostering a deeper connection to the instrument's timbres and expressive potential through active participation and creative expression. By sparking curiosity, facilitating hands-on exploration, offering clear explanations, encouraging application, and assessing understanding, the 5E model cultivates a comprehensive and enriching sound experimental experience (Lodico, 2020). The participants are encouraged to ask questions, observe, reflect, explain, argue from the new timbres and knowledge, solve problems, and get feedback from peers in a confined environment. Even though the 5E model is widely used in science education, the objectives and procedures of this model can benefit the participants in collaborative projects like the VIOLA SOUND SAFARI musical games, which are designed for sound/frequency and timbres experimentations.

2.4 VIOLA SOUND SAFARI

VIOLA SOUND SAFARI is designed based on the constructivist and 5E Instructional Model. *VIOLA SOUND SAFARI* is designed for two or more groups of participants. This multi-level game involves three distinct roles: 1) participants, 2) a referee, and 3) an audience. The game commences with a

brief, interactive introduction to the viola, incorporating visual aids or live demonstrations to pique participants' curiosity about the instrument's history, timbres, and range of sounds. The participants are divided into groups comprising no more than 10 individuals. Each group receives a prepared viola for hands-on activities, allowing participants to experiment with producing specific timbres and sounds. The referee reserves the right to disqualify any participant who intentionally mishandles or damages the instrument. After a designated time, each group selects the sound of an animal (in Level 1) to be replicated on the viola using extended techniques.

Participants are encouraged to experiment with various techniques, including sul tasto, sul ponticello, pizzicato, and glissandos, to create their chosen animal sound. Following another designated time, each group presents a short performance showcasing their sound creation. The audiences are invited to observe the performances and attempt to identify the animals presented by each group. The group whose animal sound is correctly identified first by the audience is declared the winner. All groups are then asked to share and explain their experiences and discoveries in creating their animal sound, using clear language and demonstrations to illustrate their techniques. The audience provides feedback and suggestions to all groups.

Each group receives game points based on teamwork, engagement, presentation skills, and questioning and their ability to answer questions posed by the audience. These points can be redeemed for small prizes from the referee, such as candy and stickers. Bonus points are awarded to groups that successfully incorporate audience feedback and suggestions into their sound creations and document this process in a log sheet. The game, such as smartphones, can be recorded to capture the learning process and outcomes. Multiple game rounds can be played to accumulate more points and further enhance learning.

2.5 *VIOLA SOUND SAFARI* Activities

Table 1 summarizes extended technique activities using the *VIOLA SOUND SAFARI* in viola playing in a Refugee Learning Center.

Table 1: Extended Techniques activities in viola playing

Stepp	Activity	Teaching Methods	Teaching and Learning
1	Engage: Establish rapport and spark curiosity about the viola	Icebreaker activities and introduction to the viola (history, sounds, extended techniques)	Introduce the VIOLA SOUND SAFARI game and provide hands-on exploration of the viola with specific guidelines
2	Introduction to the *VIOLA SOUND SAFARI*	Hands-on activities with specific guidelines to explore the viola	Referee demonstrates extended techniques like sul ponticello, left-hand pizzicato, and glissandos and how the techniques can be used to imitate different types of sound. The referee explains the rules and regulations of the VIOLA SOUND SAFARI. The Referee then divides the participants into two groups using random selections.

3	Guided exploration based on 5E model and constructivist principles	Experimenting with peers, collaborative, instant feedback among peers within the same group, producing and explaining the production of specific sounds.	Referee starts VIOLA SOUND SAFARI game Each group chooses an animal for the sound production using extended viola techniques Participants interact with each other to produce the sound/timbres using the prepared-violas Each group presents their sound productions to the audience using the prepared-viola Referee as facilitator
4	Feedback/Reflection	Facilitate group discussions and reflection on the sound creation process, incorporating feedback from both peers and the audience	The audience and peers from the other group give feedback and suggestions, such as the possibilities of using different extended techniques to create, such as different distribution, speed, and weight while bowing, using more fingers to pizzicato, and increasing the speed of glissandos. Participants compare game points. Referee recorded the feedback and the performance for further discussions. Referee provides feedback on the groups' performance.
5	Conclusion	Highlight the fun and motivational aspects of the game	Groups' presentation using untrained extended viola technique – multiple players on one prepared viola Experimental and motivation game

2.6 METHODOLOGY

This exploratory research investigates the non-educational impacts of a musical game designed to introduce extended viola techniques to non-viola players, specifically focusing on refugee children living in confined spaces. The focus is on the non-educational outcomes, such as social-emotional well-being and creative expression. The musical game VIOLA SOUND SAFARI aims to provide a playful and engaging experience, encouraging creativity and emotional expression through music. Data collection occurred over three weeks and involved observations, interviews, and feedback sessions with the children. Participants received simple string instruments and guidance through various game levels, introducing them to extended techniques such as sul ponticello, col legno, and harmonics. Observations focused on children's engagement, enjoyment, and social interactions during the game. Interviews with participants and facilitators provided qualitative insights into their experiences, emotional responses, and the game's impact on their well-being. This approach allowed for a comprehensive understanding of the game's potential to foster a sense of community, joy, and emotional well-being among the children.

2.6.1 Sample

A refugee learning center for children in Selangor, Malaysia, was selected as the site for this research. The participants, aged 9 to 15, constituted a sample size of 14, who engaged in a semi-structured focus group interview.

2.6.2 Data analysis

Data collection for this research encompassed semi-structured interviews with both teachers to capture their perceptions and experiences with the VIOLA SOUND SAFARI musical game, designed to introduce extended viola techniques. Additionally, observations of gameplay sessions were conducted to gain further insights. Thematic analysis, as outlined by Braun and Clarke (2012), was employed to code and organize the data. This approach offers methodological flexibility that is suited for exploratory research. This research is grounded in a pragmatic philosophy framework, positing that knowledge is socially constructed and contextually situated, particularly relevant to learning and exploring musical techniques (Biesta, 2015).

RESULTS AND DISCUSSION

3.1 Results

Research question 1: How does the VIOLA SOUND SAFARI impact the acquisition of extended viola techniques among primary school refugee children who are not viola players?

Qualitative analysis of the interview and observation transcripts yielded several themes and patterns within the data. Three primary themes emerged from this analysis: 1) **Benefits**, 2) **Fun Factors**, and 3) **Expressive Communication**, as detailed in Table 2. Participants emphasized various benefits of the VIOLA SOUND SAFARI musical game, including the ability to produce new and unique sounds, enhanced interactivity, stimulated creativity, and the development of new collaborative "shared-viola" extended techniques. The second theme, **Fun Factors**, highlighted the participants' perception of VIOLA SOUND SAFARI as an enjoyable and fulfilling musical game. Observational data further revealed that the game sparked curiosity, encouraged active engagement, and facilitated the generation of new timbres on the viola within a specified time frame. Notably, both the researcher and the refugee children identified **expressive communication** as a pivotal element in fostering the creation of new timbres and microtonal sounds through extended viola techniques.

Table 2. Themes and Sub-themes Identified in VIOLA SOUND SAFARI Participant and Researcher/Referee Feedback?

Table 2: Themes and sub-themes

Themes	**Sub-themes**	
	Participants	**Researcher/Referee**
Theme 1: Benefits	New sound creation Interactive New techniques	Interactive Imaginary to sound creation Creative New extended technique
Theme 2: Fun factors	Fun process Enjoyment Satisfaction Confidence	Curiosity Active engagement New colors to viola sound Generate new timbre

Theme 3: Expressive communication	Peer communication Peer expressions	Refugee children's communication Communication through musical expressions

Research question 2: What benefits do VIOLA SOUND SAFARI offer in introducing contemporary extended viola techniques to individuals who do not typically play the viola?

The advantages of using VIOLA SOUND SAFARI to introduce contemporary extended viola techniques among non-viola players include 1) efficiency – the game enables players to perform and explore extended techniques within a short time frame. This efficiency allows participants to grasp complex techniques that might take longer to achieve through traditional instructional methods, 2) engaging and fun – participants find the game interesting and enjoyable. The game's enjoyable elements, VIOLA SOUND SAFARI, make the experimental process more appealing, which also increases motivation and sustained engagement among players 3) Creative expression – the game encourages the creation of new sounds and timbres, allowing participants to represent their expressions and messages musically. This game aspect fosters creativity and personal expression, making the learning experience more meaningful; 4) hands-on experience – VIOLA SOUND SAFARI provides a practical, hands-on experience that allows players to directly explore extended viola techniques without needing traditional pedagogical instructions. This direct exploration helps participants to understand and apply the techniques more naturally and enjoyably intuitively. Overall, VIOLA SOUND SAFARI effectively introduces contemporary extended viola techniques to non-viola players by making the process quick, engaging, creative, and hands-on.

3.2 Discovery - Group Extended Viola Technique

An intriguing discovery, the Group Extended Viola Technique, emerged during a sound experiment to replicate a horse's laugh. This distinct sound was accurately identified by the audience within 10 seconds. The process involved placing the viola on a cloth-covered surface, with one participant fingering specific notes on the G and D strings. Simultaneously, others lightly tapped harmonics on various fingerboard locations while another participant used heavier taps. A wavy finger movement across the strings and varied bowing techniques completed the complex sonic texture, ultimately achieving the desired timbre.

The bow and the other participants' fingers occasionally touched the open C and A strings, creating harmonics and overtones. The effect was heard when the bow moved near the bridge with applied pressure and faster speed. the sound quality shifted dramatically as fingers moved across the fingerboard when the fingers that created the harmonic taps lifted and landed on different parts of the fingerboard. When bowed on only the C-string with all these fingers' movements on other strings (without touching the C-string) softly (with less bow pressure) and slowly, a thin and complex overtone in layers occurs. When bowed slowly with a heavier bow stroke near the bridge (sul ponticello), some overtones formed identifiable tonal harmonic pitches but clustered with a percussive sound effect. The timbre on this open C-string changed depending on the variations of the bow speed and weight applied. Bowing on the fingerboard was impossible due to the numerous finger movements (sul tasto), as there were many movements, including the harmonic taps and wavy moving harmonics in that area. The open A-string was experimented with briefly due to the time limit, and the participants were satisfied by the horse-laughing sound they had produced.

Another interesting discovery occurred when the leader decided not to use the bow but tapped and knocked with the participant's hands on the viola; simultaneously, all these movements on the fingerboard took place. Due to noises from other classes in a confined space, the researcher could not hear all the sounds and timbres. The recording device picked up noises from the other ongoing classes. Such conditions set limitations in this research.

The "Chop" technique, an unconventional bowing style, emerged organically due to some participants' less refined bow control. This technique, akin to martelé strokes but with a reversed bow direction, resulted in percussive, drum-like sounds reminiscent of a high-hat. The natural string tension near the bridge further facilitated this "slip" of the bow towards the fingerboard. While participants were familiar with traditional bowing methods, the appeal of this "cool" sound proved enticing, offering the ability to create rhythmic patterns by tapping the viola's body alongside the chopped bowing.

The intricate sounds and timbres evoked verbal expressions and articulations found in the dialect of the Ching people, an ethnic group in Myanmar. Participants used varied rhythms, dynamics, and tone colors to express themselves through the viola. The horse's laugh, for example, was achieved with distinct rhythmic and dynamic patterns, which were readily recognized by the audience. The participants found that the viola's pitch range closely matched the human voice, facilitating their expression. Interestingly, the harmonic range resonated with ambient sounds, such as air currents or the subtle vibrations of fluorescent lights.

VIOLA SOUND SAFARI, initially conceived as a fun way to explore extended viola techniques, yielded unexpected outcomes. Participants discovered sound references relating their findings to verbal expressions and articulations characterized by distinct rhythms, dynamics, and timbres. The enjoyable nature of the game motivated them to explore complex sounds using challenging techniques within a group setting – the Group Extended Viola Technique. This collaborative context enabled participants to master these techniques, unconsciously leading to positive learning outcomes.

Figure 1 shows the location of participants' finger movements during this process – Group Extended Viola Technique.

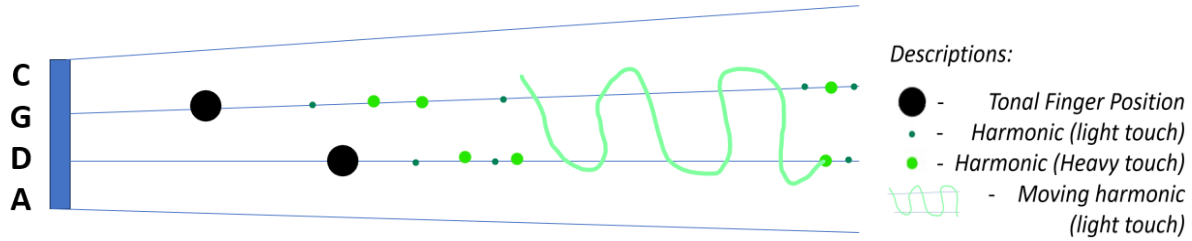

Figure 1 – VIOLA SOUND SAFARI – Group Extended Viola Technique

3.3 DISCUSSION

Introducing contemporary viola techniques to non-viola players can be effectively achieved using musical game ideas like VIOLA SOUND SAFARI instead of traditional pedagogical instructions. The interactive and engaging nature of the game creates a more appealing experimental environment, making complex techniques less intimidating and more accessible. By embedding the sound experiment process within a game, players are naturally drawn into experimenting with mastering new techniques, often without the formal structure and pressure associated with conventional methods. The hands-on exploration and experimentation facilitated by VIOLA SOUND SAFARI allow participants to create new sounds and techniques without requiring prior knowledge. This approach eliminates the fear and perceived difficulty of performing extended viola techniques. By providing

an environment where mistakes can be part of the experimental process and creativity is encouraged, participants feel more confident and willing to try new things. The freedom to explore without rigid guidelines fosters a more innovative and personalized exploration, where participants can develop their unique musical voice. For untrained or non-viola players, extended techniques seem easier to achieve and manage within the game setting, unbounded by the constraints of traditional training. The game's design simplifies complex techniques into manageable tasks, making them more approachable for beginners. Without the preconceptions and anxieties often associated with formal music training, participants can focus on the joy of sound creation and exploration, leading to a more effective and enjoyable experimental journey.

The participants in VIOLA SOUND SAFARI were unaware they were experimenting with challenging extended viola techniques. The game's engaging format directed their focus toward sound creation, using imagination and creativity rather than technical precision. This unconscious mastery is significant; players develop skills organically, motivated by their creative goals rather than the mechanical execution of techniques. As a result, the experimental process becomes more natural and less stressful, fostering a deeper connection to the viola and the sounds and timbres they create. VIOLA SOUND SAFARI also promotes teamwork and social engagement among participants. Less confident participants are supported by their peers, creating a collaborative experimental environment. This peer assistance helps individuals overcome challenges and fosters community and shared achievement. The game encourages participants to work together, share ideas, and celebrate each other's successes. The collective efforts ensure that the credit for results is shared among everyone, reinforcing the value of cooperation and mutual support.

5 CONCLUSION

The experimental study of VIOLA SOUND SAFARI reveals its significant potential in introducing contemporary extended viola techniques to non-viola players, particularly refugee children in confined environments. The game-based approach diverges from traditional methods, offering a more engaging and enjoyable experience. Participants demonstrated rapid acquisition of extended techniques, facilitated by the game's ability to simplify complex tasks into accessible activities. The VIOLA SOUND SAFARI proved effective in making advanced techniques approachable for beginners. This musical game also fostered creativity, encouraging participants to explore new sounds and timbres without constraints of technical precision. This focus on sound exploration allowed for more intuitive and imaginative engagement with the viola. Additionally, the game promoted social interaction and teamwork, which are essential for the well-being of refugee children. Participants supported each other, creating a collaborative environment where achievements were collectively celebrated.

Overall, VIOLA SOUND SAFARI enhances technical proficiency and nurtures creativity, confidence, and social bonds among participants. The study underscores the efficacy of gamification sound experiments, advocating a broader adoption of similar methodologies. By democratizing access to complex musical techniques and fostering inclusive, supportive communities, this approach holds promise for diverse experiment contexts beyond traditional settings. Further research is needed to explore the long-term impacts of using musical games like VIOLA SOUND SAFARI in various levels, contexts, and with different populations. Investigating the scalability of this approach, its applicability to other instruments, and its effects on different age groups and cultural backgrounds would provide deeper insights into its practical and social benefits. Additionally, exploring the integration of such games into formal music performance practice could further validate their effectiveness and broaden their reach. This study lays a groundwork for a promising area of research that bridges music performance using contemporary extended techniques, technology, and social development.

Acknowledgement: This research work is supported by the Project (DAIE) - Persatuan Hearts Symphony, Malaysia and funded by DAIE Culture, Malaysia.

REFERENCE

Andreeva, I.G., Dymnikowa, M. & Ogorodnikova, E.A. (2019). Structural organization and features of speech and music perception in language functions' implication with timbre's perceptive assessment. *AJHSS, Vol. 7 (05).*

Biesta, G.J.J. (2015). What is education for? On good education, teacher judgement, and educational professionalism. *European Journal of Education.*

Birch, H.J.S. & Woodruff, E (2017). Technical exercise practice: Can piano students be motivated through gamification? *JMTE, Vol. 10, Issue 1, 31-50*, http://doi.org/10.1386/jmte.10.1.31_1

Braun, V. & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds), *APA handbook of research methods in psychology, Vol. 2: Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57-71). Washington, DC: American Psychological Association.

Bruin, L.R.D. (2024). Instrumental music teachers' development of feedback across the lifespan: A qualitative study. International Journal of Music Education, 42(1), 32-46. https://doi.org/10.1177/02557614231151445

Bybee, R.W., Taylor, J.A., Gardner, A.L., & V'an, P. (2006). The BSCS 5E Instructional Model: Origins and Effectiveness.

Bybee, R. W. (2014). The BSCS 5E instructional model: Personal reflections and contemporary implications. Science and Children, 51(8), p.10-13.

Chang, J. T. (2007). The role of Alfred Schnittke's viola concerto in the development of the twentieth century viola concerto. University of Arizona. https://repository.arizona.edu/handle/10150/195445?show=full

Chong, E. K. M. (2019). Teaching and learning music theory in the age of AI and mobile technologies. *International Journal for Digital Society, 10*(3), 1505–1509. https://doi.org/10.20533/ijds.2040.2570.2019.0186

Demirtaş, E., & Özçelik, S. (2021). Music students' use of mobile applications for learning purposes. *International Journal of Modern Education Studies, 5*(2), 299-325. http://dx.doi.org/10.51383/ijonmes.2021.135

Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed and what remains uncertain: A critical review. *International Journal of Educational Technology in Higher Education, 14(*1), 9. https://doi.org/10.1186/s41239-017-0042-5

Gebrian, M. A. (2012). *Rethinking viola pedagogy: Preparing violist for the challenges of twentieth-century music*. Doc. Thesis. Rice University. http://hdl.handle.net/1911/71651

Hunter, E. J. (2009). A comparison of a child's fundamental frequencies in structured elicited vocalizations versus unstructured natural vocalizations: A case study. *International Journal of Pediatric Otorhinolaryngology*, *73*(4), 561. https://doi.org/10.1016/j.ijporl.2008.12.005

Knipper, T. & Kreutz, G. (2013). Exploring microtonal performance of "… Plainte…" by Klaus Huber for viola d'amore in third-tone tuning. *Musicae Scientiae, Vol. 17 (4).* https://journals.sagepub.com/doi/abs/10.1177/1029864913487543

Koops, L. H. (2017). The Enjoyment Cycle: A Phenomenology of Musical Enjoyment of 4- to 7-Year-Olds During Musical Play. *Journal of Research in Music Education*, *65*(3), 360-380. https://doi.org/10.1177/0022429417716921

Kwok, S. W-Y. (2018). *Breaking the sound barriers: Extended technique and new timbres for developing violist.* Doc. Thesis. The University of British Columbia.

Leung, B. W., & McPherson, G. E. (2011). Case studies of factors affecting the motivation of musical high achievers to learn music in Hong Kong. *Music Education Research*, *13*(1), 69–91. https://doi.org/10.1080/14613808.2011.553278

Lodico, A.D. (2020). Incorporating socio-scientific issues into the 5E model for learning: Engaging students in science through emotional connection, kinesthetic movement and real world phenomenon. Master Thesis. SUNY College at Brockport.

Loganathan, T., Chan, Z.X., Hassan, F., Ong, Z.L., Majid, H.A. (2022). Undocumented: An examination of legal identity and education provision for children in Malaysia. *PLoS ONE 17(2): e0263404*. https://doi.org/10.1371/journal. pone.0263404

May, A. (2022). Untune the sky: Ten original pieces for microtonal viola da gamba with voice and electronics. Master Thesis. University of North Texas. https://digital.library.unt.edu/ark:/67531/metadc1987059/

Marsh, K. (2017). Creating bridges: Music, play, and well-being in the lives of refugee and immigrant children and young people. *Music Education Research*, *19*(1), 60–73. https://doi.org/10.1080/14613808.2016.1189525

Michel, J. G. and Hambrick, D.C. (1992). 'Diversification posture and top management team characteristics', Academy of Management Journal, 35, pp.9-37.

Reid, L. (2003). The range and diversity of vocalic systems in Asian languages." In a search in Asia for a new theory of music (Proceedings of the 7th International Conference of the Asia-Pacific Society for Ethnomusicology), edited by Jose S. Buenconsejo, 249-270. Manila: University of the Philippines Center for Ethnomusicology, 2003. http://hdl.handle.net/10125/33008

Sanchez, D. R., Langer, M., & Kaur, R. (2020). Gamification in the classroom: Examining the impact of gamified quizzes on student learning. *Computers & Education, 144,* 103666. https://doi.org/10.1016/j.compedu.2019.103666

UNHCR, (2022). Figure at a glance in Malaysia. https://www.unhcr.org/en-my/figures-at-a-glance-in-malaysia.html

UNICEF, (2022). See the invisible children. https://unicef.my/championforchildren/en/

Vygotsky, L. (1978). Mind in Society. London: Harvard University Press.

Wong, M. W. Yee. (2020). Fostering musical creativity of students with intellectual disabilities: Strategies, gamification and re-framing creativity. *Music Education Research*, *23*(1), 1–13. https://doi.org/10.1080/14613808.2020.1862777