



The Needs for Musical Instruments from Recycled Materials of the Elderly: A Case Study of Tha Pho Subdistrict, Mueang District, Phitsanulok Province

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Abstract

This paper presents a qualitative case study investigating the needs for musical instruments from recycled materials of elderly people living in Tha Pho Subdistrict, Mueang District, Phitsanulok Province, Thailand. In-depth semi-structured interviews were conducted with a purposefully selected group of five elderly volunteers aged 60–75 residing in Tha Pho Subdistrict who met the following inclusion criteria: ability to participate in musical activities independently, ability to read and write, and living in Tha Pho Subdistrict.

The findings revealed a variety of musical instrument preferences and emphasized the importance of culturally sensitive interventions to promote musical engagement among the elderly. Regarding design considerations, user-centered approaches should be prioritized, focusing on usability, tactility, and lightweight construction. Instruments were crafted from materials that were visually accommodating, aesthetically pleasing, and devoid of sharp edges. Physical aspects were tailored to the anatomy of older individuals, with floor-standing designs to mitigate lifting strains for comfort and health promotion. As for the selection of materials, it prioritized safety, availability, and minimizing injury risks during playing. Additionally, instruments should be designed for easy access and playability, utilizing natural materials where possible. The choice of music for playing was curated to resonate with the elderly, featuring familiar tunes or reflecting their cultural heritage, such as “Pleng Lao Long Nan” and “Pleng Pan Fai”.

Keywords: Music, Elderly, Musical Instrument, Recycled Materials

Introduction

Music transcends generations, offering a universal language for expression, connection, and enjoyment. Research has shown that engaging with music throughout life can have a multitude of cognitive, emotional, and social benefits, improve memory, reduce stress, and enhance mood (Gu et al., 2023; Greenberg et al., 2021; Lee et al., 2022). However, engaging with music can become more challenging for elderly due to physical limitations such as decreased dexterity or arthritis (Boonrod, 2022a; Paglione et al., 2024; Tongtham, 2020). Additionally, a lack of instruments designed with their needs in mind can further hinder participation. A significant challenge in contemporary elder care delivery is the dearth of appropriate assistive technologies. This lacuna impacts both professional caregivers in institutional settings and families managing care at home. There is a critical shortage of user-friendly tools to support essential daily living activities (Iamtrakul & Chayphong, 2022). This inadequacy in geriatric assistive technology has a demonstrably negative impact. Caregivers experience more stress and burden, while the elderly themselves face heightened safety risks and a diminished sense of independence. However, there are positive developments on the horizon. A growing recognition of this critical issue has spurred more research efforts. These initiatives aim to develop user-friendly assistive technologies specifically tailored to the requirements of elder care. Additionally, a focus on affordability and accessibility is ensuring that these advancements reach the population who need them most. Finally, the role of community support programs in offering training and connecting caregivers with valuable resources cannot be overlooked. Through



a multifaceted approach that prioritizes user-friendly assistive technologies, affordability, accessibility, and caregiver support, the future of elder could promote safety, independence, and a higher quality of life.

Engaging with music throughout life offers a number of benefits for elderly, impacting their cognitive, emotional, and social well-being. Research has shown that music can improve memory function (Gustavson et al., 2021), reduce stress and anxiety (Zhao et al., 2022), and even promote physical health (Pantasri et al., 2023b). Music can also be a powerful tool for social connection, fostering a sense of community and shared experience (MacRitchie et al., 2020). Furthermore, familiar melodies can evoke positive memories and enhance mood, particularly for individuals with age-related cognitive decline (Boonrod, 2022b). In essence, music has the potential to enrich the lives of elderly in numerous ways, contributing to a higher quality of life.

The well-documented positive impact of music on well-being extends to elderly, fostering cognitive function, reducing stress and anxiety, and even promoting physical health (Barnish & Barran, 2020). However, a crucial gap exists in the accessibility of music, making itself for this group of population. Traditional instruments often require a high degree of physical dexterity, cognitive function, and unimpaired senses, all of which can decline with age. This mismatch between instrument design and the changing ability of elderly presents a significant barrier (Arafa et al., 2022; Boonrod, 2022a; Pantasri et al., 2023a). Compounding this issue is the dearth of research and development, specifically focusing on creating age-friendly instruments. The current market primarily caters to younger musicians with robust physical capabilities. This lack of innovation excludes a significant demography from the joys and well-being benefits associated with music making.

The research area, Tha Pho Subdistrict in Phitsanulok Province, is characterized by a strong attachment to traditional arts and culture, with practices passed down through generations. This community actively engages the elderly in cultural and intellectual activities, facilitated by robust local governance that has established senior clubs and schools to foster learning and experience sharing among the elderly. The researcher's direct interaction with Tha Pho's elderly community revealed that local wisdom and skills are preserved and creatively expressed by groups such as woodworkers and weavers, who produce distinctive community products, including "Phlengrua" the traditional Thai, a unique local performance. This reflects the area's strengths and the close-knit nature of its residents, who collaboratively drive positive community development (Boonrod, 2022b; Boonrod & Matarat, 2022).

This qualitative case study investigated the musical instrument needs and preferences of elderly residents in Tha Pho Subdistrict, Phitsanulok Province, Thailand. The research employed in-depth interviews with a purposefully selected group of five volunteers aged 60–75. Purposive sampling ensured participants possess relevant experiences and knowledge to contribute meaningfully. By prioritizing participant confidentiality and adhering to ethical principles throughout the research process, the study upheld the highest standards of research conduct. By understanding their preferences, the study could inform the development of culturally sensitive and user-friendly instruments that promoted active music engagement and ultimately enhanced the well-being of elderly population. This contribution aligns with the growing effort to create inclusive musical experiences for the elderly. Furthermore, the findings can add valuable insights to the under-explored field of age-friendly instrument design, paving the way for future advancements in this area.

Research Objective

This research aimed to investigate the needs for musical instruments from recycled materials of elderly people living in Tha Pho Subdistrict, Phitsanulok Province, Thailand.



Methods and Materials

This qualitative case study investigated the needs for musical instruments from recycled materials of elderly people living in Tha Pho Subdistrict, Phitsanulok Province, Thailand, by employing in-depth interviews to gather rich and detailed data.

Sample Selection and Participant Confidentiality

Purposive sampling was employed to recruit a sample group of five elderly volunteers residing in Tha Pho Subdistrict, Phitsanulok Province, Thailand, who met the following inclusion criteria: age 60–75 years old, living in Tha Pho Subdistrict, ability to participate in musical activities independently, and ability to read and write.

To protect the privacy of the research participants and adhere to ethical research principles, this study refers the sample group as “volunteers” throughout the research process. This ensures anonymity and maintains confidentiality.

Research Tool

The primary data collection tool for this research was a semi-structured interview designed to gather in-depth opinions from elderly participants. This format allowed for flexibility in exploring topics related to the needs for musical instruments from recycled materials, while maintaining a focus on the research objective. The interview was meticulously developed to ensure its quality and effectiveness. It consisted of opening questions to establish rapport, core questions that delved into instrument design, recycled materials selection, and quality standards, and closing questions for summarizing key points and allowing participants to share any additional thoughts. The sample interview questions, divided into three main aspects, are shown below.

1. Instrument Design: The below questions aimed to explore participant perspectives on the ideal design characteristics of musical instruments, considering factors like shape, materials, sound quality, and color.

- Could you please explain more about the characteristics of musical instruments for the elderly?
- What are your thoughts on the design and development of musical instruments made from recycled materials?
- What factors should be considered in terms of size, shape, materials, sound, and color?
- How important is the weight and ease of handling for an instrument you might use?

2. Material Selection: Participants were asked about their preferences for the types of recycled materials to be used, their potential sources, and the rationale behind these choices.

- What types of recycled materials do you recommend using for the design and development of musical instruments?
- Where can these materials be sourced from, and what are the reasons for choosing these materials?
- What kind of material properties would make you feel most comfortable and confident playing it?

3. Quality Standards: The final questions delved into the possibility of these instruments meeting international standards. Participants were encouraged to share their thoughts on methodologies and recommendations for achieving this goal.

- What safety and security considerations should be considered when designing and developing musical instruments from recycled materials?
- What do you think are the most important factors in making musical instruments easy to use for elderly?
- What are the key considerations in designing instruments for elderly with visual impairments, hearing loss, or reduced mobility?
- What do you think are the best ways to incorporate cultural elements into musical instrument design?



– Do you think it is possible for musical instruments made from recycled materials to be developed to meet international standards? If so, what are the methods and recommendations for achieving this?

Data Collection

This study employed in-depth, semi-structured interviews, developed through a comprehensive review of existing literature on musical engagement among the elderly, as the primary method for data collection. This format allowed for flexibility in exploring participant experiences and perspectives while maintaining a focus on the research objective of understanding production needs for musical instruments suitable for the preferences and capabilities of elderly individuals.

To ensure the interview process' effectiveness, the semi-structured interview questions underwent rigorous pilot testing with a small group of elderly volunteers. This pilot testing allowed for adjustments to the wording, flow, and order of questions and optimized data collection during the main interview phase.

During the interviews, participants were encouraged to share their experiences about playing musical instruments. This included opportunities to express their preferences regarding instrument design, recycled materials selection, and any challenges they encountered when attempting to engage with music making. Additionally, the interviews delved into participants' cultural backgrounds and musical interests. These aspects were crucial for informing the design of culturally sensitive instruments that resonated with the preferences and musical traditions of the elderly population.

Data Analysis

This qualitative study employed a thematic analysis approach using grounded theory. The collected interview data were iteratively coded to identify emerging themes and categories related to participants' needs for musical instruments from recycled materials. The analysis was based on the existing concepts and theories on quality of life, physical interaction with musical instruments, and psychological well-being in elderly. A review of relevant literature specifically focusing on the elderly population strengthened the theoretical grounding of the analysis. The obtained data were rechecked with the interviewees in order to ensure the accuracy and trustworthiness of the findings. Finally, the results obtained from the data analysis were then presented, along with a summary and descriptive discussion.

Findings and Discussion

This qualitative case study employed in-depth, semi-structured interviews in order to explore the musical instrument from recycled materials needs of a group of the elderly in Tha Pho Subdistrict, Thailand. The key findings from this research were categorized into four main groups: 1) design considerations for user-friendly instruments, 2) aesthetics, safety, and ergonomics in instrument design for elderly, 3) accessibility and playability, and 4) music selection and cultural relevance.

1. Design Considerations for User-friendly Instruments

Based on the interviews with elderly participants in this research, several key design considerations emerged for developing user-friendly musical instruments for the elderly. The interviews highlighted usability as a critical factor, emphasizing the need for instruments that were easy to learn and play. Participants stressed the need for intuitive interfaces and simplified controls to facilitate effortless engagement. In addition, tactility played a significant role. The participants emphasized the ability to feel and interact with the instrument comfortably.



This highlights the need for ergonomic designs that prioritize user comfort and ease of manipulation as shown in the interview data below.

“Musical instruments for the elderly should have playing characteristics suitable for seniors who sit in chairs with armrests. They shouldn’t require sitting on the floor or standing for too long” (Volunteer No. 5, Interviewed, May 20, 2023).

“Lightweight and easy-to-hold instruments are very important. They minimize strain and allow me to participate for longer periods” (Volunteer No. 3, Interviewed, May 20, 2023).

Participants recommended using recycled materials such as reclaimed wood, recycled plastics, and repurposed metals due to their sustainability and availability. Reclaimed wood, sourced from old furniture, construction sites, or fallen trees, fosters community and environmental connections. Recycled plastics, obtained from household waste or recycling centers, are lightweight and versatile, while repurposed metals from scrap yards or discarded appliances offer durability and a unique aesthetic. Preferred properties of these materials include smooth surfaces, tactile comfort, and safety, ensuring that they are easy to clean, non-toxic, and free from sharp edges. Additionally, the lightweight nature of these materials minimizes physical strain and facilitates prolonged use, with the natural feel and look of reclaimed wood, particularly appreciated for its aesthetic and cultural significance, as shown in the interview data below.

“I recommend using reclaimed wood, recycled plastics, and repurposed metals. These materials are not only sustainable but also readily available” (Volunteer No. 3, Interviewed, June 3, 2023).

“Reclaimed wood can be sourced from old furniture or construction sites, offering a sense of history and connection to the community. Recycled plastics can come from household waste or recycling centers, making them lightweight and versatile. Repurposed metals can be obtained from scrap yards or discarded appliances, providing durability and a unique look” (Volunteer No. 2, Interviewed, June 3, 2023).

“The materials should have smooth surfaces, be non-toxic, and free from sharp edges to ensure safety. They should also be lightweight to prevent physical strain and make it easier for prolonged use. Additionally, the natural feel and look of reclaimed wood are particularly comforting and aesthetically pleasing to me” (Volunteer No. 2, Interviewed, June 3, 2023).

Another key finding was the importance of lightweight construction to minimize physical strain and promote prolonged engagement. Participants expressed a preference for instruments that were easy to hold and maneuver, enhancing overall comfort and usability. Furthermore, participants highlighted the value of versatile instruments that could be adapted for use in various activities beyond traditional music-making. This versatility was seen as particularly beneficial for promoting engagement and enjoyment among elderly, fostering a sense of pride and accomplishment. Finally, the cultural context and material selection resonated with participants. Instruments crafted from locally sourced materials were viewed favorably as they fostered a sense of pride and connection to one’s cultural heritage. This aspect was deemed crucial in enhancing the appeal and accessibility of the instruments, particularly among elderly.

In summary, the insights gleaned from the interviews underscore the importance of prioritizing usability, tactility, and cultural relevance in the design and development of musical instruments for the elderly. By incorporating these considerations, designers can create instruments that not only facilitate musical engagement but also enhance overall enjoyment and satisfaction among elderly users. Utilizing recycled materials such as reclaimed wood, recycled plastics, and repurposed metals, which are safe, comfortable, and culturally significant,



can further enrich the musical experience. This approach promotes a sustainable and inclusive design, ensuring that instruments are not only functional and aesthetically pleasing but also resonate with the cultural and environmental values of the elderly community.

2. Aesthetics, Safety, and Ergonomics in Instrument Design for Elderly

The visual appeal and aesthetics of the instruments emerged as a critical factor beyond mere functionality. This underscores the importance of crafting instruments that are not only user-friendly but also visually stimulate and aesthetically please. Incorporating attractive materials and designs can enhance motivation to play and foster a sense of pride in instrument ownership among elderly participants. However, safety remains paramount. Material selection should prioritize readily available options that minimize the risk of injury during playing. This necessitates avoiding sharp edges or potentially hazardous components that could cause harm, particularly for users with limited dexterity or reaction times. As one volunteer aptly noted *“that’s a great point. For me, it’s important to ensure the materials won’t cause any injuries to the hands. Sharp edges or rough surfaces could be uncomfortable, especially for people in my age group. Additionally, lightweight instruments would be much easier to handle and play”* (Volunteer No. 3, Interviewed, May 22, 2023).

Furthermore, the physical design of the instruments should be tailored to the specific anatomical considerations of older individuals. Floor-standing instruments, for example, could be a valuable addition by reducing the need for lifting and maneuvering the instrument. This would significantly improve accessibility for those with limited upper body strength or mobility issues. Ergonomic principles should be central to the design process from the outset, ensuring comfortable interaction and minimizing physical strain. This might involve features like adjustable stands for personalized positioning, padded grips for enhanced control, and lightweight construction to accommodate the physical limitations that can come with age. By prioritizing aesthetics, safety, and ergonomics, designers can create instruments that are not only user-friendly but also promote a positive and enjoyable musical experience for elderly.

3. Accessibility and Playability

“Instruments should have large buttons, easy-to-read labels, sufficient volume, and adjustable height for optimal accessibility” (Volunteer No. 1, Interviewed, May 22, 2023).

“Ease of use is crucial for elderly. Instruments should be lightweight, easy to hold, and require minimal dexterity to play” (Volunteer No. 4, Interviewed, May 23, 2023).

As seen from the interviews data above, the instruments for the elderly should be designed to facilitate a smooth learning curve and minimize reliance on intricate or physically demanding maneuvers. This may involve incorporating features like larger buttons, lighter materials, or alternative fingering systems that cater to reduced dexterity, range of motion, or visual impairments. Physical limitations, including reduced dexterity and mobility, are a natural part of aging, and instruments should be designed to accommodate them with grace. Lightweight construction, ergonomic shapes, comfortable playing postures, and large, easy-to-read labels are crucial considerations for extended play sessions. Additionally, the use of natural materials like wood or bamboo can provide a more tactile and familiar playing experience.

By prioritizing accessibility and playability, musical instruments can be transformed from significant hurdles to inviting entry points for elderly. Instruments that are easy to learn and comfortable to play and cater to individual needs can unlock a world of creative expression and enjoyment. Ultimately, this approach promotes active participation and well-being in this group of population.



4. Music Selection and Cultural Relevance

The research emphasized the importance of culturally sensitive design to promote musical engagement among older adults. This finding directly resonates with the suggestions for utilizing local and familiar materials in instrument construction as mentioned in the proposed framework in Figure 1. By incorporating materials and potentially even musical styles that resonate with the cultural heritage of older adults, the framework proposes a way to create a more meaningful and engaging musical experience as shown in the interview data below.

“Instruments can be designed using local materials, incorporating cultural patterns or symbols, and playing traditional or culturally significant music” (Volunteer No. 2, Interviewed, May 22, 2023).

The selection of music played with these instruments has an important role in fostering engagement among elderly population. This present study suggests that curating music selections that feature familiar melodies or musical elements that reflect participants' cultural heritage can significantly enhance their motivation and enjoyment. This cultural relevance can evoke feelings of nostalgia and connect participants to their personal histories. Additionally, studies have shown that music that resonates with an individual's cultural background can have a positive impact on emotional well-being and cognitive function (Sheppard & Broughton, 2020). This aligns with music therapy practices that often utilize familiar music to create a positive and engaging experience for older adults. For example, incorporating traditional instruments or melodies specific to a particular cultural group could foster a deeper connection and enhance the overall musical experience (Boonrod et al., 2018; Shi & Nicolas, 2023). Additionally, instruments should be designed for easy access and playability, utilizing natural materials where possible. The choice of music curated for the elderly is intended to resonate deeply with them, featuring familiar tunes or reflecting their cultural heritage. Examples of such songs include “Pleng Lao Long Nan”, which evokes traditional memories, and “Pleng Pan Fai”, a song that reflects cultural stories and values. By incorporating these elements, the musical experience becomes more meaningful and engaging, fostering a stronger connection between the instruments and the elderly.

In conclusion, this study underscores the importance of user-centered design principles in developing musical instruments for elderly populations. Prioritizing usability, tactility, cultural relevance, aesthetics, safety, and ergonomics is essential for creating instruments that promote musical engagement and enhance the overall well-being and enjoyment of elderly users. The incorporation of sustainable, recycled materials not only make the instruments functional and aesthetically pleasing but also aligns with the cultural and environmental values of the elderly community, enriching their musical experience.

Aesthetics and safety are critical, with an emphasis on visually stimulating designs that avoid sharp edges and hazardous components. The physical design must accommodate the anatomical needs of older individuals, featuring adjustable stands, padded grips, and lightweight construction to minimize physical strain. Accessibility and playability are also crucial, requiring instruments that facilitate a smooth learning curve and cater to reduced dexterity and mobility. Culturally sensitive music selections, including familiar melodies and elements reflecting participants' heritage, significantly enhance motivation and enjoyment. This approach fosters active participation, emotional well-being, and a meaningful connection to the instruments, resulting in a positive and engaging musical experience for the elderly.



Conclusion and Implementation

This informative study, despite limited by its small sample size and focus on a single geographic location, provides valuable insights. Future research could benefit from a larger and more diverse sample population to explore a wider range of musical preferences and cultural influences. Additionally, research should investigate the effectiveness of different design features and materials in promoting musical engagement among the elderly. Longitudinal studies should also be employed to track the impact of music participation on the well-being of elderly population. Ultimately, these findings can inform the development of culturally sensitive and user-friendly musical instruments. By incorporating these considerations, we can create instruments that are more accessible and enjoyable and promote a more inclusive and engaging musical experience for elderly population.

The research highlights the importance of user-centered design principles, emphasizing instruments that are easy to use, lightweight, and visually accommodating. The proposed framework, shown in Figure 1, aligns with these findings by proposing crafting instruments from common recycled materials. These materials are often lightweight and can be easily manipulated to create comfortable and user-friendly instruments. Additionally, this framework promotes utilizing visually clear and aesthetically pleasing materials. This aligns with the framework's suggestion of utilizing local and familiar materials in instrument construction. By incorporating materials and potentially even musical styles that resonate with the cultural heritage of elderly, the framework proposes a way to create a more meaningful and engaging musical experience.

By proposing instruments designed from common recycled materials, the framework tackles potential challenges identified in the research, such as cost and accessibility. Traditional instruments can be expensive and limit accessibility for many elderly. By utilizing recycled materials, the framework offers a significantly more affordable option, opening the door for a wider range of elderly to participate in musical activities. Furthermore, the research highlights the need for instruments that can be easily played by elderly with potential physical limitations. The framework addresses this by proposing adaptable recycled materials. These materials can be modified to create instruments that are easier to hold, have larger buttons, or require less dexterity to play, making them more accessible for elderly with varying physical abilities. The research study's findings further strengthen the proposed framework for creating musical instruments for older adults.

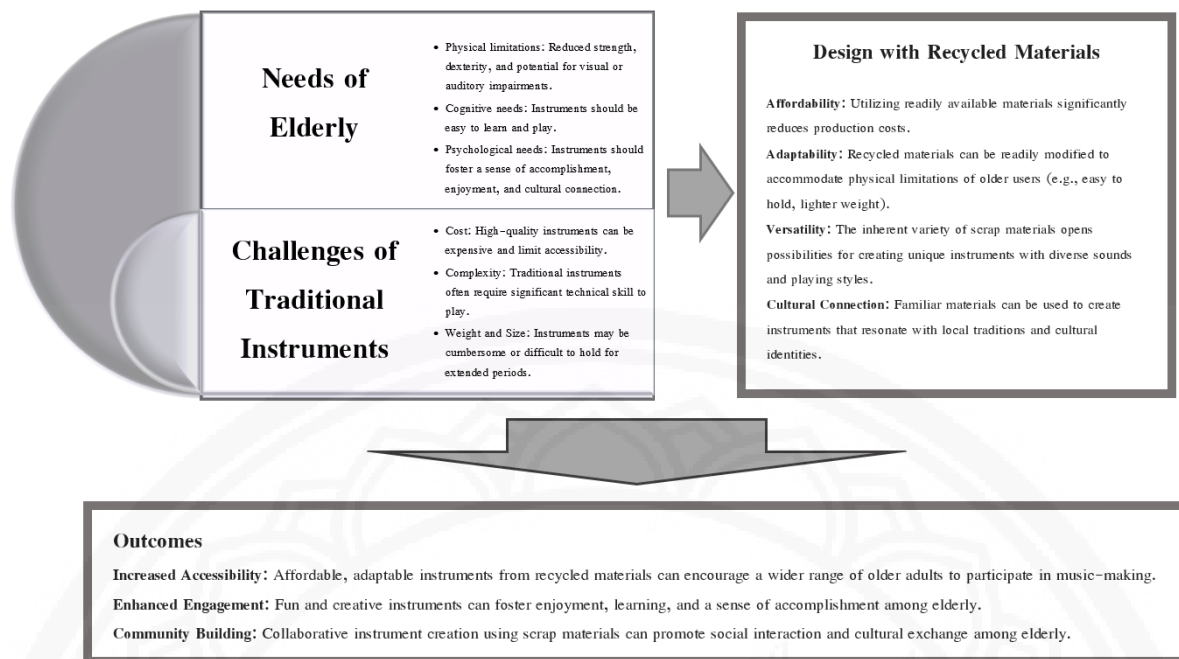


Figure 1 The Proposed Framework for Elderly-friendly Instruments.

This framework suggests that designing musical instruments specifically for older adults can address their limitations, such as reduced dexterity or strength, by incorporating lightweight materials and adaptable designs. It positions readily available materials as a resource for empowerment and artistic expression for this population. Overall, this framework offers a practical and accessible solution for creating musical instruments that align with the research findings and promote musical engagement among older adults. By addressing physical limitations, fostering creativity, and creating inclusive experiences, it has the potential to enrich the lives of older adults and contribute to a more vibrant and musically engaged society.

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