

Utilization of Educational Instructional Technology in the Ensemble Preservation of Gong Sabah Music via Formal Institutions

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DOI: <https://doi.org/10.51244/IJRSI.2025.120800101>

Received: 07 Aug 2025; Accepted: 12 Aug 2025; Published: 10 September 2025

ABSTRACT

The Gong music ensemble is a traditional musical genre of the Kadazan Dusun ethnic group in Sabah, distinguished by its unique historical context and performance style. This study was conducted to understand the musical culture and traditions, specifically on the Gong music ensemble, which has become a cultural heritage for the Kadazan Dusun people in Sabah. This cultural practice has been unofficially passed down through generations among the Sabah ethnic community. It has begun to decline amid the various behavioural changes in society that occur over time. This research provides a framework for analyzing the technical and aesthetic aspects of the Gong music ensemble, incorporating music education concepts, and resulting in the development of interactive multimedia materials for formal educational contexts. This study utilizes both quantitative and qualitative approaches, including questionnaires and semi-structured interviews for data collection, which are then evaluated by descriptive-analytical procedures. The Gong Music Ensemble, an interactive multimedia instructional resource, has been created and evaluated for its suitability in formal educational environments. The study's findings, based on feedback from educators, trainers, and students, indicate that this teaching and learning material demonstrates considerable utility and suitability for the Sabah Gong music ensemble in formal educational contexts.

Keywords: Cultural Preservation; Education and Literacy; Gong Ensemble; Interactive Multimedia; Instructional Technology

INTRODUCTION

The communal past of every ethnic group in Malaysia is remembered through the traditional musical instruments and performance. These traditional musical tools served the purpose of communication, rituals, and entertainment. This research stems from the aspiration to comprehend the musical culture and songs of the homeland, particularly focusing on the Sabah ethnic music ensemble as a cultural heritage. The Sabah Gong music ensemble was selected as the focal point of the research due to its status as a cultural heritage of the Kadazan Dusun people of Sabah, possessing a distinct historical significance. It is considered a cultural heritage due to its substantial historical significance (Mazlan et al. 2024a; 2024b; 2025a; 2025b).

Music is not only a form of entertainment. Music is an important tool in maintaining a cultural identity and in rebuilding the connections to the ancestors' traditions (Pugh-Kitingan, 2004; Pisali et al. 2017). Gong is a cultural art that must align with the nation's development and advancement. The gong music ensemble in Sabah, Malaysia, is an integral part of the cultural heritage of the indigenous communities, particularly the Kadazan-Dusun and Murut peoples. Such ensembles are often performed during cultural rites, during festivals, and during social events serving a cultural and religious function. The local term for gongs is *sompogogungan* and it is composed of a series of gongs played in a cohesive flow pattern. These ensembles are performed to mark special events like weddings, *kaamatan*, and other ceremonies.



Fig. 1: Gong music ensemble of Sabah, Malaysia

The ensemble is made up of 6-7 gongs which vary in size and pitch. The larger gongs called tawag provide the base beat, while the smaller gongs; sompogogungan and bandil, produce the beat and more complex rhythm. A lot of the times the music is described as polyphonic because of its interlocked rhythms that are precise and require exact coordination of the performers (Matusky & Tan, 2017).

Traditional Gong music, while most often associated with the rural region, has greatly impacted urban culture and has risen to national and international acclaim. Efforts to preserve and promote this form of art range from its inclusion of integration into standard school syllabuses alongside engaging in cultural shows. However, urbanization and different ways of life pose challenges to the preservation of this art-form, and the local communities and cultural groups employ strategies to sustainably conserve this heritage (Loh, 2019; Mazlan et al. 2025a; 2025b).

RESEARCH BACKGROUND

Education plays an essential role in the preservation of cultural identity of the Sabah Gong music ensemble in educational contexts. For reasons like intergenerational relationships, self-definitions and social concerns, organised education is essential for safeguarding musical culture. This further ensures that traditional art forms, instruments, and music performance will be passed onto the generations to come (Arshad et al. 2022a; Arshad et al. 2022b; Ramli et al. 2021; Mazlan & Abdullah, 2020; Mazlan et al. 2024b). If not, such practices can decrease due to industrialisation and spread of homogenising cultures. When traditional music ensemble is taught at the school level it provides students with a strong connection with their roots and instils a sense of self pride. Music education is in fact a needful intervention that contributes to the safeguarding of the cultural heritage, that is challenging the students on the importance of traditional songs, dances and other forms that define them (Campbell, 2004). Structured education further enables broad understanding as well as respect for music within its various sociocultural environments. This contributes to linking together past, present and future generations. According to Green (2008), students are able to appreciate the relevance of musical practices in understanding themselves and the society around them. Music education can reach out to people, regardless of language, culture and social barriers.

Structured music training develops collaboration, as students often take part in group performances or choruses, or form other groups (Hidayatullah et al. 2024a; 2024b). This gives a sense of belongingness and an intention to work towards a common goal. According to Elliott and Silverman (2015), music education encourages social integration through the enabling of joint activities and respect for students coming from different cultural backgrounds. Musical culture is preserved through education which ensures that the benefits are also experienced by future generations. Formalized musical training not only preserves traditions but also encourages mental and emotional development creating an all-around person (Hallam, 2010).

The incorporation of such musical culture into the formal educational practices encourages the communities to take care of their art while also developing the cognitive, emotional, and social faculties of individuals (Hidayatullah et al. 2024a; 2024b; Mazlan & Abdullah, 2020; Mazlan et al. 2024a; 2024b). This paper emphasizes the importance of the concern for the musical culture in maintaining and ensuring its protection

with the aid of organized education and technological incorporation. The triad of modernity and nation's culture tends to require better control mechanisms for its management processes to ensure the nation's cultural and historical institutions remain intact. In contrast to the obsolete methods of instruction, the incorporation of interactive multimedia materials into the educational process works wonders for the students' grasp of Gong music, by providing them with immersive experiences that involve reading, listening, and watching. Through the incorporation of interactive digital multimedia educational resources such as music, sound videos, animations, text and graphics that contain essential elements such as concept mastering and skills development, students will better understand the Sabah Gong music ensemble. As of now, several aspects of national heritage and culture, Gong for instance, exist as unstructured and unrecorded accessories instructional foundation for contemporary educational standards.

Research Aims

- i. Determining the primary elements of the Sabah Gong music group performance.
- ii. Structuring the material and instructional methodologies of the Sabah Gong ensemble music performance into an interactive multimedia format for educational application in schools.
- iii. Obtaining evaluations from music education instructional specialists concerning the development of interactive multimedia teaching and learning resources for the Sabah Gong music group.
- iv. Gathering feedback on the effectiveness and suitability of interactive multimedia products as educational tools for the Sabah Gong music ensemble in academic settings.

Documenting and implementing measures that foster cultural sustainability is crucial for achieving these objectives. This study implicitly endorses the idea that knowledge sources related to heritage culture in educational institutions will bolster its sustainability for future generations.

REVIEW OF LITERATURE

Musical heritage is an important part of cultural identity because it shows the values, history, and traditions of societies over time. But globalization, urbanization, and the decline of oral transmission methods are putting many traditional musical forms in danger of disappearing. Digital media for teaching, such as videos, interactive apps, virtual reality (VR), and online learning platforms, offers new ways to protect and share musical heritage. This literature review examines the utilization of digital media for the documentation, instruction, and preservation of traditional music, thereby safeguarding its continuity for future generations. High-quality documentation and archiving are two of the main ways that digital media helps keep musical heritage alive. Oral transmission is often used in traditional music, which means that it can be lost when musicians die without making proper recordings. Digital tools like audio and video recordings make it possible to accurately record performances, techniques, and background information.

The use of digital teaching and learning technologies is now an integral part of modern education. With constant technological advancements, educational establishments are using such tools to increase student motivation, enhance the learning experience, and prepare them for a world where technology is essential. The scope of this literature review is to analyze the role of digital instructional technology in education, highlight the role it plays, address the challenges that come with it, and suggest ways in which the digital technology for education can be used for sustainable development and marketing of culture.

Digital Technology for Instruction

Digital technology for education refers to the use of devices, tools, software, and materials to foster learning and teaching (Nasrifan & Rahim, 2019). This covers learning management systems (LMS), interactive whiteboards, educational applications, virtual reality set (VR), augmented reality (AR), and AI-based systems (Safian et al, 2024). The need to create more interesting, personalized and available learning environments has been a key factor in applying the new technology (Selwyn, 2022). It was in the 1980s when there was a movement to digitize education and that attempt started with introducing computers in the classrooms (Bates,

2019). The unveiling of the internet, mobile devices, and cloud-based platforms has revolutionized the educational passage. Currently, digital technology is not merely an supporting instrument but a ultimate component of the educational process.

Concerns have been raised regarding the overuse of technological tools in the classroom and what the end results will be. Further research is need on whether such tools truly motivate students to learn or just provide entertainment value. The impact of gamification on students was the topic studied by Hwang et al. (2020). Their results indicated a clear positive influence on students' motivation and engagement from the use of educational games. Hwang et al. (2020) explain that educational gamification in mathematics boosted scores by 25% for over 200 high school students in comparison to traditional teaching methods. Adapting to each student and developing an appropriate learning strategy is one of the most significant advantages of using digital technologies. Interactive multimedia pedagogical tools also enable students' performance evaluation and the adaptive redesign of the material to cater for each student's specific needs. Kizilcec et al. (2021) showed in their study of the use of backfitting technologies in the learning process in colleges that students using adaptive learning systems received higher grades and were more satisfied with the quality of education they received.

With the emergence of platforms such as Google Classroom, Microsoft Teams, and Zoom, the nature of collaboration and sharing of information within the education sector has changed significantly. These applications enable students and lecturers to engage with ease or rather without boundaries. According to Martin and Ertzberger (2019), collaboration technologies have also been used in online learning and the results show that students involved in collaborative activities performed better in group assignments and improved their critical thinking skills. Nowadays, integrating technological devices while teaching helps students meet the demands of the digital economy. These modern skills are important as they help students to manoeuvre the intricacies of the modern world. Voogt and Roblin (2020) also examine the issue of the inclusion of digital age skills in the curriculum and opine that students who know how to use digital tools tend to be successful in their jobs.

Obstacles of Instructional Digital Technology

The use of instructional digital technology in education does come with a few issues irrespective of its many benefits. There are issues of equality, teacher's preparation, and chances for getting distracted, to name a few. The digital divide is still a serious barrier to the successful adoption of digital technologies in education. Internet and gadget access is often limited for students from low socio-economic or rural households which places them at a disadvantage. Van Dijk and Hacker (2021) carried out research that focused on the disparity in access to digital technology and recommended measures to reduce this. To use the tools effectively, the teachers need to feel comfortable using them, which should be a given. However, a lot of teachers lack sufficient training and support. According to Ertmer and Ottenbreit-Leftwich (2020), teachers who were trained in using digital devices became more comfortable and more effective in using them during their classes.

In excess, the reliance on technology may offset the development of valuable cognitive skills. Students, for instance, may be tempted to use their mobile phones for social media and gaming, activities not related to their studies. Digital technology is therefore one of the most potent learning tools, but it can also be a huge distraction. Rosen et al. (2019) examined the impact of digital communication distractions on academic performance and frankly discovered the contemporaries who had to engage in multitasking on their devices did poorly for their exams.

Utilization of Educational Instructional Technology in the Preservation and Promotion of Musical Cultural Heritage

Heritage in music refers to the practices, traditions, and other intangible trademarks of a certain group or community that are passed down from earlier generations. In this age of globalization, protecting and promoting musical heritage has become a necessity for many communities to maintain their identity.

Instructional technology including digital equipment, multimedia, and interactive elements have turned out to be effective tools for safeguarding and promoting cultural assets.

There has been a remarkable change in the way cultural assets are salvaged and shared due to advancement in educational instructional technology. Recently developed online educational tools such as virtual and augmented reality have also contributed to creating interactive and exciting engagements with music culture. These technologies preserve the content of cultural music performance and undomesticated customs while simultaneously building a global market for them, thereby advancing international relations. The rich potential for cultural heritage preservation functions with the use of instructional technology which allows documenting and storing previously unwritten aspects of culture. This study shows that Gong traditional performances in Sabah can be digitized for storage and for use in the future, in order to ensure the performance does not vanish in that country. In addition, the use of instructional technologies is a great benefit in cultural heritage preservation as it has afforded people the access to active and meaningful interaction with cultural content through educational multimedia tools.

According to the assertion made by UNESCO (2019), it has become a necessity to preserve cultural heritage through technological intervention considering the adverse effects of urbanization, climate change and conflict. Cultural music performance and practices that are prone to being obliterated can be captured and protected with the use of digital instruments. Furthermore, technology can aid in providing the world with access to cultural content in an attempt to encourage understanding and appreciation between different cultures. There is a demand that the experts and the technologists, teachers and the custodians of cultural heritage should work together in order to ensure the proper use of technology in facilitating the conservation and dissemination of cultural resources, UNESCO emphasizes the important of interdisciplinary collaboration.

According to Fernández (2020), the tools belonging to the category of educational technologies can assist in empowering communities to conserve and share their memories and cultures. The writer emphasized that the communities are now able to have a take and re-interpret their cultural music performance in a more relevant and engaging way. In his study, Fernández accentuates the importance of involving the people into the development and implementation of a particular digital strategy in order to avoid distortion of their culture. This methodology helps not only to help preserve the culture but also foster a feeling of ownership and belonging of the culture amongst the people within the community. In the contexts of education, researcher Lee (2021) also pays attention to the nurturing capabilities of the immersive technology and interactive multimedia courseware for cultural heritage education. It is held that with these technologies, learners are offered a more engaging and interactive way of understanding and being taught about the principles and concepts of cultural heritage. Lee suggested that because of technology can be so easily integrated into other aspects of our lives, there is a greater need to foster the use of this technology in cultural heritage education among the youth that are well accustomed to other forms of media. For example, incorporating immersive technologies in the academic curriculum will allow teachers to provide rich learning situations which help the students in cultural heritage recognition and appreciation.

García and López (2019) have performed a broader examination on the use of digital storytelling in documenting and sharing some specialized forms of indigenous knowledge and its practices. Collaborating with indigenous people in creating various multimedia narratives, the researchers aimed to capture their cultural practices, beliefs, and history. The narrative text was later integrated into an e-learning system, thereby making it open for use by a larger audience. The study demonstrated that digital storytelling was effective not only in preserving indigenous knowledge but also in giving members of the community control over how their culture was represented. In this regard, this study focuses on the role of instructional technology in addressing the perspectives of the marginalized and enhancing cultural value.

Moving on to the next theory, Chen et al. (2021) gamified method in cultural heritage education. In their smartphone application, users can manage a game where they interact with events and artifacts through a series of puzzles and challenges. The purpose of the game was to allow the users to learn about the cultural heritage of a place in a more fun and engaging way. The study findings indicated that gamification significantly improved participants' interaction with and comprehension of cultural heritage education. Additionally, through the puzzles, there was an encouragement of group work. It has been demonstrated in this work that it

is possible to make cultural heritage education more effective through the use of gamification and amuse the students at the same time.

RESEARCH METHODOLOGY

The project aims to examine the teaching and learning of Gong music group performance, which has been taking place informally within the Sabah community, employing interactive multimedia to enhance student participation. This study aims to gather data and feedback from practitioners of the Sabah Gong ensemble concerning performance-related matters and thereafter transform the collected insights into structured interactive multimedia educational resources. The researcher will seek feedback from music education instructional experts on the developed interactive multimedia products to facilitate improvement before their finalization. The materials will be utilized in a specific school that provides co-curricular activities, particularly a music ensemble. The researcher will assess the efficacy and suitability of the produced resources for pedagogy by integrating the Gong music ensemble into co-curricular activities.

This research follows a mixed methods approach and in particular employs both quantitative and qualitative methods during its implementation. For instance, Phase 1 made use of such qualitative methods as interview and literature study during data collection. In contrast, Phase 3 employs a quantitative method that focuses on collecting data for determining if educational evaluators find the product appropriate for school use. Phase 4 employs qualitative methods in the form of interview to determine the usability of the product among educators, trainers and students. The methodology framework compiled and presented in Figure 3 helped to analyse the Sabah Gong group music performance within educational context.

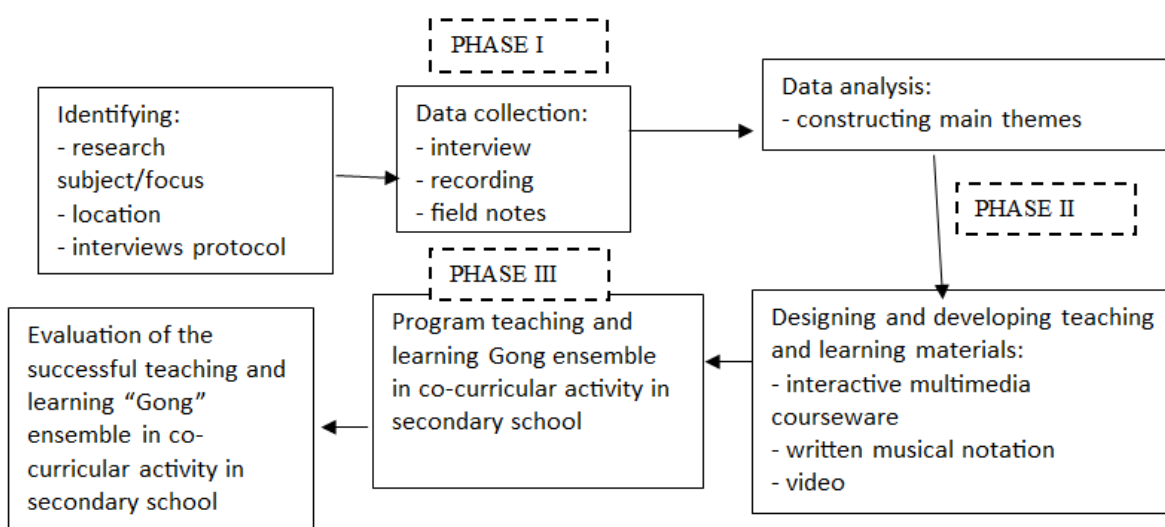


Fig. 2: Methodological Procedures

Phase one of the project seeks to collect data related to the Gong music group including some history, instrumentation, playing techniques, arrangements and compositions as well as performance data. Such relevant data will then be systematically organized for further transformation into interactive multimedia materials to be used in the teaching and learning of this ensemble across educational institutions. The participants in this project in particular, will scrutinize the ten performances and recordings of two Gong music groups based in Sabah: Firstly, the Gong Sound of Borneo Group and secondly, Kampung Kinapulidan Gong Group based in Ranau. The second phase of the research consists of the design and the production of interactive multimedia resources for the Gong music group in educational institutions. It is also very important to select a systematic instructional design model aimed at Gong music ensemble teaching because it provides a systematic perspective aimed at assisting designers in the systematic design and development of multimedia courses. In the creation of an interactive multimedia module, numerous models may be utilized. This research follows the ADDIE design framework that enhances development processes to be systematic and well-oriented. This model serves its purpose since it emphasises an instructional design approach that forms the basis for other such models. ADDIE stands for Analysis, Design, Development, Implementation, Evaluation.

Phase 3 consists of carrying out interviews and monitoring with the objective of determining the appropriateness of the developed interactive multimedia educational products. The compiled materials are sent out to experts in technology and music pedagogy as feedback along with relevant questionnaires.

In phase 4, the interactive multimedia materials that have been developed are put into use in the specified secondary school. Researcher selected Rompon Secondary School, PO Box 49, 89657 Tambunan, Sabah which practices a Music Education program. This institution was selected due to its facilities, including equipment and music rooms, and the number of students engaged in music studies, either as part of the curriculum or through extracurricular activities. The students at this institution have received fundamental Gong music ensemble equipment, including 5 gongs and 1 set of *kulintangan*. They received instructional sessions and ensemble performance training utilizing the developed interactive multimedia resources. A series of interviews was done with instructors and students to assess its utility and suitability.

Quantitative data obtained from questionnaires distributed to instructional education experts was analyzed using the Statistical Package for Social Sciences (SPSS) Version 12.0 software, applying both descriptive and inferential statistical techniques. Descriptive statistical methods are utilized to evaluate the suitability of the design and content of the interactive multimedia learning materials for the Gong ensemble performance through mean distribution techniques. The questionnaire items were developed using a Likert scale. The evaluation components for the interactive multimedia learning of the Gong ensemble are divided into three categories:

- i. Section A: Components of Interactive Multimedia Educational Resources
- ii. Section B: Educational Framework
- iii. Section C: Technical Specifications

This study utilized primary data obtained via interviews. The semi-structured interview method was utilized to collect data regarding the evaluation of the interactive multimedia learning resources for the Gong ensemble performance, conducted by two music educators who also serve as music trainers at the specified school. To supplement the information collected in regards to students' participation in ensemble performance, additional data was collected from eight students who had trained in Gong ensemble. The data included the students' knowledge, skills and preferences before, while and after the performance. In terms of assessment, there are two major aspects: a 45-minute interview and a three-month period of educational processes.

RESEARCH FINDINGS

Based on the reasoning and needs analysis from many sources, several units and key subjects have been structured for incorporation into the interactive instructional design, which includes the fundamental elements of the Sabah Gong music ensemble. Subtopics have been defined according to the chosen main topics. Specific learning outcomes to be achieved by the end of the learning process using the developed interactive multimedia tools have been outlined for each subtopic. The following delineates the topics, subtopics, and learning outcomes.

Table 1: Topics, subtopics, and learning outcomes

<i>Topic</i>	<i>Sub-topic</i>	<i>Learning outcomes</i>
Unit 1 : Introduction	1. History of the formation of the Gong ensemble	1. Trace the historical development of the Gong ensemble.
	2. Purpose and place of the Gong presentation	2. Specify the objective and location of the Gong presentation
	3. Ensemble player	3. Identify the musicians and their roles

		within the Gong ensemble music.
Unit 2 : Instrumentations	1.Gong Lapos-lapos 2.Gong Mongolutan 3.Gong Songkoluan 4.Gong Dindihon 5.Gong Ponohuri 6.Gong Kulintangan	1. Identify the instruments utilized in the performance of the Gong ensemble. 2. Specify the role of instruments within the group
Unit 3 : Function	1.The uses of gongs for society and the community. 2.The suitability of this gong ensemble is presented.	1. Elucidate the functions of gongs within society and the community. 2. Assess the appropriateness of the provided gong ensemble.
Unit 4 : Gong making	1. Types of materials used to make gongs.	1. Determine the materials utilized in the fabrication of gongs.
Unit 5 : Playing techniques	1. Pukulan Naanahangon 2. Pukulan Saasalakan 3. Pukulan Hahambatan 4. Pukulan Kuukulimpoon 5. Pukulan Tootongan 6. Pukulan Tatavag	1. Ascertain the performance styles and rhythmic patterns utilized in the Gong ensemble. 2. Implementing the appropriate playing technique
Unit 6 : Kulintangan	1. The characteristics of the kulintangan ensemble 2. Playing techniques of kulintangan	1. Identify the playing techniques and rhythms played in the kulintangan ensemble 2. Implementing the appropriate playing technique
Unit 7 : Songs and musical score	1.Sudun Hugu Divatto 2.Murut Tamigon 3.Rentak Gong Daerah Tambunan 4.Nogungan Kooduan Pangazau Magagong 5.Nogungan Pangazau 6.Nogungan Hungab 7.Nogungan Kolopis 8.(Kalimaran) Paluan Gong	1. Recognizing compositions executed by the Gong ensemble 2. Performing with the appropriate playing technique

	9.Kalipasu	
Unit 8 : Info	Get to know the researcher and research details Information related to production	None

A systematic instructional design is employed to provide interactive multimedia digital learning tools for the Gong music ensemble, in accordance with the specified subjects and learning outcomes within the formal education framework. Presented below are examples of the formulated instructional design.



Fig. 3: Examples of the formulated instructional design.

The subsequent paper delineates the survey results regarding the suitability of interactive multimedia teaching and learning tools for the Sabah Gong music group, as assessed by experts in music education technology. Based on the analyzed items and sub-items, level 5 exhibits commendable appropriateness, whereas level 1 signifies unsuitability.

Table 2: Content of Interactive Instructional Design

	<i>Criteria</i>	<i>Level</i>
2.1	The content is directly related to the objectives/learning outcomes.	4
2.2	Providing all the content or learning experiences necessary to achieve the objectives/learning outcomes	4
2.3	In accordance with the characteristics (level of ability and maturity) and experience of the students	5
2.4	Relevant to the course requirements and target group	3
2.5	Broken down into small and continuous learning steps.	3
2.6	Presented in a logical order	5
	Mean =	3.36

The appropriateness level is categorized as High (3.36) based on the Level indications. It indirectly asserts that the teaching and learning materials of the Gong music ensemble are appropriate for the students' learning outcomes, backgrounds, and capabilities.

Table 3: Content Rational

	<i>Criteria</i>	<i>Level</i>
3.1	Content review	3
3.2	Teaching and learning objectives	5
3.3	Instructions (text and symbols)	4
3.4	Providing a synopsis	4
3.5	The statement of objectives is provided in a general and concise manner.	5
	Mean =	2.72

The cumulative mean for the Rational of Interactive Instructional Design of the Gong music ensemble is 2.72, signifying a modest degree of appropriateness based on the indicators. The benchmark indicating the need for improvement initiatives.

Table 4: Learning Outcomes/Objectives Interactive Instructional Design

	<i>Criteria</i>	<i>Level</i>
4.1	There are learning outcomes/instructional objectives for each lesson unit.	5
4.2	Learning outcomes/objectives are written according to the learning hierarchy (From lower to higher levels).	3
4.3	Learning outcomes /objectives are written clearly and accurately.	5

4.4	Learning outcomes /objectives have appropriate verbs (measurable and observable).	4
4.5	Learning outcomes /Objectives have cognitive, psychomotor, and affective domains.	2
4.6	Learning outcomes /Objectives cover the entire content of the unit.	4
	Mean =	3.40

The total achievement level evaluating the Learning Outcomes/Objectives of the design of interactive multimedia teaching and learning materials for the Gong music group is 3.40, signifying its good applicability.

Table 5: Learning Activities

	<i>Criteria</i>	<i>Level</i>
5.1	Able to attract the attention and motivation of students	5
5.2	Using various methods and support media to support instructional materials (Examples: discussions, simulations, video conferences, videos/youtube)	2
5.3	Students interact with the material	3
5.4	Students interact with other students (Face-to-face and/or online)	1
5.5	Learning activities proceed according to the hierarchy of learning.	4
5.6	Learning activities encompass the cognitive, psychomotor, and affective domains.	3
5.7	The learning instructions are clear.	5
5.8	Examples/guidelines for learning are provided.	4
5.9	There is a formula for each unit to recall.	2
	Mean =	3.20

The learning activities detailed achieved a score of 3.20, signifying a high degree of appropriateness.

Overall, the developed interactive multimedia material has been properly organized into many modules and important topics to enhance successful teaching. This interactive pedagogical method allows students to methodically identify the concept of the Sabah Gong music ensemble, recognize the compositions, distinguish the playing techniques, and identify the instruments employed.

DISCUSSION

Traditional music ensembles of an ethnic group embody the expression of human emotions through cultural practices, social behaviours, economic and political frameworks, legal systems, and belief systems. The Gong ensemble music of the Sabah ethnic communities serves as a social activity that reflects their lifestyle, traditions, culture, sensory experiences, imagination, and intimate connections with humans, animals, and the environment. The allure of the Gong ensemble resides in its auditory qualities, the categorization of instruments, the distinctiveness of its musical arrangements, and the artisanship of its instruments, which reflect the organized structure of Sabah's ethnic communities, especially the *Kadazandusun*.

This discussion focuses on the active Gong ensemble within the *Kadazandusun* community. Their social sphere develops in relation to environmental and geographical elements that influence their lifestyle and

culture. The environmental context denotes the interrelation between humans and their environment, encompassing flora and fauna. The auditory elements derived from this environment are intricately linked to quotidian tasks. The *Kadazandusun* society perceives this music as a method to reinforce social interactions and hierarchical relationships.

The utilization of natural materials in the creation of costumes for Gong performances and the fabrication of musical instruments exemplifies the agrarian lifestyle and geographical influences of the *Kadazandusun* people. Their cultural beauty is maintained by a reverence for natural resources, including fauna and flora, as demonstrated in their artistic expressions, such as embroidered textiles and elaborate carvings on musical instruments. These fabrics, frequently embellished with gold thread and vivid patterns, represent the pride, strength, and affluence of the Sabah ethnic groups. The elaborate decorations necessitate precise craftsmanship, underscoring the community's commitment to safeguarding their traditional history.

The preservation of cultural heritage can be achieved by fostering talent, enthusiasm, and affection for traditional culture from a young age. The cultivation of individual potential, particularly from the age of three, should focus on skills transmitted through familial lineage. Proficiency in woodcarving, needlework, or other traditional skills typically requires years of development, commencing in childhood. Likewise, acquiring the ability to perform in a Gong ensemble by the rote method or imitation, under the guidance of family or friends, becomes a communal endeavour. This social organization, grounded in a community-oriented cultural framework, is founded on ideals such as cooperation, mutual aid, and familial connections. Consequently, the Gong ensemble serves as a catalyst for communal bonding, fostering collective accountability to sustain and transmit this musical heritage.

The production of sounds with Gong instruments is seen as a material culture that elicits human emotions and behaviours. The harmonies of the gong and the cadences of the drums generate a vibrant and celebratory ambiance. Gong ensemble performances, frequently conducted during communal events, function as a conduit for social connection and amusement, fostering joy, alleviating stress, and elevating spirits.

Every musical instrument delineated in the Sachs-Hornbostel classification system functions as a medium of communication within societies. In the Gong ensemble, the diverse dimensions of gongs and drums, performed in particular rhythms, can transmit distinct messages or represent various modes of communication. Historically, gongs were utilized in diverse human activities, including dances, music, and shadow plays, and functioned as a medium for conveying messages between communities or announcing occurrences such as deaths. The sounds of the Gong indicate familial prosperity, as they were employed in commerce and social occasions such as engagements, weddings, births, and funerals. Consequently, the Gong serves as a medium of communication, transmitting information via its sounds.

The functions and applications of the Gong ensemble parallel those of other traditional musical instruments. It is utilized in social activities that represent hereditary arts and culture. In this study, Gong music functions as a means of enjoyment to alleviate stress and exhaustion. Occasionally, it is utilized in communal ceremonies, including circumcisions, births, and weddings. These performances frequently incorporate ritualistic components to guarantee the event's success.

Traditional music fulfils particular roles in fostering peace and harmony within communities. The music serves not just as amusement but also communicates themes of social life, love, respect, mutual assistance, and the splendour of nature. The ideas of collaboration and solidarity reflected in the music act as symbolic reminders for the community to approach daily life with caution.

The Gong ensemble additionally supports dance performances. The music's tempo, alternating between slow and energetic, along with elegant motions, underscores the significance of etiquette and manners. The costumes used by performers, regardless of gender, are designed to align with the performance's theme. The community concurs on the motions of the musicians and dancers, guaranteeing that the performance adheres to traditional norms and facilitates the seamless execution of events (Matusky, 1989).

The configuration of gongs inside the ensemble, along with the *kulintangan* (a collection of miniature gongs), mirrors the hierarchical framework of governance. The principal tune performed by the *kulintangan* signifies high-ranking authorities, but the assorted gongs represent the general populace. This arrangement embodies the protocol system that must be adhered to. Effective coordination and collaboration within the ensemble guarantee the success of every performance.

The principle of mutual agreement is profoundly embedded in the culture of Sabah's ethnic groups. The *Kadazandusun* community notably prioritizes collaboration and consensus, irrespective of individual economic standing. Group conversations aimed at resolving conflicts, referred to as *berkampung* or *kerapatan*, are highly recognized and enhance the quality of Gong ensemble performances. The *Kadazandusun* community is distinguished for its focus on cooperation and consensus-building, which surpasses individual economic status. This cultural characteristic such as Gong music performance is fundamentally embedded in their ancient behaviours and social frameworks, which emphasize communal happiness over personal advantage. Through the Gong performance, community's decision-making process frequently entails comprehensive discussions and consensus, guaranteeing that all perspectives of the performance are acknowledged, irrespective of socioeconomic standing. This egalitarian principle cultivates a sense of oneness and collective responsibility, essential for sustaining societal harmony and resilience. The importance of collaboration is mostly due to the community's dependence on Gong music ensemble, which requires joint effort and shared expertise. The performance of the Gong ensemble during the practices of *moginum* (community feasting) and *tagal* (a communal system of river and resource management) illustrate the collaborative efforts of the *Kadazandusun* people to maintain their livelihoods and environment (Phelan, 2018). These methods emphasize the significance of agreement in achieving fair resource allocation and environmental management. Furthermore, the cultural values of the *Kadazandusun*, like *hinompung* (respect) and *piipio* (cooperation), further strengthen their collaborative attitude through Gong ensemble. These ideals are ingrained in their daily interactions and governance structures, where leaders are selected based on their capacity to mediate and unify rather than their affluence or rank (Regis, 2020). This practice guarantees that decisions are made for the collective benefit of the community, rather than catering to the interests of a select few. In summary, the *Kadazandusun* community's focus on collaboration and consensus demonstrates their dedication to collective welfare and social equality. Their customary customs and cultural principles establish a strong foundation for preserving unity and sustainability, rendering them a paradigm for inclusive and democratic governance.

The implementation of traditional ensembles in educational institutions, such as Gong performance, plays a vital role in fostering creativity, collaboration, and cultural appreciation among students. However, despite their educational and artistic value, numerous obstacles often hinder their successful integration into school programs. This section explores the multifaceted barriers to implementing traditional ensembles in educational settings and highlights the need for innovative solutions to ensure that all students have the opportunity to benefit from the transformative power of music education.

Educator factors

Music Education has been an integral component of the Malaysian educational system, combining diverse traditional ensembles such as *caklempong*, *gamelan*, and *kompang* into the formal curriculum. Nonetheless, challenges concerning educators and the instruction of music in educational institutions continue to endure. Relevant authorities must maintain vigilance and implement aggressive efforts to resolve these persistent issues in several Malaysian schools. A primary difficulty is the deficiency of qualified and proficient music educators. Music educators are essential in executing music-related initiatives for students and educational institutions. Insufficient music educators may impede or prevent the realization of school music programs. A significant number of current music educators possess limited experience or are "instant teachers" rapidly assigned to schools following brief music training programs. This technique is suboptimal, as music educators should have appropriate degrees and considerable expertise, considering that music differs from other academic topics.

The absence of specific expertise and skills, together with a lack of enthusiasm in traditional music ensembles, frequently impedes teachers from efficiently leading music activities. The Malaysian Ministry of Education

has addressed this issue by assigning numerous competent and proficient music educators to schools that provide music as a subject and those with the potential for advanced artistic achievement.

Moreover, music-specialized educators frequently face the obligation to instruct additional disciplines due to unforeseen situations. Numerous educational institutions rationalize this by asserting that music is not a fundamental subject and is not crucial for pupils to succeed in examinations. Such attitudes adversely affect music teaching in schools. School administrators must approach this issue with greater consideration to enable music-specialized teachers to contribute successfully based on their experience. Graduates from the Faculty of Music and Performing Arts at UPSI (Universiti Pendidikan Sultan Idris) possess adequate musical skills and experience prior to their placement in schools offering music programs.

Equipment and Specialized Facilities

Utilizing multimedia assets in schools presents challenges, as they sometimes necessitate programs installed on mobile devices like laptops or tablets. Problems such as power outages, defective projectors, or inadequate sound systems might hinder effective teaching and learning processes. Presenting content exclusively on small laptop screens may impede visibility for all students.

A major obstacle to the implementation of Gong ensemble activities in schools is the absence of equipment and specialized facilities, such as music rooms or studios adequately furnished with Gong sets, notably in Sabah within the context of co-curricular activities. The lack of soundproof spaces exacerbates the challenges of incorporating traditional music ensembles into educational institutions. Soundproof facilities would enhance the efficacy of teaching, learning, and practice for students preparing for performances or school events. The substantial expense of procuring Gong sets of differing sizes is an additional barrier for educational institutions. Students frequently depend exclusively on equipment supplied by the school for their training. Schools must undertake aggressive measures to get financing for the acquisition of Gong ensemble instruments and solicit assistance from many stakeholders to achieve the objective of integrating cultural heritage ensembles into formal education.

Educational Materials and Resources

This research has effectively recorded and generated musical scores for Gong ensembles derived from assessments of practitioners' performances. The Malaysian Ministry of Education has supplied certain instructional materials, including songbooks and musical scores, for classroom usage; nonetheless, there is a significant deficiency of resources tailored for Gong groups. At the primary school level (Years 1 to 3), the Ministry has supplied two collections of songbooks featuring 18 and 28 children's songs, respectively. The majority of these songs were created by music educators and instructors for application in primary schools, with a select number of melodies derived from international folk songs. Nevertheless, merely a select few traditional Malaysian children's songs, such as *Anak Itik Tok Wi*, *Geylang Sipaku Geylang*, and *Dayung Sampan*, are featured. Regrettably, there is scant representation of Gong ensemble music in these resources.

This disparity arises from the restricted accessibility of appropriate traditional music resources for educational purposes. Students ought to be introduced to a diverse range of traditional music, including contemporary compositions, to cultivate interest and enthusiasm for traditional music, especially Gong ensemble performance. Consequently, younger generations may cultivate a stronger appreciation for traditional music by being exposed to its components from an early age. This exposure may also facilitate the promotion of Malaysia's rich musical history, namely the Gong traditions of Sabah, to global audiences.

The Gong music is considered folk music that reflects the life and social culture of the community, corresponding with its patterns, symbolism, structuralism, and functions. This art and culture, down through generations, are at risk of being ignored due to modernization. Measures must be implemented to prevent this musical tradition from fading into obscurity. This research, entitled *The Development and Testing of Digital Interactive Learning Materials for Gong Ensemble Music*, emphasizes modernization while prioritizing the preservation of its authentic traits. Assistance from official educational institutions can act as a conduit to preserve this history and guarantee its ongoing development in the prosperous region of Sabah.

CONCLUSION

The use of teaching aids is essential in education, especially in conveying cultural heritage to the youth. This is because instructional tools can improve students' understanding. This interactive multimedia resource has text, audio, video, and graphics. Interactive features promote a reciprocal relationship between students and the computer, enhancing an engaging and meaningful learning environment (Nasrifan & Saidon, 2019). Therefore, this multimedia content is very suitable as a pedagogical tool for the instruction of Gong music. The use of appropriate instructional tools will enhance students' participation in an enjoyable learning experience. Interactive learning experiences can assist students in achieving the defined educational goals.

Traditional Gong music is a unique form of art and it serves as emblem for the identity of the Kadazan Dusun community, and therefore needs to be preserved. Education can also be used to preserve these art forms due to the increasing tendency of turning to modernity (Nasrifan, & Abdullah, 2025), there is a lack of opportunities for the younger generation to gain insight about traditional music. Cultural assets are also expected to be protected and developed using knowledge and information technologies. Respectively, it is appropriate to propose inclusion of the Gong music ensemble with other Sabah ethnic music genres into education curricula in colleges and universities. Respectively, it is necessary to prepare the Gong music curriculum for its constructive delivery as well as assessment in line with current educational practices. This entails that there are multiple stakeholders that need to work together in order to ensure the effective use technology in the preservation of cultural systems, which through collaboration will seek to design memorable and meaningful learning experiences. Furthermore, the application of business models that support technics promotes cross-cultural understanding through the preservation of the cultural inheritance for the next generations. As a result, building this first effort into a curriculum on the teaching of musical instruments in ethnic music ensembles particularly the Gong is critical in ensuring safeguarding and sustainability of the cultural heritage.

ACKNOWLEDGEMENT

The article is based on the Fundamental Research Results (FRGS), Code: 2020-0260-108-02, titled: Formulating a Model of Cultural Preservation Through the Use of Digital Technology in Teaching and Learning Mengagong Music Ensembles in Formal Educational Institutions. Financed by the Ministry of Higher Education Malaysia.

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