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DESIGN AND CONTENT VALIDATION OF BOMO-GAME: A GAMIFIED AND CULTURALLY RESPONSIVE MODULE FOR MONGOLIAN FOLK SONG AND BAMBOO FLUTE LEARNING

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ABSTRACT

This research developed and verified the BOMO-GAME module, which is a gamified and culturally responsive teaching module for the learning of Mongolian folk songs and bamboo flutes. Gamification is most effective when game mechanics are effectively aligned with learning objectives and the cultural background of the nation, especially in the field of music education, as technical skills, emotional investment, identity recognition and cultural significance are closely linked. Meanwhile, culturally responsive teaching emphasizes integrating learners' cultural references, life experiences and value systems into the curriculum and teaching. To address the issue of insufficient integration between students' in-depth understanding of ethnic music culture and teaching, this study adopts a research method that combines module development and content verification. The research employs the Fuzzy Delphi Method (FDM) to obtain the consensus of experts on the core objectives and design elements of the module. The research results support the content validity of BOMO-GAME and indicate that it provides a culturally based and teaching content for Mongolian folk songs and bamboo flute instruction.

Keywords: Gamification Culturally responsive teaching Fuzzy Delphi method Music education Mongolian folk song and bamboo flute.

1.0 INTRODUCTION

Gamification has become an important strategy in the field of education because it enhances learning engagement through game design elements such as points, badges, leaderboards, levels, and feedback (Toda et al., 2019). The educational value of gamification does not merely stem from increased rewards. Its teaching effectiveness depends on whether the game mechanisms are meaningfully connected to learning objectives and the social and cultural context in which learning occurs. At the same time, culturally responsive teaching (CRT) emphasizes that meaningful learning takes place when teaching incorporates students' cultural references, life experiences, and value systems as integral parts of the curriculum and pedagogy. In music education, this perspective is particularly important for traditional and ethnic music, as the transmission of repertoire, style, symbolic meaning, and performance practices cannot exist independently of their cultural context. Therefore, a learning module for Mongolian folk songs and bamboo flute should not only teach how to play but also cultivate students' understanding of the cultural world embedded in the instrument.

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Research on gamification and culturally responsive music education is growing, but these two research paths are rarely integrated into a unified design framework for ethnic music learning. Most gamification studies focus on general participation outcomes, while culturally responsive music education often emphasizes representation, identity, and pedagogy but provides few systematic motivational design models. This gap indicates the need to construct a teaching module that systematically integrates these two dimensions.

The goal of this research is to develop and validate the design structure of BOMO-GAME, making it a teaching module for Mongolian folk songs and bamboo flute learning that combines gamification and culturally responsive features.

2.0 LITERATURE REVIEW

2.1 Gamification and Learning Motivation

Gamification research has consistently argued that game elements are most educationally productive when they are tied to meaningful learning actions rather than appended as isolated rewards. Deterding et al. (2011) provided the foundational definition of gamification, while Kapp (2012) translated game-thinking into instructional design principles for education and training. Hamari et al. (2014) reviewed empirical studies on gamification and concluded that many interventions report positive effects, especially on engagement and motivation, although effects vary by context and design quality.

Landers (2014) further explained that gamification does not automatically produce learning. Instead, it affects learning-related behaviors or attitudes, which then mediate or moderate instructional outcomes. This theoretical perspective is particularly relevant for music learning, where persistence, repetition, and immediate feedback are central to skill development. In addition, self-determination theory suggests that learning environments are more intrinsically motivating when they support autonomy, competence, and relatedness (Ryan & Deci, 2000), all of which may be activated by well-designed gamified music tasks.

2.2 Culturally Responsive Teaching in Music Education

Culturally responsive teaching places culture at the center of teaching and learning. Ladson-Billings (1995) argued that culturally relevant pedagogy should support academic success, cultural competence, and critical consciousness, while Gay (2018) elaborated CRT as a theory and practice of teaching through students' cultural strengths and frames of reference. In music education, this perspective is especially consequential because musical knowledge is embodied in social and cultural practice, not merely in decontextualized technique.

Bond (2017) demonstrated that culturally responsive education in music education requires more than adding culturally diverse songs to a curriculum. It involves aligning pedagogy with students' cultural experiences and designing learning environments that validate varied forms of musical knowing. Related scholarship in music teacher education has shown that culturally responsive education has become a significant thread in music education discourse and requires attention to classroom practice, community connection, and teacher preparation (Bond & Russell, 2019; Lind & McKoy, 2022).

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2.3 Fuzzy Delphi Method in Instructional Module Validation

The Delphi method has long been used to obtain structured expert consensus, and fuzzy extensions were introduced to better represent ambiguity in human judgment. A pilot study of fuzzy set modification of Delphi was reported by Murray et al. (1985). In educational design, FDM has been widely used to validate module components, prioritize indicators, and filter design features before classroom implementation. Recent reviews and applications in educational contexts suggest that FDM is particularly suitable when researchers need to decide which proposed items should be retained, revised, or eliminated based on expert agreement and linguistic uncertainty.

3.0 METHOD

3.1 Research Design

This study adopted a design-and-development perspective and used the Fuzzy Delphi Method to validate the content structure of the BOMO-GAME module. The module was conceptualized as a culturally grounded gamified learning design for Mongolian folk song and bamboo flute instruction. The validation stage focused on determining whether proposed game mechanics and culturally responsive learning objectives were sufficiently important and coherent to be included in the final module.

3.2 Expert Panel

The expert panel consisted of 11 specialists with backgrounds in Mongolian music, bamboo flute performance and teaching, Mongolian music composition, Mongolian dance, and music education. The panel included 7 men and 4 women. All experts had at least five years of professional experience, with the longest experience reported as 41 years. The diversity of expertise was intended to ensure theoretical relevance, cultural authenticity, and instructional feasibility in the validation process. See table 1.

3.3 Instruments and Validation Criteria

Two expert questionnaires were administered. Questionnaire 1 focused on gamification elements, and Questionnaire 2 focused on culturally responsive teaching elements. The study converted the 7-point Likert responses into triangular fuzzy numbers and calculated threshold values, expert consensus percentages, and defuzzification values. The acceptance criteria reported in the dataset were threshold value $d \leq 0.25$, expert consensus $\geq 75\%$, and defuzzification value $A \geq 0.50$. Items that failed to meet these criteria were rejected from the final construct.

3.4 Data Source and Analytic Scope

The present article is based on the user-provided Chapter 5 material, which reports the expert validation stage of the module. Accordingly, the analysis below is limited to content validation and construct integration. It does not claim learner-level effectiveness because no pretest-posttest or comparative intervention evidence was available in the provided source material.

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4.0 RESULTS

The FDM results indicate strong expert endorsement for most proposed BOMO-GAME elements. In the gamification questionnaire, 19 of 23 items were accepted, with expert consensus ranging from 81.82% to 100% for retained items and defuzzification values between 0.806 and 0.906 in the accepted set. In the CRT questionnaire, 8 of 10 items were accepted, with consensus between 81.82% and 90.91% and defuzzification values between 0.783 and 0.930 in the accepted set.

Across both questionnaires, the retained items suggest that experts strongly favored a design in which instrumental technique, cultural symbolism, language exposure, narrative immersion, and social participation are tightly integrated rather than segmented into unrelated activities.

4.1 Accepted Gamification Elements

Among the 23 gamification items, the highest-ranked item was “Practice the bamboo flute with Mongolian rhythm patterns” ($d = 0.100$, consensus = 90.91%, $A = 0.906$). This result indicates that experts viewed culturally specific rhythm practice as the central mechanism linking skill acquisition with authentic stylistic learning. The second-ranked item was “Complete a performance of a Mongolian folk song on the bamboo flute” ($d = 0.127$, consensus = 100%, $A = 0.900$), suggesting that full-song performance should remain a core target rather than isolated technical drills.

The third- to fifth-ranked items were “Mongolian yurt pattern badge” ($A = 0.885$), “Enjoying Mongolian music through games” ($A = 0.882$), and “Points for completing Mongolian folk song flute melodies” ($A = 0.873$). Taken together, these findings show that experts endorsed both symbolic and affective dimensions of gamification. Rewards were accepted not simply as external incentives but as culturally meaningful cues that support immersion and accomplishment.

4.2 Rejected Gamification Elements

Four gamification items were rejected: “Bamboo flute pattern badge,” “No penalty for performance errors,” “Mongolian music and cultural feedback,” and “Group-based flute challenges.” These items showed comparatively high threshold values and lower expert consensus. The rejection pattern is theoretically informative. First, experts preferred the culturally stronger “Mongolian yurt badge” over a more generic bamboo flute badge, indicating that symbolic rewards should carry explicit cultural meaning. Second, experts accepted repeatable practice but did not support a fully consequence-free system, implying that productive challenge should be preserved. Third, automatic feedback on cultural understanding was viewed with skepticism, perhaps because cultural meaning is better mediated by teacher discussion and reflection than by automated evaluation. Finally, experts preferred group competition embedded within structured levels over a stand-alone challenge format that might create excessive pressure or redundancy.

4.3 Accepted Culturally Responsive Teaching Elements

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Within the CRT questionnaire, the highest-ranked item was "Understanding emotional expression in Mongolian" (d = 0.087, consensus = 81.82%, A = 0.930). This suggests that emotional understanding was regarded as the most important cultural objective in the module. The second-ranked item was "Learning cultural background of Mongolian folk songs" (A = 0.883), followed by "Learning basic Mongolian greetings" (A = 0.853), "Simulating grassland music-life scenarios" (A = 0.847), and "Discuss Mongolian music with the family" (A = 0.840).

These results indicate that experts expected BOMO-GAME to move beyond technical instrumental training toward a broader conception of cultural-musical literacy. Students were expected not only to play melodies, but also to understand how Mongolian music communicates feeling, reflects lifestyle, and relates to language and family discussion.

4.4 Rejected CRT Elements

Two CRT items were rejected: "Using Mongolian cues during bamboo flute performance" and "Family support for classroom cultural tasks." Although both items remained close to the acceptance boundary, they failed to meet the reported expert-consensus criterion. This suggests that experts were more convinced by direct cultural-learning experiences inside the module than by support mechanisms that depended heavily on external family involvement or on linguistic prompts during performance itself.

4.5 Integrated BOMO-GAME Construct

After FDM screening, the retained items from both questionnaires were reorganized into a unified four-dimensional construct. The first dimension, motivation and rewards, includes points, badges, leaderboards, and level-based group competition. The second, learning process and skill progression, includes rhythm practice, melody practice, full-song performance, increasing difficulty, repeatable tasks, and immediate feedback. The third, cultural understanding and language integration, includes cultural background, emotional expression, lifestyle understanding, greetings, and vocabulary learning. The fourth, situated experience and social participation, includes storytelling, role-playing, simulated grassland scenarios, and family discussion.

This reorganization is not a simple aggregation of accepted items. Rather, it represents a design translation from expert consensus into an implementable instructional architecture. In this architecture, gamification answers how students stay engaged and track progress, whereas CRT answers what kind of cultural-musical understanding the learning process should cultivate.

5.0 DISCUSSION

5.1 Why the Highest-Ranked Items Matter

The highest-ranked items reveal that the BOMO-GAME design was not validated as a generic reward system. Instead, expert consensus concentrated on elements that joined technical practice with cultural specificity. Rhythm-pattern practice, full-song performance, emotional understanding, and cultural background all received strong endorsement. This pattern aligns with the argument that gamification works best when it reinforces meaningful learning behaviors rather than merely decorating the learning environment (Landers, 2014; Hamari et

al., 2014). It also supports culturally responsive scholarship showing that music learning becomes more meaningful when instruction connects performance skills to cultural context and human experience (Gay, 2018; Bond, 2017).

5.2 Theoretical Contribution

The most significant contribution of the study is its integration of two literatures that are often discussed independently. Gamification literature frequently focuses on motivation, engagement, and persistence, whereas CRT literature focuses on identity, relevance, and cultural validation. The BOMO-GAME construct shows that these can be treated as co-constitutive design dimensions. In practical terms, this means that culturally resonant content can strengthen the meaning of game mechanics, while game mechanics can give structure, momentum, and visibility to cultural learning tasks.

5.3 Design Implications for Music Education

For music educators, the findings suggest at least three design implications. First, instrumental modules should privilege culturally authentic stylistic and emotional goals, not only technical accuracy. Second, rewards and narrative devices should be culturally symbolic, as shown by the preference for the yurt badge over a generic bamboo flute badge. Third, social and situated activities such as role-play and family discussion can extend musical learning beyond classroom technique into broader cultural participation.

5.4 Limitations

This article is limited by the scope of the available source material. The reported evidence supports content validation through expert consensus, but it does not establish instructional effectiveness among learners. The study also relied on 11 experts, which is acceptable for Delphi-style validation but still represents a relatively small panel. Future studies should test the BOMO-GAME module with students, examine learning outcomes and cultural-identity development, and evaluate how different game mechanics influence motivation and musical performance over time.

6.0 CONCLUSION

This study developed and content-validated BOMO-GAME as a gamified and culturally responsive module for Mongolian folk song and bamboo flute learning. Using Fuzzy Delphi analysis, the study retained 19 Gamification items and 8 CRT items and integrated them into a four-dimensional construct. The results suggest that the strongest module design is one in which cultural understanding, emotional interpretation, instrumental skill progression, and motivational mechanics are designed as an integrated whole.

Methodologically, the study demonstrates how FDM can function not only as a consensus tool but also as a design filter for transforming expert judgments into a usable instructional architecture. Substantively, the study offers a model for ethnic music education in which engagement and cultural authenticity are not competing priorities but mutually reinforcing design goals. The next step is empirical classroom testing to examine whether the validated

BOMO-GAME construct improves participation, musical achievement, and cultural connection among learners.

6.1 Data Availability Statement

This manuscript was reconstructed from the expert-validation results reported in a user-provided chapter document. No additional learner-level dataset was available in the source material used for this draft.

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