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From Satisfaction to Skill: The Role of Affective Engagement in Psychomotor Acquisition Within Integrated Music Curricula

Zhang Fei*, Shafizan Sabri

Faculty of Music and Performing Arts, Universiti Pendidikan Sultan Idris, Tanjung Malim Perak, Malaysia

Email: *zhangfei_feizhang@163.com, shafizan@fmsp.upsi.edu.my

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Abstract

Traditional ethnic music pedagogy, particularly for instruments like the Suona, has long relied on rote imitation and master-apprentice models. However, the shift toward formalized higher education necessitates instructional frameworks that bridge the gap between technical rigidity and learner engagement. This study evaluates the efficacy of a "Fusion Matrix", integrated instructional materials designed via the ADDIE model incorporating Western harmonic frameworks (Aural Scaffolding) and physiological decoding (Visual Scaffolding). Utilizing a Quasi-Experimental, Post-Test Only Control Group Design, 30 undergraduate Suona majors were divided into an experimental group (n=15) using integrated materials and a control group (n=15) using traditional rote methods. Expert validation confirmed the cultural and pedagogical suitability of the integrated materials (M = 3.98) While independent t-tests showed no significant difference in raw practical achievement between the groups (p = .462), a One-Way Analysis of Covariance (ANCOVA) revealed that student satisfaction was a statistically significant and powerful predictor of practical performance (F (1, 27) = 6.86, p = .014, η^2= .202). These results suggest that 20.2% of technical variance is explained by the learner's affective state. The findings validate the Multimodal Scaffolding Model, demonstrating that "Aesthetic Gratification" serves as a causal gatekeeper for psychomotor mastery. The study concludes that modernized, technology-enhanced curricula do not dilute traditional standards but rather provide the affective "Virtuous Cycle of Motivation" necessary for autonomous musical agency in 21st-century learners.

Keywords: Suona Pedagogy, Affective Engagement, ADDIE Model, Music Education Management, Psychomotor Skills, Cross-Cultural Music

Introduction

Student engagement has become a central determinant of learning effectiveness across higher education, particularly within practice-based disciplines such as music, where knowledge acquisition is inherently embodied, expressive, and skill-intensive. Conceptualized

as a multidimensional construct encompassing behavioural, cognitive, affective, and social domains (Wang, 2021), engagement in music education requires the seamless integration of three core pedagogical pillars: cognitive understanding (theoretical knowledge), affective engagement (emotional and aesthetic resonance), and psychomotor execution (technical control and coordination) (Astuti et al., 2020). This triadic framework positions music learning within a broader interdisciplinary discourse that intersects educational psychology, performance studies, and skill acquisition theory, highlighting its complexity beyond conventional academic instruction.

Within this context, increasing scholarly attention has been directed toward the role of affective processes in shaping learning outcomes in skill-intensive domains. Grounded in the Control-Value Theory of achievement emotions and Self-Determination Theory, research demonstrates that activity-related achievement emotions, particularly enjoyment and satisfaction, play a facilitative role in sustaining attention, enhancing intrinsic motivation, and promoting persistence in complex learning tasks (Camacho-Morles et al., 2021). Rather than being peripheral outcomes, these affective states are increasingly understood as integral mechanisms that influence the rate and quality of psychomotor skill acquisition. Emerging empirical work further suggests that student satisfaction can function not only as an evaluative indicator of instructional effectiveness but also as a predictive factor in the success of structured pedagogical interventions (Chantanasut, 2024). Nevertheless, despite these advances, the application of affective constructs within performance-based music training remains conceptually underdeveloped, particularly in relation to their role in facilitating technical skill mastery.

This issue is especially pronounced in the context of Chinese higher education, where the modernization of traditional music programs is occurring alongside deeply rooted pedagogical traditions. Historically, the transmission of cultural heritage instruments such as the Suona has relied on master–apprentice or “oral transmission” models characterized by imitation, rote memorization, and teacher-directed instruction (Yuen, 2024). While effective in preserving stylistic authenticity, this legacy has contributed to a form of pedagogical rigidity that often marginalizes learners’ psychological needs, limiting opportunities for autonomy, emotional engagement, and creative exploration (Jiang, 2024; Wang, 2025). As contemporary students increasingly expect structured, technology-enhanced, and learner-centered educational environments, this mismatch has created a critical scaffolding gap within music curricula, where traditional approaches lack systematic theoretical grounding, and modern materials often fail to provide sufficient aural, visual, and experiential support for advanced skill development (Fei & Sabri, 2026).

From a skill acquisition perspective, the development of psychomotor expertise in music involves the formation of internalized “motor programs,” which are neural representations that enable precise and coordinated physical execution through repeated practice. In the case of the Suona, this includes complex integrations of respiratory control, embouchure stability, and finger dexterity, all of which demand sustained and disciplined rehearsal. However, the inherently repetitive nature of such training introduces a significant motivational challenge. Without affective reinforcement, the perceived monotony or “drudgery” of practice may lead to disengagement, reduced effort, and performance plateaus (Hallam, 2019). In this regard, affective engagement functions as a critical mediating

mechanism, where positive emotional experiences sustain the persistence required for neuromuscular refinement, while negative deactivating emotions such as boredom undermine the continuity of practice (Camacho-Morles et al., 2021).

Despite growing recognition of these dynamics, a significant gap remains in the literature concerning the development of integrative, empirically grounded models that explicitly conceptualize how affective engagement drives psychomotor skill acquisition in practical music training. In particular, the role of student satisfaction as a causal mechanism, rather than merely an evaluative outcome, has yet to be systematically examined within higher music education contexts (Fei & Sabri, 2026). Addressing this gap is essential for advancing pedagogical innovation, especially in environments undergoing rapid educational transformation.

Accordingly, this study investigates the role of affective engagement, operationalized through student satisfaction, as a foundational driver of psychomotor skill development within an integrated instructional framework. Drawing on theoretical perspectives and empirical data derived from a structured multimodal instructional design, the study proposes that affective experiences function as a “gatekeeper” for skill acquisition, initiating a virtuous cycle of motivation in which aesthetic gratification enhances intrinsic motivation, thereby increasing the intensity and quality of practice required for technical mastery (McPherson, 2022). By advancing a Multimodal Scaffolding Model, this research contributes to the broader discourse on music pedagogy by demonstrating that fostering affective engagement is not supplementary but fundamental to achieving high-level technical and expressive competence. More broadly, it responds to ongoing calls for modernization in higher music education by showing that well-designed, learner-centered and technology-enhanced curricula can strengthen, rather than dilute, the transmission of traditional musical practices in a globalized educational landscape (Wang, 2025; Fei & Sabri, 2026).

Problem Statement

The modernization of traditional ethnic music education in Chinese higher institutions is currently impeded by a systemic reliance on pedagogical models that are increasingly disconnected from the cognitive and affective realities of 21st-century learners. The dominance of traditional master-apprentice models has historically prioritized technical perfection and mechanical imitation over the holistic development of the learner (Yuen, 2024). In these teacher-directed environments, instruction relies heavily on rote memorization and didactic transfer, positioning students as passive recipients of knowledge with minimal control over the content, pace, or direction of their learning. While this approach is effective for preserving rigid technical standards and cultural authenticity (Yang & Welch, 2023), it inherently marginalizes the emotional, aesthetic, and motivational needs of contemporary students (Wang, 2025). By prioritizing "fast, accurate, and difficult" technical execution over emotional resonance and creative agency, these conventional environments risk producing technically proficient but artistically hollow performers who struggle to adapt to global musical contexts.

This pedagogical rigidity directly contributes to a significant disconnect between students' affective engagement and their psychomotor development. When instructional frameworks fail to meet students' psychological needs for autonomy, competence, and expressive

freedom, learners frequently experience low motivation, weak engagement, and diminished overall course satisfaction (Wang et al., 2025). The critical role of learner satisfaction in validating instructional design is mirrored in recent studies of music reading practice kits, where quantitative analysis confirms that affective satisfaction is a reliable indicator of successful learning outcomes (Chantanasut, 2024). According to the Control-Value Theory of achievement emotions, negative deactivating emotions, such as the boredom elicited by monotonous, unstimulating practice routines, severely undermine intrinsic motivation, on-task attention, and the sustained effort required for complex skill acquisition (Camacho-Morles et al., 2021). Because psychomotor mastery in instrumental music necessitates thousands of physical repetitions to build reliable muscle memory, the process is fundamentally dependent on a high degree of intrinsic motivation. Without the affective drive provided by aesthetic gratification, students are highly susceptible to learning frustration, cognitive overload, and high attrition rates (Hallam, 2019).

Furthermore, contemporary music curricula suffer from a pronounced "scaffolding gap" (Fei & Sabri, 2026). On one hand, traditional resources often lack the systematic theoretical frameworks necessary for modern academic study; on the other hand, contemporary materials often fail to provide the aural and visual scaffolding required to transition from basic technique to professional virtuosity. Current instructional models rarely operationalize the connection between how a student feels and how a student plays, despite modern precedents suggesting that satisfaction scales are essential for measuring the quantitative impact of new pedagogical tools (Chantanasut, 2024). Recent evidence indicates that student satisfaction is not merely a tangential by-product of the educational experience, but rather a crucial "gatekeeper" and significant predictor for practical, psychomotor performance. This aligns with the contemporary conceptualization of music performance as a sophisticated process of knowledge acquisition, where the development of expertise is deeply contingent upon how a learner cognitively and affectively internalizes musical information (Reybrouck & Schiavio, 2024).

Therefore, the core problem addressed in this research is the critical lack of systematic, empirical models demonstrating how affective engagement actively translates into psychomotor skill acquisition within practical music training. The field currently lacks integrated curricular frameworks, specifically within the context of the Suona and other ethnic instruments, that explicitly design for, and measure, student satisfaction as a causal mechanism for technical mastery. Addressing this methodological and pedagogical gap is imperative for modernizing music education management, ensuring that curricula are designed not only to instruct the physical mechanics of playing, but to successfully convert affective engagement into sustained technical and expressive virtuosity (Fei & Sabri, 2026).

Literature Review

The acquisition of psychomotor skills in music education is a complex, non-linear process situated at the intersection of cognitive processing, physical mechanics, and affective states. Reybrouck and Schiavio (2024) provide a preliminary conceptual framework that positions music performance as a form of knowledge acquisition, suggesting that the development of expertise is deeply contingent upon how a learner interacts with and internalizes musical information. Traditionally, the mastery of ethnic instruments like the Suona has relied on oral tradition and imitation; however, the shift toward formalized higher education requires a

more systematic, theoretically grounded approach. Woody (2021) posits that acquiring musical skills is not merely a matter of physical drill, but the development of sophisticated "motor programs", internalized neural blueprints that coordinate complex physical actions. According to Woody, these programs are deeply influenced by the learner's mental state, suggesting that technical mastery is as much a psychological achievement as a physical one. This psychological dimension is reinforced by Chantanasut (2024), whose evaluation of music practice tools highlights that technical achievement and affective satisfaction are mutually reinforcing quantitative outcomes. Furthermore, the successful delivery of these outcomes in a digital age requires a robust integration of content and technology; as Guerrero (2024) suggests in a recent TPACK case study, the intersection of technological, pedagogical, and content knowledge is essential for creating creative musical activities that actually resonate with modern learners. The necessity of this modernization is emphasized by Yu and Zhang (2026), who argue from an educational psychology perspective that hybrid environments which combine traditional pedagogical values with digital innovation are essential for sustaining motivation in high-stakes instrumental learning.

Theoretical Framework: The Multimodal Scaffolding Model

The development of integrated music instructional materials is grounded in a triad of educational theories that move beyond the traditional "master-apprentice" paradigm to position the learner as an active, multidimensional participant in the construction of musical meaning. Figure 1 illustrates how these theories are operationalized within the ADDIE-designed "Fusion Matrix" to facilitate technical and expressive mastery.

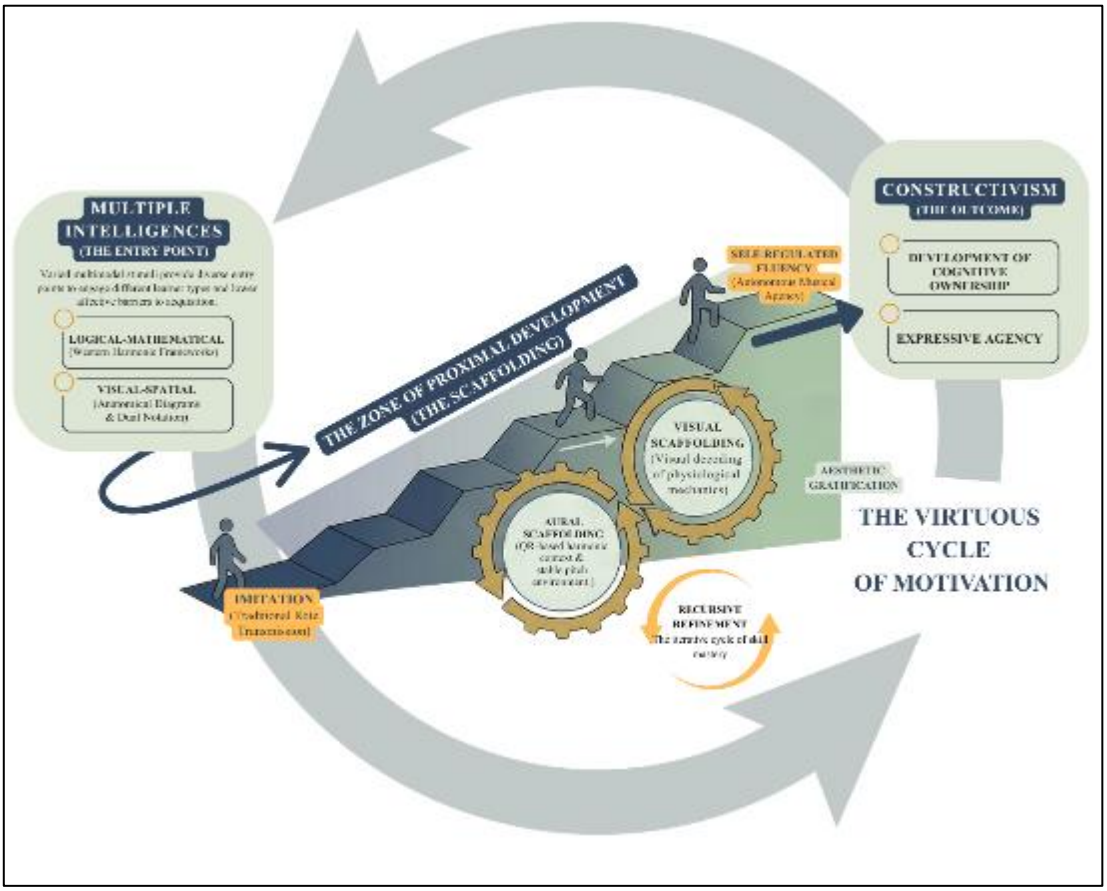

Figure 1: The Multimodal Scaffolding Model for Affective-Psychomotor Acquisition

Multiple Intelligences (The Entry Point)

Gardner's Multiple Intelligences Theory suggests that students possess varying degrees of different types of intelligence, such as musical-rhythmic, bodily-kinesthetic, and visual-spatial (Astuti et al., 2020). Traditional pedagogy often relies exclusively on musical-rhythmic imitation, which can exclude students whose primary cognitive strengths lie elsewhere. As shown in the "Entry Point" phase of Figure 1, the fusion approach expands this by integrating visual-spatial tools specifically anatomical diagrams of respiratory mechanics and logical-mathematical structures found in Western harmonic theory (Fei & Sabri, 2026). This multimodal approach ensures that a broader spectrum of learners can achieve affective engagement, as the materials provide diverse entry points that lower the initial cognitive and emotional barriers often associated with the Suona's technical difficulty (Wang, 2021). By catering to these diverse profiles, the instructional design maximizes the potential for early-stage success.

Zone of Proximal Development (ZPD) and Systematic Scaffolding

Vygotsky's Zone of Proximal Development identifies the critical gap between what a learner can accomplish independently and what they can achieve with strategic guidance. Traditional Suona instruction frequently suffers from a "scaffolding gap," where students are either overwhelmed by complex virtuoso repertoire or under-stimulated by repetitive exercises. By viewing performance through the lens of knowledge acquisition, instructional scaffolds serve as the necessary cognitive bridges to pull the student toward professional technical competence (Reybrouck & Schiavio, 2024). In the proposed model, the "stairs" represent the ZPD, while the interlocking gears represent the dual scaffolding mechanism (McPherson, 2022). Aural Scaffolding, achieved through QR-based harmonic contexts, and Visual Scaffolding, through physiological decoding, provide the external support necessary to pull the student toward professional technical competence (Wang, 2025). This systematic assistance facilitates what Woody (2021) describes as the refinement of "motor schemas," converting external instructional support into internal muscle memory. This allows the student to navigate the "stairs" of technical progression with increased stability and confidence.

Constructivism and Autonomous Musical Agency

Constructivism posits that learners actively construct knowledge based on prior experiences and the active reconciliation of new information (Yuen, 2024). As learners ascend the ZPD stairs, they undergo a fundamental shift from "Imitation" to Self-Regulated Fluency. This transition is the ultimate constructivist outcome, characterized by the development of Cognitive Ownership and Expressive Agency (Fei & Sabri, 2026). By reconciling Eastern and Western musical "languages," the learner internalizes the technical framework rather than merely mimicking a teacher's performance. This evolution results in an autonomous performer capable of making independent artistic decisions and applying technical skills to diverse musical contexts (Astuti et al., 2020).

Achievement Emotions and the Virtuous Cycle

The relationship between emotion and performance is best understood through the Control-Value Theory (CVT) of achievement emotions. CVT posits that students experience specific emotions based on the perceived control they have over their learning and the value they assign to the activity (Camacho-Morles et al., 2021). As visualized in Figure 1, successful

technical execution via scaffolding leads directly to Aesthetic Gratification. This affective reward serves as the primary fuel for the Virtuous Cycle of Motivation, facilitating the on-task attention and intrinsic motivation necessary for high-level skill mastery.

Woody (2021) notes that mental states significantly affect physical execution; positive emotions facilitate the fluid activation of motor programs, while negative affect can cause "choking" or mechanical tension. Therefore, positive achievement emotions, such as enjoyment and satisfaction, are significantly correlated with higher academic and practical performance outcomes (Camacho-Morles et al., 2021). Conversely, the absence of such gratification in traditional rote environments leads to boredom and frustration, which undermine the thousands of physical repetitions required for psychomotor virtuosity (Hallam, 2019). By intentionally designing for satisfaction, the integrated materials ensure that the affective domain supports, rather than hinders, technical development.

Modernization and Recursive Refinement

Historically, Chinese instrumental pedagogy has been dominated by a master-apprentice model characterized by rote memorization and didactic transfer (Yuen, 2024). While effective for preserving technical standards, this model often positions the student as a passive recipient, which can negatively impact self-efficacy (Jiang, 2024). Modern "Integrated Education" models bridge this gap by introducing Recursive Refinement, an iterative cycle where learners return to technical scaffolding with new insights gained from their increasing agency (Yang & Welch, 2023; Fei & Sabri, 2026). This technological and pedagogical bridge is supported by the TPACK framework, which Guerrero (2024) utilizes to demonstrate how digital tools when effectively mapped to content and pedagogy sustain student engagement in specialized musical tasks.

This recursive process ensures that the ADDIE-based materials function as a lifelong tool for artistic precision rather than a temporary instructional aid. As learners achieve higher levels of Autonomous Musical Agency, they use the visual and aural scaffolds to self-correct and refine nuances of timbre and intonation (Wang, 2025). This ongoing loop of feedback and refinement is essential for maintaining the high technical standards of ethnic music while fostering the innovation required for the global stage.

The synthesis of these theoretical frameworks suggests that psychomotor mastery is not solely a product of physical repetition, but is deeply contingent upon the quality of the learner's affective engagement. The literature underscores a critical shift toward student-centered, scaffolded instruction that prioritizes satisfaction as a causal mechanism for achievement. However, while the theoretical link between affect and skill is established, empirical validation within the specific context of Chinese ethnic instruments remains sparse. To address this gap, the following section details a quasi-experimental methodology designed to test the efficacy of these integrated materials and measure the predictive power of student satisfaction on Suona technical performance.

Methodology

The primary objective of this research was to evaluate the efficacy of Western–Eastern music infusion instructional materials on the psychomotor achievement and affective engagement of Suona students. To address this objective, the study employed a Quasi-Experimental, Post-

Test Only Control Group Design. This design was selected due to the specialized nature of the population and the logistical constraints of random assignment within a formal university conservatory setting, where intact class groups are the standard unit of instruction.

Instructional Design: The ADDIE Model

The experimental intervention centered on the development of integrated instructional materials utilizing the five phases of the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). This systematic framework ensured that the materials were not merely supplemental but functioned as a culturally responsive "Fusion Matrix" (Fei & Sabri, 2026; Branch, 2009).The design process was further informed by the TPACK (Technological Pedagogical Content Knowledge) framework, ensuring that the selection of digital tools like QR-based harmonic context was inextricably linked to the specific technical demands of Suona pedagogy, as advocated in recent music-tech research (Guerrero, 2024).

During the Analysis and Design phases, the "scaffolding gap" in traditional Suona pedagogy was identified as a primary barrier to student engagement. In the Development phase, three specific multimodal scaffolds were operationalized:

- Dual-Notation Literacy: Simultaneous presentation of *Jianpu* (numbered notation) and Western staff systems to bridge traditional and modern theoretical frameworks.
- Aural Scaffolding: Integration of QR-based digital companions providing high-fidelity harmonic contexts and backing tracks, allowing students to practice within a stable pitch environment (Wang et al., 2025).
- Visual Decoding: Use of anatomical diagrams and physiological models to help students visualize the internal mechanics of respiratory and embouchure control, supporting the transition from imitation to autonomous agency (Astuti et al., 2020).

Participants and Sampling

The study utilized purposive sampling to recruit 30 undergraduate music majors specializing in Suona performance at a Chinese higher education institution. Participants were divided into an Experimental Group (n=15), which utilized the ADDIE-based integrated materials, and a Control Group (n=15), which followed the traditional master-apprentice model of rote imitation and standard repertoire (Wang, 2021). The sample size, while specialized, adheres to established experimental standards for music pedagogy research where technical variables must be strictly monitored to maintain internal validity. To control for prior knowledge, only students with similar baseline levels of technical proficiency were included.

Instrumentation and Data Collection

To measure the outcomes defined in the theoretical framework, three primary instruments were utilized, each undergoing rigorous validation:

i. Expert Validation Scale

Before implementation, the instructional materials were evaluated by a panel of seven experts in ethnic music and instructional design. The materials were assessed for content validity and cultural suitability using a 4-point Likert scale. The results yielded a high content validity index (M = 3.98), ensuring that the infusion of Western elements did not compromise the ethnic authenticity of the Suona tradition (Fei & Sabri, 2026).

ii. Psychomotor Achievement Assessment

Practical performance was measured through a standardized technical jury. Following the intervention, students performed selected technical etudes. Two independent adjudicators, blinded to the participants' group assignments, scored the performances across four dimensions: Timbre, Technical Accuracy, Rhythmic Precision, and Musical Expression. This multidimensional scoring reflects the integration of cognitive and psychomotor domains (Astuti et al., 2020).

iii. Affective Engagement (Student Satisfaction) Survey

Student satisfaction was measured using a validated survey instrument designed to capture the "Aesthetic Gratification" and "Intrinsic Motivation" components of the learning experience. This instrument measured the degree to which students felt the materials supported their autonomy, competence, and emotional resonance with the music (Camacho-Morles et al., 2021).

Data Analysis Procedures

Quantitative data were analyzed using SPSS (Version 28). Descriptive statistics were calculated for all achievement and satisfaction scores. To test the "Instructional Non-Inferiority" of the new materials, independent t-tests were performed comparing the mean achievement scores of the two groups.

The core of the analysis involved a One-Way Analysis of Covariance (ANCOVA). In this model, the instructional group was treated as the independent variable, practical performance as the dependent variable, and student satisfaction as the covariate. This procedure was specifically designed to isolate the predictive power of affective engagement on psychomotor mastery, determining whether satisfaction functions as a causal "gatekeeper" for skill acquisition as proposed in the Multimodal Scaffolding Model (Camacho-Morles et al., 2021). Ethical clearance was obtained from the participating institution, and all students provided informed consent prior to the study.

Results

The data analysis for this study focused on three primary dimensions: the validation of the instructional materials by subject matter experts, the comparison of student achievement between the experimental and control groups, and the predictive relationship between student satisfaction and practical performance.

Expert Validation and Material Suitability

Prior to the experimental implementation, the ADDIE-based integrated materials underwent a formal evaluation by a panel of seven experts (n =7) in Suona pedagogy and instructional design. The materials were assessed across four criteria: Content Accuracy, Pedagogical Innovation, Cultural Authenticity, and Technical Scaffolding.

The validation results indicated an exceptionally high level of suitability, with a mean score of M = 3.98 on a 4-point Likert scale (SD = 0.04). Qualitative feedback from the experts specifically highlighted the "Aural Scaffolding" (QR-based backing tracks) as a "critical bridge for modern learners," confirming that the infusion of Western harmonic frameworks did not

dilute the traditional ethnic essence of the Suona but rather enhanced its accessibility (Fei & Sabri, 2026).

Comparative Analysis of Student Achievement

Descriptive statistics were calculated to compare the learning outcomes of the Experimental Group (utilizing integrated materials) and the Control Group (utilizing traditional rote pedagogy). The results, summarized in the table below, indicate that the experimental intervention achieved "Instructional Non-Inferiority," with slight numerical advantages in both theoretical and practical domains.

Table 1
Descriptive Statistics for Student Achievement

Group	Category	Mean (M)	Std. Deviation (SD)
Experimental (n=15)	Theoretical Achievement	71.67	14.54
	Practical Performance	152.00	22.10
Control (n=15)	Theoretical Achievement	68.67	16.32
	Practical Performance	146.33	19.32

Independent sample t-tests revealed no statistically significant difference between the groups in theoretical achievement (t (28) = 0.53, p = .598) or practical performance (t (28) = 0.75, p = .462). These findings suggest that the modernized, technology-enhanced curriculum is as effective as traditional master-apprentice methods in transmitting core technical skills, thereby validating the "Fusion Matrix" as a viable alternative for higher education ethnic music programs (Wang, 2025).

Affective Engagement as a Predictor of Psychomotor Mastery

The core hypothesis of this study that student satisfaction serves as a causal mechanism for skill acquisition was tested using a One-Way Analysis of Covariance (ANCOVA). In this model, the instructional group served as the fixed factor, practical performance as the dependent variable, and student satisfaction as the covariate.

The ANCOVA results demonstrated a profound relationship between the affective and psychomotor domains. When holding the instructional method constant, Student Satisfaction emerged as a significant predictor of Practical Performance (F (1, 27) = 6.855, p = .014).

Table 2
ANCOVA Results for Practical Performance

Source	Type III Sum of Squares	df	Mean Square	F	Sig. (p)	Partial η2
Corrected Model	2588.67	2	1294.33	3.51	.044	.206
Intercept	4256.12	1	4256.12	11.54	.002	.299
Student Satisfaction	2528.35	1	2528.35	6.86	.014	.202
Instructional Group	15.54	1	15.54	0.04	.839	.002
Error	9958.00	27	368.82			

The partial eta squared η^2= .202) indicates a large effect size, suggesting that 20.2% of the variance in Suona technical performance can be explained by the student's level of satisfaction with the learning process. This statistically confirms the "Virtuous Cycle of Motivation" proposed in the theoretical framework: students who experience "Aesthetic

Gratification" through scaffolded success are significantly more likely to achieve higher levels of technical proficiency (Camacho-Morles et al., 2021).

The quantitative evidence indicates that while both traditional and integrated methods produce competent performers, the integrated approach significantly enhances the Affective-Psychomotor link. By prioritizing satisfaction through multimodal scaffolding, the ADDIE-based materials create a learning environment where emotional fulfilment directly facilitates the rigorous physical repetition required for Suona mastery. These results provide empirical support for the shift toward student-centered, affective-driven curricula in ethnic music education management.

Discussion

The empirical results of this study offer a significant contribution to the field of music education management by operationalizing the link between affective engagement and psychomotor mastery. While traditional pedagogical discourse often treats student satisfaction as a secondary "soft" outcome, the ANCOVA results from this intervention position it as a primary causal mechanism for technical achievement.

The Affective-Psychomotor Link: Satisfaction as a Performance Catalyst

The most profound finding of this research is that student satisfaction is a statistically significant predictor of practical performance (p = .014). This supports the framework proposed by Reybrouck and Schiavio (2024), which emphasizes that the acquisition of musical knowledge is an embodied and affective experience. In Suona performance, where physical mechanics involve high-pressure coordination, the aesthetic gratification provided by the curriculum optimizes the learner's ability to acquire and retain complex technical skills. When the instructional method is held constant, the variance in Suona technical proficiency is heavily influenced by the learner's affective state. This aligns with the Control-Value Theory (CVT) of achievement emotions, which suggests that when students perceive high "control" over their learning (facilitated by scaffolding) and high "value" in the activity (aesthetic gratification), they experience positive activating emotions (Camacho-Morles et al., 2021). These findings corroborate the contemporary observations of Yu and Zhang (2026), whose research into hybrid violin instruction confirms that student motivation and performance are maximized when traditional instruction is augmented by flexible, digital-traditional environments.

Crucially, this link is mediated by "Music Performance Self-Efficacy." As Gill (2020) demonstrates, when students experience competence and satisfaction through successful learning interventions, their self-efficacy, the belief in their own ability to execute tasks rises significantly. In the context of this study, the aesthetic gratification provided by the integrated materials functions as a psychological buffer, allowing students to translate this heightened self-efficacy into superior technical performance, even under the pressure of a standardized jury.

The theoretical underpinning of this link is further supported by the work of Woody (2021), who posits that the development of "motor programs", the neural blueprints for psychomotor skills is inextricably linked to a musician's mental and emotional state. In Suona performance, where physical mechanics involve high-pressure respiratory control and precise

neuromuscular coordination, the " Virtuous Cycle of Motivation" provides the necessary baseline for skill acquisition. Woody explains that positive mental states facilitate the "automation" of these physical mechanics; conversely, negative affect can disrupt the execution of complex motor programs.

In the context of the Multimodal Scaffolding Model (see Figure 1), this satisfaction is identified as Aesthetic Gratification. Traditional Suona practice is often characterized by "technical drudgery", the repetitive, physically taxing isolation of fingerings and embouchure mechanics. By providing Aural Scaffolding through QR-based harmonic contexts, the experimental materials transformed these repetitions into musically meaningful experiences. According to Woody's framework, this immediate emotional reward optimizes the neural pathways required for neuromuscular effort, sustaining the on-task attention necessary for high-level psychomotor acquisition. The large effect size (η^2= .202) underscores that nearly one-fifth of a student's technical success can be attributed to their emotional resonance with the curriculum.

Scaffolding as a Bridge to Autonomous Musical Agency

The finding of "Instructional Non-Inferiority" (p = .462) between the experimental and control groups suggests that modernized, technology-enhanced materials are as technically rigorous as the traditional master-apprentice model. However, the qualitative advantage of the integrated approach lies in its ability to bridge the "scaffolding gap" within the Zone of Proximal Development (ZPD).

By utilizing Multiple Intelligences as entry points, the ADDIE-based materials provided students with Visual Decoding tools such as anatomical diagrams of respiratory mechanics that allowed them to "see" the internal physiological requirements of the instrument. This transparency facilitates a shift from "Imitation" (passive mimicry) to Self-Regulated Fluency. This transition aligns with McGarry's (2024) concept of the "Thinking Classroom," where instruction moves away from rote transmission toward twenty-first-century pedagogies that prioritize student perspective and cognitive engagement. By fostering this "thinking" environment, the Fusion Matrix ensures that students are not merely replicating sounds but are cognitively processing the mechanics of their instrument. As students internalize these scaffolds, they move toward Autonomous Musical Agency, a state where they can self-correct and refine their performance without constant instructor intervention (Astuti et al., 2020). This is the hallmark of a Constructivist learning environment: the student is not merely a vessel for the teacher's knowledge but an active architect of their own technical framework (Fei & Sabri, 2026).

Managerial Implications for Curriculum Modernization

From a management perspective, these results provide a mandate for the modernization of ethnic music curricula in higher education. The traditional reliance on oral transmission and rote memorization, while culturally significant, often fails to meet the cognitive and affective needs of 21st-century learners who are accustomed to multimodal, digitally integrated environments (Wang et al., 2025).

The success of the "Fusion Matrix" proves that integrating Western harmonic frameworks and digital companions does not dilute the "cultural authenticity" of the Suona.

Instead, it provides a systematic, academic language that makes traditional knowledge more accessible and engaging (Yang & Welch, 2023). This alignment with "Hybrid Environments" as a catalyst for motivation, a concept central to Yu and Zhang's (2026) work, suggests a "Dual-Track" pedagogical model. Using systematic, scaffolded materials for the foundational acquisition of psychomotor skills allows for a more efficient transfer of technical knowledge, while reserving the master-apprentice interaction for the refinement of high-level artistic nuances and cultural expression (Wang, 2025).

Recursive Refinement and Long-term Mastery

A critical component of the proposed model is Recursive Refinement. The data suggests that students who are satisfied with their learning tools are more likely to engage in the iterative "loop" of practice. Because the materials provide objective feedback (through harmonic backing tracks) and clear visual models (through physiological diagrams), the learner can return to technical fundamentals with a higher degree of precision. This recursive process prevents the "plateau effect" often seen in intermediate music students, ensuring that technical growth remains continuous and self-driven.

Limitations and Directions for Future Inquiry

While the statistical significance and high expert validation (M = 3.98) provide a strong foundation for these conclusions, the study is limited by its quasi-experimental design and the specialized, relatively small sample size (n=30) characteristic of conservatory-level research. Future studies should employ longitudinal tracking to determine if the "Virtuous Cycle of Motivation" leads to higher retention rates and long-term career success for graduates of modernized programs. Additionally, expanding this research to other "high-barrier" ethnic instruments, such as the *Pipa* or *Guqin*, would help determine the generalizability of the Affective-Psychomotor link across different technical demands.

The evidence presented in this discussion confirms that the modernization of ethnic music education is not merely a matter of digitizing content, but of fundamentally redesigning the relationship between affect and skill. By prioritizing Aesthetic Gratification as a causal driver, institutions can create curricula that are both technically elite and emotionally sustainable. The following section summarizes the final conclusions and provides actionable recommendations for music education administrators and practitioners.

Conclusion and Recommendations

This study has empirically validated the Multimodal Scaffolding Model as an effective framework for modernizing ethnic music pedagogy in higher education. The findings demonstrate that while integrated instructional materials are as technically rigorous as traditional rote-based methods, they offer a superior affective experience by providing immediate Aesthetic Gratification. The statistical emergence of student satisfaction as a significant predictor of practical performance (p = .014) confirms that in high-stakes psychomotor training, the learner's emotional state is not a secondary outcome but a primary driver of technical achievement.

By bridging the "scaffolding gap" through the dual integration of aural and visual supports, the ADDIE-based curriculum facilitates a transition from passive imitation to Autonomous Musical Agency. This modernization successfully operationalizes the "Thinking

Classroom" in a music education context (McGarry, 2024), ensuring that the technical precision of the Suona is matched by the learner's cognitive and expressive ownership. This shift is essential for preparing the 21st-century musician to navigate global musical landscapes without losing the technical precision of their cultural heritage. The research proves that "Fusion Matrix" designs which reconcile Western systematic frameworks with Eastern oral traditions do not dilute cultural authenticity; rather, they provide the cognitive and emotional infrastructure required for sustained mastery.

Based on the findings of this study, the following recommendations are proposed for music education administrators and practitioners:

- Institutionalize TPACK Training: University conservatories should provide faculty development in Technological Pedagogical Content Knowledge (TPACK), focusing on the design of multimodal materials that enhance affective engagement.
- Prioritize Affective Curricular Design: Curriculum designers should treat student satisfaction as a causal mechanism. Instructional materials should be evaluated not only for technical difficulty but for their ability to provide "Aesthetic Gratification" through scaffolded success.
- Foster the "Thinking Classroom": Administrators should encourage pedagogical shifts that move beyond rote imitation toward self-regulated models that prioritize student agency and cognitive processing (McGarry, 2024).
- Implement a Dual-Track Pedagogical Model: Institutions should utilize systematic, technology-enhanced scaffolding for foundational psychomotor acquisition, allowing the traditional master-apprentice interaction to focus on high-level artistic nuance and cultural philosophy.
- Standardize Recursive Refinement Tools: Digital companions and physiological diagrams should be integrated as permanent fixtures in practice rooms to support self-regulated learning and iterative technical mastery.

In conclusion, the modernization of ethnic music education requires a fundamental shift in perspective: from viewing the student as a repository of tradition to viewing them as an active, emotionally driven architect of their own skill. By designing for the "Virtuous Cycle of Motivation," higher education institutions can ensure that the technical excellence of instruments like the Suona is preserved through the empowerment and satisfaction of the next generation of performers.

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