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AN INTEGRATED TEACHING MECHANISM FOR CHAMBER MUSIC COURSES: COMBINING PROJECT-BASED LEARNING AND COOPERATIVE LEARNING

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ABSTRACT

Chamber music education in comprehensive universities often remains teacher-centered and insufficiently structured in terms of collaborative regulation. Although Project-Based Learning (PBL) and Cooperative Learning have been widely applied in arts and music education, their systematic integration within a coherent pedagogical mechanism for chamber music has received limited attention. This study aims to investigate instructional challenges, develop an integrated teaching mechanism grounded in PBL and Cooperative Learning principles, and evaluate its effectiveness in practice. Adopting a design-based research approach guided by the ADDIE framework, the study implemented a project-driven and cooperation-regulated instructional model within an undergraduate chamber music course. Data were collected through expert validation of instructional materials, expert performance evaluation, and qualitative thematic analysis. Findings indicate strong alignment between instructional objectives and procedures, alongside improvements in technical proficiency, ensemble coordination, and interpretative engagement. The results suggest that integrating project-based structure with cooperative interaction provides a mechanism-oriented framework that enhances structural coherence and collaborative depth in performance-based higher music education.

KEYWORDS: Project-Based Learning; Cooperative Learning; Chamber Music Education; Ensemble Pedagogy

1 INTRODUCTION

Chamber music holds a distinctive and indispensable position within higher music education due to its inherent emphasis on interaction, balance, and collaborative interpretation (Tahirbegi, 2023). Unlike solo performance training, which centers primarily on individual technical mastery, chamber music requires performers to engage in dialogic musical exchange, negotiate interpretative decisions, and co-construct expressive coherence (Hadar & Amir, 2021). It therefore functions not merely as a performance format but as a pedagogical arena in which ensemble awareness, musical sensitivity, and interpersonal competence are cultivated simultaneously. In comprehensive universities, where music programs are designed to foster well-rounded practitioners equipped with both artistic and pedagogical capacities, chamber music courses assume particular pedagogical significance (Tarpagkos, 2025).

Notwithstanding its recognized educational value, chamber music instruction in many higher education contexts remains predominantly teacher-centered and technique-oriented (Wang, 2021). Conventional instructional approaches frequently prioritize technical precision and fidelity to the musical score, while comparatively neglecting the cultivation of collaborative dynamics and structured learning processes (Qianqi et al., 2024). Rehearsals often depend on instructor-led correction rather than student-initiated inquiry, and ensemble cooperation tends to emerge incidentally rather than through intentionally designed pedagogical structures (Hennessy et al., 2021). Consequently, although students may exhibit measurable technical improvement, they often demonstrate limited ensemble cohesion, reduced interpretative agency, and insufficient reflective engagement.

In light of these challenges, contemporary educational discourse has increasingly emphasized learner-centered pedagogies that foreground authentic tasks, collaborative interaction, and reflective practice. Within this paradigm, Project-Based Learning (PBL) and Cooperative Learning have emerged as influential frameworks (Busnawir et al., 2025). PBL conceptualizes learning as a sustained process of inquiry driven by meaningful projects situated in authentic contexts, thereby encouraging learner autonomy and responsibility in knowledge construction (Lozano et al., 2022). Cooperative Learning, in contrast, focuses on structured group processes characterized by positive interdependence, individual accountability, and collective reflection (Ngoc Tuong Nguyen & Thi Kim Oanh, 2025). Conceptually, both frameworks resonate strongly with the collaborative and process-oriented nature of chamber music performance.

Despite their theoretical relevance, existing research in music education has tended to apply PBL and Cooperative Learning separately, with limited attempts to articulate a systematic integration of the two within a coherent instructional mechanism. Moreover, few studies have examined how these pedagogical frameworks may be deliberately combined to construct a sustainable and context-sensitive teaching mechanism specifically tailored to chamber music courses in comprehensive university settings. Thus, while the effectiveness of learner-centered approaches has been broadly acknowledged, the structural design, operational logic, and evaluative processes of an integrated mechanism remain underexplored.

To address this gap, the present study seeks to construct and examine an integrated teaching mechanism for chamber music courses grounded in the principles of Project-Based Learning and Cooperative Learning. Through structured classroom implementation and systematic empirical evaluation, this research aims to elucidate the pedagogical architecture, procedural dynamics, and educational outcomes of the proposed integrated approach.Accordingly, the objectives of this study are:

RO1: To develop an integrated teaching method for chamber music courses.

RO2:To evaluate the effectiveness of the developed teaching method in practice.

2. LITERATURE REVIEW

2.1 The Application of Project-Based Learning in Arts and Music Education

Project-Based Learning (PBL) has been widely recognized as a learner-centered pedagogical approach that organizes instruction around meaningful, inquiry-driven projects (Meng et al., 2023). Rather than transmitting knowledge through direct instruction alone, PBL situates learning within authentic tasks that require sustained engagement, problem-solving, and the production of tangible outcomes (Siregar, 2025). Research across various educational contexts has demonstrated that PBL promotes deeper conceptual understanding, learner autonomy, and intrinsic motivation by connecting academic content to real-world practices (Novalia et al., 2025).

Within arts education, PBL has been particularly valued for its compatibility with creative processes. Artistic production inherently involves iterative

exploration, collaborative negotiation, and public presentation—elements that closely align with project-based principles (Yu, 2024). Studies in visual arts and performing arts education suggest that PBL fosters creative thinking, enhances student ownership of learning, and supports reflective practice (Oo et al., 2024). By engaging students in extended artistic projects, educators create opportunities for experiential learning that integrate technical skill development with conceptual and expressive exploration.

In music education, the application of PBL has expanded in recent years, especially in areas such as composition projects, interdisciplinary arts integration, and performance-based coursework (Vasconcelos et al., 2023). Research indicates that project-based approaches can strengthen students' interpretative decision-making, contextual understanding of repertoire, and engagement in collaborative musical tasks (Xu & Li, 2025). For example, project-oriented performance modules have been shown to encourage students to assume greater responsibility for rehearsal planning, repertoire analysis, and artistic interpretation. Through structured project cycles, students move beyond passive reception of instructor feedback toward more active participation in knowledge construction and artistic problem-solving (Chen, 2026).

Despite these documented benefits, the implementation of PBL in music education has often emphasized task completion and product presentation without sufficiently articulating the internal interaction structures necessary for sustained ensemble collaboration (Barros & Penna, 2022). In performance-based contexts, particularly those involving small ensembles, effective learning depends not only on project organization but also on carefully structured interpersonal dynamics (Schiavio et al., 2022). However, relatively limited research has examined how PBL can be systematically adapted to support the intricate cooperative processes inherent in chamber music performance (Wang et al., 2025). Consequently, while PBL offers a powerful structural framework for organizing authentic musical projects, its pedagogical application in chamber music education requires further theoretical refinement and mechanism-oriented design (Rahmawati et al., 2026).

2.2 Cooperative Learning and Collaborative Dynamics in Music Education

Cooperative Learning has been extensively examined as a structured pedagogical approach that organizes students into small groups to achieve shared learning goals under conditions of positive interdependence and individual accountability (Yang, 2023). Grounded in social constructivist theory, Cooperative Learning emphasizes the social nature of knowledge construction, arguing that meaningful understanding emerges through interaction, dialogue, and collective problem-solving (Kiprianos & Stavropoulou, 2025). Core elements of this approach typically include positive interdependence, promotive interaction, individual responsibility, collaborative skills, and group processing. Together, these components establish a systematic framework for structuring peer interaction within educational settings.

In music education, Cooperative Learning has been widely regarded as particularly compatible with ensemble-based instruction (Bingham, 2025). Musical performance, especially in group contexts, inherently requires coordinated listening, responsive adjustment, and shared interpretative negotiation (Schiavio et al., 2021). Research in classroom music, choir, band, and ensemble settings suggests that structured cooperative strategies can enhance peer communication, improve rehearsal efficiency, and strengthen collective accountability (Bi & Rauduvaitė, 2025). By assigning clearly defined roles and responsibilities within groups, Cooperative Learning encourages students to engage more actively in rehearsal planning, musical analysis, and interpretative decision-making. Empirical studies further indicate that cooperative structures contribute to the development of social-emotional competencies alongside musical skills (José María et al., 2025). Students participating in structured cooperative environments often demonstrate increased confidence, improved interpersonal sensitivity, and greater willingness to assume leadership roles within ensembles. Moreover, collaborative reflection activities—such as peer feedback sessions and group evaluations—have been shown to deepen musical understanding and foster critical listening skills (Kruse-Weber et al., 2022). These findings highlight the pedagogical potential of Cooperative Learning to support not only technical performance outcomes but also the relational dynamics essential to ensemble cohesion. Nevertheless, despite its demonstrated effectiveness in facilitating interaction, Cooperative Learning in music education has frequently been implemented as a set of group management strategies rather than as part of a broader, project-driven instructional design (Rumiantsev et al., 2023). While cooperative structures enhance interpersonal engagement, they

do not inherently provide a comprehensive framework for organizing long-term artistic projects or integrating technical, interpretative, and performance-based goals within a coherent progression. In ensemble contexts such as chamber music, where extended rehearsal processes culminate in public performance, learning requires both structured collaboration and sustained project orientation (Bussu & Mangiarulo, 2024). However, relatively few studies have systematically examined how cooperative principles can be embedded within a project-based architecture to form an integrated pedagogical mechanism.

Thus, although Cooperative Learning offers a robust model for structuring interpersonal dynamics in music classrooms, its application in chamber music education remains largely interaction-focused rather than mechanism-oriented. This limitation suggests the need to explore how cooperative structures can be aligned with project-based frameworks to construct a more comprehensive instructional model tailored to the complex demands of chamber music performance.

2.3 Integrating Project-Based and Cooperative Learning: Implications for Chamber Music Pedagogy

The preceding review indicates that Project-Based Learning and Cooperative Learning each offer significant pedagogical value for music education, yet they emphasize different dimensions of the learning process. PBL provides a macro-structural framework that organizes instruction around sustained, authentic projects, enabling students to engage in extended inquiry and artistic production (Sánchez García & Reyes-de Cózar, 2025). Cooperative Learning, by contrast, concentrates on the micro-level dynamics of peer interaction, structuring collaborative processes to ensure positive interdependence and individual accountability (Yang, 2023). While both approaches align conceptually with the collaborative and process-oriented nature of musical performance, they address distinct pedagogical concerns.

Chamber music education, in particular, embodies characteristics that render the integration of these two frameworks especially pertinent. The rehearsal-to-performance cycle of chamber ensembles inherently reflects a project trajectory: repertoire selection, analytical preparation, iterative rehearsal, interpretative negotiation, and eventual public presentation (Pennill & Timmers, 2022). Simultaneously, effective chamber performance depends on intricate interpersonal coordination, including mutual listening, expressive synchronization, and shared artistic decision-making (Faraco et al., 2024). Thus, chamber music requires not only a coherent project structure but also carefully designed collaborative mechanisms. Addressing one dimension without the other may result in pedagogical imbalance—either a well-organized project lacking deep ensemble interaction, or active collaboration without sustained structural progression.

Despite this conceptual compatibility, existing research in music education has seldom articulated a systematic integration of PBL and Cooperative Learning specifically for chamber music contexts. Much of the literature remains descriptive, focusing on isolated teaching strategies or short-term interventions rather than on the construction of a sustainable, mechanism-oriented instructional model (Alisoy, 2025; Zhang et al., 2026). Moreover, few studies have examined how project design and cooperative structures can be deliberately aligned to form a coherent pedagogical architecture that supports technical development, interpretative depth, and ensemble cohesion simultaneously. The absence of a clearly defined integrated mechanism limits the scalability and replicability of learner-centered reforms in chamber music education (Guo, 2024). Without an articulated structural model, pedagogical innovations risk remaining context-dependent or instructor-specific. Therefore, there is a need for research that moves beyond the application of individual strategies toward the systematic construction and empirical examination of an integrated teaching mechanism tailored to chamber music courses in comprehensive university settings.

In response to this need, the present study seeks to bridge the theoretical and practical divide by developing and evaluating a pedagogical mechanism that intentionally combines the structural orientation of Project-Based Learning with the interactional framework of Cooperative Learning. By situating this integration within the specific context of chamber music education, this research aims to contribute to a more comprehensive understanding of mechanism-based instructional design in performance-oriented higher education.

3.THEORETICAL FRAMEWORK

Building upon the preceding review, this study conceptualizes an integrated teaching mechanism for chamber music courses by synthesizing the structural orientation of Project-Based Learning with the interactional framework of Cooperative Learning. Rather than treating these pedagogical

models as parallel strategies, the present framework positions them as complementary dimensions within a unified instructional architecture. Specifically, Project-Based Learning provides the macro-level organizational structure of the course, while Cooperative Learning governs the micro-level dynamics of ensemble interaction. Their integration forms a mechanism-oriented model designed to support technical development, interpretative depth, and collaborative cohesion in chamber music education.

3.1 Structural Dimension

Within the proposed model, Project-Based Learning functions as the external structural dimension that organizes the temporal and procedural progression of the chamber music course. Chamber music instruction naturally follows a project trajectory that includes repertoire selection, analytical preparation, iterative rehearsal, public performance, and reflective evaluation. By explicitly framing this trajectory as a structured project cycle, instructional activities are aligned with clearly defined stages and outcomes.

In this framework, the project begins with the identification of a complete musical work as the central task. Students engage in analytical exploration of stylistic features, formal structure, and interpretative challenges. Subsequent rehearsals are organized as iterative problem-solving sessions, during which technical and expressive issues are addressed in relation to the overarching artistic goal. The culmination of the project is a public performance, which serves not only as a product-oriented outcome but also as an authentic context that situates learning within real-world artistic practice. Finally, structured reflection enables students to evaluate both individual and collective progress, reinforcing metacognitive awareness.

Through this project-oriented progression, learning becomes sustained, goal-directed, and contextually meaningful. However, while PBL establishes the macro-structure of instruction, it does not inherently specify how ensemble members should coordinate, negotiate, and share responsibility during the rehearsal process. This necessitates the incorporation of a complementary interactional framework.

3.2 Interactional Dimension

Cooperative Learning constitutes the internal interactional dimension of the integrated mechanism. Within chamber ensembles, effective performance depends on intricate processes of mutual listening, expressive synchronization, and shared artistic decision-making. These processes are particularly evident in contrapuntal passages where melodic direction and rhythmic emphasis shift dynamically between voices.

As illustrated in Figure 1, the contrapuntal exchange between the viola and cello requires continuous adjustment of phrasing, articulation, and dynamic balance. The alternating melodic prominence and rhythmic counterpoint demand real-time interpretative negotiation rather than isolated technical execution. In such contexts, ensemble cohesion cannot rely solely on individual proficiency; instead, it emerges from structured interactive regulation, including active listening, anticipatory coordination, and shared interpretative planning.

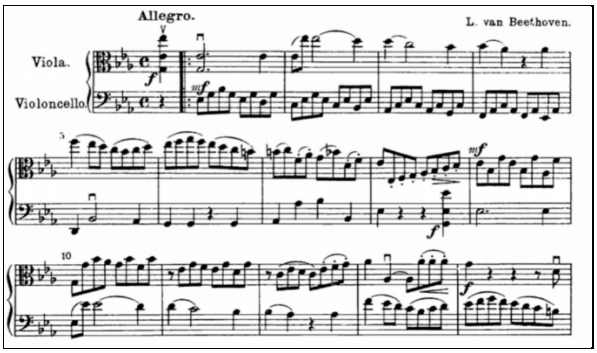

Figure 1 Rhythmic Counterpoint and Melodic Direction

Source: Beethoven's Viola and Cello Duet Mit Zwei Obligaten Augenglaesern (1939)

To support these processes, the framework incorporates key cooperative principles, including positive interdependence, individual accountability, structured peer interaction, and group reflection. Positive interdependence is established by clarifying the functional relationships among instrumental parts and emphasizing collective responsibility for interpretative coherence. Individual accountability is ensured through clearly defined rehearsal roles, such as thematic leader, rhythmic coordinator, or balance monitor, thereby preventing unequal participation and encouraging active engagement. Structured peer feedback sessions are embedded within rehearsal cycles to promote critical listening and dialogic evaluation. Additionally, group reflection activities at the end of each project phase foster collective analysis of both musical outcomes and collaborative processes.

By formalizing these cooperative elements, ensemble interaction moves beyond spontaneous

coordination toward intentionally designed collaboration. Nevertheless, cooperative structures alone may remain episodic if not embedded within a coherent project framework. Therefore, meaningful integration requires alignment between structural progression and interactional design.

3.3 The Integrated Mechanism Model

The integrated teaching mechanism proposed in this study emerges from the deliberate alignment of project-based structure and cooperative interaction. Conceptually, the model can be understood as comprising three interrelated components: (1) a project-driven instructional progression, (2) embedded cooperative role structures, and (3) a cyclical feedback loop connecting rehearsal, performance, and reflection.

At the macro level, the project cycle ensures sustained engagement and clear artistic objectives. At the micro level, cooperative principles regulate interpersonal dynamics and shared responsibility. The feedback loop functions as a mediating process, linking structural milestones with collaborative evaluation and continuous refinement. Through this alignment, technical skill development, interpretative exploration, and ensemble cohesion are addressed simultaneously rather than sequentially. Importantly, this mechanism-oriented approach moves beyond the application of isolated strategies toward the construction of a coherent pedagogical architecture. By articulating the structural and interactional dimensions within a unified model, the framework provides a systematic foundation for instructional implementation and empirical examination. The following section describes the research design and methodological procedures through which this integrated teaching mechanism was implemented and evaluated in practice.

4.METHODOLOGY

This study adopted a design-based research (DBR) approach grounded in the ADDIE instructional design framework. Design-based research is particularly suitable for pedagogical innovation in authentic classroom contexts, as it emphasizes the systematic development, implementation, and evaluation of instructional models within real educational environments. Rather than isolating variables under controlled laboratory conditions, DBR seeks to construct and refine instructional mechanisms through iterative practice and evidence-based reflection.

The instructional design of the chamber music course followed the five stages of the ADDIE model—Analysis, Design, Development, Implementation, and Evaluation.During the Analysis phase, learner needs and instructional challenges were identified. In the Design phase, specific teaching objectives and methodological strategies were formulated. The Development phase focused on preparing analytical materials, rehearsal tasks, and supporting resources. The Implementation phase involved the actual classroom execution of the integrated teaching mechanism. Finally, the Evaluation phase assessed instructional effectiveness through structured assessment tools and expert review.Table 1 presents the overall research design framework based on the ADDIE model.

Table 1 Research Design Framework Based on the ADDIE Model

ADDIE Phase	Core Focus	Research Function
Analysis	Identification of learner needs and instructional problems	Establish research foundation
Design	Formulation of teaching objectives and strategies	Construct pedagogical structure
Development	Preparation of materials and rehearsal tasks	Operationalize instructional plan
Implementation	Classroom teaching and rehearsal execution	Apply integrated mechanism
Evaluation	Formative and summative assessment	Examine instructional effectiveness

Table 1 illustrates how the instructional process and research process were aligned within a unified framework. Each stage functioned not only as a teaching procedure but also as a research step contributing to the construction and validation of the integrated pedagogical mechanism. Through this structured and iterative design process, the study aimed to construct a sustainable and context-sensitive teaching mechanism for chamber music courses, bridging theoretical integration and classroom practice.

4.2 Participants and Context

The study was conducted within the chamber music curriculum of a comprehensive university offering undergraduate programs in music performance. The institutional context emphasizes the cultivation of well-rounded musicians equipped with both artistic proficiency and collaborative competence. Within this framework, chamber music courses function as a central component of ensemble training and applied musicianship development.

Participants in the study consisted of 17 undergraduate music majors enrolled in the chamber

music course during the semester in which the instructional intervention was implemented. All participants had completed prior systematic individual instrumental training and demonstrated intermediate-level performance proficiency. The 17 students were organized into small chamber ensembles of three to four members according to repertoire requirements, forming a total of five groups. Although students possessed solid individual technical foundations, many entered the course with limited experience in structured ensemble collaboration, particularly in areas such as shared interpretative negotiation and role-based rehearsal regulation.

The course was organized around repertoire-based ensemble projects integrating analytical study, rehearsal practice, and public performance components. Students engaged in collaborative score analysis, sectional rehearsals, rotational leadership activities, and structured reflection sessions under instructor guidance. This authentic, performance-oriented classroom environment provided a suitable context for implementing and examining the integrated teaching mechanism.

In addition to the student participants, three external experts were invited to evaluate instructional materials and student performance outcomes during the evaluation phase. These experts reviewed lesson plans and supporting instructional resources using the Index of Item-Objective Congruence (IOC) method and assessed student performances according to structured evaluation criteria. Their involvement enhanced the methodological rigor and internal credibility of the study. The combination of authentic classroom implementation (n = 17) and expert validation (n = 3) ensured that the research was situated within a realistic educational setting while maintaining systematic evaluative procedures.

4.3 Instructional Intervention

The instructional intervention was implemented within the framework of the ADDIE instructional design model, integrating Project-Based Learning and Cooperative Learning principles into the chamber music course. The intervention transformed the traditional rehearsal-centered format into a structured, project-driven learning cycle aligned with the five stages of ADDIE.

4.3.1 Project-Based Structural Organization

The course was organized around complete repertoire projects, in which each musical work functioned as a central learning task. Instruction followed a progressive sequence from analytical exploration to performance realization. Consistent with the design principles outlined in the original curriculum, learning activities were structured in a gradual progression from theoretical analysis to ensemble execution.

During the Analysis phase, students examined formal structure, harmonic progression, thematic development, and stylistic characteristics of the repertoire. In the Design phase, instructional objectives were clarified, and rehearsal strategies were planned. The Development phase involved the preparation of analytical tasks, sectional rehearsal exercises, and listening materials. Implementation occurred through guided ensemble rehearsals and collaborative interpretation sessions. Finally, Evaluation included both formative assessment during rehearsals and summative evaluation following performance.Table 2 summarizes the alignment between instructional stages and pedagogical functions.

Table 2 Structure of the Instructional Intervention

ADDIE Phase	Instructional Activities	Pedagogical Purpose
Analysis	Formal and harmonic analysis of repertoire	Establish theoretical foundation
Design	Goal setting and rehearsal planning	Clarify learning objectives
Development	Preparation of tasks and materials	Operationalize instruction
Implementation	Ensemble rehearsal and interpretative negotiation	Apply integrated mechanism
Evaluation	Formative and summative assessment	Measure learning outcomes

4.3.2 Cooperative Learning Integration

To ensure that ensemble interaction was pedagogically structured rather than incidental, cooperative learning elements were deliberately embedded throughout the rehearsal cycle. Students were organized into chamber ensembles and engaged in structured collaborative procedures designed to regulate participation and enhance collective responsibility.

During analytical preparation, students conducted group-based score analysis, discussing harmonic structure and thematic relationships. In rehearsal sessions, sectional coordination was emphasized before returning to full ensemble practice. Leadership roles rotated among members to promote individual accountability and prevent passive engagement. Structured peer feedback sessions were conducted regularly, focusing on ensemble cohesion, tonal balance, and expressive alignment. Interpretative decisions were negotiated

collaboratively rather than imposed unilaterally by the instructor.Table 3 summarizes the cooperative learning components embedded in the rehearsal process.

Table 3 Cooperative Learning Structure within the Chamber Music Intervention

Collaborative Component	Implementation Strategy	Instructional Purpose
Collective Score Analysis	Group discussion of form and harmony	Develop shared analytical understanding
Rotational Leadership	Alternating rehearsal leadership roles	Promote individual accountability
Sectional Coordination	Partial ensemble rehearsal before full practice	Improve balance and synchronization
Peer Feedback Sessions	Structured post-rehearsal reflection	Enhance critical listening
Interpretative Negotiation	Collaborative decision-making on phrasing and dynamics	Foster artistic autonomy

4.3.3 Task-Driven Assessment

Assessment within the intervention was organized according to a task-oriented framework aligned with the project-based structure of the course. Evaluation was embedded throughout the instructional process rather than confined to final performance outcomes. Each task was designed to correspond directly to specific technical, interpretative, and collaborative objectives within the ADDIE cycle.

To illustrate how task-driven assessment operated in practice, Figure 2 presents a representative excerpt from Mozart's Divertimento in D Major, K. 334, which served as a structured assessment exemplar. The passage highlights issues of intonation stability, timbral blending, and articulation clarity across interacting string parts. In this context, students were assigned explicit performance tasks, including maintaining pitch consistency in exposed harmonic intervals, achieving balanced dynamic layering between melodic and accompaniment voices, and demonstrating stylistically appropriate articulation in classical phrasing. These tasks were not evaluated solely as technical outcomes but as integrated indicators of ensemble awareness and interpretative control.

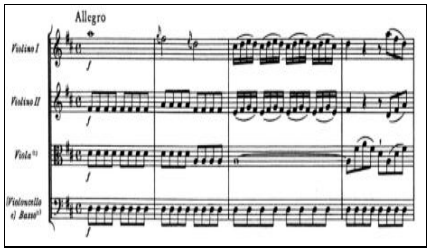

Figure 2 Intonation and Timbre Expression
Source: Mozart's Divertimento in D Major (2025)

In the Analysis phase, students completed structured analytical tasks such as harmonic labeling and formal segmentation to support interpretative planning. During the Design and Development stages, assessment tasks emphasized rehearsal strategy formulation, sectional coordination exercises, and targeted technical refinement derived from score-based challenges such as those illustrated in Figure 2. Formative assessment occurred continuously through guided observation, structured peer feedback, and rotating rehearsal roles. In the Implementation phase, full ensemble rehearsals functioned as performance-based checkpoints, where collaborative integration and interpretative consistency were evaluated. Finally, in the Evaluation phase, summative assessment incorporated performance presentation and expert review.

Table 4 illustrates the systematic alignment between ADDIE phases and corresponding assessment tasks, demonstrating how project progression and cooperative regulation were operationalized through measurable performance objectives

Table 4 Task-Oriented Assessment Framework Aligned with ADDIE Phases

ADDIE Phase	Core Task	Assessment Focus
Analysis	Harmonic and formal identification	Theoretical understanding
Design	Rehearsal planning and interpretative proposal	Strategic preparation
Development	Sectional coordination exercises	Technical accuracy
Implementation	Full ensemble rehearsal performance	Collaborative integration
Evaluation	Performance presentation and expert review	Overall artistic competence

Through the integration of structured project sequencing, cooperative interaction, and task-driven evaluation, the instructional intervention translated the theoretical mechanism into observable pedagogical practice. This alignment ensured that assessment criteria were embedded within musical tasks themselves rather than imposed externally, thereby strengthening the internal coherence of the instructional design and providing a stable foundation for subsequent data collection and analysis.

4.4 Data Collection

Data were collected through two primary sources: (1) expert validation of instructional materials and lesson plans, and (2) expert evaluation of student

performance outcomes. These data sources were selected to examine both the structural validity of the instructional design and its practical effectiveness in performance contexts.

4.4.1 Expert Validation of Instructional Materials

To ensure content validity and instructional coherence, the lesson plans and teaching materials were reviewed by three subject-matter experts using the Index of Item-Objective Congruence (IOC) method. The IOC procedure evaluates the degree to which instructional components align with defined learning objectives. Each item was rated on a three-point scale (−1 = not congruent, 0 = uncertain, 1 = congruent), and IOC values were calculated accordingly.Table 5 presents the IOC evaluation results derived from expert review.It shows that most instructional components achieved high IOC values (≥ 0.80), indicating strong alignment between teaching objectives and instructional activities. Items with lower IOC values suggested areas requiring refinement, particularly regarding flexibility and adaptation to learner diversity.

Table 5 Lesson Plan and Instructional Material IOC Evaluation Results

Item No.	Expert 1	Expert 2	Expert 3	Total Score	IOC Value
1	1	1	1	3	1
2	1	0	1	2	0.6
3	1	1	1	3	1
4	0	1	1	2	0.6
5	1	1	1	3	1
6	1	1	1	3	1
7	0	1	0	1	0.6
8	1	0	1	2	0.6
9	1	1	1	3	1

4.4.2 Expert Evaluation of Student Performance

In addition to instructional validation, student performance outcomes were evaluated by external experts following the completion of the repertoire project. Experts assessed dimensions including overall impression, teamwork and ensemble coordination, artistic expression, technical proficiency, and the educational value of the teaching model. Table 6 presents the summarized expert evaluation scores.It indicates generally positive expert evaluations across performance dimensions. Technical proficiency received consistently high ratings, while teamwork and interpretative depth showed moderate variation, suggesting areas for continued pedagogical refinement. Through the combination of IOC-based instructional validation and expert performance evaluation, the study collected both structural and outcome-oriented data to support subsequent analysis of the integrated teaching mechanism.

Table 6 Expert Evaluation of Student Performance Outcomes

Evaluation Dimension	Expert 1	Expert 2	Expert 3	Average Score
Overall Impression	1	1	1	1
Teamwork & Coordination	0	1	1	0.67
Artistic Expression	1	1	0	0.67
Technical Skills	1	1	1	1
Teaching Model Value	1	0	1	0.67

4.5 Data Analysis

4.5.1 Analysis of IOC Validation Results

The Index of Item-Objective Congruence (IOC) method was employed to examine the content validity of the instructional design, including lesson plans and supporting teaching materials. The IOC technique evaluates the degree to which each instructional component aligns with predefined learning objectives. Three subject-matter experts independently rated each item using a three-point scale: +1 (clearly congruent), 0 (uncertain), and −1 (not congruent). The IOC value for each item was calculated by averaging the expert ratings. In accordance with commonly accepted standards, an IOC value of 0.50 or higher was considered acceptable, while values closer to 1.00 indicated strong alignment between instructional objectives and teaching activities.

As shown in Table 5, the majority of items achieved IOC values of 1.00, indicating complete agreement among experts regarding objective congruence. Several items obtained IOC values of 0.60, suggesting partial agreement and indicating areas where instructional flexibility or clarity could be further refined. No item received a value below 0.50, demonstrating that all evaluated components met the minimum criterion for content validity. Overall, the IOC analysis confirmed that the instructional design exhibited strong alignment with its stated pedagogical objectives. The results provided empirical support for the structural coherence of the integrated teaching mechanism prior to classroom implementation.

4.5.2 Descriptive Analysis of Expert Performance Evaluation

Expert evaluations of student performance were analyzed using descriptive statistical methods. Given the limited number of evaluators, the analysis focused on mean scores across performance dimensions rather than inferential statistical testing.

As shown previously in Table 6, expert ratings covered five dimensions: overall impression, teamwork and coordination, artistic expression, technical skills, and perceived instructional value. To clarify the relative performance across these dimensions, the mean scores were comparatively summarized. Table 7 presents a consolidated comparison of average scores across performance dimensions.

Table 7 Comparison of Average Scores Across Performance Dimensions

Performance Dimension	Average Score
Technical Skills	1
Overall Impression	0.8
Teamwork & Coordination	0.67
Artistic Expression	0.67
Teaching Model Value	0.67

Table 7 indicates that technical skills received the highest expert rating (1.00), reflecting strong agreement regarding students' technical proficiency. Overall impression also achieved a relatively high score (0.80), suggesting positive holistic performance outcomes.The dimensions of teamwork and artistic expression obtained moderate mean scores (0.67), indicating some variability in expert judgments. This variation suggests that while the instructional intervention effectively strengthened technical competence, collaborative refinement and interpretative depth remain developmental areas.

4.5.3 Qualitative Thematic Analysis

In addition to quantitative evaluation, qualitative data derived from expert feedback and interview comments were analyzed using thematic analysis. This approach was adopted to identify recurring patterns in expert perceptions regarding the effectiveness of the integrated teaching mechanism. The analysis followed three stages:

(1) initial reading and open coding of expert comments;

(2) categorization of related codes into broader conceptual groupings; and

(3) synthesis of overarching themes reflecting instructional impact.

Through iterative review and comparison of expert statements, several recurring themes were identified, particularly concerning collaborative development, interpretative awareness, technical improvement, and pedagogical value. Table 8 presents the primary themes derived from qualitative analysis.

Table 8 Summary of Themes Identified from Expert Feedback

Theme	Description	Instructional Implication
Enhanced Ensemble Coordination	Improved synchronization and balance among performers	Cooperative mechanisms strengthened interaction
Increased Interpretative Awareness	Greater attention to phrasing and expressive nuance	Project-based structure deepened analytical engagement
Strengthened Technical Stability	More consistent tone and rhythmic control	Structured rehearsal progression supported skill development
Positive Evaluation of Teaching Model	Recognition of instructional coherence and innovation	Integrated mechanism demonstrated pedagogical feasibility

Table 8 indicates that expert feedback consistently emphasized improvements in ensemble coordination and technical stability. Comments also highlighted increased interpretative awareness, suggesting that analytical preparation and collaborative negotiation contributed to deeper musical understanding. Furthermore, experts acknowledged the instructional coherence of the integrated model, noting that the alignment between project stages and cooperative interaction enhanced the overall learning environment. The qualitative findings complement the quantitative results by illustrating how structural and interactional dimensions of the teaching mechanism were perceived in practice. Together, these analyses provide multi-dimensional evidence supporting the feasibility and effectiveness of the integrated pedagogical framework.

5.RESULTS

5.1 Identified Instructional Challenges in Chamber Music Courses

Prior to the implementation of the integrated teaching mechanism, several instructional challenges were identified within the chamber music course. These challenges were observed during the initial analysis phase of the ADDIE framework and were further reflected in expert feedback and instructional evaluation processes.

First, ensemble collaboration lacked structural guidance. Although students possessed individual instrumental proficiency, cooperative interaction during rehearsal was often spontaneous rather than systematically organized. Decision-making processes concerning tempo, phrasing, and balance were frequently dependent on instructor intervention rather than collective negotiation. This indicated a need for a structured collaborative framework to support ensemble cohesion.

Second, the linkage between theoretical analysis and performance practice was insufficiently articulated. While students were capable of performing assigned repertoire, analytical understanding—such as harmonic structure, formal design, and stylistic interpretation—was not consistently integrated into rehearsal strategies. As identified in the curriculum analysis stage, instructional activities required clearer alignment between analytical preparation and performance realization.

Third, assessment practices were predominantly outcome-oriented. Traditional evaluation methods focused primarily on final performance results, with limited formative assessment embedded within the rehearsal process. The absence of structured task-based evaluation reduced opportunities for reflective learning and iterative improvement. This issue was addressed during the design and evaluation phases of the instructional framework.

Additionally, expert comments highlighted the necessity of enhancing ensemble balance, interpretative consistency, and collaborative responsiveness. These observations reinforced the need for a pedagogical model capable of integrating project structure with cooperative interaction.

Collectively, these findings indicated that the primary instructional challenges in chamber music courses were not limited to technical skill acquisition but extended to structural organization, collaborative regulation, and evaluative coherence. The identification of these needs provided the empirical basis for developing and implementing the integrated teaching mechanism described in the previous sections.

5.2 Implementation Outcomes of the Integrated Teaching Mechanism

This section presents the observable outcomes following the implementation of the integrated teaching mechanism. The findings focus on structural execution, collaborative regulation, and instructional coherence within the chamber music course.

Following the reorganization of the course according to the project-based structure, instructional progression became more clearly staged and goal-oriented. Students demonstrated increased clarity regarding rehearsal objectives within each ADDIE phase. The alignment between analytical preparation and performance realization became more explicitly articulated, reducing fragmentation between theoretical study and ensemble execution. The structured sequencing from analysis to evaluation contributed to a more systematic rehearsal trajectory.

The operational impact of cooperative regulation became particularly evident in rhythmically demanding repertoire. As illustrated in Figure 3 (Rabinowitz, Spanish Suite, Fourth Movement: Tango), the driving rhythmic pulse, accented articulations, and rapid shifts in dynamic emphasis required precise ensemble synchronization and continuous micro-level coordination. During early rehearsals, students initially approached such passages through individual technical correction. However, under the structured cooperative framework, rehearsal strategies shifted toward collective pulse stabilization, sectional subdivision practice, and rotational leadership in tempo control. This reorientation transformed rhythm management from isolated technical adjustment into shared regulatory practice.

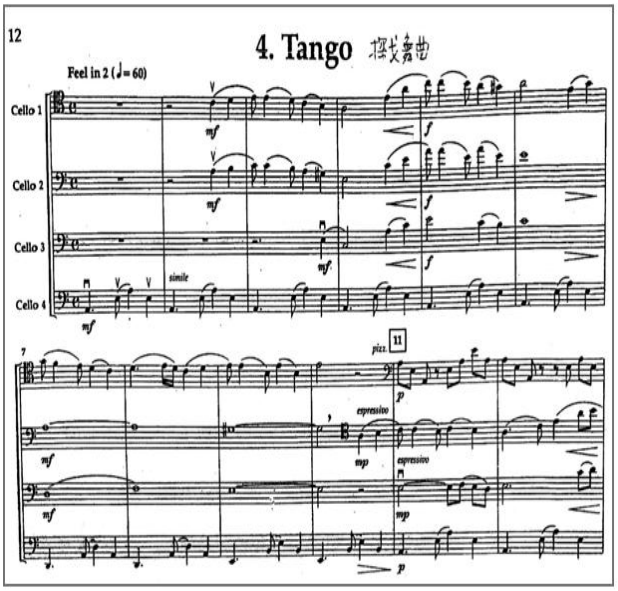

Figure 3 Fourth Movement: Tango

Source: Rabinowitz Spanish Suite Tango mm.1-12 (1984)

In terms of cooperative learning integration more broadly, ensemble interaction became increasingly organized and participatory. Rotational leadership and structured peer feedback sessions facilitated balanced engagement among ensemble members. Rather than relying solely on instructor correction, students engaged in collaborative negotiation when addressing phrasing, articulation, and dynamic shaping. This shift reflected a transition from instructor-centered rehearsal management to distributed artistic responsibility.

Observational evidence during the Implementation phase indicated improved rehearsal

efficiency. Sectional coordination practices enabled targeted correction of rhythmic alignment and tonal balance before full ensemble integration. Particularly in passages such as those shown in Figure 3, subdivided rehearsal tasks and clearly assigned coordination roles reduced repetition inefficiency and enhanced collective rhythmic precision. As a result, rehearsal time was utilized more strategically, and interpretative discussions were grounded in analytical reasoning rather than intuitive approximation.

The integration of task-driven assessment further strengthened instructional coherence. Because assessment criteria were embedded within each project stage, students demonstrated heightened awareness of performance standards throughout the rehearsal process. Formative evaluation encouraged iterative refinement rather than delayed correction at the final performance stage.

Collectively, the implementation outcomes suggest that the integrated teaching mechanism achieved not only structural stability but also interactional consistency within the chamber music course. The combination of project-based sequencing and cooperative regulation facilitated a learning environment characterized by clearer objectives, enhanced rhythmic coordination, distributed interpretative responsibility, and sustained reflective engagement.

5.3 Evaluation of Instructional Effectiveness

This section synthesizes the quantitative and qualitative findings to provide an integrated evaluation of instructional effectiveness.

Table 9 demonstrates that the integrated teaching mechanism achieved multi-dimensional effectiveness across structural, performance-based, and perceptual dimensions. The convergence of high IOC values (Table 5), differentiated expert performance ratings (Table 7), and consistent qualitative themes (Table 8) provides triangulated evidence supporting the internal coherence and practical feasibility of the proposed model.

Table 9 Integrated Summary of Instructional Effectiveness

Dimension	Structural Validation (IOC)	Performance Evaluation (Mean Score)	Qualitative Evidence
Instructional Coherence	High congruence (≥ 0.60; majority 1.00)	—	Experts confirmed clarity and alignment
Technical Proficiency	—	1	Improved stability and execution accuracy
Ensemble Coordination	—	0.67	Enhanced synchronization and balance
Interpretative Awareness	—	0.67	Increased analytical and expressive engagement
Overall Performance Quality	—	0.8	Positive holistic expert impression
Teaching Model Feasibility	Validated	0.67	Recognized pedagogical innovation and applicability

Importantly, the differentiated distribution of performance scores reveals dimension-specific developmental patterns. The particularly high rating in technical proficiency suggests that the structured project sequencing embedded in the PBL framework effectively reinforced procedural clarity and technical consolidation. In contrast, the moderate yet consistent scores in ensemble coordination and interpretative awareness indicate that collaborative and expressive competencies may evolve progressively through sustained cycles of cooperative interaction. This pattern aligns with the dual-dimensional design of the mechanism, in which macro-level structural organization supports immediate technical stabilization, while micro-level cooperative regulation gradually cultivates ensemble cohesion and interpretative depth.

6. DISCUSSION

6.1 Theoretical Contributions

The present study contributes to contemporary

scholarship in music education by advancing a mechanism-oriented perspective on chamber music pedagogy. In recent years, research in arts and music education has increasingly emphasized learner-centered approaches, collaborative creativity, and experiential learning frameworks (Aoonlamai & Kwangmuang, 2025; Lehtimäki et al., 2026). Project-Based Learning and Cooperative Learning have each been widely examined as effective pedagogical models for fostering student engagement and collaborative competence (Ngoc Tuong Nguyen & Thi Kim Oanh, 2025). However, much of the existing literature has focused on isolated applications of these approaches, often describing classroom strategies or short-term interventions without articulating a coherent structural integration.

Against this backdrop, the primary theoretical contribution of the present study lies in its systematic integration of Project-Based Learning and Cooperative Learning within a unified instructional mechanism. Rather than treating these models as parallel or interchangeable strategies, this research conceptualizes them as complementary dimensions—one providing macro-level project structure and the other regulating micro-level interactional dynamics. This dual-dimensional integration moves beyond descriptive adoption toward mechanism-based instructional design.

A second theoretical contribution concerns the articulation of chamber music pedagogy as a structured project cycle embedded with cooperative regulation. While prior studies have acknowledged the inherently collaborative nature of ensemble performance (Bussu & Mangiarulo, 2024; Sutherland & Cartwright, 2022), relatively few have modeled chamber music instruction as a deliberately staged project trajectory aligned with instructional design theory. By grounding the integrated mechanism within the ADDIE framework, the present study bridges performance pedagogy with instructional design theory, thereby extending the conceptual boundaries of music education research.

Third, this research contributes to design-based scholarship in music education by demonstrating how instructional innovation can be systematically developed, validated, and evaluated within authentic classroom contexts. The incorporation of IOC-based structural validation and expert performance evaluation provides a multi-layered analytical lens, strengthening the theoretical robustness of the proposed model. This approach responds to recent calls in educational research for greater methodological coherence and transparency in pedagogical innovation studies.

Taken together, these contributions position the integrated teaching mechanism not merely as a localized instructional reform, but as a theoretically grounded framework that expands current understandings of ensemble pedagogy. By foregrounding mechanism construction, structural coherence, and collaborative regulation, the study offers a conceptual model that may inform future research on performance-based learning environments beyond chamber music contexts.

6.2 Pedagogical Implications

The findings of this study generate several pedagogical implications for different stakeholders involved in chamber music education in comprehensive universities. By demonstrating that the integration of Project-Based Learning and Cooperative Learning contributes to measurable improvements in technical proficiency, ensemble coordination, and artistic expression, the study underscores the importance of moving beyond isolated teaching techniques toward a mechanism-oriented instructional design.

For chamber music instructors, the results suggest a necessary shift in pedagogical roles from knowledge transmitters to facilitators of structured musical collaboration. Rather than relying predominantly on teacher-led correction, instructors may consider organizing rehearsals around scaffolded project stages that guide students through repertoire analysis, interpretative decision-making, rehearsal planning, and reflective evaluation. Embedding structured peer interaction—such as assigned ensemble roles, rotating leadership responsibilities, and guided reflection sessions—can help ensure that cooperation is not incidental but intentionally cultivated. Moreover, the integration of formative assessment strategies, including peer feedback and self-reflective journals, may enhance students' metacognitive awareness and deepen their engagement with the collaborative learning process.

For curriculum developers and program designers, the study highlights the value of constructing chamber music courses as coherent pedagogical systems rather than collections of repertoire-based activities. A mechanism-oriented curriculum should align learning objectives, project structure, collaborative processes, and evaluation criteria within a unified framework. This implies designing courses that incorporate clearly defined project phases, structured ensemble responsibilities, and multidimensional assessment rubrics that evaluate not only technical accuracy but also interaction quality and expressive interpretation. Such structural coherence can support sustainable

curriculum reform and prevent chamber music instruction from reverting to purely technique-driven models.

At the institutional level, the findings indicate that effective implementation of integrated pedagogical mechanisms requires supportive learning environments. Higher education institutions may need to provide adequate rehearsal spaces, flexible scheduling arrangements, and performance platforms that enable authentic project completion. Institutional encouragement of small-ensemble formats and cross-disciplinary collaboration can further enhance students' experiential learning opportunities. Without structural support at the administrative level, even well-designed pedagogical mechanisms may struggle to achieve long-term impact.

Finally, the implications extend to music teacher education within comprehensive universities. As many students in such institutions pursue careers in primary and secondary music education, developing collaborative competence and project-oriented thinking during their undergraduate training has broader professional significance. The integration of project-based and cooperative learning principles in chamber music courses may cultivate transferable skills—such as ensemble leadership, reflective practice, and collaborative problem-solving—that are directly applicable to classroom music teaching. In this sense, chamber music pedagogy can function not only as performance training but also as a model for future instructional practice.

7.CONCLUSION

This study developed and examined an integrated teaching mechanism for chamber music courses that synthesizes Project-Based Learning and Cooperative Learning within a comprehensive university context. By identifying instructional challenges, constructing a structured mechanism aligned with the ADDIE framework, and evaluating its implementation through expert validation and performance assessment, the research demonstrates that a mechanism-oriented approach can enhance technical proficiency, strengthen ensemble coordination, and deepen interpretative engagement. The findings suggest that aligning macro-level project sequencing with micro-level cooperative regulation fosters clearer structural progression, shared artistic responsibility, and sustained reflective practice within performance-based learning environments. By conceptualizing chamber music pedagogy as a coherent integration of structural design and interactional dynamics rather than as a collection of isolated teaching strategies, the study contributes a theoretically grounded and operationally feasible framework for higher music education. Nevertheless, the study is limited by the relatively small participant cohort (n = 17) drawn from a single institutional context. As a design-based investigation emphasizing mechanism development and contextual validity over statistical generalization, the findings primarily demonstrate internal coherence within this setting. Future research may further examine the scalability and adaptability of the proposed mechanism across larger samples and diverse institutional environments

REFERENCES

Alisoy, H. (2025). Integrating Music into Curriculum Design: Strategies for Enhancing Student Achievement and Cognitive Skills. Acta Globalis Humanitatis Et Linguarum, 2, 37-70. https://doi.org/10.69760/aghel.0250040002

Aoonlamai, N., & Kwangmuang, P. (2025). Integrating digital tools and constructivist learning: a ubiquitous learning framework for enhancing creativity in music education. BMC Psychology, 13(1), 1064. https://doi.org/10.1186/s40359-025-03300-z

Barros, M., & Penna, M. (2022). Problem-based learning (PBL) in music teacher education. International Journal of Music Education, 41, 025576142211305. https://doi.org/10.1177/02557614221130526

Bi, G., & Rauduvaitė, A. (2025). Development of self-efficacy skills of prospective music teachers in singing activity: insights of educators. Frontiers Psychology, 16, 1685205. https://doi.org/10.3389/fpsyg.2025.1685205

Bingham, H. H. (2025). Practicing Collaborative Teaching With Care: A Literature Review. Update: Applications of Research in Music Education, 44(1), 37-45. https://doi.org/10.1177/87551233241278701

Busnawir, B., Yuniawati, I., Mardiati, M., & Sitepu, E. (2025). The effectiveness of project-based learning in developing the 21st century skills. Darussalam: Journal of Psychology and Educational, 4, 35-50. https://doi.org/10.70363/djpe.v4i1.272

Bussu, A., & Mangiarulo, M. (2024). Playing music together: Exploring the impact of a classical music ensemble on adolescent's life skills self-perception. Plos One, 19(7), e0306326. https://doi.org/10.1371/journal.pone.0306326

Chen, X. (2026). Developing critical thinking through scaffolded peer feedback: an action research on heuristic design. Front Psychol, 17, 1711768. https://doi.org/10.3389/fpsyg.2026.1711768

Faraco, A., Schwarz, A., Vincent, C., Susini, P., Ponsot, E., & Canonne, C. (2024). Listening Behaviors and Musical Coordination in Collective Free Improvisation. Music & Science, 7, 20592043241257023. https://doi.org/10.1177/20592043241257023

Guo, Y. (2024). Adapting music education to the new normal: Integrative teaching strategies from a global perspective. Sound & Vibration, 59, 1978. https://doi.org/10.59400/sv1978

Hadar, T., & Amir, D. (2021). Intimacy, Mutuality & Negotiations: Dialogic Moments in Joint Improvisation. Nordic Journal of Music Therapy, 30(5),460-484. https://doi.org/10.1080/08098131.2021.1915855

Hennessy, S., Kershner, R., Calcagni, E., & Ahmed, F. (2021). Supporting practitioner-led inquiry into classroom dialogue with a research-informed professional learning resource: A design-based approach. Review of Education, 9(3),e3269. https://doi.org/10.1002/rev3.3269

José María, E.-F., Esteve-Faubel, R. P., Chust-Pérez, V., & Botella-Quirant, M. T. (2025). Fostering soft skills through collaborative music projects in the initial education stage of primary teachers. Social Sciences & Humanities Open, 12, 101681. https://doi.org/10.1016/j.ssaho.2025.101681

Kiprianos, P., & Stavropoulou, A. (2025). Understanding the meaning of family-school collaboration in preschool education: A constructivist grounded theory approach. Global Studies of Childhood, 20436106251398517. https://doi.org/10.1177/20436106251398517

Kruse-Weber, S., Bucura, E., & Tumler, M. (2022). Facilitating collaborative professional development among instrumental and vocal teachers: A qualitative study with an Austrian Music School. Frontiers Psychology, 13, 1096188. https://doi.org/10.3389/fpsyg.2022.1096188

Lehtimäki, H., Hirvonen, P., Riivari, E., & Piironen, S. (2026). Innovation pedagogy in management education: Student-centered learning with arts-based methods. The International Journal of Management Education, 24(1), 101306. https://doi.org/10.1016/j.ijme.2025.101306

Lozano, A., López, R., Pereira, F. J., & Blanco Fontao, C. (2022). Impact of Cooperative Learning and Project-Based Learning through Emotional Intelligence: A Comparison of Methodologies for Implementing SDGs. International Journal Environmental Research Public Health, 19(24), 16977. https://doi.org/10.3390/ijerph192416977

Meng, N., Dong, Y., Roehrs, D., & Luan, L. (2023). Tackle implementation challenges in project-based learning: a survey study of PBL e-learning platforms. Education Technology Research Development,71(3), 1791-1207. https://doi.org/10.1007/s11423-023-10202-7

Ngoc Tuong Nguyen, T., & Thi Kim Oanh, D. (2025). Cooperative learning and its influences on student engagement. Cogent Education, 12(1), 2513414. https://doi.org/10.1080/2331186X.2025.2513414

Novalia, R., Marini, A., Bintoro, T., & Muawanah, U. (2025). Project-based learning: For higher education students' learning independence. Social Sciences & Humanities Open, 11, 101530. https://doi.org/10.1016/j.ssaho.2025.101530

Oo, T. Z., Kadyirov, T., Kadyjrova, L., & Józsa, K. (2024). Design-based learning in higher education: Its effects on students' motivation, creativity and design skills. Thinking Skills and Creativity, 53, 101621. https://doi.org/10.1016/j.tsc.2024.101621

Pennill, N., & Timmers, R. (2022). Patterns of verbal interaction in newly formed music ensembles. Frontiers Psychology, 13, 987775. https://doi.org/10.3389/fpsyg.2022.987775

Qianqi, G., Supawadee, K., & Nirat, J. (2024). Active and Collaborative Learning: A Theoretical Framework to Enhance Musical Performance and Learning Attitudes in College Students. World Journal of Education, 14, 27219-27219. https://doi.org/10.5430/wje.v14n4p48

Rahmawati, G., Abduljabar, B., & Wijaya, R. (2026). Project-Based Learning in Music Education: A Scopus-Based Bibliometric Review of Research Trends and Intellectual Structure. Jurnal Paedagogy, 13, 266-277. https://doi.org/10.33394/jp.v13i1.19068

Rumiantsev, T., van der Rijst, R., & Admiraal, W. (2023). A systematic literature review of collaborative learning in conservatoire education. Social Sciences & Humanities Open, 8(1), 100683. https://doi.org/10.1016/j.ssaho.2023.100683

Sánchez García, R., & Reyes-de Cózar, S. (2025). Enhancing Project-Based Learning: A Framework for Optimizing Structural Design and Implementation—A Systematic Review with a Sustainable Focus. Sustainability, 17, 4978. https://doi.org/10.3390/su17114978

Schiavio, A., Maes, P.-J., & van der Schyff, D. (2021). The Dynamics of Musical Participation. Musicae Scientiae, 26(3),604-626. https://doi.org/10.1177/1029864920988319

Schiavio, A., Maes, P. J., & van der Schyff, D. (2022). The dynamics of musical participation. Music Science, 26(3), 604-626. https://doi.org/10.1177/1029864920988319

Siregar, T. (2025). Implementation of Problem-Based Learning (PBL) Model to Enhance Higher-Order Thinking Skills (HOTS). Journal of Innovation and Learning, 1, 1-40. https://doi.org/10.2139/ssrn.5709306

Sutherland, A., & Cartwright, P. A. (2022). Working together: Implications of leadership style for the music ensemble. International Journal of Music Education, 40(4), 613-627. https://doi.org/10.1177/02557614221084310

Tahirbegi, D. (2023). Exploring emotion regulation in small ensemble contexts; three cases from higher music education. Learning, Culture and Social Interaction, 42, 100741. https://doi.org/10.1016/j.lcsi.2023.100741

Tarpagkos, A. (2025). Bridging the gap: how university music programs can integrate contemporary music creation into elementary school curriculum. Bulletin of the Transilvania University of Braşov. Series VIII: Performing Arts, 17(2), 15-40. https://doi.org/10.31926/but.pa.2024.17.66.2.2

Vasconcelos, M., Caspurro, H., & Costa, N. (2023). Problem-based Learning: Composing in the classroom as a music learning challenge. Revista Electrónica de LEEME, 52, 111. https://doi.org/10.7203/LEEME.0.26865

Wang, A. (2021). Models of Student Engagement in Music Education Classroom in Higher Education. Frontiers Psychology, 12, 738207. https://doi.org/10.3389/fpsyg.2021.738207

Wang, R., Phokha, P., & Chiangthong, N. (2025). The Development of Teaching Method for Chamber Music Courses in Chinese Comprehensive Universities. Journal of Cultural Analysis and Social Change, 10(3), 3074-3091. https://doi.org/10.64753/jcasc.v10i3.3638

Xu, S., & Li, D. (2025). Autonomy-supportive music teaching, collective learning, flow, and music Students' well-being: A mediational model. Acta Psychologica, 254, 104827. https://doi.org/10.1016/j.actpsy.2025.104827

Yang, X. (2023). A Historical Review of Collaborative Learning and Cooperative Learning. TechTrends, 67(4),718-728. https://doi.org/10.1007/s11528-022-00823-9

Yu, H. (2024). Enhancing creative cognition through project-based learning: An in-depth scholarly exploration. Heliyon, 10(6), e27706. https://doi.org/10.1016/j.heliyon.2024.e27706

Zhang, L.-X., Yan, Z., & Wang, X. (2026). Mapping formative assessment in higher music education: A scoping review of its implementation and impact on musical intelligence. Research Studies in Music Education, 1321103X251400571. https://doi.org/10.1177/1321103X251400571