



Research Article

Self-Assessment of Social Communication Skills: Insights into Verbal, Nonverbal, and Listening Aspects

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ABSTRACT.

Social communication skills are essential for success in collaborative learning and workplace settings, yet research examining these skills in Asian contexts remains limited. This study examined how musical engagement (rhythm, melody, and harmony) is associated with students' self-assessed social communication skills (verbal, non-verbal, and listening) among 227 Cangzhou Vocational and Technical College students, where workplace readiness and team-based learning are emphasized. A descriptive-correlational design was used, with data collected via self-assessment questionnaires and analyzed using Microsoft Excel and Jamovi. Results indicated that rhythmic engagement was associated with timing and coordination, melodic engagement was linked to verbal fluency and emotional expression, and harmonic engagement was associated with active listening and adaptability. Differences were observed across gender and performance rating, with female students and higher-performing students reporting stronger engagement. These findings suggest

environments. Educators may use rhythmic tasks to build coordination, melodic exercises to support verbal development, and harmonic activities to strengthen group collaboration. Future research may examine the longer-term effects of musical engagement on communication development.

Keywords: Musical engagement, social communication, rhythm, collaborative learning, vocational education

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INTRODUCTION

Communicating well is crucial for success in academic, professional, and social contexts, particularly for students in vocational education who often work collaboratively in practical learning environments. In vocational settings, communication is not only academic but also task-based—students must coordinate actions, negotiate roles, follow instructions, and respond to peers in real time. These competencies mirror workplace demands, making social communication skills a core component of vocational readiness. Social communication skills, including verbal, non-verbal, and listening, enable students to express themselves, interpret cues, and engage in meaningful interactions [1]. However, developing these skills requires more than conventional teaching methods. It calls for experiential learning that fosters interaction and creativity. Combining structure and expression, music education offers a practical approach to developing communication skills by engaging students cognitively, emotionally, and socially [2, 3].

Conventional communication training in vocational education often relies on lectures, scripted role-plays, or short presentation tasks. While useful, these approaches may not consistently engage students' embodied coordination, emotional expression, and active listening simultaneously. Music-based engagement offers an experiential and interactive alternative in which learners practice timing, turn-taking, attention, and group responsiveness in a structured yet motivating environment. For this reason, music-based activities may complement standard communication training by strengthening communication skills through repeated, collaborative practice.

Music provides an immersive environment where students can practice interaction through various activities involving rhythm, melody, and harmony. Rhythm, the backbone of musical engagement, enhances coordination and teamwork by synchronizing group activities [4]. Melodic engagement stimulates creativity and emotional expression, helping students articulate their thoughts and emotions [5]. Harmony promotes active listening and collaboration, as students must balance individual contributions with group efforts to achieve collective success [6]. Together, these dimensions of music contribute to holistic student development, strengthening their communication skills and ability to collaborate effectively in real-world settings.

Despite the recognized benefits of musical engagement, empirical research examining its specific influence on social communication skills in vocational education remains limited, particularly in Asian contexts. Addressing this gap, the present study examined how rhythm, melody, and harmony are associated with students' verbal, non-verbal, and listening communication skills at Cangzhou Vocational and Technical College, with the goal of informing practical, classroom-based strategies for vocational learning.

METHODOLOGY

2.1 Research Design

This study employed a descriptive-correlational research design to examine the relationship between students' musical engagement (rhythm, melody, and harmony) and their self-assessed social communication skills (verbal, non-verbal, and listening) in a vocational education context. This design enabled the analysis of associations between participants' questionnaire responses on musical engagement and communication outcomes. Data were collected through self-assessment questionnaires and analyzed using Microsoft Excel and Jamovi to identify patterns and statistically significant relationships that may inform practical interventions in vocational education.

2.2 Participants

The participants consisted of 227 students enrolled at Cangzhou Vocational and Technical College (Academic Year 2024–2025), with an age range of 18–21 years. A stratified random sampling method was employed to ensure proportional representation across year level and gender. Academic performance rating was also recorded to allow subgroup comparisons. These participant characteristics (gender, year level, and performance rating) were used to describe the sample and to examine differences in musical engagement and social communication skills across groups.

2.3 Instrumentation

Data collection utilized a structured self-assessment questionnaire to measure musical engagement and social communication skills. The questionnaire comprised two main sections: (1) students' engagement in rhythm-, melody-, and harmony-based activities, and (2) students' self-assessed verbal, non-verbal, and listening communication skills. Items were

adapted from existing instruments used in prior music education research to support content relevance and construct coverage. Reliability was established through a pilot test, yielding an overall Cronbach's alpha of 0.905, indicating high internal consistency. The instrument generated quantitative scores that enabled statistical analysis of the relationship between musical engagement and social communication skills.

2.4 Data Gathering Procedure

Data were collected through on-site administration of the self-assessment questionnaire, ensuring that students completed it under standardized conditions to maintain consistency. The survey was administered in classrooms on campus during Academic Year 2024–2025 and required approximately 10–15 minutes to complete. Before participation, students were briefed on the purpose of the study and the voluntary nature of participation, and informed consent was obtained. The pre-survey briefing was procedural (i.e., instructions and consent) and did not include coaching on how to answer the items. Participants were informed that they could withdraw at any time without penalty. No identifying information was collected; responses were treated confidentially and used strictly for research purposes. The collected data were reviewed for completeness before the analysis phase.

2.5 Data Analysis

Data analysis was conducted using descriptive and inferential statistics, with Microsoft Excel and Jamovi employed for computation and interpretation. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize respondents' profiles and the levels of musical engagement and social communication skills. Because the measures were based on Likert-type responses, non-parametric tests were applied for group comparisons: Mann–Whitney U was used to test differences by gender, while Kruskal–Wallis was used to test differences across year level and performance rating. Spearman's rho correlation was used to determine the relationships between musical engagement (rhythm, melody, harmony) and social communication skills (verbal, non-verbal, listening). Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

This section presents the descriptive and inferential results on students' musical engagement (rhythm, melody, and harmony) and self-assessed social communication skills (verbal, non-verbal, and listening). Descriptive statistics summarize the levels of engagement and communication skills. For inferential analysis, non-parametric tests (Mann–Whitney U and Kruskal–Wallis) were used to examine group differences across gender, year level, and performance rating. Spearman's rho correlation was used to determine the associations between musical engagement dimensions and social communication skills. The results are presented according to the study objectives and corresponding tables.

3.1. Levels of Musical Engagement of Students

This subsection reports students' self-assessed levels of musical engagement across the three dimensions of rhythm, melody, and harmony. The tables below summarize the mean ratings and verbal interpretations for each dimension, providing an overall profile of students' engagement with music-related activities in the vocational college context.

3.1.1 Rhythm

This subsection presents students' self-assessed engagement with the rhythmic dimension of musical activities. Table 1 reports the mean scores and verbal interpretations for the rhythm indicators and shows how consistently students rated their rhythmic engagement across the listed statements.

Table 1. Self-Assessment of Students' Musical Engagement in Terms of Rhythm.

	Indicator	Mean	Verbal Interpretation
1	Engaging with the rhythm of music enhances overall music appreciation?	4.32	Highly Engaged
2	The ability to actively participate in the rhythm of music contributes to a deeper engagement with the piece.	4.52	Highly Engaged
3	Rhythm plays a crucial role in determining the level of engagement and enjoyment of individuals experience when listening to music.	4.59	Highly Engaged
4	Engaging with the rhythm of music can increase one's emotional connection to the piece.	4.63	Highly Engaged
5	Rhythm is an essential element in music that significantly impacts how engaged listeners feel with a musical composition.	4.61	Highly Engaged
OVERALL MEAN		4.59	Highly Engaged

Note: 4.21-5.00 (*Highly Engaged*) | 3.41-4.20 (*Engaged*) | 2.61-3.40 (*Moderately Engaged*) | 1.81-2.60 (*Less Engaged*) | 1.00-1.80 (*Not Engaged*)

Table 1 shows that students reported consistently high engagement with rhythm-related musical activities, with an overall mean of 4.59 ("Highly Engaged"). All indicators fell within the "Highly Engaged" range (M = 4.32–4.63). The highest-rated item was "Engaging with the rhythm of music can increase one's emotional connection to the piece" (M = 4.63), followed by "Rhythm is an essential element in music that... [how engaged listeners feel]" (M = 4.61). The lowest mean, while still within the "Highly Engaged" range, was recorded for "Engaging with the rhythm of music enhances overall music appreciation" (M = 4.32). Overall, the results indicate a consistently high level of self-reported rhythmic engagement among the respondents.

3.1.2 Melody

This subsection presents students' self-assessed musical engagement in terms of melody. Table 2 summarizes the mean ratings and verbal interpretations for the melody indicators.

Table 2. Self-Assessment of Students' Musical Engagement in Terms of Melody

	Indicator	Mean	Verbal Interpretation
1	Melody plays a significant role in with the overall music experience.	4.57	Highly Engaged
2	The catchy nature of a melody can greatly increase engagement with a musical piece.	4.62	Highly Engaged
3	Melody is a crucial element in determining how engaged and attentive an individual when experiencing music.	4.70	Highly Engaged

4	The complexity or simplicity of a melody can significantly impact the level of engagement with a musical composition.	4.60	Highly Engaged
5	A memorable melody is essential for maintaining listener engagement throughout a musical piece.	4.53	Highly Engaged
OVERALL MEAN		4.61	Highly Engaged

Note: 4.21-5.00 (*Highly Engaged*) | 3.41-4.20 (*Engaged*) | 2.61-3.40 (*Moderately Engaged*) | 1.81-2.60 (*Less Engaged*) | 1.00-1.80 (*Not Engaged*)

Table 2 indicates that students reported a consistently high level of melody-related engagement, with an overall mean of 4.61 ("Highly Engaged"). All indicators were rated within the "Highly Engaged" range (M = 4.53–4.70). The highest-rated item was "Melody is a crucial element in determining how engaged and attentive an individual is when experiencing music" (M = 4.70), followed by "The catchy nature of a melody can greatly increase listener engagement with a musical piece" (M = 4.62). The lowest mean, while still within the "Highly Engaged" range, was recorded for "A memorable melody is essential for maintaining listener engagement throughout a musical piece" (M = 4.53). Overall, the results suggest strong self-reported engagement with melodic aspects of musical activities among the respondents. The following subsection presents students' engagement in terms of harmony.

3.1.3 Harmony

This subsection presents students' self-assessed musical engagement in terms of harmony. Table 3 summarizes the mean ratings and verbal interpretations for the harmony indicators.

Table 3. Self-Assessment of Students' Musical Engagement in Terms of Harmony

	Indicator	Mean	Verbal Interpretation
1	The effective use of harmony in musical compositions enhance overall engagement and emotional response.	4.54	Highly Engaged
2	The incorporation of complex harmonies improve the level of interaction and engagement between musicians and their audience during performances.	4.59	Highly Engaged
3	The use of harmony as a structural element in music contributes to the long-term engagement and appreciation of listeners.	4.56	Highly Engaged
4	The balance and interplay of different harmonies within a musical piece affect the listener's engagement and emotional connection to music.	4.53	Highly Engaged
5	Teaching the principles and application of harmony increases students' engagement and understanding of musical compositions.	4.58	Highly Engaged
OVERALL MEAN		4.56	Highly Engaged

Note: 4.21-5.00 (*Highly Engaged*) | 3.41-4.20 (*Engaged*) | 2.61-3.40 (*Moderately Engaged*) | 1.81-2.60 (*Less Engaged*) | 1.00-1.80 (*Not Engaged*)

Table 3 indicates that students reported a consistently high level of harmony-related engagement, with an overall mean of 4.56 (“Highly Engaged”). All indicators were rated within the “Highly Engaged” range ($M = 4.53\text{--}4.59$). The highest-rated item was “The incorporation of complex harmonies improves the level of interaction and engagement between musicians and their audience during performances” ($M = 4.59$), followed by “Teaching the principles and application of harmony increases students’ engagement and understanding of musical compositions” ($M = 4.58$). The lowest mean, while still within the same category, was recorded for “The balance and interplay of different harmonies...” ($M = 4.53$). Overall, the results reflect strong self-reported engagement with harmonic aspects of musical activities among the respondents.

With these results on musical engagement, the next section presents students’ self-assessed social communication skills.

In summary, students reported “Highly Engaged” levels across rhythm (overall mean = 4.59), melody (overall mean = 4.61), and harmony (overall mean = 4.56), indicating consistently high self-assessed engagement across all three musical dimensions.

3.2 Assessment of Social Communication Skills

This subsection presents students’ self-assessed social communication skills across the verbal, non-verbal, and listening dimensions. The tables below report the mean scores and verbal interpretations for each dimension, providing an overall profile of students’ perceived communication skills in the context of their music-related learning experiences.

3.2.1 Verbal Communication

Table 4 presents students’ self-assessed verbal communication skills in relation to their music course experiences. Overall, students reported a high level of verbal communication, with all indicators interpreted as “Highly Engaged.”

Table 4. Self-Assessment of the Students of the Verbal Aspect of Social Communication Skills.

	Indicator	Mean	Verbal Interpretation
1	Achieving success in taking the Music course requires constant communication with college classmates.	4.46	Highly Engaged
2	Discussing musical concepts with instructors enhances my understanding of the course material.	4.46	Highly Engaged
3	Sharing feedback about musical performance is crucial for improvement in music courses.	4.44	Highly Engaged
4	Asking questions during music classes helps clarify my doubts and enhances learning.	4.53	Highly Engaged
5	Providing constructive criticism to peers is essential for growth in music performance skills.	4.46	Highly Engaged

OVERALL MEAN	4.47	Highly Engaged
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Note: 4.21-5.00 (Highly Engaged) | 3.41-4.20 (Engaged) | 2.61-3.40 (Moderately Engaged) | 1.81-2.60 (Less Engaged) | 1.00-1.80 (Not Engaged)

Table 4 shows that students' verbal communication skills were rated as "Highly Engaged", with an overall mean of 4.47. All indicators fell within the "Highly Engaged" range ($M = 4.44$ – 4.53). The highest-rated item was "Asking questions during music classes helps clarify my doubts and enhances learning" ($M = 4.53$), while the lowest mean was recorded for "Sharing feedback about musical performance is crucial for improvement in music courses" ($M = 4.44$). Overall, the results indicate consistently high self-reported verbal communication among the respondents within the context of music-related learning activities.

3.2.2 Non-Verbal Communication

Table 5 presents students' self-assessed non-verbal communication skills in the context of music-related learning experiences. The table summarizes the mean ratings and verbal interpretations for indicators related to gestures, facial expressions, body language, synchronization, and eye contact.

Table 5. Self-Assessment of the Students of the Non-Verbal Aspect of Social Communication Skills.

	Indicator	Mean	Verbal Interpretation
1	Gestures are very important in communicating with my classmates through music.	4.45	Highly Engaged
2	Facial expressions contribute to enhance interpersonal relationships among students, especially in understanding music.	4.52	Highly Engaged
3	Body language during performances can significantly affect the overall presentation of a piece.	4.50	Highly Engaged
4	The synchronization of movements among group members is essential for a cohesive performance.	4.52	Highly Engaged
5	Eye contact among ensemble members helps in maintaining tempo and dynamics during performance.	4.43	Highly Engaged
OVERALL MEAN		4.49	Highly Engaged

Note: 4.21-5.00 (Highly Engaged) | 3.41-4.20 (Engaged) | 2.61-3.40 (Moderately Engaged) | 1.81-2.60 (Less Engaged) | 1.00-1.80 (Not Engaged)

Table 5 shows that students' non-verbal communication skills were rated as "Highly Engaged", with an overall mean of 4.49. All indicators fell within the "Highly Engaged" range ($M = 4.43$ – 4.52). The highest-rated items were "Facial expressions contribute to enhancing interpersonal relationships..." ($M = 4.52$) and "The synchronization of movements among group members is essential for a cohesive performance" ($M = 4.52$). The lowest mean, while still within the same category, was recorded for "Eye contact among ensemble

members helps in maintaining tempo and dynamics during performance" ($M = 4.43$). Overall, the results indicate consistently high self-reported non-verbal communication among the respondents.

3.2.3 Listening

Table 6 presents students' self-assessed listening skills in the context of music-related learning experiences. The table summarizes mean ratings and verbal interpretations for indicators related to attentive listening during practice, group discussion, instructor guidance, and listening-based tasks.

Table 6. Self-Assessment of the Students of the Listening Aspect of Social Communication Skills

	Indicator	Mean	Verbal Interpretation
1	It is important for me to listen to the ideas of my classmates during our practice and performance.	4.46	Highly Engaged
2	Listening to recordings of musical performances as a group aids in understanding different interpretations of music.	4.43	Highly Engaged
3	Receiving listening assignments from instructors improves my ability to critique music effectively.	4.50	Highly Engaged
4	Understanding the nuances of music requires attentive listening to instructors' explanations.	4.50	Highly Engaged
5	Active listening during group discussions helps in better collaboration for ensemble performances.	4.50	Highly Engaged
OVERALL MEAN		4.48	Highly Engaged

Note: 4.21-5.00 (Highly Engaged) | 3.41-4.20 (Engaged) | 2.61-3.40 (Moderately Engaged) | 1.81-2.60 (Less Engaged) | 1.00-1.80 (Not Engaged)

Table 6 shows that students' listening skills were rated as "Highly Engaged," with an overall mean of 4.48. All indicators fell within the "Highly Engaged" range ($M = 4.43\text{--}4.50$). The highest-rated items were "Receiving listening assignments from instructors improves my ability to critique music effectively" ($M = 4.50$), "Understanding the nuances of music requires attentive listening to instructors' explanations" ($M = 4.50$), and "Active listening during group discussions helps in better collaboration for ensemble performances" ($M = 4.50$). The lowest mean, while still within the same category, was recorded for "Listening to recordings of musical performances as a group aid in understanding different interpretations of music" ($M = 4.43$). Overall, the results indicate consistently high self-reported listening skills among the respondents.

Overall, students reported "Highly Engaged" levels across all three social communication dimensions: verbal (overall mean = 4.47), non-verbal (overall mean = 4.49), and listening (overall mean = 4.48). These findings indicate consistently high self-assessed social communication skills among the respondents within the context of music-related learning activities

DISCUSSION

The findings of this study indicate that students' musical engagement (rhythm, melody, and harmony) is associated with their self-assessed social communication skills (verbal, non-verbal, and listening), particularly within vocational settings where teamwork, task coordination, and collaborative performance are central. Consistent with experiential learning perspectives, music-related activities provide structured opportunities for interaction, reflection, and shared participation, which may reinforce communicative behaviors that are relevant to vocational readiness. [2,19]

4.1 Rhythm, non-verbal coordination, and group synchronization

Rhythmic engagement was rated highly by students and appears conceptually aligned with non-verbal communication demands in group-based learning. Rhythm is frequently linked to timing, coordination, and synchronized participation, which are also foundational to effective non-verbal interaction in collaborative settings. [8,27] The consistently high self-assessments in rhythmic engagement may be partly explained by evidence that rhythmic patterns influence emotional response and engagement through neural entrainment and affective processing. [10] This aligns with the view that rhythm can shape participants' perception of flow and sustained involvement in learning tasks, thereby supporting consistent participation during group activities. [11] In applied vocational contexts, rhythmic coordination may resemble real task-based collaboration where students must align pacing, roles, and actions. Studies on movement-based rhythm play further support the role of rhythmic interaction in social expressiveness and coordinated physical communication. [24]

4.2 Melody, sustained attention, and verbal expression

Melodic engagement also received consistently high ratings and appears closely linked with the verbal dimension of communication. Melody is often discussed as supporting expressive performance and emotional articulation, which may lower participation barriers and encourage verbal contributions in learning settings. [21] In addition, experimental evidence suggests that music engagement can support attention-related outcomes, which may facilitate students' focus during discussions, peer feedback, and instructor-led clarification. [15] Related scholarship on emotion regulation emphasizes how musical elements, including melodic structure, can strengthen emotional engagement and sustained attention—processes that can support communicative participation. [16] Furthermore, the use of musical text as a learning medium has been associated with language expression and meaning-making, which is relevant to verbal interaction and classroom communication. [28] Together, these studies provide converging support for why students who report high melodic engagement may also report strong verbal communication skills.

4.3 Harmony, active listening, and adaptive responsiveness

Harmony-related engagement reflects the need to balance individual contributions within a shared structure, which is strongly aligned with listening and adaptive responsiveness. Ensemble-based contexts require learners to attend to others' input, adjust timing and dynamics, and maintain coherence—behaviors that mirror workplace collaboration and conflict management. [17,29] Prior work also emphasizes that music engagement can support socio-emotional functioning and interpersonal outcomes, which may reinforce cooperative responsiveness during group tasks. [18] Moreover, structured feedback processes (audio and written feedback, guided critique, and instructor assignments) have been linked with improved reflective listening and evaluative processing, which can support

adaptive communication in collaborative learning environments. [25] In this sense, harmony can be interpreted as a meaningful model for vocational teamwork because it demands attentive listening, real-time adjustment, and shared accountability for group outcomes. [29]

4.4 Vocational relevance and implications for applied learning contexts

A key contribution of this study is its vocational relevance. While communication skills are widely studied, vocational learning environments often require applied and performance-based communication—students must negotiate roles, interpret non-verbal cues during collaboration, and respond to peers and instructors under task constraints. [19] The consistently high engagement and communication ratings in this study suggest that music-related activities may provide a structured setting for practicing these competencies. This aligns with broader work highlighting that music-based education can support competence development and holistic growth through structured participation and skills transfer. [3,7] In addition, a systematic review on music training and prosocial outcomes supports the broader idea that music engagement may be linked with interpersonal orientation, which is relevant to team-based vocational performance. [13]

4.5 Demographic patterns and differentiated support

Differences across gender and performance rating indicate that students may experience music engagement and communication behaviors differently. Prior research suggests that engagement patterns can differ by gender and support structures, which may influence students' participation and responsiveness in collaborative tasks. [20] Rather than viewing these differences as fixed, the findings suggest the value of differentiated supports—such as structured peer roles, guided participation routines, and tiered communicative tasks—to ensure equitable opportunities for verbal expression, non-verbal coordination, and active listening in group learning contexts. [19]

These discussion points contextualize the study's findings within existing literature and highlight how musical engagement aligns with communication practices in vocational learning environments. The following section presents the study's conclusions and practical recommendations.

CONCLUSION & RECOMMENDATIONS

This study indicates that students' musical engagement in rhythm, melody, and harmony was positively associated with their self-assessed social communication skills (verbal, non-verbal, and listening) in a vocational education context. Overall findings suggest that rhythm-related engagement aligns with non-verbal coordination in group activities, melody-related engagement aligns with verbal expression and participation, and harmony-related engagement aligns with attentive listening and adaptive collaboration during ensemble or team-based tasks. These patterns support the relevance of music-based learning contexts as a practical setting where communication behaviors can be practiced within structured group interaction.

Differences were observed across gender and performance rating in some communication-related outcomes, suggesting that students may engage with music-based learning and communication tasks in varied ways. This highlights the need for flexible and inclusive instructional approaches that provide equitable opportunities for verbal participation, non-verbal coordination, and active listening across learner groups.

Recommendations. To strengthen communication skills through music-informed strategies in vocational education, the following actions are recommended:

1. Embed brief rhythm-based coordination tasks (e.g., timed group clapping/drumming patterns or synchronized movement drills) in teamwork-oriented modules to support pacing, role coordination, and non-verbal alignment.
2. Integrate melody-based verbal practice activities (e.g., short guided singing lines, structured musical storytelling, or scripted call-and-response) in communication-focused lessons to encourage articulation, confidence, and participation.
3. Use harmony-based ensemble tasks for listening development, such as small-group performance roles requiring students to monitor peers' cues and adjust their timing, dynamics, or contributions to maintain group cohesion.
4. Implement periodic monitoring (e.g., short rubrics or checklists for verbal participation, non-verbal coordination, and listening behaviors) to guide instructional adjustments and targeted support.

5. Provide faculty development on implementing music-integrated collaborative activities aligned with course outcomes and vocational competencies.

Limitations and future research. Because the study used self-report data from a single setting and a descriptive-correlational design, the findings do not establish causal effects. Future studies may use longitudinal or quasi-experimental designs and include additional vocational contexts to examine whether music-integrated strategies lead to measurable improvements in communication skills and workplace readiness over time.

IMPLICATIONS

The findings of this study offer practical implications for educators, curriculum developers, and policymakers in vocational education. Students who reported higher musical engagement (rhythm, melody, and harmony) also reported higher levels of social communication skills (verbal, non-verbal, and listening), suggesting that music-related learning contexts may be a useful platform for practicing communication behaviors relevant to team-based learning and workplace interaction. Given the study's descriptive-correlational and self-report nature, these implications should be interpreted as practice-oriented applications rather than evidence of causal effects.

From an instructional perspective, rhythm-related engagement may inform the use of short coordination tasks (e.g., synchronized movement, timing drills, or group rhythm patterns) within collaborative modules where learners must align roles, pacing, and group actions. For curriculum design, melody-related engagement may support the inclusion of structured expressive tasks (e.g., guided musical storytelling or call-and-response activities) that encourage participation, articulation, and confidence in communication-focused lessons. In parallel, harmony-related engagement highlights the relevance of ensemble-based tasks that require attentive monitoring of peers and adaptive response, which conceptually aligns with listening demands in workplace collaboration (e.g., responding to team cues, maintaining group coherence, and negotiating shared outcomes).

At the institutional level, the observed differences across gender and performance rating suggest that implementation may benefit from differentiated participation structures to ensure equitable

opportunities for verbal contribution, non-verbal coordination, and active listening. Periodic monitoring of communication behaviors (e.g., short rubrics or checklists aligned with course outcomes) may help instructors adjust task difficulty and group roles to better support diverse learners. Overall, embedding music-integrated collaborative activities across vocational subjects may contribute to developing transferable communication competencies that align with workplace readiness and collaborative performance.

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