

INFLUENCE OF LEARNING MUSICAL INSTRUMENTS ON THE ACADEMIC AND COGNITIVE PERFORMANCE OF LEARNERS

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Abstract

Academic performance and cognitive development remain central concerns in secondary education, prompting growing interest in enrichment programs that may strengthen learners' intellectual outcomes beyond conventional classroom instruction. This study examined the influence of learning musical instruments on the academic and cognitive performance of learners at Dagupan City National High School during the Academic Year 2025–2026. Specifically, it compared the academic performance of learners who actively learn and play musical instruments with those who do not, determined the duration and frequency of musical instrument practice, examined the relationship between musical practice and academic performance, and assessed cognitive skills in terms of memory, concentration, and abstract reasoning after participation in a structured musical instrument learning program. The study employed a quantitative descriptive–comparative and correlational research design involving 150 learner-respondents. Data were gathered through researcher-developed questionnaires, cognitive assessment tools, and official academic records. Results revealed that learners who actively learn and play musical instruments achieved a higher mean academic performance ($M = 88.45$, $SD = 3.62$) than those who do not ($M = 83.12$, $SD = 4.15$), with the difference statistically significant ($t = 4.87$, $p = 0.000$). Learners also reported moderate practice duration (5.6 hours per week) and frequent practice sessions (4.2 per week). Moreover, practice duration ($r = 0.61$, $p = 0.000$) and frequency ($r = 0.58$, $p = 0.001$) were significantly and positively correlated with academic performance. Cognitive skill scores were likewise high in memory, concentration, and abstract reasoning. The findings support the development of an enhanced musical instrument program to improve learners' academic and cognitive performance.

Keywords: Musical Instrument Learning, Academic Performance, Cognitive Performance, Memory, Concentration, Abstract Reasoning, Secondary Learners

1. Introduction

Music education has long been associated with holistic learner development, but its place in contemporary schooling is now being reconsidered in more precise academic and cognitive terms. In the Philippine context, this reconsideration is timely. The Department of Education's revised Music and Arts curriculum frames music learning as highly contextualized and reflective of Filipino identity, while the curriculum standards emphasize creative production, performance, and engagement with cultural traditions. UNESCO likewise states that learning in, through, and with culture and the arts can develop cognitive, social, emotional, and behavioral skills and is essential to comprehensive education. These policy positions suggest that learning music is not merely a peripheral enrichment activity; rather, it can serve as a legitimate educational process linked to broader learner outcomes.

This curricular logic is especially relevant to instrumental music learning because playing an instrument is a demanding form of embodied cognition. It requires the coordination of auditory discrimination, visual decoding, fine motor control, timing, sustained attention, working memory, and self-monitoring. The older K to 12 Music Curriculum Guide explicitly characterizes music as a performance-based discipline in which effective learning occurs through active experience,

participation, performance, interpretation, and creative expression. The newer MATATAG guide similarly highlights cultural anchoring, multisensory learning, differentiated instruction, and the cultivation of higher-order skills through performing and creating. Taken together, these frameworks help explain why instrumental learning is often hypothesized to influence not only musical competence but also broader academic behaviors such as focus, persistence, memory, and disciplined practice.

Empirical research offers substantial support for this possibility, although the evidence is more nuanced than simple advocacy sometimes suggests. A 2022 meta-analysis in *Educational Research Review* found that instrumental musical training in childhood and adolescence was associated with a small benefit in cognitive skills and academic achievement, based on 34 independent samples and 5,998 participants. A 2024 study in the *British Journal of Music Education* likewise reported significant differences between adolescents with and without specialized musical training in working memory, learning strategies, and academic performance. In addition, a longitudinal intervention study in *Frontiers in Psychology* found that one year of music training in school-aged children was designed specifically to examine whether music training could facilitate working-memory development relative to language training and no training. Together, these studies support the argument that structured instrumental learning may confer advantages in the same domains examined in the present thesis, particularly academic performance, memory, and concentration.

At the same time, a credible introduction must also acknowledge that the literature is not unanimously causal in its conclusions. Sala and Gobet's multilevel meta-analysis in *Memory & Cognition* found that claims about the cognitive and academic benefits of music training in children are often overstated. At the same time, Schellenberg and Lima's 2024 review in the *Annual Review of Psychology* concluded that evidence that music training causes nonmusical benefits is weak or nonexistent and that far transfer is likely rare. A related 2025 article in *Cognition* similarly reported that music training improved fine-motor skills and auditory memory but did not causally improve broader cognitive or socioemotional abilities in school-aged children. These cautions do not make the topic less important. On the contrary, they clarify why carefully delimited, context-specific studies are needed: the question is not whether music is universally transformative, but under what conditions, for which learners, and with which outcome variables it is associated with measurable gains.

Recent work also suggests that music learning may affect academic performance indirectly through psychological and motivational pathways. A 2024 *PLOS ONE* study reported that music education improved students' psychological well-being, which in turn improved academic performance, with self-efficacy and self-esteem playing significant mediating roles. This is educationally important because school achievement is rarely shaped solely by cognition. Instrumental learning often requires repeated goal-setting, delayed gratification, disciplined rehearsal, error correction, and performance under pressure. These processes may strengthen confidence, persistence, and engagement, thereby supporting school performance even when direct far-transfer effects are modest. Thus, the literature points to a more defensible interpretation: instrumental music learning may influence academic and cognitive outcomes through a combination of cognitive practice effects, motivational reinforcement, and self-regulatory development rather than through a single, simple mechanism.

It is within this conceptual and empirical landscape that the present study becomes significant. The uploaded thesis shows that the investigation focuses on Dagupan City National High School during Academic Year 2025–2026 and examines the influence of learning musical instruments on learners' academic and cognitive performance. More specifically, it compares the academic performance of learners who actively learn and play musical instruments with those who do not, examines the duration and frequency of musical practice, tests the relationship between practice variables and academic outcomes, and assesses cognitive performance in

terms of memory, concentration, and abstract reasoning after participation in a structured musical instrument learning program. These objectives are well chosen because they move the discussion from broad claims about “the power of music” to measurable school-based evidence. By doing so, the study provides local empirical support for the broader debate on whether structured instrumental learning can serve as an educational strategy to improve both academic achievement and selected cognitive skills among Filipino secondary learners.

2. Method

2.1 Research Design

The study employed a quantitative descriptive–comparative and correlational research design to examine the influence of learning musical instruments on the academic and cognitive performance of learners at Dagupan City National High School. This design was appropriate because the investigation sought to describe existing learner conditions, compare academic outcomes between those who actively learn and play musical instruments and those who do not, and determine the direction and magnitude of the relationships between musical practice variables and academic performance, all without manipulating the natural learning environment of the participants. The descriptive component was used to profile learners’ academic performance, the duration and frequency of musical instrument practice, and cognitive skills in memory, concentration, and abstract reasoning after participation in a structured musical instrument learning program. The comparative component enabled the study to test whether there were significant differences in academic performance between learners with and without musical instrument experience. In contrast, the correlational component was used to determine whether the duration and frequency of practice were significantly associated with academic achievement. In addition, the design incorporated a program-based evaluation by examining learners’ cognitive performance after structured musical engagement and using the findings to develop an enhanced musical instrument program. Overall, the selected design provided a systematic, objective, and data-driven methodological framework for investigating how musical instrument learning may contribute to learners’ academic and cognitive development.

2.2 Participants

The study consisted of 150 learner-respondents from Dagupan City National High School, specifically Grade 10 students officially enrolled during School Year 2025–2026, who were selected to provide a focused, statistically adequate basis for examining the influence of musical instrument learning on academic and cognitive performance. The sample size was derived from an estimated population of approximately 240 Grade 10 learners, using Slovin’s formula with a 5% margin of error, yielding a sample deemed sufficient for reliable statistical analysis and meaningful group comparisons. The participants were organized into two analytically relevant groups: learners who actively learn and play musical instruments and learners who do not engage in musical instrument learning, thereby enabling the study to compare academic performance across differing levels of musical involvement while also examining the cognitive outcomes associated with structured musical engagement. A purposive sampling technique was employed to ensure that all selected respondents met the study’s inclusion requirements and could provide data directly aligned with the research objectives. This participant structure was methodologically appropriate because it allowed the researcher to examine naturally occurring differences in academic achievement, practice habits, and cognitive skill development within a clearly defined secondary-school context, while maintaining coherence between the sample characteristics and the study’s descriptive–comparative and correlational design.

2.3 Instrumentation

The study employed a combination of researcher-designed instruments and official school records to obtain data directly aligned with its statement of the problem. First, official academic records, secured with proper authorization from the school, were used to determine and compare the academic performance of learners who actively learn and play musical instruments and those who do not, thereby providing an objective basis for the comparative component of the study. Second, the researcher administered a researcher-developed questionnaire to learners engaged in musical instrument learning to gather quantitative data on the duration and frequency of musical instrument practice; the questionnaire also included profile items and perception-based indicators related to academic functioning and the perceived influence of music learning. Third, to assess the cognitive dimension of the inquiry, the study used a cognitive skills assessment tool that measured memory, concentration, and abstract reasoning, with each domain designed to capture mental processes considered relevant to structured musical practice. Together, these instruments created a coherent, methodologically appropriate data-gathering system that enabled the researcher to examine academic performance, practice engagement, and cognitive skill outcomes in an integrated manner, while ensuring that both objective school-based evidence and participant-generated responses were represented in the analysis.

2.4 Data Analysis

The study employed a quantitative data analysis framework that combined both descriptive and inferential statistical procedures to ensure an objective and systematic interpretation of the data gathered on learners' academic and cognitive performance and their engagement in musical instrument learning. Descriptive statistics—specifically frequency counts and percentages—were used to summarize the respondents' profile and describe the duration and frequency of musical instrument practice. At the same time, the mean and standard deviation were computed to determine the average levels and variability of learners' academic performance and cognitive skill scores in memory, concentration, and abstract reasoning. For inferential analysis, the study employed the independent-samples t-test to determine whether there was a statistically significant difference in academic performance between learners who actively learn and play musical instruments and those who do not. The Pearson Product-Moment Correlation Coefficient (r) is used to examine the strength and direction of the relationship between the duration and frequency of musical instrument practice and academic performance. In addition, mean score analysis was used to interpret the level of cognitive performance after learners' participation in the structured musical instrument learning program. All inferential tests were evaluated at the 0.05 level of significance, and the encoded data were processed using Statistical Package for the Social Sciences (SPSS) or an equivalent statistical software, thereby strengthening computational accuracy, minimizing error, and enhancing the reliability of the study's conclusions.

3 Results

The study found a clear difference in academic performance between learners who actively learn and play musical instruments and those who do not. Learners engaged in musical instrument learning obtained a mean academic performance of 88.45 with a standard deviation of 3.62, interpreted as Very Satisfactory. In contrast, learners who did not learn musical instruments obtained a lower mean of 83.12 with a standard deviation of 4.15, indicating a Satisfactory level. This descriptive result indicates that the group involved in musical instrument learning demonstrated stronger school performance, suggesting that sustained musical engagement may be associated with better academic discipline, concentration, and motivation in school tasks.

The inferential analysis further strengthened this pattern. The independent samples t-test revealed a significant difference in academic performance between the two groups, with a computed t-value of 4.87 and a p-value of 0.000, leading to the rejection of the null hypothesis. In research terms, this means that the observed gap in academic performance was statistically meaningful rather than a chance variation. The finding supports the study's central proposition that participation in musical instrument learning is linked to stronger academic outcomes among learners, particularly when compared with peers who do not participate in similar musical activities.

The study also examined the practice habits of learners engaged in musical instrument learning. Results showed that they practiced for an average of 5.6 hours per week, interpreted as moderate, and engaged in practice about 4.2 sessions per week, interpreted as frequent. More importantly, both practice variables were significantly related to academic performance. The duration of practice showed a significant positive correlation with academic performance ($r = 0.61$, $p = 0.000$), while the frequency of practice also showed a significant positive correlation ($r = 0.58$, $p = 0.001$). These results indicate that learners who practiced more consistently and for longer periods achieved better academic results, suggesting that the regularity and intensity of musical engagement may be important factors in supporting school achievement.

In addition to academic outcomes, the study revealed that learners who participated in the structured musical instrument learning program demonstrated high levels of cognitive performance across the three domains assessed. The mean score for memory was 89.20, concentration registered 87.65, and abstract reasoning obtained 85.80, yielding an overall mean of 87.55, all interpreted as High. Among the three, memory obtained the highest score, suggesting that musical instrument learning may be particularly supportive of retention and recall. The consistently high results across all domains suggest that musical learning may strengthen cognition by requiring learners to remember patterns, sustain attention, and interpret symbolic structures during practice and performance.

Taken together, the findings present a coherent pattern: learners who engaged in musical instrument learning not only performed better academically, but also practiced with meaningful regularity and demonstrated high levels of memory, concentration, and abstract reasoning. Because these findings converged across descriptive, comparative, and correlational analyses, they served as the basis for the development of an enhanced musical instrument program centered on structured practice schedules, cognitive-focused musical activities, guided instruction, performance-based tasks, and continuous assessment. Thus, the study's results suggest that musical instrument learning can serve as a valuable educational support mechanism for strengthening both academic and cognitive performance among secondary learners.

4. Discussion

The present study found that learners who actively engaged in learning and playing musical instruments achieved higher academic performance than those who did not, and that the group difference was statistically significant. This pattern is broadly consistent with recent literature. Román-Caballero et al. (2022) reported a small but significant overall benefit of instrumental musical training on cognitive skills and academic achievement across 34 samples and 5,998 participants, while also noting that students who self-selected into music training often had a slight baseline advantage before intervention. Likewise, Sepúlveda-Durán et al. (2024) found significant differences between adolescents with and without specialized musical training in working memory, learning strategies, and academic performance. Read alongside the present findings, these studies support the view that instrumental learning can be associated with stronger school performance, but they also suggest that part of the advantage may reflect both training effects and pre-existing learner characteristics such as motivation, family support, or academic readiness.

The study also showed that the duration and frequency of musical practice were positively correlated with academic performance, suggesting that regular and sustained practice matter, not merely participation itself. This interpretation is consistent with the same meta-analysis by Román-Caballero et al. (2022), which specifically focused on learning to play an instrument and found measurable benefits from short-term programs, as well as with the broader logic of deliberate practice in music learning. At the same time, the present study should be interpreted carefully because its design is descriptive-comparative and correlational rather than experimental, meaning it demonstrates association rather than definitive causation. That caution is reinforced by Schellenberg and Lima's (2024) review, which concluded that evidence that music training causes broad nonmusical benefits is weak or nonexistent and that far transfer is rare. Thus, the current findings are strongest when stated modestly: in this school context, sustained instrumental practice co-occurred with higher academic performance, but the exact causal pathway likely includes additional factors beyond music alone.

The study's cognitive findings—high mean scores in memory, concentration, and abstract reasoning, with memory emerging as the highest—are partly corroborated by recent empirical work, especially in domains closer to the demands of musical activity. Sepúlveda-Durán et al. (2024) found better working memory among adolescents with specialized musical training, and Neves et al. (2025) reported that music training improved auditory memory relative to controls. However, it did not improve other broader cognitive abilities. This is an important point for the present discussion. The study's strong scores in memory and concentration align well with the literature, as instrument learning repeatedly engages attention, sequencing, monitoring, and recall. However, the finding on abstract reasoning should be discussed more cautiously, because the strongest recent causal evidence does not consistently support broad transfer to all higher-order cognitive domains. In IMRAD terms, the present results suggest that music learning is plausibly linked to selected cognitive strengths, especially memory-related and attentional functions. In contrast, broader cognitive generalization remains more contested in the literature.

Finally, the study's proposal for an enhanced musical instrument program is well justified by the available evidence, especially if it is framed not as a guaranteed method for boosting all forms of cognition, but as a structured educational environment that can support academic discipline, well-being, and selected cognitive skills. Jiang et al. (2024) found that music education improved students' psychological well-being, which, in turn, enhanced academic performance, with self-efficacy and self-esteem as significant mediators. This helps explain why musical instrument learning may support school outcomes even when far-transfer effects are modest: practice routines, mastery experiences, persistence, and confidence can strengthen the learner's overall academic functioning. Therefore, the present study's recommendation for a more structured school music program is defensible, provided it is presented as a balanced educational intervention—one that supports memory, concentration, motivation, and academic engagement, while remaining careful not to overstate claims about universal cognitive enhancement.

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