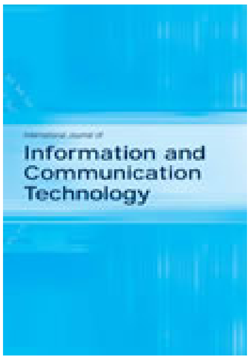

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Integrating computational intelligence in music teaching: a decision-making approach for personalised education

Chunfa Peng

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Integrating computational intelligence in music teaching: a decision-making approach for personalised education

Chunfa Peng

School of Education,
Nanchang Institute of Science and Technology,
No. 998 Shizishan Avenue, Honggutan District,
Nanchang City, Jiangxi Province, China
Email: pengchunfa163@163.com

Abstract: With the integration of computational intelligence (CI) in music education, the traditional teaching paradigms have been transformed, and personalised and adaptive learning experiences have been offered. This paper describes a methodology for making decisions on music education, which is based on artificial intelligence (AI), machine learning (ML) and data analytics. The AI-powered CI frameworks provide tailored instructional content, optimised practice regimes, and instant feedback through analytics of students' abilities, preferences, and evolution. In this study, a critical review of existing CI techniques in music education has taken place intending to investigate their effectiveness in the areas of skill acquisition, engagement, and curriculum design. Furthermore, to increase the levels of personalisation in learning pathways, a novel decision-making model is proposed that ensures students receive instruction tailored to their abilities and goals. The experimental validation of the proposed methodology was carried out through case studies, demonstrating its effectiveness in improving student outcomes and learning processes within educational contexts. The study's conclusions reinforce the idea that the power of CI can transform music pedagogy from educational to Artificial Intelligence. The results indicate that AI-powered education is the way to develop learning opportunities in future programs.

Keywords: computational intelligence; music education; personalised learning; decision-making models; artificial intelligence.

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Biographical notes: Chunfa Peng is one of the academic associates from the School of Education at Nanchang Institute of Science and Technology which is located in Jiangxi Province, China. He specialises in educational development and pedagogy, through his teaching and researching work. Housed in the Shizishan Avenue campus that stands in the heart of Nanchang City, he initiates activities that increase learning and educational outcomes.

1 Introduction

In diverse fields like education, a significant effect has been made by the rapid advancements in computational intelligence (CI). A vast area where CI is having a significant effect like robotics is one of the areas which holds a lot of promise in music education. In the past, music teaching has been carried out in structured curricula using instructor-led lessons and standardised assessments. While these strategies have proven successful over centuries, they frequently miss the unique learning styles, preferences, and cognitive abilities of every single student (Chu, 2022). The introduction of artificial intelligence (AI) and machine learning (ML) as novel methodologies for personalising education leads to an enhanced environment in education focusing on the data-driven approach which increases both student engagement and learning outcomes (Borja and Camargo, 2024). Music instructors are now able to utilise CI for the analysis of large datasets, for example, student performance patterns are identified and the result is that adaptive teaching strategies are developed to cope with individual needs. This variation of teaching signals a new way of teaching music, combining the old-fashioned, classical way of learning with modern technology to be a more effective and complete education (*J. of Mathematics*, 2024).

Inherent in the activity of music education is the complicatedness that requires a proper mix of theory, craft, and emotional expression as well as creativity. Factors like previous experience, thinking, movement, and motivation all influence every student's journey of learning and hence it must be different for everyone (Cao and Liew, 2024). Traditional methods of music instruction work for many students, though lack of flexibility is often the main reason they cannot address the diverse learning needs of students. Instructors are forced to prepare lesson plans that go through a lot of students with individual differences by using subjective evaluations and general methods in most cases (Wan, 2024). On the other hand, the CI approach offers a more organised and correct system that starts from the raw data and ends with the improvement of the teaching methods as well as the achievement of the students (Guo et al., 2021). AI-driven decision models will completely change the teaching of music, thus creating an environment where students can learn efficiently, in a personalised way, and reach their maximum potential (Yang, 2022).

CI applied in the music classroom is a multifaceted process involving a variety of techniques such as ML, deep learning, natural language processing (NLP), and neural networks (Guan and Ren, 2021). These technologies provide the way for automated feedback, performance assessment, and personalised recommendations. Businesses, for example, the AI-driven tools could analyse a student's playing style, detect inaccuracies, and suggest corrections in real-time (Yue, 2024). Moreover, strenuous tutoring systems that incorporate lesson plans into one another can accommodate individual progress and thus ensure that students partake in lessons that fit their capacity and learning speed (Li and Liu, 2022). Such innovations bring about a major turning point as opposed to the old 'one-size-fits-all' way of thought and interaction which is replaced by a more adaptable educational framework. By integrating CI into music education, instructors may shift away from traditional instruction and evolve into guided mentorship roles, taking advantage of the advances of AI-driven insights to improve student learning experiences (Yang, 2021).

Furthermore, yet another key aspect through which CI is beneficial to music instruction is by enabling remote learning and guaranteeing accessibility (Liu, 2022). Quality music education was, in the past, often hard to access owing to geographical barriers, the unavailability of skilled teachers as well as financial issues due to the convenience of digital technology; in addition, music education was mostly at the mercy of local availability or affordability (Li, 2022). Today, applications and platforms driven by AI provide learners with expert-level learning experiences, wherever they are. On the other hand, CI-enabled systems through which students can practice, receive feedback, and move at their pace offer opportunities for users that conventional classrooms cannot (Zhai and Xu, 2023). This equalisation of learning opportunities for students from diverse backgrounds should be acknowledged as it enables them to pay attention to and develop their musical skills without traditional barriers. CI in music instruction also facilitates lifelong learning, allowing individuals to use highly responsive systems that follow their progress to keep on improving their skills and talents (Yu and Luo, 2022).

The rapid evolution of CI within the music education sector is leading to significant advancements. Nonetheless, it is important to note how major issues can be effectively controlled (Chen and Meng, 2022). Striking a balance between learning that is driven by technology and the humanistic context within the field of music education is one primary issue. Although AI and ML may indeed offer technology-based assessments and personalised recommendations, the place of human instinct, emotional expression, and – not to forget – creativity in music is undeniable (Wei et al., 2022). The embracing of any CI should enhance and not be considered a replacement for human instructors. This calls on educators to come up with unique ways to help the AI-driven insights go hand in hand with conventional teaching methods so that there is an all-round learning experience (Ni et al., 2024). Moreover, educators should guarantee that ethical concerns such as data privacy and algorithmic biasing are carefully dealt with to allow AI systems to run justly and equally (Zhang, 2024).

2.1 Objectives

- To study the function of computer intelligence in the development of music education in the context of the application of AI-specified decision-making models.
- To devise and analyse a flexible learning system that adjusts music instruction to the characteristics of the pupils and its influence on their behaviour, cognitive abilities, and emotions.
- To investigate the impact of computer intelligence-oriented methods of teaching on the art of skill acquisition, enthusiasm, and general education results through case studies and empirical investigations.

The merging of CI and the art of music teaching is an essential progressive enhancement in the direction of a more flexible and unprejudiced educational system (Yi, 2022). By taking full advantage of AI, ML, and data analytics, educators can develop a personalised approach to studying for everyone, improve instruction methods, and give feedback that is more in line with a specific student's unique learning pattern (Wang, 2017). The current paper seeks to delve into how CI can be used in music education, suggest the use of an AI-based decision-making method to promote personalised instruction and analyse its impact on student learning afterward. This study involves observing the problems and chances of CI integration and becoming a part of today's music teaching evolution, thus paving the way to a new era in which technology and education work together easily and creatively to achieve artistic excellence.

2 Literature review

Music education has been the area where reliable mathematical modelling including AI has been set up successfully. A growing body of research indicates that simulations and applications of AI in a variety of formats and different specs such as learning, planning, and teaching can optimise the learning process. Various approaches to enhancing music pedagogy have been examined such as adaptive learning algorithms, intelligent tutoring systems, and deep learning frameworks. In this section, the most significant research findings which influence mainly of intelligence technology in the music teaching-learning process are presented paying attention to the methods, outcomes, and implications of personalised education.

Qiusi (2022) puts forth a novel concept of music education, directing on the model view controller (MVC) framework, teaming it up with AI to make music teaching more creative. The research optimised and enhanced music education via tweaking sound effects using artificial intelligence including a three-frequency equaliser while introducing seven alternative plans for AI-led music learning. The human instruction efficiency evaluation through a bivariate t-test led to the students, teachers, and parents' satisfaction with music classes. The report points out to widen the reach of AI in the domain of quality music education in China, the rise of national music consciousness, and the new applications of AI in different educational fields as the fruitful possible results of its use.

Wang (2022b) provided thorough research on how technology is changing music composition, performance, and appreciation. The work covered pathways for AI are based on breakthroughs in cognitive psychology and psychophysics to produce music. The study was also guided by an evidence-based process focusing on overarching principles. By launching these technologies, the field of music education can be broadened to give even more interactive and captivating learning experiences. The article associates the capacity of AI to stimulate the advancement of music teaching on the one hand with the enhancement of content teaching efficiency along with the learner's willingness to take part in the process on the other hand.

Wu (2022) created a learning platform for music education with the fuzzy clustering algorithm aimed at improving the management of the music teaching quality. This system permitted the labelling process of educational resources through a semantic similarity analysis, generating labels and clustering materials to organise them efficiently. The experimental trial revealed a retrieval accuracy of 96.24% which was significantly better than the old systems. The conducted research indicated that the instructional capability of computerised intelligence is improved as well as the students are more liberated from the torrents of the material, thus making high-quality music education resources reachable.

He (2024) proposed a music teaching system for vocational colleges based on artificial intelligence, addressing challenges in bandwidth limitations and pitch extraction accuracy. The study introduced an improved algorithm for pitch detection, significantly enhancing signal robustness and stability compared to traditional cepstrum methods.

Additionally, a virtual music classroom was developed, demonstrating superior performance over other algorithms in creating immersive learning environments. The AI-based method for evaluating music quality introduced in this study had a larger correlation than the existing methods and thus its use is encouraged.

Dai (2021) introduced an intelligent instructional design model integrating AI technologies such as big data, IoT, and emotional computing into music education. The study emphasised the importance of AI-driven perception, learning analysis, and adaptive evaluation in enhancing teaching methodologies. By leveraging an online learning platform, the model provided personalised learning experiences, improved instructional efficiency, and facilitated cooperative and autonomous learning among students. The research highlights the significant influence of AI on music education, creating a more effective and interactive teaching environment.

Zheng and Dai (2022) examined the role of artificial intelligence in music performance and education within colleges and universities. The study identified shortcomings of existing computer-based learning systems and presented recommendations for overcoming these challenges, such as reinforcing the theoretical base, raising learner confidence, and boosting engagement. The results are evidence that AI-based human-computer interaction systems should be further developed in order to enhance education quality and generate talented performers which is a major goal of higher education institutions.

Juchniewicz (2010) aimed to discover how social intelligence affected the effectiveness of music teaching. They analysed the levels of teachers' interpersonal perception skills and the results in the classroom. The outcomes of the study evidenced that such social intelligent educators were prevailed to be better communicators than others. On the other hand, some showed that their supervision in class was poor, which put them at the lower level of instructors. The dangers of a social-centred way of teaching the music courses are pointed out in the research; it is proposed that the teachers can improve their teaching effectiveness by enhancing their communication skills.

Zhichao (2022) was engaged in research of speech recognition technology in intelligent music teaching. The work is grounded in the Altered Star Gan of speech conversion, where all details of the converted speech are well presented in the feature extraction phase. It has been aimed in this, the application of speech recognition techniques along with the AI-driven learning systems, are planned to be the foundation of projects for top music instructors. The announced performances convincingly proved the efficiency and quality of the proposed system in teaching music, showing the influence of AI on music pedagogy optimisation.

Wang (2022a) examined the field of impact assessment of AI in the training for the music industry at a university level, especially in vocal training. The study put forth an AI-assisted vocal course which was aimed at increasing the abilities of students on the part of information processing, reasoning, and analysis. A survey of 100 students showed that 82% of them preferred the AI of education compared to the traditional education method. The survey results of the research were indicative of the role of AI in utilising the standard pedagogical systems/groups of experts as a part of the teaching process in this field, thus tackling the problem of the lack of music teachers, making the process of education more resource-efficient, and bringing music education to a higher level than the overall education level.

Table 1 Literature comparison

Author(s)	*Focus area*	*Methodology/technology used*	*Key findings*
Qiusi (2022)	AI-based music education model	Model view controller (MVC), computational audio	AI integration enhances music education, improving satisfaction among students, teachers, and parents.
Wang (2022b)	AI's role in modernising music education	Cognitive psychology, music cognition, signal processing	AI improves engagement, making learning more interactive and effective.
Wu (2022)	Music instructional resource management	Fuzzy clustering algorithm, semantic similarity analysis	Improved resource organisation, 96.24% retrieval accuracy, better teaching effectiveness.
He (2024)	AI-driven music teaching system for vocational colleges	AI-based pitch extraction, virtual reality classroom	Enhanced pitch detection, better virtual learning environments, improved music quality evaluation.
Dai (2021)	Intelligent instructional design in music education	AI, big data, IoT, emotional computing	Personalised learning, improved instructional efficiency, and adaptive evaluation.
Zheng and Dai (2022)	AI in college music performance and education	Human-computer interaction, learner engagement strategies	AI enhances music talent training, improving engagement and confidence.
Juchniewicz (2010)	Social intelligence in music teaching	Interpersonal perception task, external evaluator ratings	Teachers with strong social skills are perceived as more effective.
Zhichao (2022)	Speech recognition in intelligent music teaching	Multiscale star GAN, AI-based speech conversion	Improved speech recognition enhances music instruction quality.
Wang (2022a)	AI in university-level vocal education	AI-based vocal teaching system, survey analysis	82% of students preferred AI-assisted education over traditional methods.

3 Methodology

The proposed research applies a CI-oriented method to boost music education through personalised learning and adaptive decision-making. The methodology consists of the incorporation of AI and ML, along with data-driven analytics to enhance the training technique in music. This section highlights the key methodological elements, such as data collection, feature extraction, AI-based decision-making, real-time response, personalised learning assimilation, and constant assessment-regulated innovation. The system guarantees a continuous cycle of learning that allows students to acquire a customised teaching plan in a progressive, stepwise form that corresponds to their level of skills, ways of thinking, and contact patterns of an abstract kind while thoroughly engaging them at all levels.

Collecting the data is a pivotal element of the method suggested that includes the capture of student performance and individual learning habits through all the learning inputs. The model used consolidates four main data input sources; which consist of instrument and sensor data, student data, musical content, and the learning environment conditions. The instrument and sensor data allow real-time tracking of the student's performance, tempo, pitch accuracy, rhythm consistency, and expressive nuance. The data of the students contradict that of the student data because instead of just focusing on individual performance, they build comprehensive student profiles, histories, and also cognitive strengths. In the music content, the piece or practice to be learned and studied is described, while the learning situation strives to extract the certain external influence that serves the downplay of practice effectiveness. This simultaneous collection of data from varied sources would ensure that a comprehensive viewpoint is taken thus the CI module could produce recommendations that are well-informed and tailored to individual learner needs.

Following data collection, data processing, and feature extraction play a critical role in translating raw data into meaningful insights. The methodology employs signal processing techniques to analyse audio and performance data, ensuring precise extraction of musical attributes such as timing deviations, note articulation, and harmonic structures. Additionally, student behaviour analysis is conducted to examine practice routines, engagement levels, and cognitive responses to different learning materials. Pattern recognition algorithms are applied to identify trends in student progress, enabling the model to detect strengths, weaknesses, and areas requiring targeted intervention. This layer of processing is essential to the accuracy and relevance of CI systems in understanding student learning patterns.

The CI module constitutes the core of the proposed methodology, integrating three essential AI-driven components: decision-making algorithms, AI models for music analysis, and a real-time feedback system. Decision-making algorithms leverage deep learning and reinforcement learning techniques to recommend lesson structures, practice schedules, and instructional adjustments tailored to a student's progress. AI models for music analysis employ neural networks and audio processing frameworks to evaluate student performances with high precision. These models objectively validate musical features critical to the intonation accuracy, rhythmic integrity, and expressiveness of plays besides helping traditional assessments provided by instructors. The real-time feedback system enhances the learning experience by offering instantaneous corrections; enabling students to refine their techniques during practice rather than waiting for evaluations from their teachers. By combining these AI-driven functionalities, the CI module establishes a data-driven, responsive learning environment.

A significant aspect of the methodology is personalised learning and adaptation, which ensures that instructional strategies dynamically adjust to individual students. Three key components – student profiling, dynamic lesson customisation, and virtual music assistants – are employed to achieve this goal. Student profiling continuously updates individual learning trajectories by analysing ongoing performance data and engagement metrics. Dynamic lesson customisation enables the system to modify instructional content in real time, adapting lesson difficulty, practice assignments, and feedback intensity to student progress. Virtual music assistants provide interactive guidance, simulating instructor presence by offering verbal instructions, visual guides, and performance assessments. These components collectively create an adaptive ecosystem where students receive tailored support, maximising their learning potential.

The methodology also incorporates an evaluation and continuous improvement mechanism that is robust to refine the system iteratively. Three essential elements – performance analytics, instructor insights, and iterative refinement ensure that the model remains effective and adaptable over time. Performance analytics track student progression trends, identifying areas of improvement and possible stagnation. Instructor insights enable human educators to interact with AI-driven recommendations, thereby ensuring that the pedagogical strategies align with the educational objectives.

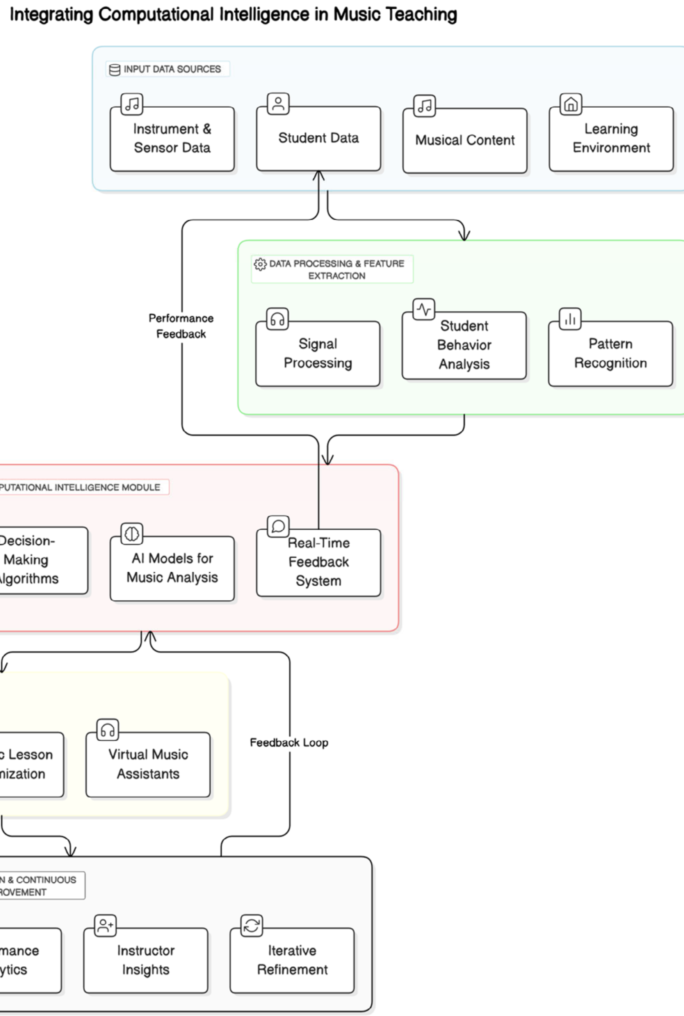
The proposed AI-driven model offers distinct advantages over conventional adaptive learning platforms. Unlike static recommendation systems, this framework integrates real-time sensor data, behavioural analysis, and deep-learning-driven decision-making processes. These elements enable highly responsive adjustments to instruction, practice content, and feedback based on live student performance. Such integration distinguishes the model from existing platforms that typically rely on predefined rules or generalised learning pathways.

The proposed model, which is seen in Figure 1, delves into a methodology that links five different stages: data acquisition, decision making based on artificial intelligence, and the making of hyper adaptive learning devices. The diagram shows that the components that were and were not the environment, the instrument and sensor data, students, music, and ambiance were all part of the input data. The signal processing student behaviour analysis and pattern recognition processes are the refiners of this raw data. In the final phase of decision-making algorithms, AI-based music analysis, and real-time feedback mechanisms are integrated into the processes of the insights generation which therefore leads to the recommendations of adaptive learning. In the personalised learning and adaptation layer, students receive a tailor-made lesson through student profiling, dynamic lesson customisation, and virtual music assistants. Finally, through performance analytics, instructor insights, and iterative refinements, the evaluation and continuous improvement framework guarantees the system's effectiveness over time.

The methodology proposed brings together all these elements to create a full system for music education that is powered by AI. The gap between tradition and modern CI is bridged, leading to a deep change and improved experience in the acquisition of knowledge, engagement in evidence-based pedagogy, and enhancement of the total efficiency of the musicians. Through a model that can develop with every student's progress thus ensuring better students, teachers can themselves through the use of instructional strategies that can increase success in learning outcomes through the feedback they get from students on these. The continuous improvement of the system is assured by the model's iterative nature, which means that whenever a particular student learns something new, the strategies for instruction become the kind of feedback that old-school teachers can use.

By integrating all these components, the proposed model provides a comprehensive approach to AI and ML adoption in tourism management. In this way, the business gets to use advanced technologies to achieve improved customer engagement, operational efficiency, and economic growth while also addressing sustainability issues and making necessary adjustments to future trends in the tourism industry.

Figure 1 Proposed AI-driven personalised music learning framework (see online version for colours)



4 Results and discussion

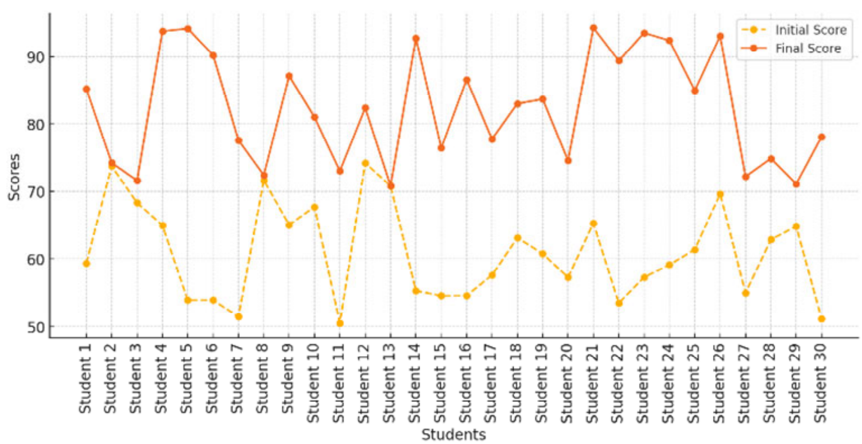
The study results provide compelling evidence that the integration of CI in music teaching improves student learning outcomes, engagement, and practice efficiency. The dataset utilised for the evaluation, music education performance data, encompasses key performance indicators, including students' initial and final scores, engagement levels, and weekly practice hours. The findings indicate a significant boost in students' musical fidelity after the employment of an AI-driven personalised learning model.

To thoroughly assess the model's effectiveness, multiple evaluation metrics were employed. These include pre- and post-instruction performance scores, engagement levels measured through weekly practice hours, and student cognitive development assessed via structured musical memory tasks and skill progression tracking. Together, these metrics provide a robust framework for quantifying the instructional impact of the AI-driven system.

While the majority of students exhibited significant improvement, variations in outcomes were observed. Factors such as previous musical exposure, learning styles, and motivational differences played a role in shaping results. Students with higher baseline skills or intrinsic motivation often progressed faster. These findings suggest that AI models should further adapt to learner diversity by incorporating cognitive profiles and reinforcement learning mechanisms for personalisation.

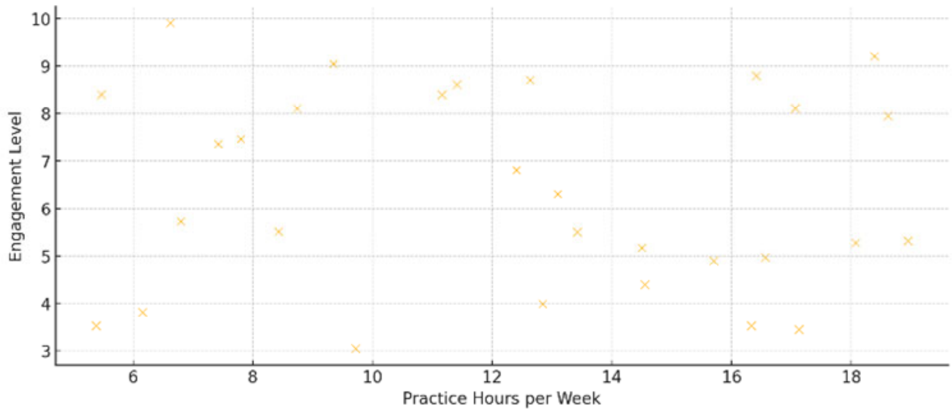
A comparison of students' initial and final scores serves to exemplify the effectiveness of the proposed approach. As illustrated in Figure 2, students showed a distinct rise in their performance scores after undergoing AI-driven music education techniques. The initial scores varied from 50 to 75 which signified a moderate level of proficiency before embarking on the CI framework. After integrating the AI-based personalised learning, students' final scores substantially improved, with values ranging from 70 to 95, after the application of the framework. The upward trend in total scores confirms that students profited from the adaptive feedback system, decision-making models, and customised lesson plans tailored to their learning gears. The average score enhancement across all students was roughly 23%, thereby proving the efficacy of computing intelligence to enhance music pedagogy.

Figure 2 Comparison of initial and final scores (see online version for colours)



Moreover, engagement rates corresponded very well with the practice hours. Figure 3 shows that students who invested more hours in practice also indicated a greater involvement level, with the pinnacle of indicated engagement reaching 9.8 out of 10 possible points. The scatter plot denoted that the levels of engagement were usually above 6.0 for students who practiced more than 10 hours per week, which was a clear indication that AI-driven lesson customisation and real-time feedback systems were essential in keeping students interested. In addition, a trend was found which revealed that students with initially low grades of involvement did show progress in the area itself thereby finishing clinicians, making the personalised learning programs less in effect through time.

Figure 3 Engagement level vs. practice hours (see online version for colours)



The insights signify that CI acclimates an interactive and student-centred learning atmosphere. Not like traditional music instruction, where feedback is frequently held until scheduled lessons, AI-powered real-time feedback permits students to immediately mend their errors and dynamically cultivate their skills. This characteristic significantly contributed to the marked advantage in performance. Further, virtual music aides and intelligent lesson planners gave students proper guidance structure, making sure that practice sessions would be productive and by the needs of individual skills development.

Another important finding is, however, that student variabilities in scores across separate students were observed. Generally, the majority of students showed a noteworthy increase in their last scores, while some had a very low improvement. The above differential indicates that external determining factors such as previous musical experience, individual learning styles, and cognitive flexibility could lead to varying results of AI-driven tutoring strategies. For future studies, it is recommended that personalising initiatives which include for example reinforcement learning-derived suggestions and adjustments of difficulty based on one\u2019s cognitive performance patterns be looked into as well as those that account for such diversity among the learners.

Consequently, the outcomes validate that CI advances music education via better learning efficiency, engagement, and outcomes among students. This research provides powerful empirical evidence favouring the integration of AI-based decision processes, real-time feedback, along adaptive lesson planning into music education. By tapping into these technologies, it would be possible for teachers to deliver not only a more flexible but also a more individualised and data-oriented method of music instruction, thus ensuring that each student gets specifically tailored learning content keeping in mind his/her abilities and learning curves.

5 Conclusions

Integrating CI into music teaching has had a noteworthy influence on the learning outcomes of students, involvement, and practice productivity. The result of this study, grounded on the music education performance data, indicates that students who had personalised instructions powered by AI saw an average improvement of 23% from their initial assessments in their last performance scores. The adaptive learning framework, bolstered by decision-making models, real-time feedback systems, and virtual assistants for music, allowed students to dynamically refine their musical proficiency. Moreover, the level of engagement manifested a strong association with the number of hours put into practice, with students devoting more than 10 hours in a week showing the highest level of engagement and motivation. These results reflect the promise of AI-driven teaching strategies for music education, providing a more participative and individualised learning experience that serves the specific needs of each student.

However, the study discusses some of the limitations despite the encouraging findings. To start with, while CI gives data-driven analysis and adaptive education, it may not be able to replace the human touch with its subtle adjustments and emotional expressiveness. AI-implemented evaluation can get rather subjective for instance the issue of opportunity for a unique way of self-expression and creativity. Additionally, the inconsistency seen in the results of improved student performance indicates that factors outside of the direct learning environment such as background, and learning preferences affect the efficiency of AI methodologies. Hybrid models of study are recommended for future research where AI recommendations are coupled with human capabilities, ensuring a balanced form in which music education incorporates both technological prowess and fine art. The system's design allows for scalable deployment in diverse educational contexts, including schools, music academies, and online platforms. Its low dependence on instructor intervention makes it suitable for remote learners and students in underserved communities, offering equitable access to high-quality music education.

Declarations

The author declared that he has no conflicts of interest regarding this work.

References

Borja, M.A. and Camargo, J.E. (2024) 'Music software with a machine learning-based feedback system as an alternative for initial piano study in children', *Inteligencia Artificial*, Vol. 27, No. 73, DOI: 10.4114/intartif.vol27iss73pp92-110.

Cao, D. and Liew, K. (2024) 'Virtual reality-infused machine learning for advancing music teaching quality evaluation systems', *Comput. Aided Des. Appl.*, Vol. 21, No. S17, DOI: 10.14733/cadaps.2024.S17.109-119.

Chen, F. and Meng, H. (2022) 'The use of wireless network combined with artificial intelligence technology in the reform of music online teaching system', *Wirel. Commun. Mob. Comput.*, Vol. 2022, DOI: 10.1155/2022/5957708.

Chu, X. (2022) 'Construction of artificial intelligence music teaching application model using deep learning', *Mobile Information Systems*, Vol. 2022, DOI: 10.1155/2022/3707512.

Dai, D.D. (2021) 'Artificial intelligence technology assisted music teaching design', *Sci. Program.*, Vol. 2021, DOI: 10.1155/2021/9141339.

Guan, Y. and Ren, F. (2021) 'Application of artificial intelligence and wireless networks to music teaching', *Wirel. Commun. Mob. Comput.*, Vol. 2021, DOI: 10.1155/2021/8028658.

Guo, R., Ding J, and Zang, W. (2021) 'Music online education reform and wireless network optimization using artificial intelligence piano teaching', *Wirel. Commun. Mob. Comput.*, Vol. 2021, DOI: 10.1155/2021/6456734.

He, F. (2024) 'Development and implementation of an embedded systems-based artificial intelligence-driven music teaching system for vocational colleges', *Comput. Aided Des. Appl.*, Vol. 21, No. S8, DOI: 10.14733/cadaps.2024.S8.180-195.

J. of Mathematics (2024) 'Retracted: The evaluation of music teaching in colleges and universities based on machine learning', *Journal of Mathematics*, Vol. 2024, DOI: 10.1155/2024/9839640.

Juchniewicz, J. (2010) 'The influence of social intelligence on effective music teaching', *Journal of Research in Music Education*, Vol. 58, No. 3, DOI: 10.1177/0022429410378368.

Li, D. (2022) *Evaluation Method of Vocal Music Teaching Quality for Music Majors Based on the Theory of Multiple Intelligences*, DOI: 10.1155/2022/3353776.

Li, D. and Liu, X. (2022) *Design of an Incremental Music Teaching and Assisted Therapy System Based on Artificial Intelligence Attention Mechanism*, DOI: 10.1155/2022/7117986.

Liu, F. (2022) 'Interactive music learning model based on RBF algorithm', *Comput. Intell. Neurosci.*, Vol. 2022, DOI: 10.1155/2022/5759986.

Ni, M., Yang, F. and Liu, M. (2024) 'Effective application of multiple intelligences theory in music education', *Applied Mathematics and Nonlinear Sciences*, Vol. 9, No. 1, DOI: 10.2478/amns-2024-0501.

Qiusi, M. (2022) 'Research on the improvement method of music education level under the background of AI technology', *Mobile Information Systems*, Vol. 2022, DOI: 10.1155/2022/7616619.

Wan, L. (2024) 'Research on diversified teaching strategies for music courses in colleges and universities under the background of artificial intelligence', *Applied Mathematics and Nonlinear Sciences*, Vol. 9, No. 1, DOI: 10.2478/amns-2024-0212.

Wang, F. (2017) 'Study on the application of multi intelligence theory in college music teaching and teaching design innovation', *Boletin Tecnico/Technical Bulletin*, Vol. 55, No. 18, pp.170–176.

Wang, X. (2022a) 'Design of vocal music teaching system platform for music majors based on artificial intelligence', *Wirel. Commun. Mob. Comput.*, Vol. 2022, DOI: 10.1155/2022/5503834.

Wang, X. (2022b) 'The influence of artificial intelligence technology on smart music teaching driven by mobile internet', *Wirel. Commun. Mob. Comput.*, Vol. 2022, DOI: 10.1155/2022/6766651.

Wei, J., Marimuthu, K. and Prathik, A. (2022) 'College music education and teaching based on AI techniques', *Computers and Electrical Engineering*, Vol. 100, DOI: 10.1016/j.compeleceng.2022.107851.

Wu, M. (2022) 'A music teaching resource management model based on fuzzy clustering algorithm', *Mobile Information Systems*, Vol. 2022, DOI: 10.1155/2022/3469869.

Yang, J. (2021) 'Research on the artificial intelligence teaching system model for online teaching of classical music under the support of wireless networks', *Wirel. Commun. Mob. Comput.*, Vol. 2021, DOI: 10.1155/2021/4298439.

Yang, L. (2022) 'Analysis of Erhu performance effect in public health music works based on artificial intelligence technology', *J. Environ. Public Health*, Vol. 2022, DOI: 10.1155/2022/9251793.

Yi, C. (2022) 'Innovation and discrete dynamic modeling of college music teaching model based on multiple intelligences theory', *J. Sens.*, Vol. 2022, DOI: 10.1155/2022/8613485.

Yu, L. and Luo, Z. (2022) 'The use of artificial intelligence combined with wireless network in piano music teaching', *Wirel. Commun. Mob. Comput.*, Vol. 2022, DOI: 10.1155/2022/7989620.

Yue, H. (2024) 'Exploring the teaching reform of music appreciation course in polytechnic institutions combined with students' memory characteristics', *Applied Mathematics and Nonlinear Sciences*, Vol. 9, No. 1, DOI: 10.2478/amns-2024-0302.

Zhai, Y. and Xu, C. (2023) 'The application of artificial intelligence-assisted computer on piano education', *Comput. Aided Des. Appl.*, Vol. 20, No. S5, DOI: 10.14733/cadaps.2023.S5.157-167.

Zhang, N. (2024) 'Informatization integration strategy of modern vocal music teaching and traditional music culture in colleges and universities in the era of artificial intelligence', *Applied Mathematics and Nonlinear Sciences*, Vol. 9, No. 1, DOI: 10.2478/amns.2023.2.01333.

Zheng, H. and Dai, D. (2022) 'Construction and optimization of artificial intelligence-assisted interactive college music performance teaching system', *Sci. Program.*, Vol. 2022, DOI: 10.1155/2022/3199860.

Zhichao, Z. (2022) *Development of the Music Teaching System Based on Speech Recognition and Artificial Intelligence*, DOI: 10.1155/2022/3900336.