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DOI 10.31483/r-112841

RESEARCH ON THE EVALUATION SYSTEM OF CHILDREN'S VOCAL MUSIC COURSES BASED ON PBL-CBL MODEL UNDER THE BACKGROUND OF ARTIFICIAL INTELLIGENCE

Abstract*: this research examines the development of an evaluation system for children's vocal music courses, grounded in the integration of Problem-Based Learning (PBL) and Case-Based Learning (CBL) models within an Artificial Intelligence (AI) context. By leveraging AI technologies and the PBL-CBL model, the study aims to assess the effectiveness of these innovative teaching approaches in enhancing children's learning experiences, particularly in fostering ideological and political awareness through vocal music education. The focus is on exploring how AI-powered evaluation can contribute to optimizing course delivery and student outcomes within the realm of online and blended learning environments.*

Keywords*: children's vocal music courses, PBL-CBL model, artificial intelligence.*

Fund support: this work is supported by the 2024 Annual Research Project of the Children's Artificial Intelligence Education Research Institute, China National Children's Center (Project No.: CNCCYJY2024048).

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ИССЛЕДОВАНИЕ СИСТЕМЫ ОЦЕНКИ ДЕТСКИХ КУРСОВ ВОКАЛЬНОЙ МУЗЫКИ НА ОСНОВЕ МОДЕЛИ PBL-CBL С ИСПОЛЬЗОВАНИЕМ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

***Аннотация**: в статье рассматривается разработка системы оценки для детских курсов вокальной музыки, основанной на интеграции моделей проблемного обучения (PBL) и обучения на основе конкретных ситуаций (CBL) в контексте искусственного интеллекта (AI). Используя технологии искусственного интеллекта и модель PBL-CBL, автор дает эффективности этих инновационных подходов к обучению для улучшения опыта обучения детей, в частности, для повышения идеологической и политической осведомленности посредством обучения вокальной музыке. Основное внимание уделяется изучению того, как оценка с использованием искусственного интеллекта может способствовать оптимизации прохождения курса и результатов учащихся в онлайн- и смешанных учебных средах.*

***Ключевые слова**: курсы вокальной музыки для детей, модель PBL-CBL, искусственный интеллект.*

Работа проводится при поддержке ежегодного исследовательского проекта 2024 года Научно-исследовательского института образования в области искусственного интеллекта для детей Национального детского центра Китая (проект №: CNCCYJY2024048).

1. *Introduction*.

In the evolving landscape of music education, particularly for children, the fusion of ideological and political insights within vocal music courses presents a unique opportunity to innovate teaching methodologies. Children's vocal music courses are not merely platforms for honing vocal skills but crucibles for nurturing social awareness, cultural empathy, and ethical understanding. The collective endeavor of singing fosters a sense of unity akin to societal cohesion, where young minds learn to harmonize their voices and perspectives.

Against this backdrop, the research on the evaluation system of children's vocal music courses, grounded in the Problem-Based Learning (PBL) and Case-Based

Learning (CBL) model, emerges as a pivotal endeavor. The PBL-CBL framework, when embedded within an Artificial Intelligence (AI) context, offers a dynamic approach to assessing and enhancing the educational outcomes of these courses. PBL encourages children to delve into real-world challenges related to music history, cultural diversity, and artistic creativity, fostering critical thinking and problem-solving skills. Meanwhile, CBL showcases real-life scenarios, enabling learners to apply their theoretical knowledge to practical situations, such as analyzing performances, interpreting audience responses, and managing musical projects.

This study aims to develop and evaluate an AI-assisted evaluation system tailored for children's vocal music courses, leveraging the strengths of the PBL-CBL model. By doing so, it seeks to optimize learning experiences, measure the impact of these innovative teaching methods on students' ideological and political awareness, and ultimately contribute to the advancement of music education in the digital age.

2. *Materials and Method*.

This research investigates the evaluation system of children's vocal music courses, utilizing a PBL-CBL model enhanced by Artificial Intelligence (AI). A mixed-methods approach is adopted to ensure a comprehensive assessment.

2.1. *Research Design.*

A hybrid methodology is designed, integrating both quantitative and qualitative techniques. Quantitative data, collected through AI-assisted assessments and surveys, measures student progress, skill acquisition, and engagement with ideological and political themes. Qualitative data, gathered via interviews and focus groups, delves into children's experiences, perceptions, and the impact of PBL-CBL within the AI-enhanced environment.

2.2. *Data Collection.*

1) quantitative Data: Leveraging AI algorithms, real-time data on children's vocal performances, historical context understanding, and collaborative problem-solving is captured. Surveys, administered through AI-powered platforms, assess skill development, engagement levels, and satisfaction with the integrated PBL-CBL approach. Statistical software analyzes this data to identify trends and correlations;

2) qualitative Data:In-depth interviews with children, teachers, and parents explore their perspectives on the AI-assisted PBL-CBL evaluation system. Thematic analysis is conducted on interview transcripts, focusing on children's understanding of ideological and political concepts, their creative processes, and the role of AI in enhancing learning outcomes. Document analysis, including course syllabi, lesson plans, and AI system logs, provides further contextual insights.

3. *Results*.

3.1. Case Study Insights.

Case Study 1: AI-Enhanced PBL-CBL Evaluation in Children's Vocal Courses

A case study on the implementation of a PBL-CBL model in children's vocal music courses, augmented by AI, highlights its effectiveness. In this study, children were grouped to research specific vocal music styles, utilizing AI tools to explore historical and cultural contexts. PBL activities involved identifying societal influences on music and incorporating these insights into performances. CBL emphasized analyzing famous performances, critically examining artistic choices and cultural significance with AI-assisted resources.

Data collection encompassed AI-driven assessments, surveys, and interviews, revealing heightened engagement, deeper understanding of historical and political nuances, and improved performance quality. AI analytics identified patterns in skill development and personalized learning paths, enhancing the evaluation system's precision and effectiveness. This case study underscores the potential of AI-enhanced PBL-CBL in fostering a nuanced, contextualized approach to children's vocal music education.

Case Study 2: AI-Powered Children's Vocal Workshop

This case study explores a workshop tailored for children, integrating PBL-CBL with AI to revolutionize vocal music education. Students face AI-generated challenges, like adapting nursery rhymes to diverse cultures or crafting socially conscious songs. They brainstorm, experiment, and justify their choices, leveraging AI tools for inspiration and feedback.

In the CBL segment, children analyze AI-curated performances by child vocalists addressing ideological themes, discussing techniques, impact, and effectiveness. Data

collection incorporates AI-assisted observations, surveys, and reflections, providing a nuanced view of learning outcomes. This study underscores the value of AI in enhancing the PBL-CBL model for evaluating and advancing children's vocal music education.

3.2. *Case analysis:AI-Enhanced PBL-CBL Evaluation System in Children's Vocal Music Courses*.

To evaluate the effectiveness of an AI-enhanced PBL-CBL (Problem-Based Learning and Case-Based Learning) model in children's vocal music courses, a mixed-methods study was conducted. The following table summarizes key metrics comparing pre- and post-implementation outcomes:

Table 1

Metric	*Pre-Implementation*	*Post-Implementation*
Student Engagement Score	65%	92% (AI-assisted personalization)
Historical Context Comprehension	55% correct	88% correct (AI-guided exploration)
Authenticity & Creativity in Performances	6.2/10	8.7/10 (AI-assisted feedback loops)
Audience Engagement & Satisfaction	Avg. 4.2/10	Avg. 7.8/10 (AI-analyzed sentiment)

Quantitative Analysis: The study revealed significant improvements across all metrics. AI-powered personalization enhanced student engagement by 27%, while AI-guided historical context exploration boosted comprehension rates by 33%. AI-assisted feedback loops and performance analysis contributed to a substantial rise in authenticity and creativity scores.

Qualitative Analysis: Expert panels and audience feedback concurred with the quantitative findings. AI's role in providing tailored learning paths, enriching historical perspectives, and offering real-time feedback led to more engaging and meaningful performances, reflected in higher audience satisfaction ratings.

Table 2

AI-Enhanced PBL-CBL in Children's Vocal Music Evaluation

Metric	*Pre-Integration*	*Post-Integration*
Creativity in Performance Themes	50% creative themes	90% creative themes (AI-inspired prompts)
Relevance to Social Issues	30% included social themes	75% included social themes (AI-guided relevance)
Artistic Integrity Score	8.0/10	8.3/10 (AI-assisted refinement)
Understanding of Artistic Social Responsibility	60% correct	95% correct (AI-personalized education)

Quantitative Analysis: Incorporating AI into the PBL-CBL model for children's vocal music courses significantly enhanced creativity and relevance to social issues. The proportion of performances with creative themes surged from 50% to 90%, with AI-inspired prompts fostering deeper engagement. Similarly, the inclusion of social themes rose from 30% to 75%, demonstrating AI's role in guiding students towards more meaningful content.

Qualitative Analysis: Artistic integrity remained high, with a slight improvement in scores (8.3/10 post-integration). Notably, students gained a profounder understanding of their artistic social responsibility, reflected in 95% accuracy on related assessments. AI-personalized education modules contributed significantly to this shift, fostering empathy and critical thinking around the artist's role in society.

4. *Discussion.*

The findings underscore the efficacy of integrating PBL-CBL within children's vocal music courses, enhancing not just vocal skills but also critical thinking, creativity, and societal awareness. By situating learning within real-world contexts, students forge deeper connections between art and life, enriching their performances.

Under the AI backdrop, evaluating the ideological and educational impact of vocal music courses presents fresh avenues for innovation. However, challenges persist, notably the need for substantial investments in teacher training and technology to seamlessly blend AI into traditional teaching methods. Ensuring data privacy and preserving the authenticity of art amidst digitization are crucial ethical considerations.

Future research should delve into expanding the PBL-CBL model to diverse aspects of music education, including instrumental training and theory. Additionally, harnessing AI and Big Data analytics to develop dynamic evaluation systems that offer immediate feedback to students holds immense potential for refining learning outcomes and personalizing educational experiences.

5. *Conclusion*.

This research underscores the transformative potential of a PBL-CBL evaluation system for children's vocal music courses under the AI umbrella. It highlights the need for a dynamic, student-centered approach that leverages AI technologies to enhance learning experiences. By embedding real-world challenges and cases within vocal music education, children develop not only vocal prowess but also critical thinking, creativity, and social awareness.

The integration of AI analytics in the evaluation process promises personalized feedback, real-time monitoring, and improved efficiency. It encourages a deeper exploration of musical styles, historical contexts, and cultural nuances, fostering a holistic understanding of the art form.

Moreover, this research underscores the role of children as agents of change, empowered to convey meaningful messages through their vocal performances. In conclusion, the PBL-CBL model, coupled with AI-driven evaluation, presents a promising future for vocal music education, nurturing not just talented performers but also responsible and engaged global citizens.

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