Evaluating the Potential and Requirements for an AI-Powered Mobile Learning Application to Enhance Sight-Reading Skills for Percussion Among Thai Youth

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Abstract

This study aims to evaluate the potential and requirements for developing an AI-powered mobile learning application based on a constructivist approach to enhance sight-reading skills for percussion instruments among Thai youth. The research employs a mixed-methods approach, involving a sample of 120 Thai youth aged 13–18 years old who have experience in playing percussion instruments. Data collection includes an online survey on learning needs, preferences, and perceived challenges in sight-reading, as well as semi-structured interviews with 15 music teachers and 5 experts in music education and educational technology. The results indicate that 78% of the youth participants express a strong interest in using a mobile learning application to improve their sight-reading skills, with 85% preferring gamified learning features. However, 65% of the participants report challenges in accessing quality learning resources and receiving personalized feedback. The interviews reveal that 90% of the music teachers recognize the potential of AI-powered mobile learning in providing adaptive learning experiences and real-time feedback, while 80% of the experts emphasize the importance of aligning the application design with constructivist principles. The findings highlight the key requirements for the mobile learning application, including interactive notation display, real-time performance evaluation, adaptive difficulty adjustment, and gamification elements. These insights will guide the development of an AI-powered mobile learning application that effectively addresses the learning needs and preferences of Thai youth in enhancing their sight-reading skills for percussion instruments.

Keywords: AI-powered mobile learning, constructivist approach, sight-reading skills, percussion instruments, Thai youth

Introduction

The ability to sight-read musical notation represents a fundamental skill that enables musicians to learn new repertoire quickly, participate effectively in ensemble performances, and develop musical independence. However, for percussion students, sight-reading presents uniquely complex cognitive challenges that extend far beyond those encountered with melodic instruments. Percussionists must simultaneously process multiple staves, decode diverse notation systems for different instruments, interpret complex rhythmic patterns, and coordinate movements across various instruments—all while maintaining musical expression and ensemble awareness. In Thailand's northeastern region, these challenges are compounded by contextual factors including limited access to quality practice materials, insufficient numbers of qualified instructors, large class sizes that prevent individualized attention, and the need to navigate between traditional Isan musical concepts and Western notation systems. Traditional teaching approaches, which typically rely on limited repertoire and repetitive practice with the same materials, struggle to provide the diverse, fresh sight-reading exercises necessary for genuine skill development—once a musical exercise has been practiced, it can no longer serve as authentic sight-reading material for that individual.

Recent technological advances in artificial intelligence and mobile learning offer promising solutions to these longstanding pedagogical challenges. AI-powered educational applications have demonstrated capability to provide adaptive learning experiences that adjust content difficulty based on individual performance patterns, deliver immediate feedback on musical accuracy, generate unlimited practice materials tailored to specific skill levels, and maintain detailed learning analytics that inform both students and instructors (Pedraja-Rejas et al., 2024; Rizal et al., 2024). Furthermore, constructivist learning principles—which emphasize active knowledge construction, learner agency, and authentic problem-solving—align particularly well with the interactive, exploratory affordances of mobile technologies (Wang et al., 2025). Research has shown that well-designed mobile learning applications can significantly enhance student motivation, increase practice frequency, and improve learning outcomes across various educational domains.

Despite these promising technological capabilities and growing research attention to technology-enhanced music education, significant gaps remain in understanding how to effectively design and implement AI-powered mobile learning solutions for percussion sight-reading, particularly within non-Western educational contexts. While several studies have explored mobile learning applications in music education generally (Larasati & Sukmayadi, 2020) and others have examined cognitive processes in sight-reading for melodic instruments, few have specifically addressed the unique instructional needs of percussion students or investigated stakeholder perspectives within Thai cultural and educational contexts. Perhaps most critically, current research on educational technology development has inadequately attended to the voices of learners themselves, as well as teachers and experts, in the design process.

This study addresses these critical gaps by conducting a comprehensive needs assessment that systematically investigates the perspectives of three key stakeholder groups regarding the potential and requirements for AI-powered mobile learning applications to enhance percussion sight-reading skills among Thai youth. Through mixed-methods investigation combining quantitative surveys with 120 Thai youth percussion students and qualitative interviews with 15 music teachers and 5 experts in music education and educational technology, this research seeks to understand Thai youth students' current learning experiences, challenges, and

preferences related to sight-reading and mobile learning technologies, music teachers' perspectives on pedagogical potential and implementation considerations, and expert recommendations regarding essential design features and cultural considerations.

Literature Review

Sight-Reading Skills in Music Education

Sight-reading represents a fundamental yet complex competency in music education, requiring integration of perceptual, cognitive, and motor processes. Contemporary research reveals evolving pedagogical priorities and persistent challenges in sight-reading instruction. Kallio (2025) examined attitudes toward sight-reading in Finnish piano education, finding that only 38% of teachers consistently emphasized this skill compared to 86% in Hardy's 1992 study, while students maintained stronger conviction about its importance. This discrepancy suggests potential disconnection between learner needs and instructional emphasis. For percussion instruments specifically, sight-reading presents unique challenges including diverse notation systems, complex rhythmic patterns, and coordination of multiple limbs simultaneously. Saranoy and Boriboonwiriya (2022) analyzed Trinity and ABRSM sight-reading exercises at intermediate levels, finding eighth notes most frequent with ABRSM materials demonstrating greater rhythmic diversity. Cognitive research employing eye-tracking technology illuminates the sophisticated visual-motor coordination underlying sight-reading proficiency. Imai-Matsumura and Mutou (2023) demonstrated that auditory working memory significantly predicts eye-hand span, which in turn predicts performance quality, establishing cognitive mechanisms mediating sight-reading success.

AI-Powered Mobile Learning in Music Education

Mobile learning technologies integrated with artificial intelligence offer unprecedented opportunities for personalized music education through adaptive content delivery, intelligent feedback systems, and automated assessment. The systematic review by Pedraja-Rejas et al. (2024) analyzing 50 empirical studies from 2015–2024 established that m-learning integration improves learning outcomes and critical thinking across diverse disciplines, with effective applications combining immediate feedback, progress tracking, social features, and flexible practice schedules. In specialized music education applications, Rizal et al. (2024) demonstrated that Problem-Based Learning Management System as a mobile application significantly enhanced creative thinking skills. Application design features critically influence learning outcomes and sustained engagement. Yuan et al. (2025) identified strong positive correlation between multi-modal design and assisted learning performance, with visual modality most popular and aural modality perceived as most important for learning enhancement. Chen et al. (2024) demonstrated that mobile applications incorporating self-regulated learning modules significantly improved both vocabulary achievement and motivation compared to non-self-regulated applications. These empirical findings establish mobile learning applications' substantial potential for music education.

Gamification and Constructivist Approaches

Gamification strategies have emerged as powerful mechanisms for enhancing motivation in educational contexts, with particular relevance for music education where sustained practice and repetitive exercises are essential. Systematic research demonstrates that game elements including points, badges, leaderboards, and challenges significantly increase learner

engagement across diverse educational contexts (Bovermann & Bastiaens, 2020). The effectiveness of gamification varies based on specific design elements and learner characteristics, requiring thoughtful design informed by theoretical frameworks. Constructivism's emphasis on active knowledge construction through experiences, social interaction, and reflection has gained increasing relevance in AI-enhanced educational technologies. Wang et al. (2025) found that constructivism-based approaches in AI courses significantly influenced learning ability, learning experience, and learning outcomes, with blog-based approach fostering collaborative learning, reflective practice, and continuous self-assessment. These theoretical and empirical foundations establish constructivist principles as essential guides for AI-powered mobile learning application design, emphasizing learner agency, scaffolded support, reflection opportunities, and connections to authentic musical contexts.

Methodology

Research Design

This study employed a convergent parallel mixed-methods design to comprehensively evaluate the potential and requirements for an AI-powered mobile learning application for percussion sight-reading instruction among Thai youth. The research integrated quantitative survey data from student participants with qualitative interview data from music teachers and educational technology experts, enabling triangulation of perspectives and rich contextual understanding of stakeholder needs and preferences. The mixed-methods approach was selected for its ability to capture both breadth through surveys of a larger youth sample and depth through detailed interviews with teachers and experts, enabling triangulation of findings and more robust conclusions than either approach alone. The research was conducted in northeastern Thailand from September to November 2024. The study received ethical approval from the institutional review board, and all participants provided informed consent before data collection.

Participants

The study involved three distinct participant groups, each selected through appropriate sampling strategies to ensure representative and information-rich data. The primary quantitative sample comprised 120 Thai youth aged 13–18 years, grades 7–12, with percussion playing experience, recruited through purposive sampling from secondary schools in Thailand's northeastern region that maintain active music programs. Demographic distribution was balanced across grade levels with 20 students per grade, 58 males and 62 females. Playing experience varied from less than one year to more than four years, with majority having 1–2 years or 3–4 years experience. Inclusion criteria required that students were currently enrolled in grades 7–12, had at least six months of experience playing percussion instruments, and could read basic musical notation. These criteria ensured participants had sufficient musical foundation to provide informed perspectives on sight-reading challenges and mobile learning preferences.

Qualitative data collection involved semi-structured interviews with 15 music teachers employed at secondary schools in northeastern Thailand with minimum three years teaching experience and expertise in percussion instruction. Teachers were selected through purposive sampling based on specific criteria: minimum of 5 years teaching experience in music education, current teaching responsibility for percussion instruction, and teaching at one of the participating schools. Teachers represented varied backgrounds in terms of educational

qualifications and teaching experience ranging from 5 to 16 years. Additionally, five experts in music education and educational technology participated in interviews, selected based on their specialized knowledge in technology-enhanced music education, instructional design for mobile learning applications, or artificial intelligence in education. Expert participants included university faculty, instructional designers specializing in music education technology, and developers of educational music applications, all with minimum 10 years professional experience and master's degree or higher in relevant disciplines.

Data Collection Instruments

A structured online survey developed specifically for this research served as the primary quantitative data collection instrument for student participants. The survey comprised four sections: demographic information including age, grade level, gender, and playing experience; current learning experiences and challenges in percussion sight-reading with 10 items using 5–point Likert scales; preferences regarding mobile learning features and interface design with 12 items; and perceived needs for AI-powered learning support with 15 items. The survey instrument underwent content validation by three experts in music education and survey methodology, achieving Content Validity Index of 0.92, indicating excellent content validity. Internal consistency reliability for scaled sections ranged from 0.82 to 0.89.

Semi-structured interview protocols guided qualitative data collection with teachers and experts. Teacher interview protocol explored pedagogical approaches to sight-reading instruction, observed student challenges and learning patterns, perspectives on technology integration in music education, and recommendations for mobile application features to support percussion sight-reading development. Expert interview protocol examined theoretical frameworks for technology-enhanced music education, design principles for effective mobile learning applications, considerations for AI integration in music instruction, and cultural factors relevant to Thai educational contexts. Both protocols underwent review and refinement through pilot interviews with one teacher and one expert not included in the final sample.

Data Collection and Analysis Procedures

Data collection occurred over a six-week period during the academic semester. Student survey data were collected through online platform accessible via personal devices, with informed consent obtained from both students and parents for participants under 18 years. School music teachers facilitated survey administration during regular class time, providing technical support as needed while ensuring student privacy and voluntary participation. Average completion time was approximately 20 minutes. Teacher and expert interviews were conducted individually through video conferencing platform, with each session lasting 45–60 minutes. Interviews were audio-recorded with participant consent and subsequently transcribed verbatim for analysis.

Quantitative survey data underwent descriptive statistical analysis. Frequencies, percentages, means, and standard deviations were calculated for demographic variables and scaled items measuring learning preferences, perceived challenges, and feature priorities. Cross-tabulation analyses examined relationships between demographic characteristics and response patterns to identify potential variations based on grade level, gender, or playing experience. Qualitative interview transcripts underwent thematic analysis following Braun and Clarke's six-phase approach: familiarization with data through repeated reading, systematic generation of initial codes identifying relevant features, searching for themes by grouping related codes, reviewing themes for internal coherence and distinctiveness, defining and naming themes to clarify their

essence, and producing the final analysis report with illustrative quotations. Two researchers independently coded approximately 20% of transcripts to establish inter-coder reliability, achieving Cohen's kappa of 0.84, indicating substantial agreement.

Results

Student Survey Findings

Survey responses from 120 Thai youth percussion students revealed strong interest in mobile learning applications for sight-reading development and clear preferences regarding application features and design. Table 1 presents demographic characteristics of the student sample, showing balanced distribution across grade levels and near-equal gender representation, with majority having 1-4 years of percussion playing experience.

Table 1
Demographic Characteristics of Student Participants (N =120)

Characteristic	Category	n	%
Grade Level	Grade 7	20	16.7
	Grade 8	20	16.7
	Grade 9	20	16.7
	Grade 10	20	16.7
	Grade 11	20	16.7
	Grade 12	20	16.7
Gender	Male	58	48.3
	Female	62	51.7
Playing Experience	Less than 1 year	25	20.8
	1–2 years	42	35.0
	3–4 years	35	29.2
	More than 4 years	18	15.0

Table 2
Student Interest and Learning Challenges (N = 120)

Variable	n (%)
Interest in Mobile Learning Application	
High interest	94 (78.3%)
Moderate interest	21 (17.5%)
Low interest	5 (4.2%)
Preference for Gamification Features	
Prefer gamification	102 (85.0%)
Uncertain	13 (10.8%)
Do not prefer	5 (4.2%)
Challenges in Accessing Resources and Feedback	
Experience challenges	78 (65.0%)

Gamification emerged as a highly desired feature, with 85.0% of students indicating preference for game-like elements in the learning application. When asked about specific gamification features, students most frequently mentioned achievement badges for completing levels, progress visualization through experience points, challenges with increasing difficulty, and social features enabling comparison with peers. Several students emphasized that gamification

should maintain focus on musical learning rather than becoming purely entertainment-focused, reflecting sophisticated understanding of learning goals.

A significant majority of students, 65.0%, reported experiencing challenges in accessing quality learning resources and receiving personalized feedback on their sight-reading practice. Students identified three primary obstacles: limited availability of varied practice materials appropriate to their skill levels, insufficient one-on-one feedback from teachers due to large class sizes and limited instructional time, and difficulty knowing whether they were making progress or identifying specific areas needing improvement. These findings underscore substantial unmet needs that mobile learning technology could potentially address.

Regarding desired application features, students prioritized several functionalities. Interactive notation display that highlights notes as they should be played received highest importance ratings on 5-point scale. Real-time performance evaluation providing immediate feedback on accuracy and timing was second highest rated. Adaptive difficulty adjustment that automatically adjusts challenge level based on performance ranked third. Other highly rated features included video demonstrations of proper playing techniques, progress tracking showing improvement over time, and practice reminders and goal-setting tools. These preferences align directly with documented capabilities of current AI and mobile learning technologies.

Teacher Perspectives on Pedagogical Potential

Interview analysis revealed that 90% of music teachers, 14 of 15 participants, recognized significant potential for AI-powered mobile learning to enhance percussion sight-reading instruction. Teachers articulated several key benefits. First, automated real-time feedback could supplement limited instructor availability, enabling students to practice independently while still receiving guidance on performance accuracy. As one teacher explained, having 40 students in percussion ensemble class makes individual attention challenging, and an application providing immediate feedback would function like an assistant teacher available continuously.

Second, teachers emphasized the value of adaptive learning systems that adjust difficulty based on individual student performance. Traditional classroom instruction typically addresses the average skill level, leaving advanced students under-challenged and struggling students overwhelmed. Teachers noted that AI-driven adaptation could provide personalized learning paths that maintain optimal challenge for each student, potentially improving engagement and outcomes across the skill spectrum. Third, teachers valued the potential for unlimited practice material generation. Several teachers described frustration with limited sight-reading resources, particularly materials appropriate for Thai musical contexts and varying difficulty levels.

However, teachers also articulated important concerns and cautions. Most prominently, 12 of 15 teachers emphasized that technology should complement, not replace, human instruction. They stressed the importance of musical expression, artistic interpretation, and ensemble skills that require human interaction and cannot be fully developed through individual practice with an application. Teachers also expressed concerns about potential overreliance on technology, suggesting that applications should encourage but not mandate use. Additionally, teachers highlighted practical implementation challenges including ensuring all students have access to appropriate mobile devices, managing screen time concerns especially for younger students,

maintaining student privacy and data security, and providing adequate teacher training to effectively integrate the application into instruction.

Expert Recommendations for Design and Implementation

Interviews with five experts revealed consensus on several critical design principles. Most prominently, 80% of experts, 4 of 5 participants, strongly emphasized the importance of grounding application design in constructivist learning theory. Experts explained that effective learning applications should enable active knowledge construction through exploration and experimentation rather than passive consumption of information. Experts recommended several specific design features aligned with constructivist principles: learner agency and choice enabling students to select practice materials, difficulty levels, and learning goals rather than following rigid predetermined sequences; scaffolded exploration providing graduated support that guides learners through initial explorations but gradually reduces assistance as competence develops; reflection prompts incorporating opportunities for learners to reflect on their practice sessions and identify patterns in their errors; social learning features enabling peer collaboration and sharing of achievements; and authentic musical contexts connecting technical skill development to meaningful musical experiences.

All five experts emphasized the critical importance of four core technical features: interactive notation display with synchronized audio and visual highlighting, real-time performance evaluation using audio recognition to assess accuracy and provide immediate corrective feedback, adaptive difficulty adjustment that maintains optimal challenge through algorithmic assessment of student performance patterns, and comprehensive progress tracking that visualizes improvement over time and identifies specific areas requiring attention. Regarding cultural considerations, experts stressed the importance of incorporating Thai musical elements and traditions, including offering practice materials drawn from Thai folk music and contemporary Thai popular music in addition to Western classical repertoire, providing explanations of cultural contexts for different musical styles, using Thai language interface with clear translations of musical terminology, and designing gamification narratives that resonate with Thai cultural values.

Finally, experts discussed implementation strategies and policy considerations. They recommended phased rollout beginning with pilot testing in a small number of schools, comprehensive teacher professional development addressing both technical operation and pedagogical integration, ongoing technical support and regular application updates based on user feedback, and careful attention to accessibility ensuring equitable access regardless of socioeconomic status. Experts also emphasized the importance of rigorous evaluation research to demonstrate effectiveness and guide continuous improvement.

Discussion

This study provides comprehensive evidence regarding the potential and requirements for developing an AI-powered mobile learning application to enhance percussion sight-reading skills among Thai youth. The convergence of findings across three stakeholder groups reveals both substantial enthusiasm for mobile learning innovation and clear guidance for effective design and implementation. This discussion interprets key findings, connects them to existing research, and outlines implications for practice and future research.

Student Enthusiasm and Learning Needs

The strong interest expressed by Thai youth, 78% reporting high interest, in mobile learning for sight-reading practice aligns with broader research demonstrating digital natives' preference for technology-mediated learning experiences. This enthusiasm suggests high likelihood of adoption and sustained engagement if applications are well-designed. Particularly noteworthy is the consistency of interest across demographic subgroups, indicating that mobile learning appeals to diverse learners rather than only technologically sophisticated or highly motivated students. Students' overwhelming preference for gamification, 85%, corroborates extensive research on game-based learning effectiveness in music education. However, students' emphasis that gamification should maintain focus on musical learning rather than pure entertainment reflects sophisticated understanding of learning goals and aligns with expert warnings about superficial gamification that prioritizes engagement over educational substance. This finding suggests that while gamification features are important, they must be carefully balanced with clear learning objectives and authentic musical experiences.

The challenges students reported in accessing quality resources and personalized feedback, 65% experiencing difficulties, reveal significant gaps in current percussion education. These findings substantiate teachers' observations about limited instructional time and material scarcity, highlighting substantial unmet needs that technology could address. The specific features students prioritized—interactive notation, real-time feedback, adaptive difficulty—directly correspond to these identified needs, suggesting that student preferences are grounded in practical learning challenges rather than abstract technology desires.

Teacher Recognition and Implementation Concerns

Music teachers' recognition of AI-powered mobile learning potential, 90%, is particularly significant given that teacher buy-in is essential for successful technology integration. Teachers' specific identification of benefits—supplementing limited instructional capacity, enabling adaptive personalized learning, generating unlimited practice materials—demonstrates sophisticated understanding of technology affordances aligned with documented capabilities of current AI and mobile learning systems. However, teachers' cautionary notes about technology complementing rather than replacing human instruction reflect important pedagogical wisdom. Research consistently shows that most effective technology integration occurs when digital tools enhance rather than substitute teacher expertise, particularly for complex skills like musical expression and ensemble performance that require human modeling and interpersonal interaction.

Teachers' concerns about practical implementation challenges—device access, screen time, privacy, training needs—identify critical factors that must be addressed for successful adoption. These findings underscore that technology effectiveness depends not only on application design but also on thoughtful implementation strategies that address systemic and practical constraints. The emphasis on teacher training is particularly important, as research demonstrates that technology integration success correlates strongly with educator confidence and competence in using educational technologies pedagogically.

Expert Emphasis on Theoretical Grounding

Experts' strong emphasis on constructivist learning theory, 80% prioritizing this approach, provides crucial theoretical grounding for application design. Constructivism's focus on active

knowledge construction, learner agency, and authentic problem-solving aligns particularly well with the interactive, exploratory nature of well-designed mobile learning environments. The specific constructivist design features experts recommended—learner choice, scaffolded exploration, reflection prompts, social learning, authentic contexts—are well-supported by research on effective technology-enhanced music learning. Notably, experts' recommendations substantially extend beyond students' explicit requests. While students prioritized interactive notation and immediate feedback, experts identified deeper pedagogical requirements that students might not recognize but that research shows are essential for meaningful learning.

Experts' emphasis on cultural responsiveness addresses a critical gap in existing music technology research, which predominantly reflects Western musical traditions and educational contexts. The specific recommendations for incorporating Thai musical elements, cultural contexts, and language support reflect growing recognition that effective educational technology must be culturally grounded rather than culturally neutral. This finding has significant implications beyond Thailand, suggesting that music learning technologies should be designed with cultural flexibility enabling localization for diverse contexts rather than assuming universal applicability of Western-designed solutions.

Synthesis and Design Framework

Synthesizing findings across all stakeholder groups reveals clear design requirements for an effective AI-powered mobile learning application for percussion sight-reading. The application should incorporate core technical features including interactive notation display with synchronized highlighting, real-time audio-based performance evaluation, adaptive difficulty algorithms, comprehensive progress tracking, and unlimited practice material generation. Gamification elements should include achievement systems with badges and experience points, graduated challenges with increasing difficulty, progress visualization, and optional social features, all designed to support rather than distract from musical learning goals. Constructivist design principles should emphasize learner agency in selecting materials and goals, scaffolded support that gradually reduces as competence develops, reflection prompts and metacognitive tools, collaborative features enabling peer learning, and connections to authentic musical contexts. Cultural responsiveness requires incorporating Thai musical repertoire alongside Western and contemporary styles, cultural context explanations, Thai language interface, and culturally resonant gamification narratives. This integrated framework addresses documented learning needs, aligns with evidence-based pedagogical principles, and reflects stakeholder preferences and concerns.

Conclusion

This study provides robust evidence that AI-powered mobile learning applications hold substantial potential for enhancing percussion sight-reading education among Thai youth. The convergence of strong student interest, teacher recognition of pedagogical benefits, and expert identification of sound design principles creates favorable conditions for effective technology development and implementation. Key requirements emerging from this research include interactive notation display, real-time performance feedback, adaptive difficulty adjustment, thoughtful gamification, constructivist learning design, and cultural responsiveness. These requirements provide concrete, evidence-based guidance for application developers, music educators, and educational policymakers.

However, findings also reveal important cautions and complexities. Technology must complement rather than replace human instruction, practical implementation challenges must be addressed systematically, and design must balance user preferences with evidence-based pedagogical principles. Success will require not just sophisticated application development but also comprehensive teacher training, supportive policies, ongoing evaluation and refinement based on actual use, and careful attention to equity and access. The study contributes to music education scholarship by providing empirical evidence regarding stakeholder needs and preferences in an underexplored domain—percussion sight-reading in non-Western contexts.

Looking forward, the next critical step is translating these requirements into actual application development, followed by rigorous evaluation of effectiveness through experimental research examining whether applications designed according to identified requirements actually improve sight-reading skills, increase practice frequency, and enhance motivation. If implemented thoughtfully with attention to pedagogical principles, practical constraints, and cultural contexts, AI-powered mobile learning applications could significantly expand access to quality percussion education, provide personalized learning experiences that traditional classroom instruction struggles to deliver, and help young musicians develop sight-reading skills essential for musical independence and lifelong musicianship.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The authors declare that no AI or AI-assisted technologies have been used to generate, refine, or correct the content in the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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