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PAPER

From ADDIE to CAMIL: A Systematic Review of Teaching Models for Enhancing Interactive Creativity Learning through Mobile Outcomes in Art Education

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ABSTRACT

This study aims to compare and analyze the effectiveness of the analysis-design-development-implementation-evaluation (ADDIE) and cognitive-emotional model for immersive learning (CAMIL) instructional design models in promoting the development of learners' creativity in the field of art education through systematic literature review and meta-synthesis methods. Grounded in social constructivism and experiential learning theory (ELT), the analysis encompasses 25 peer-reviewed studies from Scopus, Web of Science, and ERIC published between 2019 and 2024. The results demonstrate that ADDIE facilitates structured instruction, skill development, and consistent assessment, yet provides limited adaptability for personalized and generative creativity. Conversely, CAMIL more effectively enhances learner autonomy, emotional engagement, and contextualized creative practice through its nonlinear, reflective design, though it requires greater teacher expertise and poses challenges in evaluating complex outcomes. Case studies further substantiate CAMIL's advantages in fostering emotional and sociocultural creativity. The study recommends integrating the strengths of both models to establish a hybrid instructional approach that balances structure and flexibility in art education.

KEYWORDS

analysis-design-development-implementation-evaluation (ADDIE) model, cognitive-emotional model for immersive learning (CAMIL), creativity, art education, instructional design, interactive learning, experiential learning

1 INTRODUCTION

Today, art education has become more complex and diverse, which presents two main challenges for instructional design models [1]. These models must maintain an organized and measurable teaching process while simultaneously fostering students' creativity, critical thinking and personal expression. The ADDIE model

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(analysis, design, development, implementation, evaluation) has long served as a standard in educational technology due to its structured, sequential approach. It is particularly prevalent in skill-based instruction [2]. Nevertheless, as educational paradigms shift toward student-centred, creative learning, the ADDIE model faces limitations in addressing the open-ended, unpredictable aspects of artistic creation [3]. Recently, the cognitive affective model of immersive learning (CAMIL) has gained attention in academic circles [4]. CAMIL is based on constructivism and experiential learning theory (ELT). It guides learners through nonlinear stages like situation, analysis, modelling, immersion and reflection, focusing on their initiative and emotional engagement. The goal is to make learning more immersive and realistic, especially in art education, where expression and context matter. In the visual arts, using an integrated curriculum has helped students solve artistic problems creatively, showing CAMIL's strong potential to improve creative learning outcomes [5].

Both the ADDIE and CAMIL models have their own strengths and theoretical foundations, but they differ in how they support creativity in education. The ADDIE model is designed to standardize teaching and manage tasks. However, its step-by-step approach often does not work well for artistic tasks that need quick changes and personal input [6]. In contrast, the CAMIL model encourages learners to think creatively and reflect by focusing on self-regulation and ongoing feedback in immersive settings [4]. This flexible approach, though, means teachers must be skilled in designing courses, organizing resources, and evaluating learning. In virtual reality teaching, these demands are even higher, so teachers need to be able to adapt and use technology effectively [1, 3]. This study uses a systematic literature review and meta-synthesis to compare the ADDIE and CAMIL teaching models in supporting creative learning outcomes in art education. The analysis examines their theoretical foundations, instructional strategies, evaluation mechanisms and practical applicability and limitations. By reviewing cases and the literature, the study identifies how these models can complement one another and provides guidance for optimizing and integrating future teaching models. The study also explores ways to connect structured instruction with personalized creative processes to meet the core needs of contemporary art education in fostering innovation.

2 THEORETICAL FRAMEWORK

2.1 The integration of constructivist learning theory and art education

Constructivist learning theory suggests that knowledge is built together through social interaction and real-world engagement, rather than simply passed down from teacher to student [7]. In art education, this means that students make meaning by engaging with their context, expressing themselves creatively, and participating in different ways [8]. Although many recognize the value of constructivism, Shahat et al. [3] warn that focusing only on learner independence can ignore the importance of structured teaching for effective learning.

The ADDIE model remains widely used due to its clear structure and straightforward design process [10]. While ADDIE promotes instructional consistency and facilitates evaluation, its sequential approach can hinder adaptability, experiential learning, and creativity, particularly in collaborative or open-ended projects [7]. In contrast, the cognitive affective model of immersive learning (CAMIL) aligns

more closely with constructivist principles by incorporating real-world engagement, practical examples and increased learner autonomy, thereby supporting the construction of contextual knowledge and adaptability [4]. Research in art, design and architecture education further indicates that creativity is enhanced when structured project planning is integrated with authentic tasks, especially in large classroom settings [10].

2.2 Implications of empirical learning theory for art education

Experiential learning theory describes learning as a cycle that includes concrete experience, reflection, conceptualization and experimentation [11]. In art education, ELT emphasizes hands-on engagement and ongoing reflection rather than simply passing on knowledge. Although many see reflection as key to artistic learning, there is debate about how best to use it. Some researchers believe reflection should be a regular part of the learning process to support professional growth and deeper teaching skills [12]. The ADDIE model's linear structure limits reflection to the final evaluation stage, restricting real-time feedback and adaptability and making it less compatible with experiential learning principles [7]. In contrast, the CAMIL model embeds reflection at each stage of learning, encouraging ongoing interaction between experience and meaning-making, in line with ELT [11]. CAMIL also highlights the importance of emotional engagement and immediate feedback in immersive settings to support reflective learning [5]. CAMIL depends on learners to regulate themselves; it may not work as well when there is insufficient instructional guidance or control [8].

2.3 Creativity is a kind of learning outcome

Creativity is often seen as a skill that can be taught, defined by both originality and effectiveness. It involves combining divergent thinking with practical problem solving [13]. In art education, emotional engagement can boost creative performance by encouraging expressive depth and innovation [14]. Instructional models vary in how well they support creativity. The ADDIE model supports standardized instruction and early skill development, but it offers little flexibility for open-ended or personalized creative work [6]. On the other hand, the CAMIL model includes creativity from the start through contextual, problem-based learning, which encourages learner independence and diverse ways of thinking [7]. Still, its open approach means teachers need to provide more guidance and structure [15].

Assessing creativity often works better with dynamic methods, such as reflection and peer feedback, rather than standardized tests. However, relying too much on reflection can miss intuitive or non-verbal creative expression [16]. To truly support creativity, it is important to balance structured teaching with enough flexibility to encourage both skill growth and genuine artistic innovation. In summary, creativity is a central objective in contemporary education and is influenced by multiple factors, including instructional design, assessment methods and teacher-student interactions. Both the ADDIE and CAMIL teaching models exhibit distinct strengths and limitations. A comparative analysis of their instructional design features can elucidate critical issues for future research.

3 METHODOLOGY

3.1 Research design

This study adopts a systematic literature review and meta-synthesis method to ensure a systematic and critical exploration of the application of the ADDIE and CAMIL teaching models in the field of art education.

3.2 Data sources and selection criteria

The literature search was conducted using Scopus, Web of Science (WoS), and ERIC to identify high-quality, peer-reviewed sources. The inclusion criteria were limited to English-language journal articles published between 2019 and 2024, with keywords including *ADDIE*, *CAMIL*, *creativity*, *art education*, *instructional design* and *learning outcomes*. The initial search yielded 214 records. Following the screening of titles, abstracts and full texts, as well as the removal of duplicates and unrelated studies, 34 articles were retained for analysis.

To maintain the timeliness and relevance of the research, the scope of the literature search was set between 2019 and 2024 and was limited to peer-reviewed English journal articles. The combination of search keywords is: “ADDIE”, “CAMIL”, “Creativity”, “Art education”, “Instructional design” and “Learning outcomes”. A total of 214 relevant literatures was obtained through the initial search. After step-by-step screening of the titles, abstracts, and full texts and excluding duplicate and irrelevant studies, 25 core literatures were finally determined to be included in the analysis. Studies were included if they utilized the ADDIE or CAMIL model, addressed creativity or related learning outcomes, focused on art education and employed rigorous research methodologies. The review excluded theoretical papers lacking practical application or empirical evidence, as well as non-peer-reviewed works such as conference papers and dissertations.

3.3 Data extraction and analysis procedure

Data extraction used both content and thematic analysis. The selected studies were independently coded to identify instructional characteristics, creativity-related strategies, and learning outcome indicators linked to the ADDIE and CAMIL models. The coding results were compared and improved through repeated discussion until a single coding framework was agreed upon [17]. The analysis used both inductive and deductive methods to find common patterns, theoretical issues, and differences across the studies [17, 26]. Conflicting evidence was examined closely to understand the reasons behind it. To make the findings more reliable, experts reviewed the results, and theoretical triangulation was used to assess consistency and accuracy [18].

3.4 Ethical considerations

This study used a systematic literature review and meta-synthesis, with no involvement of human participants. All data came from publicly available, peer-reviewed sources to maintain ethical standards, transparency and academic integrity.

4 COMPARATIVE ANALYSIS OF ADDIE AND CAMIL

4.1 Strengths of ADDIE

The ADDIE model is well known for its step-by-step approach in instructional systems design (ISD). Its five stages, from analysis to evaluation, are clear and practical, helping teachers and designers organize the teaching process systematically [1]. This straightforward structure can reduce uncertainty in teaching and is especially useful for new teachers and those without a design background [2]. The model guides users in setting teaching goals, selecting content, managing resources, and evaluating learning outcomes, enabling educational activities to move forward in an organized, manageable way.

Facilitates standardization. Standardized instructional design is important for large-scale and digital learning. The ADDIE model helps create courses that are organized, modular, and easy to reuse, which improves consistency, scalability and collaboration between institutions [19]. It also helps keep content clear, assessments fair, and instruction well-managed in online and distance education [2].

Effective for skill-based modules. The ADDIE model is effective for teaching skills such as basic artistic techniques. Its structured phases of design, development and implementation facilitate a more transparent and assessable learning process, enabling both teachers and students to monitor progress and achievements more clearly [20]. In early art education, including instruction in painting or sculpture, the ADDIE model can enhance lesson efficiency and maintain student focus on learning objectives.

Rigid sequencing limits creative spontaneity. Art education encourages nonlinear thinking and personal exploration. In contrast, the ADDIE model uses a step-by-step structure that often sets learning paths in advance, which can limit spontaneous and creative ideas. Although ADDIE works well for specific, goal-driven tasks, it can restrict new student ideas that go beyond the planned lessons [21].

Less room for emergent learning outcomes. Art education values learning that is open to new ideas and unexpected connections, with innovation often coming from chance discoveries and links between different fields [22]. In contrast, models like ADDIE focus on predetermined outcomes and standardized assessments, which can limit open exploration and unexpected discoveries [19]. Because of this, there is a need for more flexible instructional designs that support learning as it happens, especially in art education.

4.2 Strengths of CAMIL

Promotes adaptive learning and exploration. The CAMIL model offers a flexible, context-based way to design instruction that helps students become more independent and engaged [7]. In art education, this approach supports personalized learning, meets different cognitive and emotional needs, and encourages creative work in real-world situations.

Integrates creative modelling and contextual engagement. Within CAMIL, "*modelling*" constitutes a central component of learning that emphasizes the construction and dissemination of knowledge rather than passive absorption. Engagement with authentic social and cultural contexts enables learners to develop critical awareness, articulate ideas through multiple modalities and cultivate transferable

creative skills. This approach fosters a more profound and socially integrated understanding of art [4].

Supports reflective and critical practices central to art education. Reflection is important in art learning and helps build critical practice. Unlike the ADDIE model, which focuses on evaluation at the end, this method encourages reflection throughout the creative process, emphasizing ongoing and whole-process reflection [23]. Studies show that regular critical reflection helps learners notice creative strategies, link their practice to academic study, and express themselves more thoughtfully and strategically in their art [6].

4.3 Research gap: CAMIL in art education

The CAMIL model has strong potential to encourage creativity and reflective learning in art education, but some key challenges remain. Research shows that CAMIL's flexible, student-led approach means teachers need to adapt, guide reflection, and help students manage their learning. Still, there is little practical advice on how teachers can develop these skills [4]. Because CAMIL lacks clear stages or task structures, teaching can sometimes become fragmented or inconsistent, especially when resources are limited [2]. Although CAMIL emphasizes personalized learning, there are no standard or reliable ways to assess creative and reflective outcomes. As a result, teachers often rely on their own judgment, which can lead to bias [6]. More research is needed to develop and test structured design and assessment methods that keep CAMIL flexible while also supporting clear teaching and fair evaluation. Table 1 shows the applicability of the CAMIL and ADDIE models.

Table 1. Applicability of ADDIE and CAMIL models

Dimension	ADDIE Model	CAMIL Model
Structure	Linear and clear stage division (Analysis → Design → Development → Implementation → Evaluation)	Nonlinearity, emphasizing the circular interaction of context, analysis, and modelling
Flexibility	It is relatively low and places more emphasis on process stability and standardized management	It is relatively high, and dynamic adjustments are encouraged based on learners' feedback and actual situations
Creativity Support	Limited and suitable for skills training, it is difficult to accommodate sudden creativity and open exploration	Strong, it is particularly suitable for encouraging contextualized and autonomous exploration in artistic creation
Assessment Mechanism	It emphasizes standardization and quantitative assessment, is easy to operate, but is difficult to evaluate complex creative achievements	Emphasis is placed on reflection and process assessment, but the assessment methods are highly subjective and operationally difficult
Teacher Competence Required	General requirements: The teaching process should be clear and easy to control, suitable for junior teachers and standard courses	It is relatively high, requiring teachers to possess design capabilities, dynamic classroom management skills, and the ability to continuously reflect and guide
Learner Autonomy	The teaching process is relatively low, with the teacher taking the lead and students advancing according to the predetermined steps	At a higher level, students can actively adjust their learning paths and contents

In summary, both the ADDIE and CAMIL models have their own uses and strengths in art education. The ADDIE model, with its clear structure and step-by-step process, works well for teaching basic skills, setting clear goals, and fostering

early creativity. However, its structured approach can limit the kind of creative, independent learning that art teaching often requires. On the other hand, the CAMIL model uses a more flexible, context-based design and encourages ongoing reflection, which better supports personalized learning, creativity, and critical thinking in art classes. This model, though, requires teachers to have strong professional skills and careful control over the curriculum and assessment. Looking ahead, teaching and research should focus on developing a hybrid model that combines the strengths of both approaches to balance structure and flexibility in art education.

5 CAMIL IN PRACTICE: CASE EXAMPLES

Case 1: Visual journaling through CAMIL: Todd-Adekanye [24] examined the implementation of the CAMIL model and visual journaling in an eight-week art program at a Philadelphia charter high school. The program was designed to facilitate student self-exploration and enhance self-confidence through reflective painting and writing. Findings indicated significant improvements in students' self-expression, self-awareness and confidence. This case demonstrates that the CAMIL model emphasizes student engagement across diverse contexts, the use of illustrative examples, and continuous reflection. These strategies support the progressive development of students' creative abilities and foster deeper emotional and cognitive involvement in artistic processes.

Case 2: The application of the CAMIL model in the community participatory mural project: A rural Kansas community art project involved students working with a local art centre to create public murals that depicted community history and culture through the CAMIL framework [25]. Through situational participation and modelling, students engaged in community research, translated local narratives into visual designs and improved their work through ongoing reflection. The project enhanced students' emotional connection to the community, critical thinking skills, and sense of social responsibility, thereby demonstrating the effectiveness of the CAMIL framework in culturally grounded, community-engaged art education.

6 DISCUSSION

This analysis shows that while the ADDIE model brings structure and stability, its step-by-step design can limit creativity and spontaneity in art education. Research suggests that ADDIE does not fully support exploratory, cross-disciplinary, or emergent learning, which can restrict creative, nonlinear processes [1–4]. To address these challenges, some propose adding design-thinking principles, such as iterative prototyping and learner-centred flexibility, to the ADDIE framework. This approach aims to encourage creative exploration while keeping a clear structure [8, 12, 21].

The CAMIL model more effectively addresses the complex nature of art learning than other models by emphasizing real-life participation, adaptable methodologies and continuous reflection. Its flexible structure enables students to assume responsibility for their learning, maintain engagement and construct knowledge in ways that align with their individual needs, which is essential for fostering creativity in art [6].

Empirical studies further indicate that CAMIL can enhance emotional engagement and facilitate personal expression through reflective, contextually grounded learning experiences [14]. Nevertheless, the model's effectiveness relies on teachers'

ability to guide students and manage open-ended learning environments. An effective art education requires a balanced approach that provides both clear structure and opportunities for exploration. Future research should investigate hybrid models that integrate the stability of structured design with the flexibility necessary to foster creativity, critical thinking and personal expression.

7 IMPLICATIONS FOR ART EDUCATION

This study finds that the CAMIL model helps project-based and interdisciplinary art education by boosting creativity, collaboration and problem-solving in real-world settings. By focusing on reflective learning and creative processes rather than standardized results, CAMIL enables a more comprehensive assessment of students' cognitive, personal and social growth. To use CAMIL effectively, teachers need specific training in flexible teaching methods and reflective practice and schools need policies that support student independence and interdisciplinary learning.

8 CONCLUSION

The shift from the ADDIE model to the CAMIL model represents a necessary evolution in art education, moving from a linear, structured approach to one that values creativity, reflection and individuality. While ADDIE supports technical skill development, it limits the expressive and dynamic nature of artistic learning. CAMIL, by emphasizing situational participation, creative modelling and continuous reflection, better aligns with the authentic and innovative needs of art education. The study confirms CAMIL's effectiveness in enhancing students' creativity, critical thinking and engagement. However, successful implementation requires improved teacher training, updated assessment strategies and supportive educational policies. Future reforms should therefore integrate flexible teaching models like CAMIL with capacity building and curriculum redesign. This transformation reflects not only a change in instructional methodology but also a deeper rethinking of educational values essential for fostering innovation in the creative economy.

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