

# Reimagining Learning Through Visual Expression: The Role of Doodling as a Pedagogical Tool in Fostering Creativity and Engagement in Educational Environments

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## ABSTRACT

*In response to the evolving demands of 21st-century education, this study investigates the pedagogical potential of doodling as a transformative tool to enhance cognitive engagement, emotional expression, creativity, and inclusive learning. Traditionally dismissed as a distraction, doodling is reconsidered here as a multimodal strategy aligned with contemporary theories such as Constructivism, Dual Coding Theory, and Universal Design for Learning (UDL). Adopting a mixed-methods quasi-experimental design, this research compares the effects of doodling in experimental and control classroom settings, analysing outcomes through quantitative surveys, academic records, and qualitative interviews. Findings are expected to reveal that doodling significantly supports memory retention, emotional regulation, and creative problem-solving, especially in linguistically and culturally diverse classrooms. The study highlights inclusivity as a key moderating factor, amplifying the educational benefits of doodling for students with varied learning needs. Ultimately, the research advocates for the strategic integration of visual expression into curriculum design, reinforcing the importance of creative, inclusive, and student-centred pedagogies in enhancing both academic performance and holistic development.*

**Keywords:** doodling, multimodal learning theory, constructivism, inclusive pedagogy, cognitive engagement, emotional engagement, creative thinking, classroom inclusivity



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## 1 INTRODUCTION

In today's evolving educational landscape, there is a noticeable shift toward more holistic, student-centred learning methodologies that prioritise the overall development and engagement of learners (Datnow et al., 2022). Within this context, the incorporation of visual expression into the educational process has gained substantial interest among educators and researchers alike. One particularly compelling form of visual expression is doodling an activity traditionally regarded as inconsequential or even disruptive in academic environments (Bhardwaj et al., 2025). The evolving landscape of education, there is a growing emphasis on student-centred and multimodal learning approaches that cater to diverse cognitive, emotional and cultural needs (Alviz and Opina, 2024). Visual expression, particularly through doodling, has emerged as a potential tool to enhance learning experiences by fostering creativity and engagement. However, recent studies and classroom practices have begun to

challenge this perception, revealing that doodling can serve as a powerful pedagogical tool (Sundaraman, 2020).

This paper explores the role of doodling as a transformative educational practice that redefines traditional approaches to learning through the lens of visual expression. It explores the strategic use of doodling to cultivate creativity, deepen student engagement and support a broad spectrum of learning needs within diverse educational settings. Through a comprehensive analysis of current academic research, classroom-based case studies and practical implementations, this study seeks to uncover the pedagogical potential of doodling as more than a supplementary activity. Instead, it positions doodling as a deliberate and effective tool that can be integrated into teaching methodologies to foster more dynamic, inclusive and learner-centred educational experiences. Ultimately, the research aims to contribute to the growing discourse on innovative, multimodal strategies in contemporary education.

## **2 LITERATURE REVIEW**

### **2.1 Doodling as Medium for Pedagogical Learning**

Pedagogical learning is the process of acquiring knowledge, skills, attitudes and values through instructional approaches that are intentionally designed and guided by the principles of pedagogy the art and science of teaching. This form of learning is typically characterised by a structured and systematic approach, where educators play a central role in shaping and directing the learning experience. In recent years, the incorporation of visual elements into pedagogical practices has garnered growing attention, reflecting a broader shift in educational philosophy toward more dynamic, inclusive and multimodal approaches to learning (Mutairi, 2025). Moreover, accordingly previous researchers Ungusari, (2015) have been increasingly drawn to the potential of visual strategies as a means of transcending the limitations of conventional, text-heavy instruction. By leveraging imagery, diagrams, drawings and other forms of visual representation, educators aim to foster deeper student engagement, accommodate diverse learning preferences and enhance conceptual understanding. Moreover, visual expression encourages active learning, fosters creativity and supports individualised ways of thinking, making it particularly beneficial in diverse classrooms where students possess varying strengths, learning styles and linguistic backgrounds. As such, incorporating visual elements like doodling into instructional strategies not only enhances comprehension but also empowers students to take ownership of their learning through personalised and imaginative representation. However, it's important to note that not all studies have found positive effects of doodling on learning outcomes challenged the notion that doodling enhances learning. Their experiments indicated that doodling did not significantly reduce boredom or improve attention and memory retention compared to traditional notetaking. The integration of doodling into educational practices presents both opportunities and challenges. While several studies highlight its potential benefits in enhancing memory, executive functioning, and engagement, other research calls for a more nuanced understanding of its effectiveness. This thesis aims to explore the multifaceted role of doodling in education, examining how it can be strategically employed to foster creativity and engagement, while also considering the contexts in which it may or may not be beneficial.(Janan Shoja Doost, 2024).

### **2.2 Fostering Cognitive Through Doodling**

According to the previous scholar, Coward and Coward, (2022) the benefits of doodling extend to creating a more cognitive process towards ideas. Doodling, often perceived as idle or distracting behaviour, has increasingly been re-evaluated for its cognitive benefits. Studies have shown that doodling can enhance memory retention, attention, and cognitive processing by engaging multiple neural pathways.

While, in particular, doodling holds unique promise in the context of cognitive education for students with diverse cognitive learning profiles such as those with Attention Deficit Hyperactivity

Disorder (ADHD), autism spectrum disorders or anxiety doodling can serve as a self-regulation strategy that helps channel restlessness, reduce stress and maintain focus during instruction (Son et al., 2024). Moreover, it provides a constructive and non-disruptive way for these students to stay engaged, supporting both their academic performance and behavioural well-being. In this way, doodling emerges not just as an artistic activity, but as a meaningful educational tool that promotes cognitive, engagement and personal expression in the classroom (Mahardika and Andi Purnawan Putra, 2023).

### **2.3 Fostering Creativity Through Doodling**

Far from being a mere pastime, doodling has been shown to stimulate creative thinking, sustain student engagement and improve a processes such as memory retention and comprehension (Cruz and Ramos, 2019). As such, integrating doodling into educational practices offers a promising avenue for fostering deeper learning experiences and enhancing the overall effectiveness of instruction. According to the act of doodling cultivates divergent thinking a key component of creativity and supports learners in visualising problems and conceptualising innovative solutions. Moreover, incorporating creative visual practices into the classroom reinforces students' confidence in their ideas, promoting risk-taking and exploration (Belram and Kumar, 2022). Recent research has highlighted the diverse advantages of integrating doodling into educational practices. Studies suggest that doodling supports creative retention and enhances information processing by activating various cognitive pathways at once. Moreover, it promotes creative learning by enabling students to visualise and internalise complex ideas, which leads to deeper comprehension. In scientific disciplines, particularly biology, drawing has proven effective in helping learners understand abstract concepts, underscoring the value of visual tools in reinforcing conceptual knowledge (Edlund and Balgopal, 2021).

### **2.4 Fostering Engagement and Emotional Through Doodling**

This growing emphasis on visual learning aligns with contemporary theories, which suggest that information presented in both verbal and visual formats is more likely to be retained and internalised. Beyond its, doodling contributes significantly to emotional and behavioural engagement. Doodling has been found to reduce stress, regulate emotions and foster a more relaxed and inclusive classroom environment. However, beyond its cognitive advantages, doodling also plays a significant role in fostering emotional and behavioural engagement within educational settings (Hunt-Anderson and Shannon-Baker, 2023). While, It functions as a valuable medium for self-expression, allowing students to visually articulate their thoughts, feelings and experiences in ways that might not be possible through traditional verbal or written communication (Zafaren Zakaria et al., 2021). This doodle settings can be especially empowering for learners who may struggle with conventional modes of expression, offering them an alternative means to connect with the material and participate actively in the learning process (Poon, 2023). These forms of feeling expression allow learners to interact with information through both visual and kinaesthetic channels, reinforcing their cognitive processing and promoting a deeper understanding of complex concepts. By transforming abstract or text-based material into visual representations, students are better able to organise, internalise and recall information. This aligns with the principles of dual coding theory, which posits that the integration of verbal and visual input leads to more effective learning outcomes.

### **2.5 Fostering Inclusive and Multilingual Through Doodling**

The pedagogical value of doodling extends beyond individual cognitive and emotional benefits to encompass its potential as a powerful tool for fostering inclusivity in culturally and linguistically diverse classrooms (Wijayanti, 2024). Meanwhile, in educational settings where students come from a wide range of backgrounds and may face language barriers, traditional text-based instruction can sometimes hinder full participation and comprehension (Pinilih et al., 2023).

However, doodling offers an alternative mode of communication that transcends linguistic limitations by enabling students to convey complex ideas, emotions and narratives through visual means (Papandreou and Dragouni, 2022). Thus, by encouraging students to express their understanding through drawings and symbols, educators can create more equitable learning environments that recognise and respect the diverse ways in which students process and present information. This visual approach not only supports learners who may be acquiring the language of instruction but also validates the cultural richness they bring to the classroom (Molle et al., 2022). Throughout the past studied Bjarnason, (2023) doodling helps build a more inclusive and participatory educational atmosphere one in which all students, regardless of language proficiency or cultural background are empowered to engage meaningfully with the content and with one another. Accordingly to the previous studies Dr Jeremy Dean, (2023) reported that participants who engaged in doodling while listening to information demonstrated a 30% improvement in recall compared to those who did not doodle. This finding suggests that doodling may play a significant role in sustaining attention and enhancing memory retention.

## 2.6 Fostering Practical Integration

Doodling has been successfully integrated into a range of pedagogical approaches, from science education to language arts. Techniques such as sketch-noting, visual journaling, and concept mapping leverage doodling to help students organise thoughts, synthesise information, and internalise learning. However, challenges remain, including teacher perceptions, assessment criteria, and curriculum constraints. Educators must be supported in recognising the pedagogical legitimacy of doodling and provided with training on how to implement it effectively (Paepcke-hjeltness and Lu, 2020).

## 2.8 Implications of the Proposed Theoretical Structure

This study is grounded in a theoretical structure that positions doodling as a deliberate pedagogical tool within contemporary multimodal and learner-centred educational frameworks. Drawing from Multimodal Learning Theory, Constructivism, and Dual Coding Theory, the framework views doodling not as a passive or distracting act, but as an active, visual learning strategy that enhances cognitive, emotional, and creative engagement. As students convert abstract or verbal information into visual symbols and representations, they engage more deeply in the learning process, facilitating memory retention, focus, and meaning making. Additionally, Cognitive Load Theory supports the idea that doodling may help learners manage complex information by reducing extraneous mental effort. Simultaneously, Creative Cognition Theory highlights how doodling fosters divergent thinking, allowing learners to explore problems innovatively and develop confidence in their ideas.

The framework further emphasises emotional engagement and inclusivity as central to the learning experience. According to the Affective Filter Hypothesis, doodling can reduce stress and foster emotional expression, creating a more relaxed and participatory classroom environment. Moreover, through the lens of Universal Design for Learning (UDL), doodling is seen as a tool to promote equity in culturally and linguistically diverse classrooms, offering alternative forms of communication and expression for students with varying learning needs. Inclusivity operates as a moderating factor, strengthening the effects of doodling on engagement and comprehension in diverse settings. Ultimately, by supporting cognitive, creative, emotional, and inclusive dimensions of learning, this theoretical structure positions doodling as a catalyst for improving both academic performance and personal development. The current framework used in this investigation is shown in Figure 1.

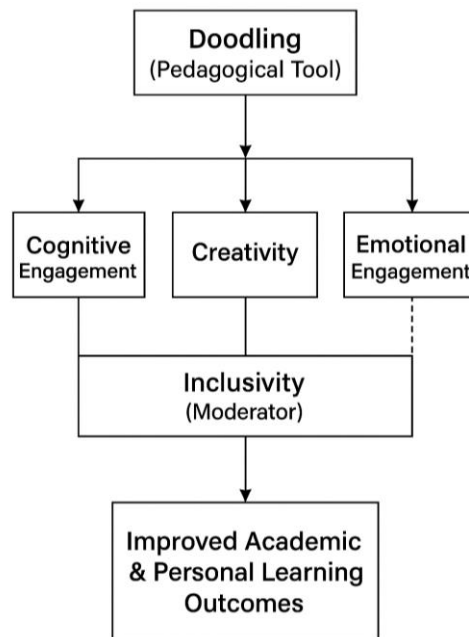


Figure 1 Sources are developed for the ongoing study.

## 2.9 Development of Hypothesis

To explore the pedagogical value of doodling in education, this study proposes a theoretical model that links doodling with key aspects of student engagement and learning outcomes. Grounded in multimodal and inclusive learning theories, the framework suggests that doodling positively influences cognitive engagement, creativity, and emotional engagement, which in turn enhance academic and personal development. Furthermore, inclusivity is considered a moderating factor that may strengthen or alter these relationships, particularly in diverse and multilingual classroom settings. Based on this structure, the following hypotheses are proposed. The current framework used in this investigation is shown in Figure 2.1.

The following theories have been outlined in light of earlier study findings:

- H1: Doodling as a pedagogical tool has a positive effect on students' cognitive engagement in the learning process,
- H2: Doodling significantly enhances students' creative thinking and problem-solving skills.
- H3: Doodling positively influences students' emotional engagement, including stress reduction and classroom participation.
- H4: Higher levels of cognitive, creative, and emotional engagement are positively associated with improved academic and personal learning outcomes.
- H5: The positive relationship between doodling and learning outcomes is moderated by classroom inclusivity (e.g., linguistic and cultural diversity), such that the effect is stronger in more inclusive or multilingual learning environments.
- H6: The effect of doodling on academic outcomes is mediated by cognitive engagement, creativity and emotional engagement.

## 3 METHODOLOGY

### 3.1 Research Design

This study adopted a mixed-methods quasi-experimental design to investigate the impact of doodling as a pedagogical tool on students' cognitive engagement, emotional engagement, creativity,

and academic and personal learning outcomes, with inclusivity serving as a moderating factor. The research will involve both an experimental group (using doodling) and a control group (traditional instruction), with pre- and post-tests to measure changes. Quantitative data will be collected through validated surveys and academic performance records, while qualitative insights will be gathered through interviews, focus groups, and classroom observations. This design allows for both measurable comparisons and in-depth understanding of how inclusivity shapes the effectiveness of doodling in enhancing student learning and engagement.

### **3.2 Research Instrument**

The best research instrument for this study is a combination of standardised questionnaires, academic performance records, creativity rubrics, and qualitative interview guides. For quantitative data, validated Likert-scale questionnaires should be used to assess cognitive and emotional engagement e.g., the Student Engagement Instrument, perceived creativity e.g., Creative Self-Efficacy Scale and inclusivity e.g., Inclusive Classroom Climate Scale. Academic performance can be tracked using students' test scores, assignments, and grades before and after the intervention. For creativity, teacher-assessed rubrics or tools like the Torrance Test of Creative Thinking (TTCT) can be used. Qualitative data should be collected using semi-structured interview guides and observation checklists, allowing for deeper exploration of student experiences, emotional responses, and the role of inclusivity in the learning environment. Together, these instruments provide a comprehensive and reliable means to capture the multidimensional effects of doodling in education.

## **4 ANALYSIS AND DISCUSSION**

The findings of this study are expected to highlight the potential of doodling as a low-cost, creative pedagogical tool that significantly enhances cognitive and emotional engagement, fosters student creativity, and ultimately leads to improved academic and personal learning outcomes. The results may reveal that students in the experimental group show greater involvement, retention, and expression of ideas, aligning with constructivist theories that emphasise active and personalised learning. Moreover, the study could uncover that inclusivity plays a critical moderating role, where diverse learners particularly those who may feel marginalised in traditional learning environments benefit more from doodling due to its non-verbal, open-ended, and student-centred nature.

This would support inclusive pedagogy literature, suggesting that learning tools must cater to different abilities, cultures, and learning preferences. Unexpected findings or group differences should be discussed in light of contextual variables such as teacher facilitation, classroom environment, or student familiarity with visual learning. You should also address the implications for teachers, curriculum designers, and policymakers, recommending the integration of creative, inclusive strategies in classrooms. Finally, reflect on limitations e.g., sample size, duration and propose directions for future research, such as longitudinal studies or exploring doodling in digital/hybrid learning contexts.

## **5 CONCLUSIONS**

This study has demonstrated that doodling, when used as a pedagogical tool, holds significant potential to enhance students' cognitive and emotional engagement, stimulate creativity, and contribute to improved academic and personal learning outcomes. The integration of doodling into classroom practices provides a non-traditional, yet effective, approach to learning that supports diverse thinking styles and encourages active participation. Importantly, the findings emphasise the role of inclusivity as a moderating factor, highlighting that the benefits of doodling are amplified when learning environments are inclusive, culturally responsive, and supportive of individual differences.

By bridging creativity with engagement and inclusivity, this research contributes to the growing body of evidence advocating for more flexible, student-centred teaching methods. The outcomes of this study not only inform educators and curriculum designers but also underscore the need for further exploration into creative, inclusive strategies that foster deeper learning and holistic student development.

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## AUTHOR CONTRIBUTIONS

All authors contributed equally to this research paper.

## CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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