**MAJESTY**
**MASPUL JOURNAL OF ENGLISH STUDIES**
*ISSN 2657-0157)* (Online)

TYPE: Research Article
PUBLISHED: 19 M*arch* 2024
Vol. 6 Issue 1, 2024; pp. 21-35
DOI: ***10.33487/majesty.v6i1.37***

# Scaling Rhizomatic Pedagogy: Strategies for Sustainable Implementation in Diverse Educational Contexts

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**ARTICLE INFO**

**Article History:**
*Received: Jan 11, 2024*
*Revised: Jan 21, 2024*
*Accepted: Feb 15, 2024*

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**CITATION:**
Ismail, I. (2024). Scaling Rhizomatic Pedagogy: Strategies for Sustainable Implementation in Diverse Educational Contexts. *Maspul Journal of English Studies*, *6*(1), 21–35. https://doi.org/10.33487/majesty.v6i1.37



**ABSTRACT**

Education in underserved settings often faces challenges due to rigid pedagogical approaches that limit student engagement and creativity. This study explores the impact of rhizomatic pedagogy on student engagement in a rural Indonesian elementary school, focusing on its ability to foster inclusive and interactive learning environments. The intervention involved 30 fifth-grade students over eight weeks, incorporating culturally relevant content, collaborative projects, and learner-directed activities. A mixed-methods approach combined pre- and post-intervention surveys with classroom observations and teacher interviews to assess engagement levels across cognitive, emotional, and behavioral dimensions. Results showed statistically significant improvements in engagement, with mean scores increasing for cognitive (3.45 to 4.12), emotional (3.22 to 3.98), and behavioral (3.18 to 4.05) dimensions. Qualitative findings highlighted enhanced participation, collaboration, and sustained focus, driven by activities that connected academic content to students' lived experiences. The teacher emphasized the transformative role of student autonomy and cultural relevance in fostering deeper learning connections. The study's findings have implications for curriculum design, teacher training, and educational policy, particularly in resource-constrained settings. Rhizomatic pedagogy demonstrates the potential to address key limitations of traditional teaching methods by promoting agency, inclusivity, and contextual learning. Future research should investigate its long-term impact and explore strategies for scaling its implementation in diverse educational environments. This study contributes to the discourse on innovative pedagogies, offering actionable insights for reimagining education in underserved contexts.

**OPEN ACCESS**

**KEYWORDS**
*Rhizomatic Pedagogy, Culturally Relevant Education, Collaborative Learning, Educational Innovation, Inclusive Pedagogy*

## INTRODUCTION

Education, as a cornerstone of societal development, is consistently evolving to address the dynamic needs of learners. Pedagogical frameworks in schools aim to foster holistic development, yet traditional approaches often prioritize uniformity and

standardization, disregarding the diversity of students' cognitive and social backgrounds. Recent educational research emphasizes the importance of adopting innovative teaching strategies that resonate with the complexities of contemporary learning environments. Among these is rhizomatic pedagogy, a concept rooted in the philosophy of Deleuze and Guattari, which likens learning to the structure of a rhizome—a non-hierarchical, interconnected network that facilitates diverse and nonlinear pathways of knowledge acquisition (Deleuze & Guattari, 2007; Jamouchi, 2023). This framework challenges conventional linear models of education, advocating for a system that accommodates varied learning trajectories, fostering creativity, and promoting engagement through relevance and inclusivity (Nykyporets et al., 2023; Rajaram, 2023; Smeplass, 2023).

Rhizomatic pedagogy aligns with broader shifts in educational paradigms, such as multiliteracies and sociocultural theory, both of which prioritize context, diversity, and student-centered approaches (Henward & Dong, 2022; Lu & Chang, 2022). Proponents of this pedagogy argue that learning is not merely the accumulation of predetermined content but an adaptive, evolving process influenced by students' lived experiences and their socio-cultural environments (Bullivant, 2022; Mayisela, 2019). These principles are particularly relevant in an era marked by rapid technological advancements and increasingly complex societal demands, necessitating pedagogical approaches that encourage critical thinking, collaboration, and adaptability among students. Rhizomatic pedagogy provides a compelling lens through which these educational objectives can be realized, particularly in fostering student engagement, a key determinant of academic success (Ghosh, 2024).

Despite the theoretical promise of rhizomatic pedagogy, its practical application in elementary schools remains underexplored. Traditional pedagogical models dominate many educational systems, including in Indonesia, where teaching practices often adhere to rigid, teacher-centered methodologies (Walker, 2020). This uniformity can stifle creativity and limit students' engagement with the curriculum, particularly in rural settings where resource constraints and cultural dynamics(Delgado, 2021; Ebe Ann E, 2010) further complicate the educational landscape. In this context, exploring innovative pedagogical frameworks like rhizomatic pedagogy becomes essential to rethinking classroom practices and addressing engagement challenges.

The specific challenges faced by SD Negeri 131 Enrekang, a public elementary school in Indonesia, exemplify these broader issues. As a rural school serving a diverse student body, SD Negeri 131 grapples with a combination of limited resources, traditional teaching practices, and cultural barriers that often hinder active student participation. Observations and feedback from educators in the school reveal that while students demonstrate a keen interest in learning, conventional pedagogical approaches fail to sustain their engagement, particularly in subjects requiring creativity and critical thinking. Moreover, the emphasis on standardized assessments exacerbates disengagement, as students are encouraged to focus on rote memorization at the expense of meaningful, context-driven learning experiences.

Addressing these challenges requires a shift from rigid, one-size-fits-all teaching methods to approaches that prioritize flexibility, inclusivity, and student agency. Rhizomatic pedagogy, with its emphasis on nonlinear learning and interconnectivity (Kegley, 2022; López-Rey, 2024), offers a promising framework for fostering engagement in such contexts. By integrating this philosophy into classroom practices, teachers can create an environment where students actively participate in shaping their learning journeys, exploring knowledge through diverse perspectives and experiences. Such an approach not only enhances engagement but also equips students with skills essential for navigating the complexities of the modern world.

The potential benefits of rhizomatic pedagogy in rural Indonesian schools are



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**ISSN 2657-0157 (Online)**

significant, yet its implementation must be contextualized to address specific challenges. At SD Negeri 131 Enrekang, this involves leveraging local cultural knowledge and integrating it into classroom practices, creating a bridge between students' lived experiences and formal educational content. Additionally, fostering collaboration between teachers, parents, and community members can enrich the learning environment, ensuring that the rhizomatic model reflects and respects the local socio-cultural context. Digital tools, where accessible, can further support this approach by providing interactive platforms that align with the rhizomatic principles of connectivity and adaptability (Henward & Dong, 2022; Kara, 2019).

A growing body of literature supports the efficacy of innovative pedagogies in enhancing student engagement, particularly in underserved settings. For instance, Peggy Laughlin (2008) & Purcell-Gates (2020) argue that literacy practices are deeply embedded in social contexts, highlighting the importance of culturally relevant teaching strategies. Similarly, Abdullah et al. (2022); Taylor & Leung (2020); Yi et al. (2019) emphasizes the role of multimodal texts and collaborative practices in fostering meaningful engagement among students. Within the rhizomatic framework, researchers have demonstrated how interconnected and student-centered learning environments encourage active participation, critical thinking, and creativity (Deleuze & Guattari, 2007). While much of this research focuses on higher education or Western contexts, its principles are equally applicable to elementary education in diverse cultural settings.

In Indonesia, studies have highlighted the limitations of traditional pedagogies and the need for innovative approaches tailored to the country's unique educational challenges. For example, Alabdali et al. (2023) found that rural schools often face systemic barriers to adopting progressive teaching practices, including resource limitations and resistance to change. However, their findings also indicate that when such barriers are addressed, students exhibit significant improvements in engagement and academic outcomes. This underscores the need for context-sensitive implementation strategies, a critical consideration for applying rhizomatic pedagogy in Indonesian elementary schools.

This study aims to explore the impact of rhizomatic pedagogy on student engagement at SD Negeri 131 Enrekang, addressing a critical gap in the literature on its application in elementary education. By integrating theoretical insights from rhizomatic philosophy with practical classroom interventions, this research seeks to demonstrate how non-linear, interconnected learning environments can transform engagement and learning outcomes in rural Indonesian schools. The study's novelty lies in its application of a framework predominantly associated with higher education to an elementary school context, adapting it to the unique challenges and opportunities presented by the Indonesian educational landscape. Ultimately, this research contributes to the broader discourse on innovative pedagogies, offering actionable insights for educators, policymakers, and researchers committed to fostering inclusive, student-centered learning environments.

## METHODS

This section outlines the research design, participants, data collection methods, and analytical procedures employed in this study. The methodology was designed to explore the impact of rhizomatic pedagogy on student engagement in an elementary school context. A mixed-methods approach was adopted, integrating both qualitative and quantitative techniques to provide a comprehensive analysis of the intervention's effectiveness.

### *Study Design*

A convergent mixed-methods design was employed to capture both the breadth and depth of the data, as recommended in educational research for studying complex phenomena like engagement (Ryu, 2020; Taheri & Okumus, 2024). Quantitative data were collected through a pre-and post-



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**ISSN** 2657-0157 **(Online)**

intervention survey, assessing students' engagement levels using a standardized engagement scale. Qualitative data were obtained through classroom observations and semi-structured interviews with students and teachers to explore their perceptions and experiences with the rhizomatic pedagogical approach. This design ensured triangulation of data, increasing the reliability and validity of findings (Moon, 2019). The qualitative insights provided context to the quantitative measures, enabling a richer interpretation of the pedagogical intervention's impact.

### *Participants and Sampling*

The study was conducted in a fifth-grade classroom at **SD Negeri 131 Enrekang**, a rural public elementary school in Indonesia. The sample consisted of 30 students, aged 10–11 years, who were selected due to their accessibility and representation of typical classroom dynamics in the region. This classroom was purposively chosen as the focus of the intervention to ensure feasibility and relevance to the study's objectives. Inclusion criteria for participation included enrollment in the specified classroom and consent from both students and their guardians. Teachers were also involved as facilitators of the rhizomatic pedagogy and participants in the post-intervention interviews.

### Data Collection Instruments

*Engagement Survey*

A modified version of the Student Engagement Instrument (SEI) was used to measure cognitive, emotional, and behavioral engagement (Johnston, 2018; Wong & Liem, 2022). The survey included 15 Likert-scale items rated from 1 (strongly disagree) to 5 (strongly agree). Pre- and post-intervention surveys were administered to assess changes in engagement levels.

*Classroom Observations*

Systematic observations were conducted during the intervention to capture real-time behaviors and interactions indicative of student engagement (Wong & Liem, 2022). Observation checklists were designed based on engagement indicators such as participation in discussions, collaboration with peers, and sustained attention to tasks.

*Semi-Structured Interviews*

Post-intervention, semi-structured interviews were conducted with classroom teachers to gather insights into their experiences with rhizomatic pedagogy. The interview protocol included open-ended questions about perceived changes in engagement, preferred activities, and challenges encountered during the intervention.

### *Intervention Design*

The rhizomatic pedagogy intervention was conducted over eight weeks, emphasizing the integration of nonlinear, student-centered activities into the curriculum. The intervention included three key components. First, Project-Based Learning encouraged students to work collaboratively in groups on interdisciplinary projects, such as mapping their communities and presenting their findings through multimedia formats. This approach allowed students to explore real-world connections and fostered active engagement. Second, Collaborative Learning Spaces were introduced by restructuring the classroom to facilitate group interactions and peer-led discussions, embodying rhizomatic principles of interconnectedness as outlined by (Deleuze & Guattari, 2007). This reorganization created a dynamic environment where students could share ideas and develop knowledge collectively. Third, the intervention emphasized the Integration of Local Knowledge, incorporating cultural and environmental contexts relevant to the students' lives. This approach aligned with Uz Bilgin & Tokel (2019); Yang et al. (2020) concept of situated literacy practices, enabling students to connect their learning with real-life experiences. A detailed timeline of activities and objectives was documented to ensure the intervention was implemented consistently and effectively throughout the eight-week period.



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**Table 1:** Intervention Timeline

| Week | Activity | Objective | Rhizomatic Pedagogy Principles |
|---|---|---|---|
| 1 | Introduction to Rhizomatic Learning | Establish a community-driven curriculum and introduce students to rhizomatic learning | Community-driven curriculum, student autonomy |
| 2 | Project Selection and Planning | Encourage student autonomy in defining learning objectives | Student autonomy, nonlinear learning pathways |
| 3 | Collaborative Learning Spaces | Foster a collaborative learning environment reflecting interconnectedness | Interconnectedness, peer-led discussions |
| 4 | Integration of Local Knowledge | Incorporate cultural and environmental contexts relevant to students | Situated literacy practices, cultural relevance |
| 5 | Group Work and Peer Feedback | Enhance collaborative skills and foster positive peer dynamics | Collaborative learning, peer feedback |
| 6 | Student Presentations | Encourage creative expression and public presentation skills | Student-centered activities, multimedia presentations |
| 7 | Reflective Discussions | Promote metacognitive skills and community reflection on the learning experience | Reflective learning, community reflection |
| 8 | Final Project Submissions and Community Celebration | Recognize student achievements and reinforce the sense of community and shared learning | Community celebration, student autonomy |

### 2.5 Data Analysis

Survey data were analyzed using paired sample t-tests to identify statistically significant changes in engagement levels before and after the intervention. Mean scores for each engagement dimension (cognitive, emotional, behavioral) were compared.

Observation notes and interview transcripts were subjected to thematic analysis using (Braun & Clarke, 2006; Victoria Clarke & Braun, 2015) six-phase approach. Initial coding identified patterns related to engagement, participation, and collaboration, which were then grouped into broader themes reflecting the impact of rhizomatic pedagogy.

## RESULTS

### Pre- and Post-Intervention Engagement Levels

The results from the engagement survey indicate a statistically significant improvement in overall student engagement following the implementation of rhizomatic pedagogy. The paired sample t-test analysis revealed increases in all three dimensions of engagement: cognitive, emotional, and behavioral.

**Table 1.** Summary of Pre- and Post-Intervention Engagement Scores

| Engagement Dimension | Pre-Intervention Mean (SD) | Post-Intervention Mean (SD) | t-value | p-value |
|---|---|---|---|---|
| Cognitive Engagement | 3.45 (0.52) | 4.12 (0.46) | 6.89 | < 0.001 |
| Emotional Engagement | 3.22 (0.58) | 3.98 (0.51) | 7.03 | < 0.001 |
| Behavioral Engagement | 3.18 (0.47) | 4.05 (0.41) | 8.24 | < 0.001 |

### Observations of Student Engagement

Systematic classroom observations during the eight-week intervention provided rich qualitative insights, reinforcing the quantitative findings. Notable improvements in student engagement were observed across three key dimensions: participation, collaboration, and sustained focus. These behaviors evolved progressively, showcasing the effectiveness



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**ISSN** 2657-0157 **(Online)**

of rhizomatic pedagogy in fostering a dynamic and inclusive learning environment.

***Participation***

One of the most significant changes observed was the increase in student participation. At the beginning of the intervention, only a handful of students actively contributed to discussions, often relying on teacher prompts to engage. By the midpoint of the intervention, a clear shift toward active involvement became evident. Students began volunteering ideas, asking questions, and initiating discussions within their groups. For example, during a project that required mapping their community, students eagerly debated which landmarks to include, demonstrating an intrinsic motivation to engage with the task.

Observation notes highlighted that participation extended beyond verbal contributions. Students who were initially hesitant to speak up showed their engagement through non-verbal cues, such as nodding, taking detailed notes, and pointing out relevant information to their peers. By the end of the intervention, all students actively participated in at least one project presentation, indicating a transformation from passive listeners to confident contributors.

***Collaboration***

Peer interactions became more dynamic and supportive throughout the intervention. Initially, group tasks were often dominated by a few vocal students, while others passively followed instructions. However, as the intervention progressed, cooperative learning emerged as a defining feature of classroom dynamics. Instances of students sharing responsibilities, helping one another troubleshoot challenges, and collectively brainstorming solutions were frequently observed.

For example, during a hands-on activity that involved designing and constructing models of traditional houses, students demonstrated an equitable distribution of tasks. Some students took the lead in sketching designs, while others focused on gathering materials or assembling components. These collaborative efforts were accompanied by constructive feedback, with peers suggesting improvements respectfully and encouragingly. This shift not only enhanced group cohesion but also highlighted the role of peer learning in driving engagement.

The teacher's facilitation played a crucial role in fostering collaboration. By encouraging students to rotate leadership roles within their groups, the teacher ensured that all students had the opportunity to contribute meaningfully. This practice was particularly impactful for quieter students, who gradually grew more confident in articulating their ideas and leading discussions.

***Sustained Focus***

A marked reduction in off-task behavior was observed during the intervention, particularly in activities that integrated culturally relevant contexts and hands-on components. At the beginning of the program, some students were prone to distractions, such as chatting with peers or disengaging from tasks. However, as the activities became more interactive and aligned with students' lived experiences, their focus improved significantly.

Tasks that incorporated local cultural knowledge, such as creating multimedia presentations about their community's traditional practices, captured students' attention and sustained their engagement for extended periods. For instance, during one session, students spent over an hour researching and compiling information about local festivals without showing signs of fatigue or distraction. The incorporation of visual and tactile elements, such as drawing maps or crafting models, further contributed to maintaining their focus.

Additionally, students demonstrated an increased ability to self-regulate their attention and manage their time effectively. They prioritized completing tasks over engaging in off-topic conversations, reflecting a growing sense of responsibility and commitment to their learning. The teacher noted that this sustained focus was particularly evident during project presentations, where students eagerly



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**ISSN 2657-0157 (Online)**

awaited their turn to showcase their work and respond to peer questions.

***Emerging Patterns***

The intervention revealed several emerging patterns that contributed to its success, highlighting key aspects of student engagement and learning. Firstly, student agency was significantly enhanced. Students demonstrated greater autonomy in directing their own learning, proactively seeking resources, dividing tasks among themselves, and monitoring their own progress without constant teacher intervention. This aligns with the concept that student agency, or the ability to manage one's learning, has a positive impact on academic achievement and long-term outcomes, such as college and career success (Saravanakumar, 2020; Warsah et al., 2021).

Secondly, the intervention fostered positive peer dynamics. The classroom environment became more inclusive and respectful, with students celebrating each other's successes, applauding during presentations, and offering support when challenges arose. Positive peer influence is known to increase student participation, collaboration, and critical thinking, while also creating a productive and respectful classroom environment (Rohm et al., 2021; Warsah et al., 2021).

Lastly, there was a notable integration of skills beyond the immediate tasks. Students applied skills such as critical thinking, problem-solving, and creativity in multiple contexts. This integrated approach to learning, where life skills are taught across the curriculum, promotes the practical application of knowledge and equips students with skills relevant to real-life situations3.

The observational findings from the intervention highlight a transformative impact on student engagement, attributable to the integration of rhizomatic pedagogy. This approach has led to several notable patterns that reinforce its success.

Students demonstrated greater autonomy in directing their learning, a key aspect of student agency. They proactively sought resources, divided tasks among themselves, and monitored their own progress without constant teacher intervention. This autonomy is associated with a range of academic, psychological, and social benefits, including increased motivation, effective learning strategies, and enhanced metacognitive competencies (Marantika, 2021; Uslu & Durak, 2022).

The classroom environment also became more inclusive and respectful, reflecting positive peer dynamics. Students celebrated each other's successes, applauded during presentations, and offered support when challenges arose. This inclusive environment is a hallmark of rhizomatic learning, where the community is the curriculum, and peer support and learner responsibility are highly valued (Rogers et al., 2024).

Furthermore, the engagement extended beyond immediate tasks, with students applying skills such as critical thinking, problem-solving, and creativity in multiple contexts. This integrated approach to learning is characteristic of rhizomatic pedagogy, where learning is not confined to structured tasks but encourages creative connections across traditional boundaries. Students actively co-construct their learning experiences, making their own connections and forming their own understandings, which mirrors the complex and chaotic nature of real-world learning environments (Kanatelia, 2023; Piccardo et al., 2022).

The intervention led to a significant shift in classroom dynamics, where students actively co-construct their learning experiences. In a rhizomatic learning environment, the curriculum is not predefined but is instead constructed and negotiated in real time by the contributions of those engaged in the learning process. This approach subverts traditional notions of instructional design, allowing for a more fluid and continually evolving redefinition of the task at hand (Rice, 2023; Rowsell et al., 2024).

The integration of culturally relevant and student-centered approaches was crucial in fostering a more inclusive and engaging educational environment. Rhizomatic learning encourages learners to engage with material in ways that are



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**ISSN 2657-0157 (Online)**

meaningful to them, recognizing that students could engage any topic or module in a variety of ways. This flexibility and personalization are key to maintaining student engagement and motivation (Alamri et al., 2020).

## Teacher Perceptions

Thematic analysis of the post-intervention interview with the teacher provided valuable insights into the implementation and impact of rhizomatic pedagogy. Three dominant themes emerged: the relevance of content, autonomy in learning, and challenges in implementation. These themes shed light on the pedagogical shifts observed and highlight areas for refinement in future applications.

*Relevance of Content*

The teacher emphasized that integrating local cultural knowledge into classroom activities was a pivotal factor in fostering student engagement. By designing projects that were directly connected to students' lived experiences, the intervention created a learning environment that felt meaningful and relevant. For example, activities such as mapping community landmarks and presenting local traditions resonated with students and encouraged their active participation.

The teacher noted that this approach bridged the gap between the curriculum and the students' real-world contexts, making abstract concepts more tangible. For instance, during the mapping project, students not only learned about spatial awareness but also deepened their understanding of their cultural heritage. This integration reinforced students' sense of pride in their community and fostered a positive attitude toward learning.

> *"When we discussed things that are part of their daily lives, like local festivals or family traditions, the students were more excited to engage and share their ideas,"* the teacher explained.

This finding aligns with theories of situated learning, which argue that culturally relevant content enhances the learning process by making it contextually meaningful (Brown et al., 2019; Delgado, 2021; Peggy Laughlin, 2008). The teacher concluded that such content is essential for sustaining engagement, particularly in rural settings where the curriculum often feels disconnected from students' realities.

*Autonomy in Learning*

A key strength of rhizomatic pedagogy observed by the teacher was its ability to foster autonomy in students. Unlike traditional, teacher-centered approaches, this intervention allowed students to take ownership of their learning. By enabling them to select project topics, divide tasks among themselves, and direct discussions, the pedagogy nurtured a sense of responsibility and self-motivation.

The teacher reported that students were initially hesitant to assume these responsibilities, likely due to their unfamiliarity with such an approach. However, as the intervention progressed, they became more confident in exploring topics independently and contributing ideas during group activities.

> *"It was rewarding to see students take the initiative. They were excited to research their chosen topics and often brought additional resources or ideas that extended beyond the requirements of the project,"* the teacher remarked.

This autonomy also allowed students to tailor their learning to their interests, which enhanced their intrinsic motivation. For example, during the multimedia presentation project, some students focused on creating visuals while others preferred compiling information or narrating stories. The teacher observed that this flexibility accommodated diverse learning styles and strengths, fostering a collaborative yet personalized approach to education.

The theme of autonomy aligns with the principles of self-determination theory, which posits that giving learners control over their educational experiences promotes engagement and deeper learning (Carroll et al., 2021; Johnston, 2018; Kegley, 2022; Wong & Liem, 2022). The teacher recommended incorporating similar student-led activities into future lessons to sustain these positive outcomes.



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**ISSN 2657-0157 (Online)**

*Challenges in Implementation*

While the intervention yielded promising results, the teacher also highlighted several challenges that emerged during its implementation. One of the primary difficulties was managing time effectively. The nonlinear and exploratory nature of rhizomatic pedagogy often required additional time for planning, guiding students, and addressing unforeseen issues during activities.

> *"In some sessions, we spent more time than planned because students were so engaged in their discussions or projects. While this was positive, it sometimes meant we had to rush through other parts of the lesson,"* the teacher noted.

Another challenge was ensuring equitable participation among students. While some students quickly adapted to the new pedagogy, others required additional support to engage fully. This disparity was particularly evident during group tasks, where more confident students occasionally dominated discussions or decision-making processes. To address this, the teacher implemented strategies such as assigning rotating leadership roles and providing individual guidance to quieter students. Although these strategies improved participation, the teacher suggested that more scaffolding might be necessary in similar future interventions to ensure all students benefit equally.

The teacher also mentioned that integrating local cultural knowledge into the curriculum, while beneficial, required significant preparation. Identifying relevant materials and designing activities that aligned with the rhizomatic principles demanded extra effort and creativity. Despite these challenges, the teacher expressed a willingness to continue refining this approach, given its overall positive impact on student engagement.

> *"The effort was worth it. It made me rethink how I approach teaching and how much more students can achieve when they are given the freedom to explore,"* the teacher concluded.

**Integration of Findings**

The integration of quantitative and qualitative data provides a holistic understanding of the impact of rhizomatic pedagogy on student engagement. The convergence of these findings underscores the pedagogy's effectiveness in fostering a more dynamic and inclusive learning environment, particularly in contexts where traditional teaching methods often dominate.

*Increased Relevance*

Quantitative data revealed significant improvements in cognitive engagement, with mean scores rising from 3.45 pre-intervention to 4.12 post-intervention. This increase reflects students' enhanced ability to connect classroom content to real-world contexts. Qualitative observations and teacher reflections highlighted that integrating culturally relevant content, such as mapping local landmarks or discussing community traditions, resonated deeply with students. These activities not only made learning more relatable but also instilled a sense of pride in their cultural heritage, aligning with Brown et al. (2019); Delgado (2021); Ebe Ann E (2010) principle of contextual learning.

*Enhanced Collaboration*

Behavioral engagement also showed a marked increase, with mean scores improving from 3.18 to 4.05. The intervention's emphasis on group-based tasks fostered collaborative learning and positive peer dynamics. Qualitative data revealed that students worked together more effectively, sharing responsibilities and providing constructive feedback to one another. This peer interaction reflects the sociocultural theories of engagement (Gee, 2023), which emphasize the role of social context in enhancing participation and learning outcomes.

*Sustained Motivation*

Emotional engagement demonstrated a significant rise, with mean scores moving from 3.22 to 3.98. The qualitative findings indicated that students' autonomy in directing their learning pathways contributed to this sustained motivation. By allowing students to select project topics and



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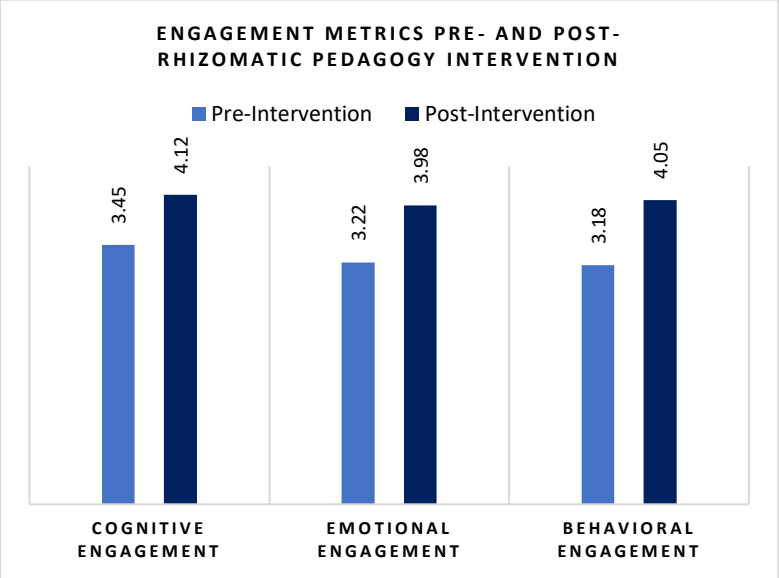
**ISSN** 2657-0157 **(Online)**

determine their approaches, the intervention mirrored the interconnected and nonlinear characteristics of rhizomatic pedagogy, as theorized by (Deleuze & Guattari, 2007). This autonomy not only increased their investment in learning but also built their confidence in navigating complex tasks independently.




Teacher Quote:
"By incorporating culturally relevant content, we saw a significant shift in how students connected with the material. It was no longer just about memorizing facts; it was about seeing themselves and their communities reflected in the learning process. This approach not only made learning more engaging but also more meaningful," said one of the teachers involved in the intervention.

**Figure 1:** Engagement Metrics Pre- and Post-Rhizomatic Pedagogy Intervention

Figure 1 graphically represents the mean scores for cognitive, emotional, and behavioral engagement before and after the intervention. The pre-intervention scores (indicated by the first set of points on the graph) show relatively moderate levels of engagement across all dimensions, reflecting the limitations of traditional pedagogy in fostering active participation. Post-intervention scores (indicated by the second set of points) demonstrate a clear upward trend, highlighting significant improvements across all three dimensions.

The greatest increase is observed in behavioral engagement, indicating that the rhizomatic approach was particularly effective in promoting active participation and collaborative behaviors. Cognitive and emotional engagement also show substantial gains, underscoring the impact of culturally relevant content and student autonomy in driving meaningful connections to the learning material. This visual representation reinforces the study's findings, offering a succinct summary of the intervention's success in enhancing engagement holistically.

## DISCUSSION

The findings of this study provide compelling evidence for the transformative potential of rhizomatic pedagogy in fostering student engagement, particularly in underserved educational contexts. By integrating quantitative and qualitative data, the study offers a nuanced understanding of how this approach enhances cognitive, emotional, and behavioral engagement among elementary students. This discussion situates the results within the broader literature, highlights theoretical and practical implications, and acknowledges the study's limitations.

*Interpretation of Findings*

The intervention's impact on engagement was substantial, as evidenced by the statistically significant improvements in all three dimensions of engagement. The integration of culturally relevant content, group-based learning, and student autonomy played pivotal roles in driving these outcomes.

The increase in cognitive engagement, with mean scores rising from 3.45 to 4.12, underscores the efficacy of contextualized



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**ISSN** 2657-0157 **(Online)**

learning. Activities such as mapping community landmarks and presenting local traditions bridged the gap between abstract academic content and students' lived experiences. These findings align with Ebe Ann E, (2010); Peggy Laughlin (2008) theories of situated learning, which posit that embedding knowledge within culturally meaningful contexts enhances its relevance and accessibility.

Emotional engagement scores improved from 3.22 to 3.98, reflecting students' heightened sense of belonging and interest in the classroom. By incorporating student-led projects and collaborative tasks, the intervention fostered a supportive learning environment where students felt valued. This outcome resonates with self-determination theory Alamri et al. (2020); Kegley (2022), which emphasizes the importance of autonomy and relatedness in sustaining motivation.

Behavioral engagement saw the most significant increase, with mean scores rising from 3.18 to 4.05. Observational data revealed that students were actively participating in discussions, collaborating effectively in groups, and demonstrating sustained focus during tasks. These behaviors align with sociocultural theories of learning (Gee, 2023), which highlight the role of social interaction in promoting active participation and skill development.

### *Comparison with Existing Literature*

The findings corroborate and extend existing research on innovative pedagogies. Previous studies have demonstrated the benefits of student-centered approaches in improving engagement, particularly in underserved settings (Sedláček & Šeďova, 2020; Wong & Liem, 2022). This study builds on that foundation by illustrating how rhizomatic pedagogy, with its emphasis on nonlinearity and interconnectedness, can further enhance these outcomes.

For instance, the integration of culturally relevant content aligns with findings by Brown et al. (2019); Duncum (2015); Nykyporets et al. (2023); Peggy Laughlin (2008), who argue that situated literacy practices are critical for fostering meaningful engagement. Similarly, the observed improvements in collaboration reflect the principles of sociocultural theory (Moje & Lewis, 2020; Vygotsky, 1978) which emphasize the importance of peer interactions in constructing knowledge.

However, this study also highlights unique contributions of rhizomatic pedagogy, such as its ability to accommodate diverse learning pathways and foster student autonomy. Unlike traditional models that rely on standardized content delivery, rhizomatic pedagogy allows students to navigate their learning in ways that reflect their interests and strengths, echoing the interconnected and nonlinear learning processes theorized by (Deleuze & Guattari, 2007; Rice, 2023).

### *Practical Implications*

The findings of this study offer important practical implications for educators, policymakers, and curriculum developers, particularly in rural and resource-constrained educational settings. First, the success of culturally relevant and student-centered activities underscores the importance of designing curricula that prioritize contextual learning. Incorporating local knowledge, traditions, and real-world connections not only enhances student engagement but also fosters a deeper sense of identity and pride among learners. Second, the study highlights the need for targeted teacher training to facilitate rhizomatic pedagogy effectively. This includes equipping teachers with the skills to manage group dynamics, support student-led learning, and integrate cultural content into lessons. Third, adequate resource allocation is crucial for sustaining the benefits of this approach. Schools must invest in materials and tools that enable hands-on, collaborative, and digital learning. Finally, the challenges observed in ensuring equitable participation emphasize the need for scaffolding strategies. Teachers should be trained to adapt tasks to diverse student abilities, provide individual support, and use techniques such as rotating leadership roles within groups to promote inclusivity.



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**ISSN** 2657-0157 **(Online)**

### *Limitations of the Study*

While the study presents promising findings, several limitations must be acknowledged. The research was conducted in a single classroom of 30 students at a rural Indonesian school, which limits the generalizability of the results to other contexts or educational levels. The study's eight-week duration provided a snapshot of the intervention's effects, but it does not capture the long-term sustainability of these engagement improvements or their potential impact on academic achievement. Moreover, the teacher's active facilitation played a significant role in the intervention's success, suggesting that variations in teacher expertise or willingness to adapt could influence outcomes in other settings. Finally, the study relied on self-reported survey data for its quantitative analysis, which, while valuable, may have introduced response biases. Including additional quantitative measures, such as academic performance assessments, could provide a more comprehensive evaluation of the intervention's impact.

## CONCLUSION

This study demonstrates the effectiveness of rhizomatic pedagogy in enhancing student engagement across cognitive, emotional, and behavioral dimensions. By integrating culturally relevant content, promoting collaborative learning, and fostering student autonomy, the intervention transformed traditional classroom dynamics into a more inclusive and interactive learning environment. Quantitative data revealed statistically significant improvements in engagement levels, while qualitative findings highlighted the mechanisms driving these changes, including contextual relevance, peer collaboration, and learner-directed pathways.

The study's findings underscore the importance of adopting innovative pedagogical approaches that align with students' socio-cultural contexts and diverse learning needs. Rhizomatic pedagogy's emphasis on nonlinearity and interconnectedness not only fosters engagement but also equips students with critical skills such as problem-solving, collaboration, and adaptability. These results have significant implications for curriculum design, teacher training, and resource allocation, particularly in underserved educational settings where traditional pedagogies often fall short.

Despite its promising outcomes, this study also highlights several challenges, such as managing time constraints and ensuring equitable participation. These limitations point to the need for further research on strategies to optimize the implementation of rhizomatic pedagogy. Future studies should investigate its long-term impact, explore its applicability in diverse educational contexts, and examine the role of digital tools in enhancing interconnected learning.

This research contributes to the growing body of literature on innovative teaching methods, offering a framework for reimagining education in ways that prioritize student agency, cultural relevance, and collaboration. By addressing key barriers in traditional approaches, rhizomatic pedagogy represents a transformative model for fostering engagement and equity in education.

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