

Implementation of CANA as a Neurohumanistic Pedagogy in Community-Based Inclusive Education: A Qualitative Case Study at Rainbow Children’s Intervention and Learning Center

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ABSTRACT

This study explores the implementation of CANA (Collaborative Activation for Nurturing Awareness) as a neurohumanistic pedagogy within a community-based inclusive education ecosystem at Rainbow Children’s Intervention and Learning Center, Malang. While international literature highlights the significance of responsive relationships, professional collaboration, and emotional awareness in learning, limited research examines how these dimensions are integrated into sustained pedagogical practice in local contexts. Using a qualitative case study design, this study analyzes how special education teachers, behavior therapists, and parents construct shared understanding of CANA practices and how their collaborative processes develop through the framework of Community of Practice (CoP). Data were collected through in-depth observations, field notes, learning documentation, and semi-structured interviews with fourteen participants. A deductive analysis approach was employed to examine the five CoP characteristics through daily practitioner interactions. Findings show that CANA not only provides a relational approach that enhances teachers’ conscious presence and quality of teacher–child interactions but also facilitates stable and reflective cross-professional collaboration patterns. Negotiation of goals, shared meaning-making of challenges, and co-development of strategies consistently appeared within team dynamics. The study confirms that CANA functions as a neurohumanistic pedagogical framework that strengthens professional learning culture and enhances intervention quality in community-based inclusive education. Recommendations are proposed for broader implementation in formal schools and for developing CANA-based training modules for educators and therapists.

Keywords: CANA, neurohumanistic pedagogy, inclusive education, community of practice, emotional regulation, professional collaboration.

INTRODUCTION

Education is a fundamental need for every citizen, including children with special needs who experience mental retardation, or what is more commonly referred to as intellectual disability. The American Association on Intellectual and Developmental Disabilities (AAIDD) defines intellectual disability as a condition that emerges before the age of 18 and is characterized by significant limitations in intellectual functioning and adaptive behavior, which subsequently affects an individual’s social skills and daily living abilities.

Inclusive education is fundamentally grounded in the belief that every child is capable of learning when they are accepted as a whole human being and supported through relationships that are safe, responsive, and conscious. Over the past two decades, global policy directions have increasingly emphasized the importance of humane and collaborative approaches in supporting learner diversity

(Ainscow, 2020; UNESCO, 2020). However, in many developing contexts, inclusive education continues to face structural barriers: limited teacher capacity, insufficient cross-professional collaboration, academic pressure, and weak family community support systems (Florian & Black-Hawkins, 2011; Norwich, 2014). These conditions create a persistent gap between policy idealism and actual practices in the field.

In Indonesia, efforts to build inclusive ecosystems have expanded, yet there remains a lack of pedagogical models capable of bridging findings from neuroscience, relational practices, and community collaboration. It is within this context that CANA (Collaborative Activation for Nurturing Awareness) was developed as a neurohumanistic pedagogical approach emphasizing conscious presence, attuned connection, neuro-reflective dialogue, and active collaboration among educators, therapists, and parents. Conceptually, CANA draws on recent developments in social neuroscience, which position human relationships as primary drivers of learning processes (Immordino-Yang & Damasio, 2007; Cozolino, 2013; Feldman, 2012), while also integrating the values of humanistic pedagogy, which view educators as figures who nurture rather than merely instruct.

Despite the growing global attention to relational and awareness-based approaches, empirical research examining the implementation of neurohumanistic pedagogy in community settings remains limited. Most studies on inclusive education in Southeast Asia still focus on policy, access, or individual services rather than exploring relational processes and professional cultures that sustain learning transformation. In contrast, research on Communities of Practice (CoP) (Wenger, 1998; Wenger-Trayner & Wenger-Trayner, 2015) demonstrates that sustainable educational practice emerges through negotiation, shared reflection, and collective learning among practitioners. Yet to date, the link between neurohumanistic pedagogy and CoP dynamics has not been systematically explored.

Rainbow Children's Intervention and Learning Center in Malang provides a rich context for such inquiry. As a community-based intervention center involving special education teachers, behavior therapists, and parents, Rainbow has long cultivated a collaborative and relational culture in supporting children with diverse learning needs. The implementation of CANA within this institution offers a unique opportunity to understand how neurohumanistic pedagogy shapes everyday professional interactions, influences the quality of teacher child relationships, and fosters stable and adaptive inclusive practices at the community level.

This study aims to analyze in depth how CANA is implemented by educators and therapists at Rainbow and how their collaborative dynamics develop through the lens of Communities of Practice. By integrating social neuroscience perspectives with theories of collaborative professional practice, this study seeks to expand the understanding of how inclusive education can be operationalized through approaches that are conscious, relational, and reflective. Through a qualitative case study design, this research offers conceptual and empirical contributions to strengthening an emerging direction in inclusive pedagogy one that centers awareness, connection, and collaboration as the core of learning transformation.

Theoretical Framework

Research on inclusive education has evolved from approaches centered on individual services toward more comprehensive understandings of relationships, social contexts, and collaborative dynamics in learning. This paradigm shift is rooted in the development of social neuroscience, humanistic pedagogy, and community-based learning theories, which collectively emphasize that the quality of human relationships constitutes the foundation of meaningful educational processes (Immordino-Yang & Damasio, 2007; Cozolino, 2013; Ainscow, 2020).

Neurohumanistic Pedagogy: Conceptual Foundation of CANA

CANA is derived from a neurohumanistic framework, an approach that views learning as a biological, emotional, relational, and existential event. This perspective stems from neuroscientific findings showing that the human brain develops through interactions that are attuned, responsive, and attentive (Feldman, 2012; Siegel, 2012). Within this context, attunement between educator and child becomes the central driver of adaptive learning systems, including emotional regulation, attention, and executive functioning. Neurohumanistic pedagogy also connects with humanistic educational traditions that conceptualize education not merely as knowledge transfer but as a process of growing human beings through presence, empathy, and authentic relationships (Rogers, 1969; Palmer, 1998). The integration of these traditions positions CANA as a pedagogical model emphasizing four pillars: conscious presence, attuned connection, neuro-reflective dialogue, and active collaboration. These pillars are not merely techniques but a guiding framework that supports educators in building learning processes through self-awareness, relational empathy, and mature professional interaction.

Professional Collaboration in Inclusive Education

Inclusive education requires coordinated work among multiple stakeholders, including special education teachers, behavior therapists, psychologists, and families. Literature highlights that effective collaboration among professionals is a strong predictor of successful inclusive services (King et al., 2009; Florian & Black-Hawkins, 2011). Such collaboration is not merely about sharing information but involves complex processes of negotiation, role clarification, and sustained reflection. In practice, collaboration is often hindered by fragmented roles, inconsistent communication patterns, and a lack of reflective spaces. CANA offers a framework that unites cross-professional perspectives through relational awareness and structured dialogue. Through presence-based interactions, practitioners are able to build shared understanding of children's needs, reduce role conflict, and increase consistency of intervention strategies at school and at home.

Communities of Practice as an Analytical Lens

To understand how CANA practices develop in the field, the Communities of Practice (CoP) framework (Wenger, 1998) serves as a relevant analytical lens. CoP conceptualizes professional practice as a form of social learning that unfolds through interaction, negotiation, and regular participation among community members. Knowledge in such communities is not merely transmitted but co-constructed through shared experience, reflection, and collaboration. Wenger identifies three core elements of CoP: participation, shared repertoire, and joint enterprise. These elements are enacted through processes such as negotiating goals, addressing shared challenges, engaging in meaningful and regular interaction, and developing evolving professional practices. Contemporary research reinforces that CoP can enhance teacher competence, reflective quality, and even emotional well-being (Elvira et al., 2017; Liu et al., 2020). In this study, CoP is used not merely as a collaboration theory but as a lens to understand how CANA becomes a living social practice at Rainbow Children's Intervention and Learning Center. Thus, professional interactions, reflective exchanges, and strategy development are seen as outcomes of collective learning processes rather than isolated individual actions.

Integrating the Framework: From Neuroscience to Community Practice

The integration of neurohumanistic pedagogy and CoP suggests that inclusive education becomes effective when two dimensions intersect: (1) pedagogical approaches that center awareness and relationships, and (2) professional communities that sustain practice through dialogue, reflection, and collaboration. CANA operates at the meeting point of these dimensions bringing together conscious presence, emotional responsiveness, and cross-professional collaboration into a unified ecosystem of

practice. This integrative perspective positions CANA as a pedagogical approach, CoP as an analytical lens, and social neuroscience as the physiological explanation of why relationships and collaboration matter for learning. Together, these perspectives enable a deeper understanding of how inclusive education is constructed, sustained, and enacted within real communities.

METHOD

This study employed a case study method within a qualitative research design. The use of a qualitative case study approach is highly appropriate for conducting an in-depth investigation of inclusive education programs, particularly curriculum accommodations for students with intellectual disabilities in Madrasah Ibtidaiyah. The research was conducted at Madrasah Ibtidaiyah Terpadu (MIT) Ar-Roihan, located on Monginsidi 2 Street, Lawang District, Malang Regency, East Java Province. MIT Ar-Roihan is led by the principal, Laili Qomariyah, M.Pd. As an independent educational institution, MIT Ar-Roihan is not affiliated with any political groups or parties. Established in 2008, the madrasah operates under the Ar-Roihan Islamic Education Foundation, chaired by Farid Afandi. The data sources in this study refer to Sugiyono (2016), consisting of research informants and archival documents. Data collection techniques followed Yin (2015), which include: (1) interviews, (2) observations, and (3) document analysis. This study employed a qualitative approach with an instrumental case study design to gain an in-depth understanding of how the CANA pedagogy is implemented within a community-based inclusive education ecosystem. A case study was selected because it enables a detailed exploration of collaborative processes and relational dynamics that cannot be separated from the social context in which the practice occurs (Merriam & Tisdell, 2016; Creswell & Poth, 2016). Rainbow Children's Intervention and Learning Center was chosen as the study site due to its long-standing adoption of relational and collaborative approaches, providing a rich context for examining the natural implementation of CANA.

Research Setting

The study was conducted at Rainbow Children's Intervention and Learning Center, a community-based intervention center in Malang that serves children with diverse learning needs. The institution integrates special education practices and behavioral therapy within a collaborative ecosystem. Interactions between special education teachers, behavior therapists, and parents occur regularly through classroom sessions, intervention programs, reflective meetings, and daily communication. This context offers a valuable opportunity to understand how CANA shapes professional practices and relationships among educational stakeholders.

Participants

Fourteen participants were involved in this study, consisting of special education teachers ($n = 7$), behavior therapists ($n = 4$), and parents ($n = 3$). A purposive sampling strategy was employed to select participants who were directly involved in the implementation of CANA and had at least three months of experience in collaborative practice at Rainbow. Participants' ages ranged from 24 to 46 years, with professional experience varying from one to ten years. This strategy ensured both diversity of experience and depth of perspective.

Data Collection

Data were collected over a period of eight weeks through in-depth observations, semi-structured interviews, field notes, and institutional documentation. Observations were conducted during individual learning sessions, behavioral interventions, teacher meetings, and coordination sessions among teachers,

therapists, and parents. A total of 32 hours of observation were recorded in descriptive and reflective field notes. Semi-structured interviews were conducted with all participants, each lasting between 30–60 minutes, producing approximately 14 hours of recorded audio. The interview transcripts resulted in 126 pages of text. Documentation including individualized learning plans, progress reports, teacher–parent communication logs, and internal policy documents was used to enrich the understanding of how CANA operates within the institution.

Data Analysis

Data analysis employed a deductive content analysis approach guided by the Communities of Practice (CoP) framework proposed by Wenger (1998). Five analytical categories goal negotiation, meaning-making of challenges, regular and intentional interaction, development of shared practice, and utilization of cross-professional expertise were used as lenses to organize the data. The analysis process began with repeated readings of all data to gain a comprehensive understanding of practice dynamics at Rainbow. The data were then coded using a deductive coding scheme, while allowing for the emergence of additional codes when new patterns appeared in the field. These codes were consolidated into themes representing how CANA becomes a living collaborative practice. Triangulation was carried out through comparisons between interviews, observations, and documents. Peer debriefing with one qualitative researcher and one special education practitioner strengthened the credibility of interpretations. The researcher’s reflective journal was also used to examine potential biases and maintain transparency throughout the interpretation process.

Ethical Considerations

All research procedures adhered to ethical standards for educational research. Participants provided informed consent after receiving an explanation of the study’s purpose, procedures, and their right to withdraw at any time. The identities of participants and children involved in the observations were anonymized to ensure privacy. Observations were conducted only during sessions that had been approved by participants, and all data were stored securely.

Researcher’s Role

In qualitative research, the researcher serves as the primary instrument. The researcher’s background in special education and familiarity with the intervention context facilitated sensitive and nuanced observations of relational dynamics. However, such positionality also carries the potential for bias. To minimize this, the researcher maintained a reflective journal throughout the study and conducted regular reflective discussions with external collaborators. This process supported clearer, more layered interpretation of the data.

RESULT AND DISCUSSION

RESULT

The implementation of CANA at Rainbow Children’s Intervention and Learning Center revealed rich and layered collaborative dynamics between special education teachers, behavior therapists, and parents. Analysis of interviews, field notes, and classroom and therapy observations indicated that CANA is enacted relationally and continuously through ongoing negotiation, meaning-making, and reflective dialogue. Five key themes emerged based on the Communities of Practice (CoP) framework: (1) negotiation of shared goals, (2) collaborative meaning-making of challenges, (3) regular and awareness-oriented interactions, (4) development of shared practices, and (5) utilization of cross-professional expertise.

The results for each theme are presented below.

Negotiating Shared Goals: Constructing Clarity Through Conscious Presence

At Rainbow, each intervention begins with a collaborative meeting between teachers, behavior therapists, and parents to discuss short- and long-term goals. The negotiation process is warm and relational rather than technical.

A teacher noted:

"We usually start by listening to the parents... how they see their child, what worries them, and what they hope for. From there, we arrange goals that feel aligned for everyone." (Special Education Teacher, G3)

Field notes, 12/03:

"The meeting took place in a small room near the library. The teacher sat at eye level with the parents, without a table barrier. They used short, calm sentences and allowed pauses for reflection. Goals were discussed not as targets but as stories about small changes that could happen."

Meaning-Making of Challenges: Challenges as Shared Learning Spaces

Challenges such as emotional regulation and transitions are interpreted as opportunities for collective reflection.

A behavior therapist said:

"When a child has a meltdown, we don't focus on the behavior right away. We ask: What's happening inside the child? What might we have missed? It makes us more careful and more sensitive." (Behavior Therapist, T2)

Field notes, 19/03:

"Teacher G1 shared that A refused writing tasks. Therapist T4 explained that A had poor sleep the night before. The team proposed a new strategy: starting the session with a short fine-motor activity before writing. Everyone agreed."

Regular and Awareness-Oriented Interactions: Everyday Collaboration in Action

Daily interactions support the embodiment of CANA in everyday practice.

A teacher stated:

"Some days we only meet for five minutes, but those five minutes are meaningful... It makes us feel like one team." (Special Education Teacher, G5)

Field notes, 08/04:

"Child B became restless during a drawing activity. Teacher G4 gently lowered herself to eye level, breathed together with the child, and said softly, 'Let's start slowly, okay?' The child appeared calm again."

Developing Shared Practices: Building a Repertoire Through Open Reflection

New practices and strategies develop organically through bi-weekly reflective meetings and daily communication.

A parent expressed:

"I feel I'm not alone... I send photos or videos to the teacher, and they discuss them together before giving me clear suggestions." (Parent, O1)

A teacher also stated:

"Before, we focused on the program. Now we focus on the relationship first. New strategies come from observing together." (Special Education Teacher, G1)

Utilizing Cross-Professional Expertise: Collaboration as a Knowledge Ecosystem

CANA strengthens collaboration by recognizing and integrating the unique expertise of each member.

Field notes, 22/04:

"Therapist T3 showed a behavior pattern chart. Teacher G6 connected it to phonological challenges. Parent O2 added that the child cooperates more with improved sleep. A two-week strategy was agreed upon."

A therapist reflected:

"What I love about Rainbow is... no one feels like they are the one who knows best. Everyone has a piece that completes the whole." (Behavior Therapist, T1)

DISCUSSION

The findings illustrate how CANA functions as a relational and collaborative pedagogical approach that supports inclusive education. The results align with existing theories across social neuroscience, humanistic pedagogy, and Communities of Practice.

Negotiating Shared Goals

The collaborative goal-setting process reflects early-stage joint enterprise (Wenger, 1998) and demonstrates the centrality of conscious presence in establishing shared understanding. This supports earlier findings that relational attunement is foundational to inclusive education (Florian & Black-Hawkins, 2011) and that emotional safety facilitates collective problem solving (Feldman, 2012; Cozolino, 2013).

Meaning-Making of Challenges

Interpreting challenges as shared learning spaces aligns with neurohumanistic pedagogy, where empathetic curiosity precedes behavioral correction (Siegel, 2012). From a CoP perspective, this represents shared problematizing, which deepens community cohesion and collaborative competency (Wenger, 1998). The findings support research showing that collaborative reflection enhances inclusive practice quality (King et al., 2009; Liu et al., 2020).

Regular Awareness-Oriented Interactions

Daily micro-interactions demonstrate mutual engagement, a key element of CoP (Wenger, 1998). These findings align with co-regulation research, which highlights how relational micro-moments regulate affective states and prepare children for learning (Feldman, 2012; Immordino-Yang & Damasio, 2007).

Developing Shared Practices

The emergence of a shared repertoire, as seen in strategy development and reflective meetings, directly corresponds to Wenger's (1998) conceptualization of how communities build collective knowledge. This supports studies noting that reflective dialogue fosters teacher competence and well-being (Elvira et al., 2017).

Cross-Professional Expertise

The integration of diverse expertise reflects a mature CoP where knowledge systems converge. This corresponds with literature stating that multidisciplinary collaboration is a key determinant of inclusive education success (Florian & Black-Hawkins, 2011). CANA appears to function as a relational framework that strengthens these integrative processes.

CONCLUSION

This study demonstrates that the implementation of CANA (Collaborative Activation for Nurturing Awareness) as a neurohumanistic pedagogy at the Rainbow Children's Intervention and Learning Center has generated meaningful transformation in community-based inclusive education practices. Through an analysis of the five characteristics of a Community of Practice (CoP), the study reveals that CANA functions not only as a pedagogical framework but also as a social infrastructure that cultivates a mature, reflective, and awareness-driven collaborative culture. CANA has been shown to strengthen educators' relational competencies through its three core elements Conscious Presence, Attuned Connection, and Neuro-Reflective Dialogue. Collectively, these elements foster a stable emotional climate, enhance children's self-regulation, and facilitate learning that is responsive to neurocognitive needs. In parallel, Activated Collaboration ensures that teachers, behavioral therapists, and parents operate within a shared framework, enabling alignment and consistency of strategies between home and the learning center.

The study further demonstrates that the five pillars of CoP negotiated purpose, shared meaning-making of challenges, sustained intentional interaction, collective development of practices, and the utilization of cross-professional expertise consistently emerge within CANA practices. This confirms that CANA serves as a collaborative platform that strengthens the professional identity of the community, enhances responsiveness to children's behaviors, and builds an adaptive learning ecosystem. Accordingly, the study concludes that CANA functions as a neurohumanistic pedagogical paradigm that integrates social neuroscience, educational relationality, professional reflection, and cross-professional collaboration within community-based inclusive education in Indonesia. This model offers both conceptual and practical contributions for countries in the Global South seeking to develop culturally, emotionally, and pedagogically relevant approaches to inclusive education.

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