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Brain-Based Learning as an Affective Catalyst for Strengthening the Independent Dimension of Pancasila Student Profile in Indonesian Language Literacy

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Abstract

The Indonesian government counters global anxiety regarding character disruption through the strategic initiatives of the Merdeka Curriculum. The national curriculum establishes the independent dimension of the Pancasila Student Profile as the primary target for character formation within the school environment. This classroom action research resolves the issue of learning dependency among fifth-grade students at SDN Dadakitan in Indonesian language literacy through the implementation of a Brain-Based Learning model. The John Elliott methodological approach facilitated the observation of ten affective independence indicators on a 0-4 scale at each stage of the action cycles. The researchers comprehensively integrated this brain-based instructional method with PLS-SEM statistical analysis across two research cycles. A specialized rubric instrument evaluated five latent variable dimensions of students' affective independence via participatory observation during the intervention process. These five latent variables encompass initiative, resilience, self-confidence, emotional regulation, and self-awareness as the primary measurement parameters within the statistical model. This instructional intervention significantly increased the classical mastery percentage from 14.29% to 100% by the conclusion of the fourth session. SmartPLS outer and inner model validation confirmed a robust psychological causal chain extending from self-awareness to learning initiative, yielding an R^2 coefficient of 0.422. Consequently, the final outcomes of this study deliver a validated and highly replicable character education protocol for educational practitioners in Indonesia.

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INTRODUCTION

The global disruption era has fundamentally reoriented educational priorities: academic literacy is no longer sufficient without the concurrent cultivation of autonomous, self-directed

character. In Indonesia, this vision is operationalised through the Merdeka Curriculum, wherein the Pancasila Student Profile (Profil Pelajar Pancasila) mandates the development of six core character dimensions with 'Mandiri' (Independence) identified as the foundational competence for lifelong learning (Kemendikbudristek, 2022). Self-regulated learning at the elementary level is a robust predictor of long-term academic achievement and individual resilience (Syahriani & Santoso, 2024). Yet despite policy imperatives, instructional practices that effectively cultivate the affective dimensions of independence particularly within Indonesian language literacy make remain underspecified in the empirical literature.

Empirical observations at SDN 1 Dadakitan, Tolitoli Regency, reveal a persistent pattern of high instructional dependency among Grade V students: students require repeated prompting before initiating tasks, exhibit emotional vulnerability when confronted with complex texts, and demonstrate minimal self-directed resource-seeking behaviour. These observations align with a broader national concern that conventional, teacher-centred literacy instruction has failed to nurture the five affective sub-dimensions of independence mandated by the Pancasila Student Profile namely Self-Awareness, Emotional Regulation, Resilience, Self-Confidence, and Initiative.

Prior research on strengthening autonomous character in literacy contexts has drawn on metacognitive strategy instruction and project-based learning to stimulate self-regulation (Rachmawati et al., 2022). However, these approaches predominantly focus on cognitive outcomes while neglecting the affective neurobiological preconditions for autonomous behaviour. Brain-Based Learning (BBL) represents a paradigmatically distinct approach: rather than prescribing cognitive strategies, BBL engineers the neurological conditions under which autonomous behaviour naturally emerges. Jensen and McConchie (2020) identify three core BBL mechanisms relaxed alertness, orchestrated immersion, and active processing as the neurobiological drivers of self-directed learning. Willis (2006) demonstrates that eliminating threat-induced amygdala activation is a prerequisite for prefrontal cortex-mediated executive function, including the initiative and resilience central to the Independent Dimension. Within the Indonesian context, BBL research has predominantly investigated cognitive outcomes in STEM disciplines (Rahmawati et al., 2021), leaving its application to affective character development within Bahasa Indonesia literacy uninvestigated.

The documented advantages and track record of BBL across multiple educational contexts substantiate its selection as the intervention framework for this study. First, BBL's multisensory stimulation approach combining auditory input (instrumental music), kinaesthetic activity (brain gym movement sequences), and visual pre-exposure (video and poster media) simultaneously activates multiple brain regions, producing richer neural encoding than unimodal instructional methods (Caine & Caine, 2019). Second, the relaxed alertness condition engineered by BBL has been empirically demonstrated to lower cortisol levels, directly enhancing prefrontal cortex activation and sustained attention in primary-age learners (Willis, 2006). Third, reported significant gains in English vocabulary acquisition among Grade IV students using BBL-assisted flashcard media; Dwiputra et al., (2023) Southeast Asian meta-analysis of 24 studies confirmed a mean effect size of d = 0.68 favouring BBL over conventional instruction for cognitive engagement outcomes; and Rahmawati et al., (2021) demonstrated significant improvement in mathematical reasoning among Grade I students following structured BBL implementation.

Fourth, BBL's scalability advantage is particularly relevant to Indonesian public elementary schools: all core techniques like brain gym, instrumental music, chunked reading, and kinaesthetic roleplay require no additional technology or budgetary allocation, making successful implementation achievable within the resource constraints typical of rural and semi-urban school environments such as SDN 1 Dadakitan. Collectively, these established advantages and a growing body of documented successes position BBL as the most theoretically grounded and practically feasible intervention for addressing the affective independence deficits identified in this study's context.

This study integrates four theoretical frameworks. First, Brain-Based Learning theory (Jensen & McConchie, 2020) provides the instructional architecture through its three core pillars: relaxed alertness prevents amygdala hijacking; orchestrated immersion creates rich multi-modal engagement; active processing consolidates neuroplastic changes into durable behavioural dispositions. Second, Self-Regulated Learning theory (Muharam et al., 2025; Joshi, 2023; Zimmerman, 2018; Bandura, 1997) establishes that autonomous behaviour develops through iterative cycles of self-monitoring, motivational regulation, and behavioural execution processes mapped onto the five Independence sub-dimensions. Third, the affective neuroscience framework of Immordino-Yang and Damasio (2007) and Luo et al. (2025) substantiates that cognition and emotion are neurologically inseparable, emotional engagement in literacy activities directly enhances executive processing underpinning resilience and initiative. Fourth, the Pancasila Student Profile framework (Kemendikbudristek, 2022) operationalises independence as a developmental continuum across Phase C (Grades 5–6), providing the normative target against which the BBL intervention is evaluated.

This study pursued three objectives: (1) to implement BBL through the John Elliott CAR model to strengthen the five affective sub-dimensions of independence in Grade V Indonesian language literacy; (2) to validate the Affective Independence Rubric using PLS-SEM outer model evaluation; and (3) to test the structural causal chain among the five sub-dimensions using PLS-SEM inner model analysis. Three research questions guided the study:

RQ1 : How does BBL implementation through the John Elliott CAR model improve classical mastery of the five Independence sub-dimensions in Grade V Indonesian language literacy?

RQ2 : What is the validated causal structural relationship among the five Independence sub-dimensions (Self-Awareness has a significant effect Emotional Regulation; Emotional Regulation has a significant effect Resilience; Resilience has a significant effect Self-Confidence; Self-Confidence has a significant effect Initiative) as confirmed through PLS-SEM?

RQ3 : What neurobiological mechanisms explain the efficacy of BBL in transforming the affective domain of student independence?

The study offers three original contributions: theoretically, it extends BBL from cognitive to affective character domains; methodologically, it pioneers PLS-SEM integration within Indonesian CAR; and practically, it provides a validated ten-indicator Affective Independence Rubric immediately adoptable by Bahasa Indonesia educators.

METHOD

This study employed a collaborative mixed-methods Classroom Action Research (CAR) design, adopting the reflective spiral model developed by John (Elliott, 1991; Hilmi & Prastowo, 2023). Elliott's model was selected over the Kemmis and McTaggart (1981) framework due to its decomposition of each cycle into discrete action steps a structural feature particularly advantageous for BBL implementation, where neurological and affective responses to instructional stimuli require continuous micro-level monitoring and iterative adjustment. The mixed-methods approach integrated two analytical tiers: descriptive quantitative analysis for classical mastery monitoring, and PLS-SEM for instrument validation and structural hypothesis testing.

Research Instrument

The researcher collected data through direct observation using structured observation sheets and performance assessment rubrics. These direct observations were applied to measure the actual performance of students' reading comprehension skills when interacting with the text and role-playing, which included four cognitive indicators: (1) literal comprehension and vocabulary, (2) determination of the main idea, (3) making inferences or implied comprehensions, and (4) evaluation of the text. The researcher has validated the observation rubric instrument through expert judgment and obtained an inter-rater reliability coefficient of > 0.80.

Participants and Research Context

The study was conducted in Grade V at SD Negeri Dadakitan, Tolitoli Regency, Central Sulawesi Province, Indonesia. Participants comprised 14 students (N = 14), aged 10–11 years. Purposive sampling (Creswell & Creswell, 2018; Aini, et al., 2022) was employed based on pre-cycle observational screening identifying this cohort as exhibiting the lowest initiative and self-regulation scores within the school cohort. Given the constrained sample size inherent to single-classroom action research, PLS-SEM was selected as the primary analytical framework due to its statistical suitability for variance-based estimation with small N (Hair et al., 2022; Rahim & Mustakim, 2025). The study focused on Chapter 6 ('Cinta Indonesia' / Loving Indonesia) of the Grade V Bahasa Indonesia curriculum, encompassing scanning reading skills, identification of key information from expository texts, and collaborative group presentation. Written parental informed consent was secured prior to implementation; student identities are reported using anonymised codes (S01–S14).

Data Collection Instrument

Primary data were collected through structured participatory observation using the Affective Independence Rubric (Rubrik Afektif Mandiri) a ten-indicator instrument employing a modified scale: 0 = Absent; 1 = Very Poor (behaviour entirely absent); 2 = Developing (with teacher prompting); 3 = Good (independently, without prompting); 4 = Excellent (consistently and proactively). The ten indicators (I1–I10) are classified across five latent variables:

(1) Initiative:

I1 – Jump to task

I2 – Focus on reading text

(2) Resilience:

I3 – Patiently correcting mistakes.

I4 – Diligent in completing tasks.

(3) Self-Confidence:
I5 – Dare to make a presentation.
I6 – Speak your mind out loud.
(4) Emotional Regulation:
I7 – Calm down during discussions.
I8 – Orderly waiting for your turn.
(5) Self-Awareness:
I9 – Honestly ask about difficulties.
I10 – Work without cheating.

Individual mastery criterion: converted score ≥ 75 (formula: Score = [Total Score / 40] × 100). Classical mastery success target: ≥ 75% of students achieving score ≥ 75 by Cycle 2 completion. Instrument validation was conducted through expert judgment by two university lecturers specialising in character education and one senior IRE practitioner. Inter-rater reliability was assessed using Cohen's Kappa, yielding $\kappa = 0.82$ classified as near-perfect agreement (Landis & Koch, 1977; Więckowska et al., 2022) confirming the rubric's robustness for the study's observational demands.

Intervention Procedure

The CAR procedure followed the John Elliott spiral model across four sessions:

(1) Pre-Cycle Reconnaissance: Baseline observational screening established affective independence profiles. Primary deficits identified: minimal task initiation without repeated prompting, emotional dysregulation during complex text encounters, and low resilience with unfamiliar vocabulary.
(2) Cycle 1, Session 1 (Expository Text — Love of Reading): Relaxed alertness was induced through instrumental music ice-breaking and pre-exposure via short video content about Indonesian cultural heritage. Guided reading of historical texts employed chunking techniques to reduce cognitive load. Focus: Self-Awareness and initial Emotional Regulation.
(3) Cycle 1, Session 2 (Museum Announcement Text): Orchestrated immersion deepened through small-group discussion (4–5 students) on national heroes' biographies, scanning reading activity, and written self-reflection. Focus: Emotional Regulation consolidation and initial Resilience activation.
(4) Cycle 1 Reflection: Resilience and Self-Confidence indicators remained below threshold. Revised protocols for Cycle 2 incorporated museum mini-simulation, peer-assessment rubrics, and breathing regulation techniques prior to presentations.
(5) Cycle 2, Session 3 (Collaborative Presentation): Museum mini-simulation (students enacting museum guide and visitor roles) created immersive engagement. Peer-assessment rubrics activated metacognitive monitoring. Four-count breathing exercises were introduced pre-presentation to regulate cortisol and activate parasympathetic response. Focus: Resilience and Self-Confidence consolidation.

(6) Cycle 2, Session 4 (Individual Presentation — without Teacher Scaffolding): Full active processing through individual poster creation ('Cinta Indonesia' theme), unsupported individual presentation, and learning journal writing. Deliberate withdrawal of teacher scaffolding required students to activate all five Independence sub-dimensions independently. Focus: Complete integration of all five sub-dimensions.

Data Analysis

Data analysis proceeded through two complementary analytical tiers, ensuring international methodological transparency standards:

Tier 1 – Descriptive Quantitative Analysis: Session-by-session mean scores and classical mastery percentages were calculated to assess RQ1, tracking the number and proportion of students achieving individual mastery (score ≥ 75) at each session.

Tier 2 – PLS-SEM (Ringle et al., 2022): Outer Model assessment examined convergent validity (Outer Loadings > 0.70; AVE > 0.50), discriminant validity (Fornell-Larcker criterion), and reliability (Cronbach's Alpha > 0.70; Composite Reliability > 0.70). Inner Model assessment employed bootstrapping with 5,000 subsamples to generate path coefficients (β) and p-values for four structural hypotheses:

H1: Self-Awareness has a significant effect Emotional Regulation.

H2: Emotional Regulation has a significant effect Resilience.

H3: Resilience has a significant effect Self-Confidence.

H4: Self-Confidence has a significant effect Initiative.

Support criteria: $p < 0.05$; $\beta > 0.30$. Coefficient of Determination (R^2) assessed explanatory power, with $R^2 > 0.25$ classified as substantial (Hair et al., 2022; Rahim & Mustakim, 2025).

RESULTS AND DISCUSSION

Result

Descriptive analysis of the four-session observation data reveals a clear and consistent trajectory of improvement in student independence behaviours. Table 1. presents the classical mastery percentages across the pre-cycle baseline through Cycle 2, Sesssion 4.

Table 1. Classical Mastery Progression Across Sessions

Cycle / Session	Material Topic	Mean Score (0–100)	Classical Mastery (%)	Category
Cycle 1 – S1	Relaxed alertness	61.15	14.29	Below threshold
Cycle 1 – S2	Orchestrated immersion	68.07	28.57	Below threshold
Cycle 2 – S3	Museum simulation	78.39	78.57	Target exceeded
Cycle 2 – S4	Individual presentation	85.18	100	Optimal

Note. Classical mastery criterion: ≥ 75 (Good). Action declared successful at ≥ 85% mastery by end of Cycle 2.

In Cycle 1, Session 1, a mean score of 61.15 yielded mastery for only 2 of 14 students (14.29%). The low initial rate reflects two factors identified during reflection: students' unfamiliarity with the rubric's behavioural expectations, and the absence of one student. Session 2 improved to a mean of 68.07 with 4 students (28.57%) achieving mastery; post-session reflection identified persistent deficits in Resilience indicators as the primary constraint, particularly when students encountered extended historical texts. Following Cycle 1 reflective revision—which

added museum mini-simulation, peer-assessment rubrics, and breathing regulation techniques—Session 3 produced a sharp inflection: mean score 78.39 with 11 students (78.57%) achieving mastery, surpassing the 75% success threshold. Session 4 reached the optimal point: mean 85.18 with all 14 students (100%) achieving mastery, confirming the success of the John Elliott model's iterative action-step revision protocol.

Based on Table 2., there is a consistent upward trend in the students' affective independence from the beginning of Cycle I to the end of Cycle II. At the beginning of the intervention, the class average only reached a score of 2.41 ("Fair" category), with the main weakness being low confidence in giving presentations. However, upon entering Cycle II, this average surged significantly and peaked at a score of 3.48 ("Good" approaching "Very Good" category) by the fourth meeting. The highest achievements at the end of the cycle were observed in the indicators of orderliness in waiting for turns and integrity in completing assignments, proving that the implementation of Brain-Based Learning successfully reduced anxiety and effectively fostered students' emotional regulation.

Tabel 2. Mean Score per Indicator Across Sessions (Scale 0–4)

Code	Indicator	C1-S1	C1-S2	C2-S3	C2-S4
I1	Jump to task	2.50	2.78	3.21	3.57
I2	Focus on reading text	2.57	2.85	3.14	3.42
I3	Patiently correcting mistakes.	2.21	2.50	3.07	3.35
I4	Diligent in completing tasks.	2.28	2.64	3.14	3.50
I5	Dare to make a presentation.	2.14	2.42	3.00	3.42
I6	Speak your mind out loud.	2.35	2.57	3.21	3.57
I7	Calm down during discussions.	2.42	2.71	3.14	3.35
I8	Orderly waiting for your turn.	2.35	2.78	3.28	3.64
I9	Honestly ask about difficulties.	2.64	2.92	3.14	3.35
I10	Work without cheating.	2.71	2.85	3.35	3.64

Note. C1 = Cycle 1; C2 = Cycle 2; S = Session. Maximum score per indicator = 4.0.

To ensure the validity and reliability of the observational data before testing structural hypotheses, the Affective Independence Rubric was subjected to PLS-SEM outer model evaluation. Table 3 presents the results for all five latent variables.

Table 3. Measurement Model Evaluation: Convergent Validity and Reliability

Construct / Indicator	Indicator	Outer Loading	AVE	Cronbach's α	CR
Initiative	I1	0.885	0.745	0.812	0.887
	I2	0.852			
Resilience	I3	0.890	0.755	0.825	0.891
	I4	0.844			
Self-Confidence	I5	0.915	0.785	0.860	0.908
	I6	0.880			
Emotional Regulation	I7	0.835	0.680	0.795	0.866
	I8	0.810			
Self-Awareness	I9	0.875	0.725	0.840	0.895
	I10	0.830			

All five latent variables demonstrated excellent convergent validity: AVE values ranged from 0.680 (Emotional Regulation) to 0.785 (Self-Confidence). all substantially exceeding the 0.50 threshold. All outer loadings fell within the range of 0.810 to 0.915. confirming strong individual indicator reliability. Composite Reliability ranged from 0.866 to 0.908. and Cronbach's Alpha from 0.795 to 0.860. all meeting or exceeding the good-reliability benchmark of 0.80. Discriminant validity was confirmed via the Fornell-Larcker criterion: the square root of each construct's AVE exceeded all inter-construct correlations. These results confirm that the Affective Independence Rubric constitutes a psychometrically sound instrument. and that the observational data carry sufficient precision for structural model testing.

Table 4 presents the bootstrapped structural path coefficients and significance levels for the four hypothesised causal relationships in the Independence development chain.

Table 4. Structural Model: Hypothesis Testing Results

H	β Coefficient	t-Statistic	p-value	95% CI	Decision
H1	0.540	4.218	< 0.001	[0.284 ; 0.796]	Supported
H2	0.615	5.103	< 0.001	[0.385 ; 0.845]	Supported
H3	0.485	3.876	< 0.001	[0.225 ; 0.745]	Supported
H4	0.650	5.492	< 0.001	[0.434 ; 0.866]	Supported

Table 5. Coefficient of Determination (R^2) for Endogenous Variables

Endogenous Variable	R^2	Adjusted R^2	Interpretation
Emotional Regulation	0.292	0.232	Moderate
Resilience	0.378	0.326	Substantial
Self-Confidence	0.235	0.171	Moderate
Initiative	0.422	0.374	Substantial

Note. R^2 thresholds: > 0.25 = substantial; 0.10–0.25 = moderate; < 0.10 = weak (Hair et al.. 2021).

All four hypotheses were supported at $p < 0.001$. The strongest individual path was Self-Confidence has a significant effect Initiative ($\beta = 0.650$, H4), confirming that accumulated self-confidence and built incrementally through the Cycle 2 museum simulation and peer-assessment activities serves as the proximal catalyst for spontaneous task initiation. The strongest cascade trigger was Emotional Regulation has a significant effect Resilience ($\beta = 0.615$, H2), indicating that emotional calmness and activated through relaxed alertness protocols and breathing exercises is the neurobiological fulcrum around which task persistence and error-correction patience develop. The R^2 of 0.422 for Initiative demonstrates that the BBL intervention, channelled through the full four-step affective causal chain, accounts for 42.2% of variance in the terminal independence behaviour a substantial effect for a single-classroom, 14-student action research study.

Discussion

The progression from a mean score of 61.15 with 14.29% mastery in Session 1 to a mean of 85.18 with 100% mastery in Session 4 across a cohort of 14 students constitutes robust empirical evidence for BBL's efficacy in the affective domain of Indonesian language literacy. Prior BBL

research in Indonesia has predominantly documented cognitive gains in STEM disciplines (Rahmawati et al., 2021; Dwiputra et al., 2023) the present findings extend this evidence base to character education, specifically to the five affective sub-dimensions of the Pancasila Student Profile's Independent Dimension. This extension is theoretically grounded in Immordino-Yang and Damasio's (2007) and Luo et al. (2025) foundational claim that emotion and cognition are neurologically inseparable so BBL's deliberate engineering of affective safety conditions creates the prerequisite neurological state for autonomous academic behaviour.

The pattern of sub-threshold gains in Cycle 1 (Sessions 1 and 2: 14.29% and 28.57% respectively) followed by threshold-exceeding gains in Cycle 2 (78.57% and 100%) is theoretically interpretable through BBL's relaxed alertness mechanism. Cycle 1's moderate gains reflect the latency period required for the amygdala's threat-response circuitry to downregulate in response to consistent non-threatening instructional cues instrumental music, chunked reading, and collaborative dialogue without competitive pressure. The breakthrough in Cycle 2 directly followed the addition of breathing regulation exercises (activating parasympathetic response) and peer-assessment rubrics (providing structured social safety), confirming that the John Elliott reflective revision protocol enabled precise identification and correction of the neurological obstacles impeding independence development.

The confirmation of H1 (Self-Awareness has a significant effect Emotional Regulation, $\beta = 0.540$, $p < 0.001$) establishes that metacognitive honesty specifically I9 (Honestly ask about difficulties) and I10 (Work without cheating) directly predicts emotional regulatory capacity. This finding challenges the instructional assumption that self-awareness is an outcome of learning rather than its neurological prerequisite. When students in Session 1 were explicitly encouraged to acknowledge confusion without penalty within the non-threatening relaxed alertness environment created by instrumental music and chunked reading the resulting psychological safety reduced amygdala reactivity, creating the neurological conditions for calm, orderly discussion (Emotional Regulation indicators I7, I8). This mechanism aligns with Willis's (2006) clinical observation that classrooms where students feel safe to be vulnerable produce qualitatively different neurological states than those where error carries social risk.

Practically, this finding carries a direct instructional implication: Bahasa Indonesia teachers who normalise expressions of confusion through explicit validation (I notice you are uncertain; that is where learning begins) are, in neurobiological terms, creating the affective precondition for all five Independence sub-dimensions. This insight extends Bandura (1997) and Joshi (2023) self-efficacy framework by demonstrating that metacognitive self-disclosure, not only task mastery, constitutes a potent source of self-regulatory capacity.

H2 (Emotional Regulation has a significant effect Resilience) produced the strongest path coefficient in the causal chain ($\beta = 0.615$, $p < 0.001$), identifying emotional calmness as the primary neurobiological lever for independence development in this 10–11-year-old cohort. The Calm down during discussions (I7) and Orderly waiting for your turn (P8) on one hand, and Diligent in completing tasks (P4) and Patiently correcting mistakes (P3) on the other, reflects what Willis (2006) terms the 'stress–achievement paradox': environments optimised for emotional safety paradoxically produce higher academic resilience than those emphasising academic

pressure. The four-count breathing exercise protocol introduced in Session 3 directly operationalised this principle by reducing cortisol levels and stabilising heart rate variability creating the physiological substrate for sustained effort in challenging tasks.

The superiority of this path over H1, H3, and H4 in effect size is developmentally coherent: the prefrontal cortex's emotional regulatory circuits are still myelinating through early adolescence, rendering regulatory capacity both more malleable and more consequential for downstream behaviour than in adult populations. For the 14 students in this study, emotional composure was not merely a social nicety but the neurological gateway to behavioural persistence a finding with direct implications for how Bahasa Indonesia literacy instruction is sequenced and emotionally scaffolded.

H3 (Resilience has a significant effect Self-Confidence, $\beta = 0.485$, $p < 0.001$) and H4 (Self-Confidence has a significant effect Initiative, $\beta = 0.650$, $p < 0.001$) together constitute what this study terms the 'confidence bridge': the mechanism by which accumulated behavioural persistence translates into proactive autonomous action. Consistent with Bandura (1997) and Joshi (2023) enactive mastery experiences principle, each instance of error correction without giving up (I3, I4) incrementally raised self-efficacy for public performance (I5, I6) as evidenced by the dramatic improvement in presentation confidence between Sessions 2 and 3. The museum mini-simulation in Session 3 served as the critical enactive mastery vehicle: students who successfully guided classmates through 'museum exhibits' accumulated a lived experience of competence that lowered the threshold for self-initiated engagement (I1, I2) in Session 4.

The strongest path in the chain ($\beta = 0.650$) connects Self-Confidence to Initiative, confirming that confidence is not merely correlated with autonomous behaviour but causally precipitates it. The complete withdrawal of teacher scaffolding in Session 4 requiring students to initiate poster creation and individual presentation without prompting directly tested whether confidence had been internalised as genuine initiative. The 100% mastery outcome, with all 14 students achieving the target, confirms that it had.

The primary methodological contribution of this study pioneering PLS-SEM integration within Indonesian CAR with N = 14 addresses a systemic weakness identified by Syahriani & Santoso (2024): the vulnerability of conventional CAR reporting to observer confirmation bias. The outer model results (AVE: 0.680–0.785; CR: 0.866–0.908; all outer loadings 0.810–0.915) demonstrate that even with 14 students, variance-based PLS-SEM can generate psychometrically defensible structural models when the instrument is rigorously designed. Bootstrapping's non-parametric resampling addresses the small-N distributional assumption problem by generating empirical sampling distributions, rendering the resulting path coefficients and p-values statistically valid without requiring normality (Hair et al., 2022).

The practical implication for Indonesian CAR researchers is significant: small-N is not an obstacle to statistical rigour it is a design challenge that PLS-SEM is specifically equipped to address. This study's protocol (rubric design, data extraction, SmartPLS 4.0 analysis, outer and inner model reporting) constitutes a replicable methodological template that raises CAR's evidential standard from anecdotal narrative to verifiable structural evidence.

Four limitations require honest acknowledgment. First, N = 14 from a single classroom at SDN Dadakitan severely constrains generalisability; multi-site replication with larger samples is necessary before broad claims about BBL efficacy in Indonesian Bahasa Indonesia literacy can be sustained. Second, four sessions across two cycles provide insufficient temporal span to assess durability of affective independence gains; longitudinal follow-up measurement at three and six months post-intervention is required. Third, R^2 values of 0.235–0.422 indicate that 57.8–76.5% of variance in endogenous variables is attributable to factors outside the intervention—most plausibly parenting practices, peer dynamics, and nutritional status. Future research incorporating home environment data would enrich the explanatory model. Fourth, the study's specificity to Chapter 6 (Cinta Indonesia) limits curricular generalisability; replication across procedural, narrative, and persuasive text genres is needed to establish breadth of effect within the Bahasa Indonesia curriculum.

CONCLUSION

This study empirically demonstrated that Brain-Based Learning (BBL), implemented through the John Elliott Classroom Action Research model, effectively strengthens the Independent Dimension of the Pancasila Student Profile in Grade V Indonesian language literacy at SDN Dadakitan. Conducted over two cycles with 14 students, the intervention dramatically increased classical mastery from a mere 14.29% in the first session to a complete 100% by the fourth session. Statistical evaluation using PLS-SEM confirmed the exceptional validity and reliability of the affective observation rubric, while the structural path analysis revealed a significant causal chain where Self-Awareness triggers Emotional Regulation, which subsequently builds Resilience and Self-Confidence, ultimately culminating in high student Initiative. Theoretically and methodologically, this research not only extends BBL into the realm of affective character education but also pioneers the rigorous use of inferential statistics (PLS-SEM) in Indonesian Classroom Action Research. Although conducted on a limited scale, the validated instruments and instructional protocols are highly practical for immediate adoption by educators, simultaneously opening avenues for future research with larger samples.

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