

Dialectical Materialism as an Analytic Toolkit for Critical Thinking in Vietnamese Higher Education: A Mixed-Methods Case Study

Manh Ha Le

University of Education, Hue University, Hue, Vietnam

Thi Phuong Thu Bui

University of Education, Hue University, Hue, Vietnam

Abstract

Dialectical materialism (DiaMat) remains a required component of Marxist–Leninist higher education in Vietnam, yet it is often taught as content to be reproduced rather than as a mode of inquiry. This bounded mixed-methods case study examined a 12-week DiaMat-infused module with 150 undergraduates at Hue University. Mean self-reported critical-thinking scores increased from 3.12 (SD = 0.54) to 3.87 (SD = 0.49), mean change = 0.75, 95% CI [0.68, 0.82], $t(149) = 21.83$, $p < .001$. Cohen's d using the pooled pre/post SD was 1.46, 95% bootstrap CI [1.28, 1.68]. Retained qualitative documentation provides selected illustrations of students using relational and threshold prompts in one translated interaction and one candidate worksheet; it does not establish prevalence, causal mechanisms, or participant-level convergence. The results therefore document change in an intervention-aligned self-report measure and limited complementary illustrations, not demonstrated critical-thinking ability or full dialectical-materialist attainment. DiaMat may have pedagogical value when enacted as a heuristic resource for inquiry rather than treated as doctrinal content.

Keywords: *critical thinking; dialectical materialism; higher education; mixed methods; Vietnam*

1. Introduction

Dialectical materialism (DiaMat) is a foundational component of Marxist–Leninist curricula in Vietnamese higher education and is commonly presented as a worldview and philosophical method for analysing social reality. In practice, however, DiaMat courses are often experienced by students as content to be reproduced rather than as a mode of inquiry to be exercised. This tension is pedagogically consequential. When instruction privileges doctrinal transmission, students may acquire terminological familiarity while remaining under-supported in argumentation, evaluation of evidence, and reasoned judgement—capacities that are central to critical thinking in higher education. The tension is also curricular and policy-related. If compulsory philosophy courses are enacted mainly through exposition, memorisation, and examination-oriented reproduction, their contribution to students’ critical agency remains limited. If, however, their conceptual resources are reorganised as tools for examining contradiction, causality, evidence, and social transformation, they may become sites where students practise disciplined critique. The pedagogical issue, therefore, is not whether DiaMat should be present in the curriculum, but how it is enacted: as fixed doctrine to be repeated, or as an analytic language through which students investigate complex social and educational problems. Research on critical thinking instruction suggests that students are more likely to develop critical thinking when reasoning practices are infused into subject teaching, classroom dialogue, and assessment rather than treated as detached generic skills (Niu, Behar-Horenstein and Garvan, 2013; Abrami, et al., 2015; Tiruneh, De Cock and Elen, 2018). From this perspective, critical thinking develops through repeated opportunities to analyse claims, compare

explanations, evaluate evidence, and revise judgement within meaningful tasks. This is especially important in higher education contexts where students may be accustomed to success through accurate reproduction of authoritative knowledge. In such contexts, critical thinking requires more than encouragement to question; it requires conceptual tools, dialogic routines, and evaluative criteria for doing so responsibly.

At the same time, critical thinking is not enacted in culturally neutral ways. Its classroom expression is shaped by local traditions of authority, discourse, and evaluation. In Vietnamese and other Confucian-influenced settings, pedagogies that rely heavily on overt contestation or adversarial critique may not transfer straightforwardly. Students may be hesitant to challenge peers or teachers directly, and classroom norms may value harmony, respect, and disciplined participation. These conditions do not preclude critical inquiry, but they suggest that critique must be designed in forms that are pedagogically workable and institutionally recognisable. The question is therefore not simply whether students should be encouraged to think critically, but how critical reasoning can be cultivated through locally intelligible forms of analysis.

Within this context, DiaMat may be relevant when treated not as doctrine to be memorised, but as a heuristic resource for analysing contradiction, relationality, and change. Framed in this way, DiaMat may help students move beyond single-cause explanation and engage more systematically with tensions, interacting conditions, and developmental processes. Contradiction analysis can prompt students to identify opposing tendencies within a phenomenon; quantity–quality transformation can direct attention to accumulation, thresholds, and shifts in systemic conditions; and negation of the negation can be used as a prompt for revising initial claims in light of counter-evidence or alternative interpretations. These heuristics do not automatically produce critical thinking, but they may provide structured pathways through which students practise relational and evaluative forms of reasoning.

Such a possibility is especially important in Vietnam, where Marxist–Leninist philosophy remains institutionally mandated but is often criticised for encouraging reproduction more than inquiry. Existing debates about critical thinking in Vietnamese higher education have tended to focus either on broad policy aspirations or on general pedagogical recommendations. Less empirical attention has been given to the classroom-level question of whether mandated philosophical content can be reorganised so that it supports students’ critical thinking. This gap is important for critical education policy because policy is not enacted only through official curriculum documents, but through the forms of reasoning, interaction, and assessment that students encounter in classrooms. Despite the conceptual potential of DiaMat as a heuristic resource, there remains limited empirical evidence on whether and how DiaMat-informed heuristics can be operationalised in course design and assessment to support undergraduates’ critical thinking in Vietnamese higher education. Existing work has more often discussed critical pedagogy, Marxist–Leninist philosophy, or higher-order thinking at the level of principles. Fewer studies have provided integrated evidence from situated classroom practice, combining learning outcomes with qualitative accounts of how students take up analytic tools, what reasoning practices become visible, and what implementation barriers remain. This study addresses that gap by examining a 12-week DiaMat-infused module implemented at Hue University, in which contradiction analysis, quantity–quality transformation, and negation of the negation were embedded into learning tasks, prompts, dialogue, and reflective activity. Accordingly, this bounded mixed-methods case study examines whether students’ self-reported critical-thinking scores changed after the module and what limited qualitative documentation illustrates about the intended reasoning activities. The quantitative component uses the original participant-level CSV from the 2023-2024 study for a complete paired analysis. The qualitative component is restricted to provenance-bounded author-supplied materials and is

not used to establish corpus-wide mechanisms, frequency, or participant-level linkage. The study remains deliberately modest: it asks how a mandated philosophical course might be organised so that students practise analysis, evidence use, and reflective judgement without treating those practices as proof of full dialectical-materialist reasoning.

This article is relevant to critical education policy because it examines how a formal curricular requirement can be enacted in ways that may enlarge, rather than restrict, students' critical agency. It also contributes to debates about ideology, curriculum, and critical pedagogy by shifting attention from abstract advocacy to pedagogical enactment. The central argument is not that DiaMat is inherently emancipatory, but that its educational significance depends on how it is translated into tasks, dialogue, assessment, and opportunities for students to reason about real problems.

The study was guided by the following research questions:

RQ1. To what extent did undergraduates' self-reported critical-thinking scores change between the pre- and post-module surveys?

RQ2. What do the retained qualitative and documentary illustrations show about selected uses of the module's relational and threshold prompts?

RQ3. What implementation limits follow from the study design, instrument, and retained qualitative documentation?

2. Conceptual framing

2.1. Critical thinking as situated and infused

Critical thinking is widely conceptualised as a multidimensional construct that integrates cognitive skills—including analysis, inference, evaluation, interpretation, explanation, and self-regulation—with dispositions such as open-mindedness, fair-mindedness, attentiveness to reasons, and willingness to reconsider judgements (Facione, 1990). In higher education, these capacities are

not merely technical skills for completing academic tasks. They are central to students' ability to examine claims, recognise assumptions, evaluate reasons, and make defensible judgements in relation to complex social, professional, and civic issues. Pedagogically, this means that critical thinking requires learners to coordinate concepts, evidence, criteria, and context when forming and revising a position.

This multidimensional understanding has direct implications for teaching. Influential approaches to critical thinking emphasise explicit attention to intellectual standards, including clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness (Paul and Elder, 2014). Yet such standards become educationally meaningful only when students have repeated opportunities to use them in substantive tasks. Critical thinking is therefore more likely to develop when reasoning is embedded in disciplinary or subject-matter activity, made visible through classroom dialogue, and assessed through criteria that require explanation rather than recall. Recent higher-education reviews also show that critical thinking remains unevenly conceptualised and strongly dependent on task design, explicit instruction, and disciplinary context (Lloyd and Bahr, 2010; Andreucci-Annunziata, et al., 2023). This is consistent with intervention and review evidence showing that explicit instruction, domain-specific practice, dialogue, and assessment alignment are important conditions for critical thinking development (Niu, Behar-Horenstein and Garvan, 2013; Abrami, et al., 2015; Tiruneh, De Cock and Elen, 2018; Lorencová, et al., 2019).

The literature on infusion approaches is particularly relevant here. Rather than teaching critical thinking as a generic and detached skill, infusion approaches embed reasoning practices within subject content, tasks, and assessment. Such approaches are compatible with inquiry-oriented and dialogic pedagogies, which engage students in question formulation, hypothesis testing, evidence evaluation, argumentation, and collaborative refinement of ideas (Brookfield,

2012; Bailin and Battersby, 2018). The key pedagogical point is that students need structured opportunities to work on problems where reasons must be examined, positions defended, and alternative explanations considered. However, critical thinking is not culturally neutral. Its classroom enactment is shaped by local traditions of authority, communication, assessment, and student–teacher relations. In Confucian-influenced educational contexts common in East and Southeast Asia, critique may be complicated by norms of hierarchy, respect for teachers, collective harmony, and examination-oriented learning (Tan, 2017; Wang and Wu, 2023). These conditions do not imply that students are incapable of critical thinking, nor that critical inquiry is alien to Asian educational traditions. Rather, they suggest that the forms through which critique is invited, legitimised, and assessed matter. A pedagogy that assumes adversarial debate as the primary expression of critical thinking may not be the most workable route in contexts where direct contestation can be socially risky or pedagogically unfamiliar.

For this reason, the present study approaches critical thinking as both teachable and situated. It is teachable because students can be supported to identify assumptions, weigh evidence, trace causes, and revise claims through structured tasks and feedback. It is situated because the meaning and practice of critique depend on the curriculum, classroom norms, institutional expectations, and cultural resources available to learners. This framing is especially important for Vietnamese higher education, where Marxist–Leninist philosophy remains part of the formal curriculum. The key question is not whether critical thinking should be imported into this curriculum from outside, but whether existing conceptual resources can be pedagogically reorganised to support more rigorous forms of inquiry.

2.2. Dialectical materialism as an analytic heuristic

DiaMat is used here as a bounded analytic orientation, not as a replacement for critical-thinking pedagogy or as a claim to exclusive cognitive skills. Analysing claims, identifying assumptions, evaluating evidence, comparing explanations, considering alternatives, and revising judgement are generic epistemic operations (Facione, 1990); inquiry approaches likewise organise reasoned judgement through comparison of contending positions and arguments (Bailin and Battersby, 2018). DiaMat does not contribute an exclusive set of such operations. Its possible distinctiveness lies in directing inquiry toward internally related and historically developing contradictions and, in its materialist form, toward the material social relations through which those contradictions are constituted. The present study documents a selective pedagogical translation of DiaMat heuristics and limited, provenance-qualified indicators, not students' demonstrated attainment of full dialectical-materialist analysis.

The distinction is therefore overlapping rather than binary. At a first level, generic critical thinking evaluates the warrant, coherence, alternatives, and revisability of a judgement. At a second, dialectical reasoning frames an object through constitutive relations, internal contradiction, mediation, process, historical development, and possible qualitative reorganisation. At a third, dialectical-materialist analysis asks how a contradiction is constituted through historically specific material social relations, including context-relevant relations of labour, property or ownership, production and reproduction, resource control, institutional or economic power, and the distribution of benefits, costs, and risks (Marx, 1859; Pavlidis, 2010). These levels can overlap in one task, but they are not interchangeable: evaluating two opinions is not yet dialectical reasoning, and identifying several causes is not yet a materialist account.

Contradiction, in this framework, does not mean any disagreement, pair of opinions, or externally opposed “side”. It concerns mutually implicated

tendencies or relations whose interaction helps constitute the object and its development. A tourism policy and a conservation objection, for example, become dialectically relevant only when analysis shows how they depend on and constrain one another within a developing whole, rather than merely listing competing preferences. Pavlidis (2010, pp. 85–94) presents this orientation as reconstruction of an object's internal relations and contradictions in historically concrete inquiry. Within that Hegelian-Marxist tradition, contradiction is treated as a source of movement and transformation; the stronger universal claim that contradiction invariably “drives” every process or systemic change is neither required nor adopted here.

Quantity-quality transformation adds a further, but narrower, question: whether quantitative variation can issue in qualitative reorganisation under determinate conditions. Engels's exposition illustrates that the relevant magnitude and transition point depend on the process under examination rather than on a universal numerical formula (Engels, 1878, Part I, ch. XII). In pedagogical use, students may therefore ask what is accumulating, what relations set a consequential range or limit, and what would count as a change in the organisation or character of the object. A generic threshold or tipping point is not by itself a dialectical explanation. The analytic work lies in relating the measured change to the constitution and development of the particular phenomenon, while avoiding the deterministic claim that accumulation must “eventually” produce transformation.

Negation requires similar restraint. In Engels's account, dialectical negation is determinate by the specific nature and conditions of the process, while the negation of the negation names a further developmental result; neither is a synonym for simple rejection, compromise, balance, counter-evidence response, or a thesis-antithesis-synthesis formula (Engels, 1878, Part I, ch. XIII). The module's prompt asking students to reconsider and revise an initial judgement is therefore treated only as a bounded pedagogical translation: it can make self-

correction and attention to consequences visible, but it cannot demonstrate philosophical negation of the negation. At most, a response may show that an earlier position has been reworked through identified tensions and retained or transformed determinations. The available evidence does not establish this fuller enactment.

These distinctions supply an operational criterion for uptake. Repeating terms such as “contradiction”, naming two interests, revising an opinion, or locating a threshold does not by itself demonstrate dialectical reasoning. A response must show how relations constitute the object, how tensions arise within those relations, how the object develops through mediation and process, and, for the materialist level, how historically specific material social relations organise the contradiction. The available materials contain limited instances consistent with mechanical reproduction, generic evaluation and judgement revision, and relational, processual, contradiction, interdependence, or threshold reasoning. They do not establish prevalence, cohort-wide attainment, or analysis of class, labour, property, ownership, exploitation, capital, relations of production, or material power. Section 2.3 therefore specifies the materialist criterion without converting every classroom problem into conventional class analysis.

2.3. DiaMat, critical pedagogy, and Vietnamese higher education

The materialist qualifier changes the object of inquiry, not merely its vocabulary. Labour, property, production, reproduction, resource control, institutional and economic power, and distributions of benefit, cost, and risk are not checklist variables whose mention validates a materialist reading. They matter when evidence shows that such relations constitute the problem: they organise who can act, who controls resources, how a practice is reproduced, and how consequences are distributed. Marx's account of historically specific relations of production and property provides the central criterion (Marx, 1859), while Pavlidis (2010, pp. 84–89) connects dialectical critique to reconstructing concrete social relations. This

does not require every activity to become a conventional class analysis; it requires relevant material relations to be demonstrated rather than presumed.

The available evidence sets a decisive boundary on interpretation. The supplied materials document planned prompts, mechanical DiaMat terminology, generic evaluation or judgement revision, and limited relational, processual, contradiction, interdependence, or threshold indicators; they cannot establish historically specific material analysis. The Hue tourism task illustrates the distinction: its design and one unauthenticated worksheet candidate juxtapose economic development or modernisation with heritage preservation, connect the two, identify a height or visitor threshold, and propose a synthesis. Yet the artifact does not analyse who owns resources, who performs labour, which institutions exercise economic power, or how benefits, costs, and risks are distributed. One provenance-incomplete worksheet also cannot establish implementation, prevalence, or cohort-wide attainment. It illustrates limited relational and threshold reasoning, not students' enactment of dialectical-materialist analysis.

Selective use also requires historical differentiation. Marx's 1873 afterword distinguishes inquiry from presentation, analyses forms of development and their inner connection, and positions his materialist dialectic against Hegelian idealism (Marx, 1873). A later Soviet codification systematised dialectical materialism as a party-philosophical method centred on interconnection, development, qualitative change, and internal contradiction (Stalin, 1938, section 1). A 2023 Ministry-approved curricular model identifies Marxist–Leninist philosophy among political-theory courses and uses development and the historical-specific viewpoint as sample teaching topics (Ministry of Education and Training of Vietnam, 2023, Appendix, pp. 42–45). These are related but non-identical formations. The module is therefore a selective pedagogical and curricular translation, not an unmediated transmission of one homogeneous or “full, unmodified” Marxian method.

The contribution is bounded. Conceptually, it proposes a reader-facing progression from generic epistemic evaluation, through relational and developmental inquiry, to analysis of material social relations constituting a historically specific contradiction. Pedagogically, selected prompts can orient attention toward relations, process, contradiction, thresholds, and judgement revision; they do not belong uniquely to DiaMat, and instructional design does not prove uptake. Empirically, the available materials contain only limited, provenance-qualified instances consistent with generic evaluation and some relational, processual, contradiction, interdependence, or threshold reasoning. They establish neither prevalence or cohort-wide attainment nor the material-relations analysis required for a full dialectical-materialist claim. This boundary states the theoretical rationale while leaving the subsequent empirical sections to determine what the study can support.

At the same time, this framing requires caution. A pre–post gain in self-reported critical-thinking scores does not establish demonstrated critical-thinking ability, full dialectical-materialist reasoning, or a causal effect of the module. The survey provides a cohort-level indicator of change in reported practices. The retained qualitative documentation provides selected, provenance-limited illustrations of relational, interdependence, and threshold language; it cannot establish prevalence, historical material analysis, corpus-wide mechanisms, or participant-level convergence.

This conceptual framing leads to a bounded empirical design. The quantitative analysis asks whether reported scores changed in one complete paired cohort. The qualitative material is used only to illustrate selected task enactments and to clarify inference limits. DiaMat is therefore treated neither as an object of advocacy nor as a guaranteed solution, but as a pedagogical possibility whose evaluation depends on design, provenance, and evidence.

3. Method

3.1. Research design

The study used a bounded single-site mixed-methods pedagogical case design to examine change in students' self-reported critical-thinking scores and selected qualitative illustrations associated with a DiaMat-infused module. The quantitative component is a complete single-group pre–post analysis. The qualitative component consists of author-verified study activities but is reported only through retained, provenance-limited supplementary materials. The design does not constitute a randomised or controlled trial, and the strands are integrated at the level of complementary interpretation rather than participant-level convergence.

The case was bounded by one compulsory Marxist–Leninist philosophy course at Hue University of Education during the 2023–2024 academic year. A pre-test survey preceded a 12-week DiaMat-infused module and a post-test survey followed it. The study record also identifies reflective essays, focus groups, and classroom observations conducted during or after enactment. Because no authorised participant-level linkage key is documented, those source types are not matched to individual survey records. Quantitative change and qualitative illustrations are therefore reported separately and compared only at a bounded dataset level.

3.2. Setting and participants

The study was conducted at Hue University of Education in Vietnam, in two departments whose undergraduates complete mandatory coursework in Marxist–Leninist philosophy: Political Education and Primary Education. This setting was suitable because the course is not an optional critical thinking programme, but part of the institutional curriculum. It therefore allowed the study to examine whether a required philosophy course could be reorganised

pedagogically so that students used DiaMat concepts as analytic tools rather than only as content to be memorised.

Participants were 150 undergraduates enrolled in the focal course during the 2023–2024 academic year. The sample included 76 students from Political Education and 74 from Primary Education. Across the sample, 62% were female and 38% were male, with a mean age of 20.1 years and an age range of 18–22. Students represented different stages of undergraduate study: 85 were first- or second-year students, and 65 were third- or fourth-year students.

Participation in the research component required voluntary informed consent, as confirmed by the author. A formal ethics approval or exemption reference and the related role-separation, confidentiality, data-governance, and permission procedures are not documented in the retained study materials and are not asserted in the revised manuscript. Because the supplied final-essay rubric identifies graded coursework, any retained student material is used only in a provenance-limited illustrative role.

3.3. The DiaMat-infused module

The intervention consisted of a 12-week DiaMat-infused module embedded within the regular Marxist–Leninist philosophy course. The module did not replace the official philosophical content of the course. Instead, it reorganised selected content around three analytic heuristics: contradiction analysis, quantity–quality transformation, and negation of the negation. These heuristics were introduced not as slogans or definitions to be reproduced, but as prompts for analysing social, educational, and locally situated issues.

Instruction was organised around weekly 90-minute sessions. Each session typically included short conceptual input, a structured task, small-group discussion, class dialogue, and individual reflection. Tasks were designed to make reasoning visible. Students were asked to identify contradictions, distinguish relevant causes and conditions, consider thresholds or turning

points, justify claims with evidence, and revise positions where appropriate. One recurring example concerned economic–environmental tensions in Hue tourism, where students examined relations among development, heritage preservation, environmental pressure, and policy constraints.

Structured dialogue was central to the intervention. Rather than encouraging debate as adversarial victory, the module framed discussion as a process of testing, refining, and improving explanations. Students were asked to respond to peers by identifying strengths, limitations, and possible syntheses. Assessment criteria and instructor prompts reinforced this orientation by asking students to demonstrate analytic moves: identifying contradictions, tracing interacting causes, evaluating alternatives, and reflecting on the development of their own judgement.

The retained protocol and task materials document the intended instructional sequence, including shared prompts, structured tasks, group work, dialogue, reflection, and assessment criteria. These materials establish the design of the instructional supports but do not independently establish formal instructor training, implementation fidelity across classes, or the frequency and content of implementation discussions among instructors.

3.4. Data sources

The quantitative source was a 25-item, five-point self-report survey administered before and after the 12-week module in this Vietnamese higher-education case. The retained supplemental documentation broadly attributes the survey to Facione's (1990) Delphi framework—rather than documenting use of an authenticated California Critical Thinking Skills Test form—and to Paul and Elder's (2014) model. It gives response anchors from 1 (Strongly Disagree) to 5 (Strongly Agree) and displays 11 exact sample items, several marked as adapted for the DiaMat context. The complete administered wording for items 12–25, an authenticated item-to-column mapping for every item, complete item-level source mapping, the full adaptation-development record, Vietnamese translation

or back-translation procedures, and a verified reverse-coded-item key are not documented in the retained materials. The outcome is therefore treated as an intervention-aligned self-report composite of critical-thinking practices, not a validated performance measure or a complete measure of dialectical-materialist reasoning.

The original participant-level CSV contains 25 scored item responses at each time point for all 150 complete paired records. No additional reverse-coding transformation was applied during the present reproduction, each composite was calculated as the arithmetic mean of the 25 recorded item values, and the file contains no missing item scores. Internal consistency reproduced from the scored item columns was $\alpha = 0.88$, 95% bootstrap CI [0.84, 0.90], at pre-test and $\alpha = 0.86$, 95% bootstrap CI [0.82, 0.89], at post-test. Cronbach's alpha describes internal consistency only: independent factor structure, dimensionality, construct-validity evidence, complete item wording, and translation validity are not established by these coefficients or otherwise documented in the retained materials.

The author-verified study record identifies 60 reflective essays of approximately 500–800 words completed after the module. The retained supplemental material includes the final-essay rubric and describes intended prompts, but it does not contain the complete essay corpus, a sampling frame, or source-language essay records. Consequently, no corpus-wide theme, frequency, or prevalence claim is derived from the essays.

The study record identifies three student focus groups of six participants and two instructor focus groups of four participants. The retained supplement provides a four-question student focus-group guide and selected author-supplied translated material, but not full source-language transcripts, recordings, recruitment records, facilitator records, or a participant-level linkage key. Focus-group material is therefore used only as a located illustration with an exact supplemental-page locator.

The study record identifies eight non-participant classroom observations. The retained supplement includes one author-supplied translated group interaction on pages 10–11, but not the complete original-language observation notes or their distribution across classes and instructors. The revised manuscript treats that interaction as one illustration of a structured task, not as evidence of frequency, cohort representativeness, or a general mechanism.

3.5. Data analysis

All quantitative results were regenerated from the original participant-level CSV using a deterministic analysis script. The file contains 150 complete pairs.

Composite scores were verified as the arithmetic mean of the 25 recorded item scores, gain was defined as post-test minus pre-test, and Table 1 was exported directly from the resulting statistical output. The overall change was analysed with a paired-samples *t* test. Cohen's *d* used the pooled pre/post SD, defined as the square root of the mean of the pre-test and post-test sample variances; its interval used a 20,000-replicate participant-level bootstrap that recomputed the same pooled-SD denominator within every resample (seed 23082026). Gain-score one-way models were the primary tests of differential change for department, gender, and year group. Post-test subgroup models were retained only as separate cross-sectional descriptive/comparative analyses and were not interpreted as differential improvement. Neither set of subgroup results is interpreted causally because groups were not randomly assigned and the study had no control group. Exact two-sided *p* values, mean-difference intervals, and η^2 were generated directly from the script.

The retained supplemental material labels the qualitative approach as hybrid deductive–inductive and provides an abbreviated codebook with selected illustrations. It does not provide the complete source corpus, codebook versions, coding export, coding-unit definition, analytic memos, or negative-case record

required to reproduce a corpus-wide thematic analysis. The revised manuscript therefore does not present new corpus-level themes or prevalence estimates. No claim of independent double coding, inter-coder reliability, member checking, saturation, or formal triangulation is retained because the corresponding records are not documented. The author-supplied translated interaction and candidate worksheet are read descriptively against the stated evidentiary criteria: terminology or task completion alone is not evidence of substantive dialectical reasoning, and one illustration cannot establish cohort-wide uptake.

The qualitative material has a limited analytic role. It can show how one supplied interaction and one located worksheet candidate articulate relations, interdependence, or a threshold within the instructional tasks. It cannot show how often those moves occurred, whether they persisted, whether they represented the cohort, or whether they involved the historically specific material relations required for full dialectical-materialist analysis.

3.6. Mixed-methods integration and inference

Integration occurred only at a bounded dataset level. The quantitative component documents change in self-reported composite scores. The retained qualitative material illustrates selected ways in which the module's prompts were articulated in one translated interaction and one candidate worksheet. These strands concern the same pedagogical case but do not share an authorised individual-level linkage key or a common outcome measure. Their relation is therefore classified as complementary, not participant-level convergence. The integration does not establish a causal mechanism. Compatibility between an increase in reported scores and a selected illustration cannot show that the illustrated reasoning produced the quantitative change. Divergence and non-comparability also remain possible because the qualitative documentation does not support prevalence or cohort coverage.

The study's inferences are consequently restricted to change in an intervention-aligned self-report measure within one pedagogical case and provenance-bounded illustrations of selected task responses. Demonstrated critical-thinking ability, causal effects, full dialectical-materialist reasoning, and participant-level mixed-method convergence remain outside the evidence ceiling.

4. Findings

The findings are reported in three parts. Section 4.1 presents the regenerated quantitative results and distinguishes post-test comparisons from gain-score analyses. Section 4.2 reports only located, provenance-bounded qualitative illustrations. Section 4.3 states the limited complementary relation between the strands and the resulting implementation constraints.

4.1. Quantitative change in critical thinking

Across 150 complete pairs, mean self-reported critical-thinking scores increased from pre-test ($M = 3.12$, $SD = 0.54$) to post-test ($M = 3.87$, $SD = 0.49$). Mean paired change was 0.75 ($SD = 0.42$), 95% CI [0.68, 0.82], $t(149) = 21.83$, exact two-sided $p = 2.82 \times 10^{-48}$. Cohen's d using the pooled pre/post SD was 1.46, 95% bootstrap CI [1.28, 1.68]. This result documents change in the intervention-aligned self-report composite; it is not a performance-based demonstration of critical-thinking ability or a causal estimate of the module's effect.

The primary differential-change models used gain scores. Political Education students had a larger mean gain than Primary Education students (difference = 0.17, 95% CI [0.04, 0.30]), $F(1, 148) = 6.37$, $p = 0.0127$, $\eta^2 = 0.041$.

First/second-year minus third/fourth-year gain was -0.14, 95% CI [-0.27, -0.001], $F(1, 148) = 3.97$, $p = 0.0480$, $\eta^2 = 0.026$. The gender gain contrast was not significant (difference = -0.02, 95% CI [-0.16, 0.12]), $F(1, 148) = 0.11$, $p =$

0.7390, $\eta^2 = 0.001$. Separate post-test comparisons were department $F(1, 148) = 7.30, p = 0.0077$; gender $F(1, 148) = 0.05, p = 0.8248$; and year group $F(1, 148) = 6.99, p = 0.0091$. These post-test models are not interpreted as differential improvement.

The department and year-group gain-score differences describe variation within the original participant-level dataset, but they do not establish that department or academic seniority caused different improvement. The groups were not randomly assigned, the study had no comparison group, and unmeasured baseline or curricular differences may contribute. The non-significant gender gain model similarly indicates no detected differential change by the study's gender coding; it does not establish equal effects beyond this sample.

Table 1 is exported directly from the scripted output. At full precision, subgroup counts sum to 150, weighted subgroup means equal the full-sample means, and every gain equals post-test minus pre-test. The previously inconsistent departmental cells have therefore been replaced by one mutually coherent set of values.

Table 1. Descriptive statistics for pre/post self-reported critical-thinking scores

Group	N	Pre-test M (SD)	Post-test M (SD)	Mean gain (SD)
Overall sample	150	3.12 (0.54)	3.87 (0.49)	0.75 (0.42)
Political Education	76	3.14 (0.56)	3.97 (0.46)	0.83 (0.44)
Primary Education	74	3.10 (0.52)	3.76 (0.49)	0.66 (0.38)
Male	57	3.15 (0.55)	3.88 (0.50)	0.74 (0.38)
Female	93	3.10 (0.53)	3.86 (0.48)	0.76 (0.44)
First/Second year	85	3.09 (0.51)	3.78 (0.46)	0.69 (0.42)
Third/Fourth year	65	3.16 (0.58)	3.99 (0.49)	0.83 (0.42)

Note. *M* = mean; *SD* = sample standard deviation. Gain = post-test minus pre-test and is shown as *M* (*SD*). Department codes are Political Education and

Primary Education; year groups are first/second year and third/fourth year. Values are direct scripted exports from the original participant-level CSV. The outcome is an intervention-aligned self-report composite, not a performance assessment.

4.2. Provenance-bounded qualitative illustrations

The qualitative contribution is restricted to retained author-supplied supplementary material. Locator existence has been verified, but the complete source-language corpus, sampling records, coding trail, translation audit, and chain of custody are not documented. The illustrations below are therefore descriptive and cannot establish frequency, representativeness, saturation, or a cohort-wide mechanism.

Supplemental pages 10–11 provide one author-supplied interaction translated from Vietnamese. In that interaction, a group moves from opposing economic development and heritage preservation toward questions about their interdependence and a possible building-height threshold. The exchange is consistent with the module's relational and threshold prompts, but it is one selected translated illustration rather than an authenticated observation corpus. Supplemental page 13 displays a photographed Vietnamese worksheet attributed by its caption to the group name Blue Star. Entries concern the Hue tourism task and include opposing forces, interdependence, a proposed threshold, and a synthesis. The date field is blank and no participant link, collection log, or chain-of-custody record is supplied. The page is therefore treated as one candidate student artifact, not as representative evidence for the cohort.

The supplementary protocols and task materials also document the intended instructional sequence: students were prompted to identify opposing forces, analyse interdependence, identify a primary contradiction or threshold, and propose a synthesis. These materials establish the design of the prompts; they do not by themselves establish enactment, learning, or prevalence.

No direct participant quotation is used in the revised Findings because permissions, source-language records, and translation verification are not sufficiently documented for quotation-level claims. The translated interaction is described at the level of its located analytic sequence and page range.

Within that ceiling, the interaction illustrates how a structured prompt can make relations between two concerns discussable rather than merely list two opinions. It does not demonstrate the historically specific material relations required for a full dialectical-materialist analysis, and it cannot explain the quantitative score change.

The candidate worksheet similarly illustrates one group's written use of interdependence and threshold language. Completion of the template is not treated as evidence that the reasoning was independently generated, philosophically complete, or shared by other students.

Because the survey, essay, focus-group, observation, and worksheet records are not linked through a documented authorised key, the study does not identify which survey records correspond to any qualitative illustration. Claims of individual-level convergence, triangulation, or mechanism are therefore excluded.

4.3. Bounded integration and implementation limits

The retained focus-group protocol includes a question about difficulty translating philosophical laws into practical tools. This documents an intended topic of inquiry, not the frequency or distribution of a reported barrier. The revised manuscript therefore does not quantify terminology difficulty or attribute it to the cohort.

The final reflective-essay rubric on supplemental page 9 shows that the essay was graded coursework. This creates an assessment and voluntariness consideration: without a documented separation procedure, the essay material cannot be treated as if it were an independently recruited qualitative corpus.

The protocol and worksheet materials show that implementation depended on explicit prompts, examples, and rubric criteria. That is a property of the instructional design. The retained records do not establish how consistently instructors enacted those supports across sessions.

Instructor focus groups are author-verified as study activities, but the retained documentation does not support reporting recurrent instructor views, agreement, or implementation frequency. Specific instructor-perception claims are therefore not used as empirical findings.

The quantitative and qualitative components are complementary only in a limited sense: one documents cohort-level change in reported scores, while the other illustrates selected task responses. Neither strand validates the other, and their combination does not establish causation or participant-level convergence. Taken together, the findings show a coherent quantitative pattern regenerated from the original participant-level CSV and a small number of provenance-bounded illustrations consistent with selected module prompts. They do not establish demonstrated ability, corpus-wide qualitative mechanisms, or full dialectical-materialist reasoning.

5. Discussion

This bounded mixed-methods case documents a substantial increase in intervention-aligned, self-reported critical-thinking scores across a 12-week module and provides two provenance-bounded illustrations of the task design. The selected translated interaction contains limited relational and threshold indicators, while the candidate worksheet illustrates the structure of one response. Neither material establishes how often such reasoning occurred, a mechanism of change, or participant-level convergence with survey scores. The contribution is therefore interpretive and design-oriented: it concerns how required philosophical content was organised for inquiry, not proof of

demonstrated critical-thinking ability, causal transformation, or cohort-wide dialectical-materialist attainment.

Across the 150 complete pairs, the pre-test mean was 3.12 (SD = 0.54) and the post-test mean was 3.87 (SD = 0.49). The mean change was 0.75 (SD = 0.42), 95% CI [0.68, 0.82], $t(149) = 21.83$, with an exact two-sided $p = 2.82 \times 10^{-48}$. Cohen's d using the pooled pre/post SD was 1.46, with a bootstrap 95% CI [1.28, 1.68]. These estimates show a substantial within-cohort association in the intervention-aligned self-report composite. They do not establish an objective increase in critical-thinking ability or a definitive treatment effect. Because several retained sample items repeat or closely resemble module terminology, increased familiarity with its language, concepts, or expected responses remains a plausible contributor to the change.

Interpretation also depends on preserving three analytic levels. Generic critical thinking concerns the warrant, coherence, alternatives and revisability of judgement (Facione, 1990; Paul and Elder, 2014). Dialectical reasoning adds attention to constitutive relations, internal tension, mediation, process and possible qualitative reorganisation; these emphases overlap with, but are not reducible to, generic evaluation (Pavlidis, 2010; Bailin and Battersby, 2018). Full dialectical-materialist analysis asks a further question: how historically specific material social relations constitute the contradiction. The retained materials contain limited relational and threshold indicators only. Multi-causal explanation, contextual connection, or use of DiaMat vocabulary does not by itself cross the boundary from generic or relational reasoning to dialectical-materialist analysis.

That materialist criterion is especially important in the Hue tourism task. Analysis at this level would need evidence about relations of labour, property or ownership, production, resource control, material power, exploitation, and the distribution of benefits, costs and risks (Marx, 1859; Pavlidis, 2010). The selected interaction and candidate worksheet connect development with heritage

preservation and use relational or threshold prompts, but they do not reconstruct those historically specific relations. They therefore do not demonstrate attainment of full dialectical-materialist analysis. The materials are compatible with the intended pedagogical use of the prompts; they cannot support the stronger claim that students appropriated a full dialectical-materialist method. The defensible pedagogical contribution lies in translating abstract concepts into explicit prompts, locally situated tasks, group dialogue, reflection and assessment criteria. This architecture can make the expected work of identifying relations, testing evidence and revising a judgement more visible, while keeping the distinction between naming a concept and using it analytically. Such a design rationale is consistent with research that locates critical-thinking development in explicit instruction, subject-matter practice, dialogue and aligned tasks rather than in exposure to terminology alone (Niu, Behar-Horenstein and Garvan, 2013; Abrami, et al., 2015; Tiruneh, De Cock and Elen, 2018). In the present case, however, this literature informs interpretation of the design; it does not validate the self-report outcome or establish DiaMat-specific effects.

This attribution concern is therefore substantive. DiaMat was implemented together with structured tasks, group work, dialogue, reflection, instructor prompts and assessment criteria. The one-group design cannot estimate how much of the observed score change is specific to DiaMat and how much relates to this broader pedagogical bundle. Nor can it identify which component, combination or local implementation condition mattered most. The appropriate claim is that the case documents a bundled instructional design and a substantial within-cohort association. Component-sensitive comparisons, process measures and implementation records would be needed before assigning an independent effect to the philosophical heuristics or to any accompanying practice.

The two strands are complementary only at the bounded dataset and case level. Quantitative analysis documents cohort-level change in the self-report

composite; the qualitative record comprises one author-supplied English translation of a classroom interaction and one candidate Vietnamese worksheet. The selected translated interaction contains limited relational and threshold indicators, and the candidate worksheet illustrates the structure of one task response. No authorised participant-level linkage key is documented, so these materials cannot validate the scores, establish individual convergence, or explain the observed change. They provide provenance-bounded illustrations of the intended prompts, not evidence of prevalence, representativeness, thematic saturation, recurrent mechanisms or independently assessed reasoning quality. The subgroup findings answer two distinct questions. Gain-score models are the primary analyses of differential change; within this dataset, they identified department and year-group contrasts, while the gender gain model was not statistically significant. These uncontrolled comparisons remain descriptive rather than causal group effects and may reflect baseline conditions, disciplinary background, study-year experience or other unmeasured features of participation. The non-significant gender result is not evidence that effects were equal. Separate post-test ANOVAs describe cross-sectional differences in end-of-module scores. They do not estimate longitudinal change and are not used to infer that one subgroup gained more than another.

The wider implication is a bounded instructional-design proposition for one Vietnamese higher-education case. A mandatory philosophical curriculum can be organised to create structured opportunities for relational inquiry, rather than being treated only as content for reproduction. How such opportunities are received depends on classroom authority, interactional norms and assessment conditions; work on critical thinking in East Asian contexts similarly cautions that the form through which critique is invited and legitimised matters (Tan, 2017; Wang and Wu, 2023). The evidence here does not demonstrate political agency, critical consciousness, institutional transformation or questioning of

state authority. It supports consideration of a design option, not a universal policy effect.

Future research should separate what the present case necessarily combines. Comparative or quasi-experimental designs could examine the contribution of DiaMat-informed prompts relative to alternative structured pedagogies, while performance-based assessments could test reasoning beyond endorsement of intervention-aligned statements. Complete instrument wording, item-source and item-column mapping, adaptation and translation records, and construct-validation evidence are also needed. Qualitative studies should preserve source-language corpora, sampling and analytic trails, permissions and explicit linkage governance. Where claims concern full dialectical-materialist reasoning, tasks and analyses must elicit evidence about historically specific material relations rather than treating relational vocabulary, multiple causes or judgement revision as sufficient.

6. Limitations

The primary outcome is a 25-item, five-point, intervention-aligned self-report composite. The original participant-level CSV contains 25 scored columns at both time points, but the retained record preserves exact wording for only 11 sample items; wording for the remaining 14 items and complete item-level source mapping are not documented. The full adaptation-development and Vietnamese translation/back-translation record, an authenticated item-to-column mapping, and a verified reverse-coded-item key are also not documented. Pre-test reliability was $\alpha = 0.88$, 95% bootstrap CI [0.84, 0.90], and post-test reliability was $\alpha = 0.86$, 95% bootstrap CI [0.82, 0.89]. Internal consistency does not establish factor structure, dimensionality, construct validity or objective ability.

The single-group pre-test/post-test design and absence of a control or comparison group prevent definitive causal attribution. Maturation, concurrent coursework, repeated measurement, assessment expectations and other semester experiences remain alternative explanations for the score change. Attribution is further limited because DiaMat was delivered with structured tasks, group work, dialogue, reflection, instructor prompts and assessment criteria. The design includes no component-isolation condition and cannot determine how much of the association is specific to DiaMat or to the broader pedagogical bundle. Accordingly, the result is a substantial within-cohort association, not an estimated treatment effect.

Department, gender and year-group comparisons were not based on random assignment and remain vulnerable to confounding. The gain-score models provide the relevant within-dataset tests of differential change, but their department and year-group contrasts cannot be read as causal effects of group membership or as evidence of a universally different response to the module. The non-significant gender model does not prove equivalence. Post-test ANOVAs address a separate, cross-sectional question about end-of-module status; they neither control prior differences nor supply evidence of differential gains. Replication with prespecified subgroup hypotheses, adequate power and stronger baseline control is needed.

Qualitative provenance sharply limits the analytic role of the retained materials. The record contains one author-supplied English translation of a classroom interaction on supplemental pages 10–11 and one candidate Vietnamese worksheet on supplemental page 13. A complete source-language corpus, sampling frame, coding trail, translation audit and authenticated participant authorship are not documented. These materials may illustrate selected prompts and limited relational or threshold indicators, but they cannot establish frequency, representativeness, saturation, corpus-wide themes, recurrent

mechanisms, independent reasoning quality or cohort-wide uptake. The candidate worksheet remains one artefact, not a basis for generalisation. Mixed-method integration is also restricted because no authorised participant-level linkage key or corresponding governance record is documented. The strands can be considered together only as complementary evidence about the same pedagogical case, not as mutual validation or individual convergence. Voluntary informed consent is author-confirmed, but the available documentation does not establish a formal ethics approval or exemption reference, a sufficiently detailed ethics-committee determination, or procedures for storage, confidentiality, retention and separation of assessment from research. The final reflective essay was graded coursework. Without a documented assessment–research separation procedure, those essays cannot be treated as an independently recruited qualitative corpus, and no absence of consent or participant harm is inferred from the documentary limits. Finally, this is a single-site case shaped by its institutional setting, student population, instructor preparation, mandatory curriculum and local implementation conditions. Its findings should not be generalised uncritically to other Vietnamese institutions, disciplines or settings in which DiaMat has a different curricular position. Transferability depends on a sufficiently detailed account of context and enactment, which the retained implementation record only partly provides. Multi-site studies should combine comparison conditions with performance-based outcomes, complete instrument and qualitative documentation, prospective ethics and data-governance procedures, and component-sensitive implementation measures. Such designs would permit stronger tests of construct interpretation, causal attribution and contextual transfer without presuming that the present pattern will recur.

7. Conclusion

This case observed a substantial increase in intervention-aligned, self-reported critical-thinking scores across a 12-week module. Among 150 complete pairs, the mean rose from 3.12 (SD = 0.54) to 3.87 (SD = 0.49), with a mean change of 0.75 and a pooled-SD Cohen's *d* of 1.46. The result is a substantial within-cohort association, not evidence of objectively demonstrated critical-thinking ability or proof that DiaMat caused the change. The retained qualitative materials offer two provenance-bounded illustrations and do not explain the score pattern.

The principal contribution is theoretical and pedagogical at the level of design. The manuscript distinguishes generic critical thinking from relational and developmental dialectical reasoning, and both from full dialectical-materialist analysis. It then shows how a required philosophical curriculum was translated into prompts, locally situated tasks, dialogue, reflection and assessment criteria intended to make relations, tensions and thresholds available for inquiry. This design proposition does not depend on treating DiaMat vocabulary as evidence of uptake; it depends on specifying the analytic work that tasks ask students to perform.

The evidence ceiling remains decisive. A single-group design cannot isolate DiaMat from the broader pedagogical bundle; an incompletely documented self-report instrument cannot establish construct validity or objective ability; one translated interaction and one candidate worksheet cannot establish prevalence, mechanism or participant-level convergence. Nor do the selected materials demonstrate full dialectical-materialist analysis of historically specific relations of labour, property, ownership, production, exploitation, resource control, material power or distributions of benefits and costs. These are not peripheral caveats but limits on what this case can claim.

Within those limits, the case offers a proportionate proposition for Vietnamese higher education: mandatory philosophical content can be organised as a resource for structured relational inquiry rather than only as material for recall. Testing whether that proposition is transferable requires comparative, component-sensitive research, performance-based assessments, complete instrument and source-language qualitative records, and prospective ethics and linkage governance. Future studies should also require empirical evidence of material social relations whenever they claim dialectical-materialist attainment. Until such evidence is available, the present contribution should remain a carefully documented design possibility accompanied by a reproducible change in self-reported scores.

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Author Details

Corresponding author: Manh Ha Le, Department of Primary Education, University of Education, Hue University, Vietnam. Email:

lemanhha@hueuni.edu.vn; lemanhha@dhsphue.edu.vn

Manh Ha Le is Head of the Natural Sciences Section, Department of Primary Education, University of Education, Hue University, Vietnam. He received his PhD in Mathematics from the Institute of Mathematics, Vietnam, in 2011, following earlier degrees in mathematics education from Hue University of Education. His academic background is rooted in discrete mathematics, graph theory, and combinatorial models. His current research focuses on primary mathematics education, preservice teacher education, mathematical reasoning, computational thinking, philosophy of education, and classroom-based instructional design. His work seeks to connect formal mathematical structures with pedagogical innovation in primary and teacher education contexts.

ORCID: <https://orcid.org/0009-0009-7247-6861>

Correspondence: Manh Ha Le, Department of Primary Education, University of Education, Hue University, Vietnam. Email: lemanhha@hueuni.edu.vn, lemanhha@dhsphue.edu.vn

Thi Phuong Thu Bui is a lecturer in the Department of Political Education, University of Education, Hue University, Vietnam. Her teaching and research focus on Marxist–Leninist philosophy, dialectical materialism, political education, and higher education pedagogy. Her work examines how philosophical concepts can inform critical pedagogy, curriculum innovation, and the development of students’ critical thinking in Vietnamese higher education.

Email: btpthu@hueuni.edu.vn; buihiphuongthu@dhsphue.edu.vn