

Building Critical Reasoning Through Learning Deep Learning: Literature Review Systematic 21st Century Social Studies Learning in the Independent Curriculum

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ABSTRACT: *Critical thinking skills are essential competencies that students must possess to face the challenges of the 21st century and the Big Data era. In the context of the Independent Curriculum, Social Studies (IPS) learning is directed at developing higher-order thinking skills through a student-centered deep learning approach. This study aims to synthesize and analyze innovative pedagogical strategies in IPS learning that can improve students' critical thinking skills and digital literacy. The method used is a Systematic Literature Review (SLR) of 25 primary literature and policy documents published in the 2022–2026 period. Data were analyzed using thematic analysis techniques through the stages of data extraction, coding, and theme synthesis. The results of the study indicate that improving critical thinking skills in IPS learning can be realized through four main pillars, namely: (1) utilizing the SOLO Taxonomy to shift learning from memorization to in-depth understanding; (2) implementing innovative learning models such as Problem-Based Learning (PBL), Project-Based Learning (PjBL), and inquiry as a means of developing HOTS; (3) the integration of artificial intelligence (AI) and digital literacy as information verification tools in the era of disinformation; and (4) strengthening student agency through contextual and local wisdom-based learning. These findings demonstrate that the synergy between innovative pedagogy, digital technology, and immersive learning approaches can transform social studies learning to be more relevant, critical, and adaptive to the needs of the 21st century.*

Keywords: *Moral, Education, Student*

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I. INTRODUCTION

global dynamics of the 21st century demand individual For No just own knowledge factual , but rather ability For processing , analyzing , and evaluating information in a way critical . In the era of Big Data, where the flow of information and disinformation move massive through digital technology and intelligence artificial , skill think level high (Higher Order Thinking Skills or HOTS) becomes shield essential intellectual (Celik et al., 2024; Mahrannisya , 2023). In context education , eyes lesson Knowledge Knowledge Social Studies (IPS) has role strategic . IPS does not Again viewed as discipline rich knowledge will memorization history or geography only , but as receptacle crucial For print critical , ethical , and capable citizens solve problem social (Nada & Zainuddin, 2026; Syapurrohman et al., 2025). Although urgency skills think critical has realized globally , quality education elementary and secondary education in Indonesia is still face challenge serious . Report The 2022 Programme for International Student Assessment (PISA) shows that ability literacy and power reason critical participant Indonesian education is still is below the OECD country average (OECD, 2023a, 2023b). Responding gap This time , the Ministry of Education, Culture , Research, and Technology (Kemendikbudristek) implemented Independent Curriculum as framework transformation systemic . Different with curriculum Previously , the Independent Curriculum emphasized learning in-depth (deep learning) which is focused on the material essential and development of student agency (Anggraena et al., 2025; Wahyudin et al., 2024). Achievements Social Studies Learning (CP) in curriculum This designed use SOLO Taxonomy (Structure of the Observed Learning Outcome) for build ladder cognitive participant educate from stage remember until stage reflect and construct understanding in a way critical (Holilah et al., 2025). Transition paradigm curriculum This demand fundamental changes in pedagogical strategies in the classroom . Practice learning conventional educator - centered start replaced by learning models participant - centered innovation learning , such as Problem Based Learning (PBL), Project-Based Learning (PjBL), and inquiry (Hartasasi et al., 2025; Musyaffa & Atno , 2025). Various study latest prove that implementation of PBL and inquiry in a way significant increase interest , engagement , and outcomes Study critical student in eye social studies lessons (Mashita & Putri, 2026; Trisnani , 2025; Ulandari & Khusna , 2025). In addition , integration tool based intelligence artificial intelligence (AI) and innovative digital media in cycle inquiry proven capable facilitate participant educate in verify data and analyze phenomenon social in a way more sharp (Moundridou et al., 2024; Putri & Ginanjar, 2025). Although framework regulations The Independent Curriculum has provide strong foundation (Anggraena et al., 2025; Wahyudin et al., 2024) and a number of research empirical has prove effectiveness method learning innovative

such as PBL and Inquiry (Mashita & Putri, 2026; Trisnani , 2025), studies the Still tend fragmented . There is gap significant research gap in literature moment this : some big research evaluating pedagogical models innovative and integrated digital technology (such as intelligence artificial) in separately (Celik et al., 2024; Ulandari & Khusna , 2025). Not much yet review literature that is holistic synthesize How integration between tool digital verification , pedagogy innovative , and the SOLO Taxonomy can orchestrated For solve problem low reasoning critical student in eye social studies lessons , especially in corridor Independent Curriculum . Absence complete synthesis This causing educators in the field often experience confusion in translate the concept of deep learning and student agency becomes practice applicable learning in the Big Data era . Therefore that , study This aim For synthesize and analyze pedagogical strategies innovative in social studies based learning Independent Curriculum designed For increase skills think critical and digital literacy of participants educate 21st century.

II. METHOD

Research Design Study This use approach Review Literature Systematic Literature Review for identify , evaluate , and synthesize results study latest as well as document relevant policies with learning strategies Knowledge Knowledge Social Studies (IPS). Main objective from review This is For formulate framework comprehensive about How social studies based learning Independent Curriculum can increase skills think critical and digital literacy of participants educate . Criteria Inclusion and Exclusion For ensure quality and relevance data sources , selection literature done based on criteria inclusion following : (1) article published in journal scientific review peer - reviewed between 2022 to 2026 ; (2) focus study includes social studies learning models (such as PBL, PjBL , and Inquiry), skills think level high (HOTS), or integration technology / digital literacy in education ; (3) contextual Independent Curriculum or education 21st century in general general ; and (4) documents policy officially issued by the institution authorities (for example , BSKAP Kemendikbudristek , OECD, and NCSS). Literature in the form of opinion No data -based , non-relevant articles published in a way official , or studies that are outside range time the excluded from study this . Procedure Search Data Collection literature done through academic databases such as Google Scholar, journals education national SINTA indexed , as well as repository official ministries and institutions international . Keywords search used Good in a way single and Combinations (using Boolean operators) include : " Social Studies Learning " , " Independent Curriculum " , "Critical Thinking " , "HOTS" , "Problem-Based Learning" , " Inquiry " , " Intelligence " Artificial in Education" , and " Digital Literacy " . Based on search those , collected approximately 25 primary literatures consisting of from article journal empirical , study literature systematic previously , and document guide official (such as the Social Studies Subject Guide and Curriculum Guide) Educational Unit). Data Analysis Data obtained from literature selected analyzed use technique analysis thematic analysis. Analysis This done through three stages main : (1) data extraction , where the findings main from every article noted in a way structured ; (2) coding , namely identify keywords and concepts main from findings and (3) synthesis theme . Through this process , literature grouped to in a number of theme essential answer objective research , namely : the effectiveness of pedagogical strategies innovative (PBL, PjBL , Inquiry), role taxonomy

cognitive (SOLO Taxonomy) and HOTS, as well as urgency tool digital verification (including AI technology) in Social studies learning in the Big Data era. (Calibri, 12) .

III. RESULT AND DISCUSSION

RESULT

Based on review systematic against 25 primary literature and documents policy curriculum , study This find that effort increase skills think critical in social studies learning demands existence overhaul structural , good from aspect framework cognitive and practice pedagogical . Transformation from pedagogy rote learning towards learning deep learning in the era of Big Data can realized through integration four main pillars following : (Calibri, 12)

1. Deconstructing Memorization Pedagogy through SOLO Taxonomy and Essential Content

The primary problem of Indonesian students' low reasoning skills (OECD, 2023a) stems from the tradition of social studies learning that reduces the complexity of social phenomena to mere memorization of facts. The Independent Curriculum policy document responds to this by adopting the SOLO Taxonomy (Structure of the Observed Learning Outcome) as an instrument for formulating Social Studies Learning Outcomes (CP) (Holilah et al., 2025; Wahyudin et al., 2024). Literature analysis shows that the SOLO Taxonomy provides a more measurable cognitive roadmap than traditional taxonomies. By reducing material density and focusing on essential content, students are encouraged to move from unistructural understanding (remembering a single fact) to relational and extended abstract stages (analyzing cause and effect and generalizing solutions) (Musyaffa & Atno, 2025; Rimadia et al., 2026). The relevance of social studies subjects in the 21st century is no longer judged by how much history students memorize, but rather by how sharply they define, interpret, and formulate theories using their own language and logic (Nada & Zainuddin, 2026).

2. Orchestrating the Learning Experience Cycle through Innovative Pedagogical Models

This study identified that the deep learning framework must be realized through a continuous cycle of learning experiences: Understanding, Applying, and Reflecting. A literature synthesis confirmed that the application and reflection stages are most optimally facilitated by Problem-Based Learning (PBL), Project-Based Learning (PjBL), and Inquiry models. Research consistently reports that PBL and PjBL force students out of their passive zone by confronting them with contextual problems that require real-world resolution (Mashita & Putri, 2026; Martinez, 2022; Ulandari & Khusna, 2025). On the other hand, inquiry and case-based learning approaches have proven highly effective in training social science process skills. Through inquiry, the learning process is reconstructed into an investigative arena, where students collaboratively solve historical puzzles or geographical anomalies, thus giving birth to meaningful and evidence-based understanding (Houghton et al., 2022; Madhakomala et al., 2025; Pratama et al., 2025).

3. Integrating Digital Verification Tools and AI in the Big Data Era

Addressing the literature gap regarding verification stuttering in the era of information disruption (Mahrunnisya, 2023), this study found that conventional inquiry cycles are no

longer adequate without the integration of digital literacy. Social studies process skills must be elevated to become robust verification tools against disinformation. Recent findings indicate that artificial intelligence (AI) and learning analytics can be effectively integrated into inquiry stages (Celik et al., 2024; Chen & Chen, 2025). AI is not used as a provider of instant answers, but rather as educators' assistants and data comparison instruments (Moundridou et al., 2024). Furthermore, the use of innovative media with gamification, such as Edugame Wordwall and Educaplay, has been shown to mediate the complexity of data analysis into an interactive learning process and increase the cognitive motivation of secondary students (Ella et al., 2024; Safitri & Rusdini, 2026). This integration bridges the gap between the demands of HOTS critical thinking and the reality of students' digital environment (Putri & Ginanjar, 2025; Rahmasari et al., 2025).

4. Shifting Authority Through Student Agency and Contextuality

The implementation of sophisticated pedagogical strategies often fails because educators still retain absolute control in the classroom. This study confirms that critical thinking skills require a democratic climate that facilitates student agency—where students are involved as the primary designers of their learning process (Anggraena et al., 2025; Hartasasi et al., 2025). Strengthening student agency is strongly supported by culturally relevant pedagogy. Integrating local wisdom into collaborative learning provides a strong foundation for identity, making the social issues studied personally relevant and meaningful for students (Fitrianto & Farisi, 2025; Syapurrohman et al., 2025). Through methods such as Group Investigation (Sapitri et al., 2025) or the CORE learning model (Zebua et al., 2024), control of learning is shifted from educators to collaborative responsibility. Within this framework, educators transform into facilitators who orchestrate reflective dialogue, not just single truth transmitters (Rustiyani & Mardiana, 2025).

IV. CONCLUSION

Based on review literature systematic to implementation Merdeka Curriculum and pedagogy 21st century, study This conclude that improvement skills think critical in learning Knowledge Knowledge Social Studies (IPS) demands holistic transformation, not just change method teaching. Transformation This standing on top four main pillars: (1) use SOLO Taxonomy for deconstruct pedagogy memorization and focusing learning on the content essential; (2) implementation cycle learning in-depth (deep learning) through Problem-Based Learning (PBL), Project-Based Learning (PjBL) and Inquiry models; (3) integration intelligence artificial intelligence (AI) and digital literacy as tool verification information For equip student facing the Big Data era; and (4) growing student agency through approach contextual and wisdom local. In overall, integration from fourth element This capable change IPS face of eye lessons that are passive and centered on the past, becoming discipline dynamic, future-oriented, and relevant science with reality life participant educate. Although Thus, the study literature This own a number of limitations of the study. First, the literature reviewed part big limited to a range time publication 2022-2026 with focus specific to the ecosystem Independent Curriculum in Indonesia, so that generalization findings in context system education in other countries is necessary done in a way heart heart. Second, the study This find that literature empirically which special test effectiveness integration intelligence

artificial intelligence (AI) comprehensive in social studies class level middle class in Indonesia still be at the stage early , so that impact term length to development cognitive student Not yet can mapped in a way complete . Therefore that , study This recommend a number of action continued . For educators and the Social Studies Subject Teachers' Conference (MGMP), it is recommended For start shift role from transferor knowledge become designer experience learning (learning designer) which is intentional blend technology No just as tool props , but rather as instrument reasoning and data verification . For researchers Next , it is recommended For do study empirical scale both broad (quantitative) and longitudinal study that specific measure correlation between Utilization of learning analytics or AI media in the PBL/ Inquiry model to increased cognitive level student based on indicator SOLO Taxonomy.

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