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Academic Identity Formation among University Students in AI-Enhanced Collaborative Learning Spaces

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ABSTRACT

Purpose: This study aims to analyze how academic identity is constructed and transformed among students engaged in Artificial Intelligence (AI)-assisted collaborative learning, addressing the limited research on this issue in underrepresented regions such as Papua. **Methods:** A qualitative case study approach was conducted over eight weeks in a collaborative university class in Papua. Data were collected through four classroom observations, in-depth interviews with eight students and one lecturer, five cycles of reflective journals, and analysis of learning artifacts. The data were analyzed using thematic analysis with systematic coding, source triangulation, and comparison of identity development at the beginning and end of the study. **Findings:** The findings indicate that AI appeared to support students' academic agency, increase confidence in articulating scientific arguments, and strengthen the visibility and legitimacy of their contributions in collaborative group work. However, differences in digital literacy and varying intensities of AI use were associated with unequal participation and influence within collaborative activities. **Research Implications:** These findings suggest that reflective and inclusive AI integration may support academic identity development while highlighting the importance of equitable pedagogical strategies to reduce dependency, marginalization, and participation gaps in collaborative learning environments. However, the findings are limited to a single-case qualitative context and may not be fully transferable to other educational settings. **Originality:** This study provides contextual and empirical insights into academic identity formation within AI-mediated collaborative learning spaces in an underrepresented higher education context, particularly Papua, and contributes to discussions on inclusive learning design in human AI educational environments.

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INTRODUCTION

The development of artificial intelligence in higher education has shifted the learning landscape from a transmissive model to a technology-mediated collaborative ecosystem. Globally, the integration of artificial intelligence-based systems is no longer limited to administrative automation, but has entered the pedagogical space as feedback facilitators, cognitive scaffolding providers, and partners of academic dialogue (Sofologi et al., 2025). Olawumi & Onasanya (2025) emphasize that digital transformation in education has structural implications for the role of lecturers, classroom dynamics, and student learning experiences. At the same time, research by Tan et al. (2022) demonstrates a significant increase in the use of artificial intelligence in collaborative learning practices. This phenomenon marks a fundamental shift in the way students construct meaning, participate in discussions, and position themselves in academic communities.

At the local level, especially in the Papua region, the integration of educational technology presents more complex dynamics. Geographical contexts, variations in digital infrastructure, and diversity of socio-cultural backgrounds affect students' experiences in utilizing artificial intelligence as part of the learning process. Alanoglu et al. (2025) emphasize that the success of digital learning is greatly influenced by the readiness of the ecosystem and the technological literacy

of students. In the context of relatively underrepresented regions in the global literature, digital transformation is not only a technical issue, but also a question of academic legitimacy and epistemic access (Mhlongo & Dlamini, 2022). Therefore, the formation of students' academic identities in learning spaces assisted by artificial intelligence is an urgent issue to be studied contextually and empirically.

Conceptually, academic identity refers to the self-construction of students as competent, empowered, and recognized subjects in the scientific community (Sozio & De Giuseppe, 2026). The study of identity in higher education has developed through sociocultural perspectives and community of practice theory, as outlined by Campbell et al., (2022), which emphasizes the importance of social recognition in the formation of academic identity. Nevertheless, most studies still focus on human-to-human interactions without considering the presence of non-human agents such as artificial intelligence. Nash (2024) suggests that artificial intelligence in education has the potential to reshape epistemic relationships, but its implications for the identity dimension have not been extensively investigated. Thus, there is a need to understand how academic identity is formed in a hybrid learning space of humans and technology.

A number of cutting-edge studies have explored the effectiveness of artificial intelligence on student learning outcomes and engagement. Li et al. (2023) show that generative language models can improve the quality of students' academic arguments when used reflectively. However, the focus of the study is more on cognitive performance than identity dynamics. Similarly, research by Merino-Campos (2025) underscores the potential of artificial intelligence in improving learning personalization, but has not examined how the process affects students' sense of ownership and academic legitimacy. This gap shows that the psychosocial and identity dimensions are still relatively marginalized in the artificial intelligence discourse in higher education.

In addition, the literature on collaborative learning confirms that identity is formed through interaction, role negotiation, and distribution of authority within the group. Tellez (2023) explains that digital collaboration builds meaning through an evolving dialogical process. However, the presence of artificial intelligence as a discursive partner presents a new configuration in participation structures. In this context, academic identity is closely related to epistemic agency, confidence in articulating arguments, and the legitimacy of contributions recognized by peers within collaborative learning spaces (Nordbäck et al., 2022). Whether artificial intelligence strengthens student agency or instead creates epistemic dependency remains an open question. Although studies on artificial intelligence in education continue to grow, most existing research focuses on learning effectiveness, academic performance, engagement, or personalization. The psychosocial and identity dimensions of AI-assisted learning remain relatively underexplored, particularly in collaborative higher education settings. Moreover, limited empirical studies integrate the perspectives of academic identity, collaborative learning, epistemic agency, and human–AI mediation within a single analytical framework. This limitation becomes more evident in peripheral or non-metropolitan contexts such as Papua, where digital access, technological literacy, and socio-cultural conditions may shape learning experiences differently.

This study is grounded in the assumption that academic identity formation in AI-mediated collaborative learning is not only influenced by technological assistance, but also by social recognition, epistemic participation, and the distribution of authority within groups (Mrstik, 2026). Therefore, understanding how students negotiate confidence, legitimacy, and agency while interacting with artificial intelligence becomes important for explaining the broader impact of AI on higher education practices. In addition, the Papua context provides a distinctive analytical setting because unequal digital readiness and access may influence how students experience AI-supported collaboration. Thus, the study not only examines technology use, but also explores how AI interacts with contextual educational realities in underrepresented regions.

Based on these gaps, this study aims to analyze in depth the process of forming and transforming students' academic identities in an artificial intelligence-assisted collaborative learning space at a university in Papua. This study explicitly examines how artificial intelligence mediates learning agency, confidence in articulating scientific arguments, and the legitimacy of contributions throughout the collaborative learning process. With a qualitative case study approach, this study seeks to uncover internal dynamics that are difficult to capture through quantitative approaches alone. The focus of analysis is directed at identity transformation from the beginning to the end of the learning process.

Theoretically, this research contributes to the development of academic identity studies by extending them into the context of hybrid learning spaces involving humans and artificial intelligence. The findings enrich discussions regarding the relationship between technology, epistemic agency, legitimacy, and collaborative participation in higher education, as conceptually highlighted by Nieminen & Ketonen (2024). Practically, the results provide an empirical basis for designing inclusive and reflective artificial intelligence-assisted collaborative learning, particularly in regions characterized by unequal digital access and technological readiness. Thus, this research not only addresses an important gap in the literature, but also offers pedagogical insights relevant to the development of higher education in peripheral and developing contexts.

METHOD

Research Design

This study uses a qualitative approach with a case study design (Viera, 2023). The case study design was selected because the research focuses on obtaining an in-depth understanding of how students' academic identities are formed and transformed within a real educational setting, namely an artificial intelligence-assisted collaborative learning environment. This design enables researchers to examine classroom dynamics contextually, including student-to-student interaction, lecturer facilitation, collaborative negotiation, and the mediation role of artificial intelligence in shaping participation and academic contribution. The orientation of the analysis was directed toward identity transformation throughout the learning period, allowing the study to capture both processes and changes over time.

The study was conducted in an undergraduate educational technology and academic writing class at a university in Papua over eight weeks. The class consisted of 32 students divided into several collaborative groups working on discussion-based academic projects and reflective assignments. The course was selected because it actively integrated artificial intelligence into collaborative learning activities, including brainstorming, outline development, argument refinement, academic language support, summarization, and feedback generation.

The AI applications most frequently used by students included ChatGPT, Grammarly, and Google Gemini under lecturer supervision and classroom ethical guidelines. Students were instructed to use AI as a support tool rather than as a substitute for independent thinking and collaborative participation. The unit of analysis in this study was the AI-assisted collaborative learning space itself, which included classroom interaction, collaborative group practices, lecturer-designed learning rules, and student engagement with AI technologies. Thus, the learning environment was understood as a socio-academic ecosystem involving both human interaction and technological mediation.

Participants

The participants consisted of nine focal informants, including eight undergraduate students and one teaching lecturer who facilitated the class. Participant selection was conducted using purposive sampling based on relevance to the research focus. The selected students were active participants in collaborative learning activities, had experience using artificial intelligence during the course, and were willing to participate in interviews and reflective journals. To strengthen analytical variation, students were selected to represent different levels of AI utilization, namely high, medium, and low intensity users. This variation was considered important because students' experiences in developing academic identity may differ according to technological familiarity, confidence in AI use, and patterns of participation in collaborative tasks. The lecturer participant was selected because of their role in designing collaborative activities, regulating AI use, facilitating interaction, and evaluating student contributions throughout the learning process.

Instruments and Data Sources

The study employed four main data sources to strengthen credibility through methodological triangulation (Morgan, 2024). These sources included classroom observation, in-depth interviews, reflective journals, and learning artifacts.

a. Classroom Observation

Classroom and group observations were conducted during four collaborative sessions across the eight-week learning period. Observations were limited non-participant observations, in which researchers observed interactional processes without intervening directly in learning activities. Observation focused on patterns of participation, negotiation of arguments, forms of AI use, collaborative role distribution, and recognition of contributions within groups. Field notes documented interaction sequences, forms of technological mediation, and emerging analytical reflections.

b. In-Depth Interviews

Semi-structured interviews were conducted with all student informants and the teaching lecturer. Student interviews explored experiences related to academic confidence, learning agency, legitimacy of contribution, and perceptions of AI-assisted collaboration. Lecturer interviews focused on learning design, classroom management, AI integration strategies, and assessment considerations. Interview duration ranged from 30–45 minutes for students and approximately 45–60 minutes for the lecturer. All interviews were audio-recorded with participant consent and transcribed verbatim for analysis.Examples of interview prompts included: "How does AI influence your confidence in participating during discussions?", "Can you describe a moment when AI affected your role within the group?", and "How do you determine whether AI-assisted contributions still reflect your own academic thinking?" These prompts were designed to capture both cognitive and identity-related experiences during collaborative learning.

c. Reflective Journals

Students completed reflective journals in five cycles during the research period. The journals were guided through structured prompts to maintain consistency across reflections. The reflective journals focused on meaningful learning experiences, challenges in collaboration, the role of AI in academic tasks, and perceived changes in confidence and

participation. Reflective writing allowed researchers to access internal experiences that were not always visible during classroom observation. Examples of reflective prompts included: "Describe how AI influenced your participation this week," "What challenges did you experience when using AI collaboratively?", and "Do you feel your academic voice became stronger or weaker during the learning process? Explain why."

d. Learning Artifacts

Learning artifacts were collected to connect participant narratives with observable academic practice. These artifacts included assignment drafts before and after revision, collaborative discussion summaries, lecturer instructions, rubric documents, and approved traces of AI-assisted revisions that did not contain sensitive information. The artifacts were analyzed to identify changes in academic language, argument structure, and contribution patterns within collaborative work.

Procedures

The research procedure was conducted in three stages. The preparation stage in the first week involved coordination with the lecturer, identification of collaborative learning activities, ethical approval, and participant orientation regarding confidentiality and voluntary participation. The data collection stage occurred from the second until the seventh week and involved classroom observation, periodic reflective journal collection, interviews, and documentation of learning artifacts. The final stage in the eighth week focused on data clarification, preliminary interpretation confirmation, and limited member checking with selected participants.

Analysis Plan

Data were analyzed using thematic analysis conducted iteratively and systematically (Kushnir, 2025). Researchers first familiarized themselves with all observation records, interview transcripts, reflective journals, and learning artifacts. Initial coding was then conducted on data segments relevant to the study focus, including academic agency, confidence in argumentation, legitimacy of contribution, AI reliance, participation inequality, and academic language development. Examples of initial codes included "waiting for peer direction," "AI-assisted confidence," "recognition from group members," "fear of being judged," and "unequal participation due to AI literacy." These codes were subsequently categorized into broader themes such as academic agency development, legitimacy negotiation, and participation inequality. The analysis also incorporated temporal comparison by examining differences between the beginning and end of the learning process to identify patterns of identity transformation. Cross-source triangulation was applied by comparing evidence from interviews, observations, journals, and artifacts to ensure consistency and analytical rigor (Maina et al., 2025). The findings were then synthesized into an interpretive model illustrating the relationship between collaborative learning practices, AI mediation, and academic identity formation.

Researcher Positionality and Reflexivity

The researchers acknowledge that their interpretations were shaped by their academic backgrounds and prior engagement with higher education and technology-assisted learning. Because the researchers observed classroom interaction within a specific educational context in Papua, reflexive awareness was maintained throughout the study to minimize interpretive bias. Reflective memos were written during data collection and analysis to critically examine assumptions, participant relationships, and emerging interpretations. The researchers also continuously compared observational evidence with participant narratives and learning artifacts to maintain analytical balance and credibility (Chand, 2025).

Ethical Considerations

To ensure trustworthiness and credibility, the study applied triangulation of methods and data sources, member checking, audit trail documentation, and systematic cross-data verification for each major theme (Biddix & Bourke, 2025). Participation was voluntary and based on informed consent. Participant identities were anonymized, and all collected data were securely stored in accordance with ethical principles of qualitative research (Alhabsi, 2024). All AI interaction records and collaborative artifacts were collected only with participant approval and were anonymized prior to analysis. Participants were also informed that their involvement in the study would not influence academic grading or classroom evaluation.

RESULTS AND DISCUSSION

Academic Agency Development in AI-Mediated Collaboration

The findings indicate that artificial intelligence appears to support the development of students' academic agency, particularly in relation to learning initiative, decision-making, and control over academic contributions. During the early phase of the learning process, several students tended to wait for direction from dominant peers and participated

passively in group discussions. However, over the eight-week learning period, some students gradually became more active by proposing argument structures, suggesting conceptual alternatives, and revising the logical flow of discussions. AI was frequently used to generate initial ideas, organize work steps, and evaluate argument coherence before students presented ideas to their groups.

One student explained the shift in participation patterns: "*I used to wait for a smart friend to join me, now I can start from AI to make a skeleton, after that I dare to give proposals to the group*." (M1, November 03, 2025). Another student described how AI supported decision-making during collaborative work: "*If there is an assignment, I use AI to check the steps, so during the discussion I not only participate, but can say, 'this is a neater order'*." (M3, November 08, 2025). Similarly, another participant emphasized that AI functioned as a stimulus rather than a replacement for human thinking: "*AI is like a lighter. But what makes me feel 'this is my job' is when I choose what is suitable and what is not*." (M5, November 14, 2025). The lecturer also observed changes in students' initiative and classroom participation: "*I see some who were initially silent, the more they start to move forward, they come with concepts, bring designs, and look more prepared*." (D, November 18, 2025). However, several negative cases also emerged. Some students who relied heavily on AI-generated suggestions became hesitant when collaborative discussions shifted direction unexpectedly. In these situations, students occasionally struggled to continue arguments independently without AI support, indicating that technological assistance did not always translate into sustained analytical engagement.

These findings suggest that academic agency in AI-mediated collaboration is associated not only with technological support, but also with students' ability to critically negotiate AI outputs before integrating them into collaborative interaction. In collaborative learning contexts, agency develops when learners gain opportunities to participate actively in decision-making and contribution negotiation (Bender, 2023; Zhou et al., 2025). The findings are also consistent with the argument that human–AI interaction may function as a preparatory space for academic participation, allowing students to validate ideas before entering discussion forums (Dash et al., 2025). Similar to previous studies, the present research found that AI-assisted learning may encourage greater student participation, initiative, and engagement in collaborative academic activities. Earlier research generally emphasizes the role of AI in supporting learning effectiveness, academic performance, and cognitive preparation.

However, this study differs from previous research because it specifically examines how academic agency is socially constructed and negotiated within AI-mediated collaborative interaction, rather than focusing solely on learning outcomes or technological efficiency. The findings demonstrate that academic agency is not formed merely through access to AI tools, but through students' ability to critically interpret, adapt, and justify AI-generated outputs within collaborative academic spaces. In this sense, agency emerges through the interaction between technological mediation, peer recognition, and participation dynamics.

Importantly, the Papua context contributes analytically to this finding because students' varying exposure to digital technology shaped how confidently they engaged with AI-assisted participation. In peripheral educational settings where technological experience and infrastructure are uneven, academic agency is influenced not only by cognitive readiness, but also by digital familiarity and accessibility. Therefore, the development of academic identity in this study cannot be separated from the broader socio-technological realities of higher education in Papua. The novelty of this study lies in its integration of academic agency, collaborative learning, and AI mediation within a peripheral higher education context that remains underrepresented in global literature. Furthermore, this study highlights that AI-assisted participation may simultaneously function as a mechanism of empowerment and a source of participation inequality, depending on students' technological readiness and social positioning within collaborative groups.

Confidence in Articulating Scientific Arguments

The second theme shows that artificial intelligence was associated with increased confidence in composing and articulating scientific arguments, particularly in relation to academic language, reasoning structure, and willingness to participate in group discussion. At the beginning of the learning period, several students expressed fear of making mistakes or using inappropriate academic terminology. AI-assisted preparation enabled students to independently rehearse arguments before collaborative interaction by checking sentence structure, simplifying concepts, and evaluating logical coherence.

One student explained: "*I am usually afraid to talk about it, afraid of the wrong term. But after I tried AI to help me clean up sentences, I became more confident in explaining it to my friends*." (M2, November 05, 2025). Another participant stated: "*Before the discussion, I asked the AI, 'does my argument make sense?' So when I speak, I already have a handle*." (M4, November 10, 2025). A student also reflected on changes in academic language use: "*In the past, my writing was a lot of conversational language. Now I can change it to be more academic, and it makes me feel more*

'student'." (M6, November 16, 2025). The lecturer similarly observed improvements in argument structure during presentations and collaborative discussion: "*Their arguments are getting more organized. Not only is it long, but it is connected, there is a reason, there is a conclusion*." (D, November 20, 2025). Nevertheless, several students admitted that they occasionally became overly dependent on AI-generated academic phrasing and found it difficult to explain concepts spontaneously without technological assistance. This indicates that improved confidence did not always correspond with equally strong conceptual mastery.

The findings indicate that AI-assisted preparation may reduce psychological barriers associated with academic participation, particularly in collaborative learning environments. Previous studies demonstrate that AI-supported writing feedback can strengthen academic language readiness and reduce anxiety when students critically evaluate generated outputs (Song & Song, 2023; Pertiwi et al., 2025). Similarly, Sharshova et al. (2025) argue that the educational value of AI-assisted writing depends largely on students' self-regulation and selective engagement with AI-generated content. In line with these previous studies, the present research also found that AI-assisted support may contribute to improved confidence, academic communication, and participation readiness among students. Earlier studies generally emphasize the effectiveness of AI in improving writing quality, language accuracy, and learning performance, particularly within digital learning environments.

However, this study differs from previous research because it examines confidence development not only as a cognitive or linguistic outcome, but also as a process of academic identity construction within collaborative interaction. The findings show that students' confidence emerged through the interplay between AI-assisted preparation, peer interaction, recognition within group discussions, and opportunities to participate academically. In this context, confidence was not merely related to language improvement, but also to students' perceptions of legitimacy, belonging, and academic voice within collaborative learning spaces.

Within the Papua context, confidence development was also shaped by educational and linguistic diversity. Several students came from educational backgrounds with limited exposure to formal academic discourse and digital academic tools, making AI-assisted language scaffolding particularly meaningful for participation in higher education discussion spaces. Consequently, AI functioned not only as a technological aid, but also as a bridge toward academic communication practices that some students had previously perceived as inaccessible. The novelty of this study lies in its ability to position AI-assisted confidence development within a broader socio-cultural and peripheral educational context, where unequal digital exposure and academic communication experiences significantly shape students' participation dynamics. Furthermore, this study highlights that AI-assisted confidence may simultaneously empower students academically while also revealing structural inequalities related to technological familiarity, access, and educational background.

Legitimacy and Authenticity of Contributions in Group Work

The third theme demonstrates that artificial intelligence appears to reshape the legitimacy of student contributions in collaborative learning. Students who effectively used AI to improve writing structure, summarize concepts, or organize arguments often gained greater visibility and recognition within groups. However, this recognition was simultaneously accompanied by questions regarding authenticity and ownership of ideas.

One participant explained: "*At first, I was considered to be just a follower. But when I helped clean up the arguments using AI, my friend said, 'This is so easy to read.' I feel like my contribution is finally visible*." (M7, November 06, 2025). Another student noted: "*I'm not always the one who talks much, but I'm the one who makes neat group writing. After that, my friends started asking me too*." (M1, November 12, 2025). At the same time, concerns regarding authenticity emerged: "*Someone once said, 'that AI has words.' I answered, I choose and adjust. But yes, it still makes me think*." (M4, November 17, 2025). The lecturer reinforced the importance of accountability: "*I always emphasize, AI is a tool. What is assessed is the thought process and the way they account for the results in the discussion*." (D, November 22, 2025). Several students also expressed discomfort when peers perceived AI-assisted work as less authentic, even when substantial revision and interpretation had been conducted independently. These experiences created moments of hesitation and self-doubt regarding whether their contributions were academically legitimate. To provide a concise overview of the core findings, Table 1 summarizes the main dimensions of academic identity formation identified throughout the collaborative learning process.

These findings suggest that legitimacy within AI-mediated collaboration is socially negotiated rather than determined solely by the final academic product. Existing literature on academic integrity demonstrates that generative AI technologies create uncertainty regarding ownership, contribution, and accountability in higher education settings (Nagpal, 2024; Jin et al., 2025). Similarly, Eze (2024) argues that academic legitimacy increasingly depends on transparency of reasoning processes rather than merely the quality of final outputs. In line with previous studies, the present research also found that AI-assisted learning influences how students' contributions are recognized, evaluated,

and negotiated within collaborative academic environments. Earlier studies generally emphasize concerns regarding academic integrity, authorship, and accountability in the use of generative AI technologies in higher education.

Table 1. Core Findings of Academic Identity Formation in AI-Mediated Collaboration

Aspect	Key Findings	Identity Implications
Academic agency	Students became more active in initiating ideas and organizing arguments through AI-assisted preparation	Increased sense of participation and academic control
Argument confidence	AI-supported preparation improved students' confidence in academic communication	Stronger academic voice and discussion readiness
Contribution legitimacy	AI-assisted contributions gained recognition but also triggered authenticity negotiation	Legitimacy became socially negotiated within groups
Participation inequality	Unequal AI literacy and digital access shaped participation and influence	Academic identity development became uneven across students

However, this study differs from prior research because it examines legitimacy not only as an ethical or procedural issue, but also as a dynamic process of academic identity negotiation within collaborative interaction. The findings demonstrate that students' legitimacy was shaped through peer recognition, contribution visibility, technological competence, and the ability to justify AI-assisted work academically. In this context, legitimacy extended beyond the final quality of academic products and became closely related to how students socially positioned themselves within collaborative learning spaces.

The Papua context further intensified these legitimacy negotiations because unequal technological familiarity influenced perceptions of competence within collaborative groups. Students with stronger AI literacy were often viewed as more academically capable, even when these differences were partially shaped by unequal prior exposure to technology rather than intellectual capacity alone. Consequently, legitimacy in collaborative learning became intertwined with digital capital and technological confidence. The novelty of this study lies in its integration of academic legitimacy, collaborative learning, and AI mediation within a peripheral higher education context that remains underrepresented in global literature. Furthermore, this study highlights that legitimacy in AI-mediated collaboration is simultaneously shaped by technological capability, social recognition, access inequality, and contextual educational realities, thereby extending existing discussions on academic integrity beyond issues of plagiarism and authorship toward broader questions of participation, recognition, and identity formation. Figure 1 illustrates the process of academic identity formation in AI-mediated collaborative learning environments.

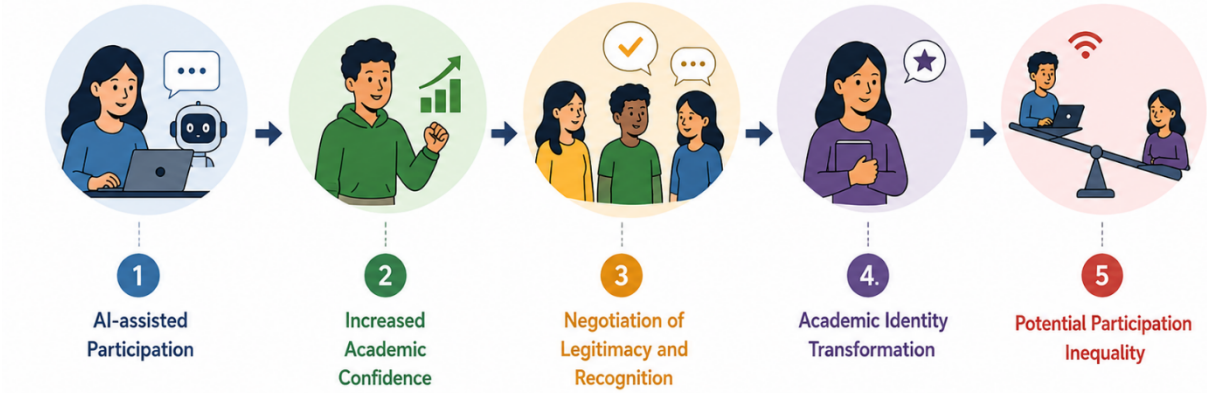

Figure 1. Process of Academic Identity Formation in AI-Mediated Collaboration

Figure 1 illustrates the process of academic identity formation within AI-mediated collaborative learning environments. The process begins with AI-assisted participation, which contributes to increased academic confidence and more active engagement in collaborative discussion. As interaction develops, students experience negotiation of legitimacy and recognition regarding their AI-assisted contributions, particularly in relation to authenticity and academic accountability. These experiences gradually shape students' academic identity transformation within collaborative learning spaces. However, differences in AI literacy, technological familiarity, and digital access may also create unequal participation and influence among students, especially within peripheral educational contexts such as Papua..

Digital Literacy Inequality and Uneven Participation

The fourth theme indicates that differences in digital literacy and intensity of AI use were associated with variations in participation and influence during collaborative learning. Students who were more familiar with AI technologies tended to contribute more actively, produce faster summaries, and influence discussion directions more strongly. In contrast, students with limited digital literacy or unstable internet access frequently occupied more peripheral positions within collaborative interaction.

One student explained: "*My friend is quick to use AI, I'm still confused about what to ask. In the end, I followed their decision a lot.*" (M8, November 04, 2025). Another participant highlighted access barriers: "*If the network is bad, I can't help much. When they are online again, they are almost finished.*" (M2, November 09, 2025). A student with stronger AI literacy stated: "*If I come to bring a quick summary of AI, my friends immediately use it. So I feel like I have more influence, even though I don't intend to dominate*." (M5, November 15, 2025). The lecturer also acknowledged unequal participation dynamics: "*I see that some are fast because they are used to technology, some need time. If it is not regulated, it can become more dominant*." (D, November 25, 2025). Importantly, not all students experienced identity development positively. Several participants reported feelings of exclusion, reduced confidence, and hesitation to contribute because they perceived themselves as less technologically capable than their peers. In some collaborative situations, students with lower AI literacy became passive followers who accepted group decisions without substantial participation. These findings indicate that AI-mediated collaboration may simultaneously create opportunities for empowerment and risks of marginalization.

The findings align with digital inequality research showing that differences in technological literacy and access directly shape learning participation and educational outcomes (Robinson et al., 2020; Miah, 2024). Similarly, (Balouch et al., 2025) and Niemi (2024) emphasize that AI literacy and self-regulation strongly influence students' experiences in AI-supported learning environments. In line with previous studies, the present research also found that unequal digital readiness significantly affects students' participation, confidence, and influence within collaborative learning environments. Earlier research generally highlights how technological access and AI literacy contribute to differences in academic performance, engagement, and learning opportunities in digital education contexts. However, this study differs from prior research because it examines digital inequality not only as a technological or infrastructural issue, but also as a social and identity-related process within AI-mediated collaboration. The findings demonstrate that unequal AI literacy and access influenced how students positioned themselves within group interaction, how their contributions were recognized, and how much influence they exercised during collaborative activities. In this context, participation inequality emerged not merely from differences in academic ability, but also from unequal technological familiarity, confidence, and opportunities for digital engagement.

Analytically, the Papua context is highly significant because infrastructural inequality, unstable internet connectivity, and uneven prior exposure to digital learning technologies created differentiated conditions of participation. In this setting, AI did not function as a neutral educational tool, but interacted with broader structural inequalities related to access, literacy, and educational opportunity. Therefore, the findings suggest that AI-mediated collaboration in peripheral regions requires pedagogical strategies that actively address unequal technological readiness rather than assuming equal participation conditions among students. The novelty of this study lies in its ability to connect digital inequality, academic identity formation, and AI-mediated collaboration within a peripheral higher education context that remains underrepresented in global discussions on educational technology. Furthermore, this study highlights that AI-assisted learning may simultaneously expand academic participation opportunities while also reproducing existing structural inequalities, particularly in educational settings characterized by uneven digital infrastructure and socio-technological access.

CONCLUSION

This study indicates that artificial intelligence-assisted collaborative learning appears to contribute to the formation and transformation of students' academic identities in higher education contexts. The findings reveal four major insights. First, AI-mediated collaboration was associated with increased academic agency, as students became more willing to initiate ideas, organize arguments, and participate actively in group discussions. Second, AI-supported preparation contributed to stronger confidence in articulating scientific arguments through improvements in academic language, reasoning structure, and discussion readiness. Third, AI-assisted collaboration reshaped the legitimacy of contributions within groups, where students experienced both increased recognition and negotiation regarding authenticity and academic accountability. Fourth, differences in digital literacy, technological familiarity, and internet access created unequal participation patterns, causing some students to gain stronger influence while others remained more peripheral in collaborative interaction. Overall, the findings suggest that academic identity development in AI-

mediated learning environments is shaped not only by technology itself, but also by social recognition, collaborative negotiation, and contextual educational conditions, particularly within peripheral educational settings such as Papua.

Practically, these findings highlight the importance of developing inclusive pedagogical strategies in AI-assisted higher education learning, including AI literacy scaffolding, transparent group-role distribution, and process-based assessment mechanisms that emphasize critical reasoning and accountability rather than final outputs alone. In addition, collaborative learning design should ensure that students with lower technological familiarity are not marginalized during AI-mediated interaction. This study has limitations because it was conducted within a single class, involved a limited number of focal informants, and was carried out over an eight-week period, so the findings cannot fully represent long-term academic identity formation or broader higher education contexts. Therefore, future research is recommended to involve multiple institutions and disciplinary settings, apply longer observation periods, and integrate qualitative and quantitative approaches to generate a more comprehensive understanding of how artificial intelligence shapes academic identity, participation, and learning dynamics in diverse educational environments.

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AUTHOR CONTRIBUTION STATEMENT

PJK initiated the research idea, designed the study, and led the manuscript writing. YM contributed to field data collection and documentation of the collaborative learning process. TB conducted data analysis and interpreted the findings related to the dynamics of academic identity. ABPH contributed to strengthening the theoretical framework and provided critical revisions to the manuscript. All authors contributed to the discussion of the results and approved the final version of the article.

AI DISCLOSURE STATEMENT

In the process of preparing this manuscript, the authors made limited use of artificial intelligence–based tools to assist in improving clarity of expression and language structure. Nevertheless, all ideas, analyses, and interpretations presented in this study are entirely the authors' own. The manuscript has been carefully reviewed and refined by the authors, who take full responsibility for the content of this publication.

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