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ARTIFICIAL INTELLIGENCE AS A WRITING SCAFFOLD: HIGHER EDUCATION STUDENTS' EXPERIENCES WITH AI-SUPPORTED ACADEMIC WRITING

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Abstract
The rapid adoption of artificial intelligence (AI) in higher education has reshaped students' academic practices, particularly in relation to academic writing. While prior studies have largely examined attitudes or perceived effectiveness of AI-based tools, limited attention has been given to how AI-supported writing unfolds as a learning process shaped by student agency, contextual constraints, and reflective practice. Addressing this gap, the present study adopts a qualitative, process-oriented perspective to explore how higher education students experience and perceive the use of ChatGPT in supporting academic writing. Using a qualitative research design, semi-structured interviews were conducted with nine higher education students representing language studies, social sciences, and exact sciences. Data were analysed thematically to capture patterns related to writing support, perceived learning processes, challenges, and students' strategies for reflective and critical AI use. The findings indicate that ChatGPT supports academic writing by reducing initial barriers to writing, enhancing engagement and motivation, and providing personalised feedback that facilitates language development and revision. Students reported improvements in writing quality and increased confidence, suggesting that AI can function as both cognitive and affective scaffolding. However, these benefits were accompanied by concerns regarding rigid or inconsistent AI-generated responses, uneven technological competence, and limited institutional guidance. Importantly, students demonstrated critical awareness by evaluating AI outputs and combining them with other academic sources, highlighting reflective and responsible use rather than passive reliance. Overall, the study conceptualises AI-supported academic writing as a dynamic and mediated learning process rather than a discrete technological intervention. By proposing a process-oriented qualitative model, this study contributes to ongoing debates on AI in higher education and underscores the need for pedagogical strategies and institutional frameworks that promote ethical, reflective, and learning-oriented integration of AI technologies.
Keywords: artificial intelligence, academic writing, higher education students, qualitative research, AI-supported learning.

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INTRODUCTION

The rapid expansion of artificial intelligence (AI) technologies has significantly reshaped higher education, particularly in how students engage with academic learning tasks such as writing. AI-based applications are increasingly embedded in students' everyday academic practices, offering support for idea generation, language refinement, feedback, and revision. Within educational contexts, AI has been associated with its capacity to personalise learning, provide immediate feedback, and assist learners in managing cognitively demanding tasks (Kukulska-Hulme, 2021). From a conceptual perspective, AI refers to intelligent systems capable of perceiving their environment and acting in ways that maximise goal achievement (Russell & Norvig, 2021), highlighting its adaptive and decision-support functions in learning environments.

Recent advances in large language model–based applications, such as ChatGPT, have intensified scholarly attention to AI-supported academic writing. Existing studies have documented the pedagogical potential of such tools in supporting language use, idea development, and revision processes, positioning AI as a complementary resource rather than a replacement for human instruction (Jeon, 2023). Empirical evidence also suggests that students' acceptance of AI-based tools is closely linked to perceived usefulness and ease of use, indicating that adoption is driven largely by practical learning experiences rather than technological novelty (Fuentes et al., 2024).

Despite these promising findings, the integration of AI into higher education remains characterised by pedagogical and ethical tensions. While AI-based applications are often praised for efficiency and convenience, concerns persist regarding overreliance, rigid or inaccurate outputs, diminished originality, and potential challenges to academic integrity. Prior research has reported ambivalent student perceptions, in which enthusiasm for AI's learning benefits coexists with scepticism about its limitations and risks (Saputra, 2023). However, much of the existing literature has approached AI use through attitudinal surveys or outcome-based evaluations, offering limited insight into how students actually experience AI use as an ongoing learning practice.

More critically, current research has largely overlooked the process-oriented nature of AI-supported academic writing. AI use is frequently treated as a discrete intervention, rather than as a dynamic and iterative practice shaped by learners' engagement, self-regulation, critical judgement, and contextual constraints. As a result, there remains insufficient understanding of how higher education students move from initial AI adoption to learning support, perceived learning processes, learning outcomes, and reflective or critical use over time. This gap is particularly significant given growing concerns about responsible AI use and the need to balance pedagogical benefits with ethical and academic considerations.

Addressing this gap, the present study adopts a qualitative, process-oriented perspective to examine how higher education students experience and perceive the use of AI-based applications—specifically ChatGPT—in supporting academic writing. Rather than focusing solely on issues of acceptance or perceived effectiveness, this study investigates students' lived experiences of engaging with AI, including the ways AI supports their writing processes, the benefits they perceive, the challenges they encounter, and the reflective practices they develop when interacting with AI-generated output. In particular, the study explores how AI use relates to students' engagement and motivation, the provision of personalised feedback, and the development of writing-related language skills, while also examining students' critical awareness of AI's pedagogical value and limitations. In addition, the study identifies contextual and individual constraints that shape AI-supported writing practices, such as variations in technological competence and the availability of institutional guidance. By synthesising these dimensions, the study aims to develop a process-oriented qualitative model that explains how AI-supported academic writing evolves over time and how students exercise critical and reflective judgement in using AI tools. Through this approach, the study contributes to ongoing debates on AI in higher education by moving beyond instrumental and attitudinal accounts

toward a more nuanced, learner-centred understanding of AI-supported academic writing as a dynamic and mediated learning practice.

METHOD

Research Design

This study adopted a qualitative descriptive research design to obtain an in-depth understanding of how higher education students experience, perceive, and negotiate the use of artificial intelligence (AI)–based applications in academic writing. A qualitative approach was considered appropriate given the study's focus on exploring students' lived experiences, perceptions, and reflective practices, rather than measuring predetermined variables or testing causal relationships.

Data were collected through semi-structured interviews, which allowed the researcher to maintain consistency across participants while remaining flexible in probing emergent issues relevant to AI-supported writing practices. This approach enabled participants to articulate not only the perceived benefits of AI use, but also the challenges, ethical considerations, and adaptive strategies they employed when interacting with AI tools. As suggested by Patton (2002), semi-structured interviews are particularly effective for capturing nuanced perspectives and uncovering patterns of meaning within participants' narratives.

Research Participants

The participants in this study were five higher education students enrolled in the fifth semester at a university in Pontianak, Indonesia. All participants had prior experience using AI-based applications, particularly ChatGPT, to support their academic writing tasks. Participants were selected through purposive sampling, based on their active engagement in academic writing activities and their familiarity with digital learning technologies.

The selected participants represented students who regularly interacted with AI tools during coursework, making them well positioned to reflect on the pedagogical value, limitations, and ethical implications of AI-assisted writing. Their perspectives provided rich insights into how AI is integrated into everyday academic practices and how students exercise agency, critical judgment, and reflective use when engaging with AI-based applications.

Data Collection Techniques and Instruments

Data were collected through individual semi-structured interviews, conducted to explore participants' experiences with AI-supported academic writing. The interviews focused on several key areas, including: (1) students' experiences using AI-based applications in writing, (2) perceived impacts of AI on engagement, learning processes, and writing quality, (3) challenges and constraints encountered during AI use, and (4) students' recommendations for future and responsible use of AI in learning.

Each interview was audio-recorded with participants' consent to ensure accuracy and completeness of the data. The recordings were then transcribed verbatim to facilitate systematic analysis. An interview guide was used as the primary research instrument, consisting of guiding questions and prompts designed to elicit detailed reflections while allowing participants to elaborate on issues they considered important. This flexible structure enabled the emergence of unanticipated themes related to learner agency, critical evaluation, and contextual constraints, which later informed the development of the qualitative frameworks presented in the findings.

Data Analysis

The data were analysed using a thematic analysis approach, following an iterative and inductive process. First, the interview transcripts were read repeatedly to achieve familiarisation with the data. Initial codes were then generated to capture meaningful segments related to AI use, learning

processes, outcomes, challenges, and reflective practices. These codes were subsequently grouped into broader themes that represented recurring patterns across participants' accounts.

Through this process, themes such as engagement and motivation, personalised learning support, language development, learner confidence, technological competence, and institutional constraints were identified. The relationships among these themes were further examined to construct a process-oriented and relational understanding of AI-supported academic writing practices. This analytical approach allowed the study to move beyond surface-level categorisation and to develop conceptual models that illustrate how AI use unfolds dynamically over time, as reflected in the framework diagrams presented in the findings section.

RESULTS AND DISCUSSION

This qualitative study, based on in-depth interviews with five higher education students, as can be learnt from figure 1, examined: (1) students' experiences using AI-based applications to support writing, (2) perceptions of AI's role in writing development, (3) challenges encountered during AI integration, and (4) recommendations for future use. Across interviews, AI—particularly ChatGPT—was generally perceived as enhancing students' writing-related learning experiences through three interrelated benefits: increased engagement and motivation, personalised learning support, and improvement in language-related writing skills. However, these benefits were accompanied by concerns about response reliability, rigidity in AI-generated text, uneven user competence, and limited institutional guidance.

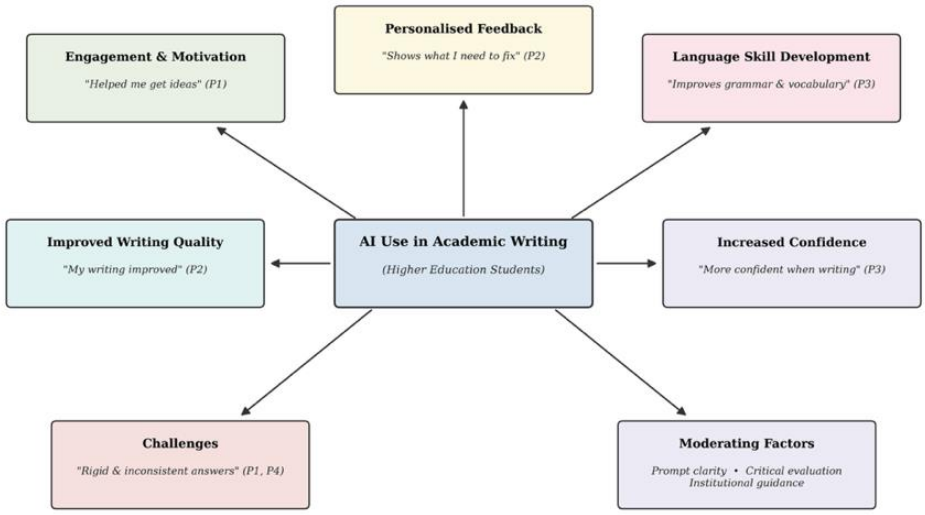

Figure 1. A Qualitative Model of AI-Supported Academic Writing in Higher Education

AI-Based Applications Enhance Students' Learning Experiences

Increased Engagement and Motivation

Most participants described AI as an accessible "starting point" that reduced initial barriers in writing, especially during idea generation and early drafting. AI support was viewed as motivating because it provided immediate responses and rapid feedback on grammar and word choice, enabling students to revise in real time. For example, one participant noted that AI supported brainstorming: *"ChatGPT helped me come up with an idea I wanted to write about"* (P1). Another participant emphasised how AI followed instructions and improved output quality: *"This AI can respond to instructions effectively and significantly enhance the quality of my writing"* (P2). Overall, students reported that instant feedback made writing feel more manageable, interactive, and motivating.

Personalisation of Learning Support

Participants reported that AI feedback felt personalised because it could be adjusted to their specific prompts and writing needs. Students valued AI suggestions that highlighted what needed improvement, supporting self-correction and independent learning. As one participant stated: *"AI has been very helpful… it also shows me what I need to fix in my work"* (P2). Another participant highlighted language development benefits: *"It improves vocabulary and grammar, provides ideas and suggestions… and enhances my overall writing skills"* (P3). These accounts suggest AI served as a scaffold—helping students identify weaknesses and practise targeted revisions.

Improvement in Writing-Related Language Skills

Participants commonly reported improvement in sentence structure, vocabulary use, coherence, and grammar accuracy. They perceived their writing as becoming more polished and organised after using AI suggestions. One participant remarked: *"My writing could easily be improved by this AI"* (P2). Another participant described both idea support and grammar learning: *"I was provided with many ideas… and I learned to write well and organise grammar effectively"* (P3). These narratives indicate that AI was used not only for generating text but also for refining linguistic form and structure.

Students' Perceptions of AI-Based Applications

Positive Perceptions and Continued Use Intentions

Students generally viewed AI as useful beyond writing, reporting intentions to continue using it for academic support. For instance: *"I will keep using ChatGPT because it is very useful not only for writing but also for other tasks"* (P2). Similarly: *"It is quite effective… helpful for completing essays and other writing tasks"* (P3). These responses suggest perceived utility, convenience, and broad applicability.

Concerns and Scepticism

Alongside positive views, participants raised concerns about AI limitations—particularly rigid grammar, unnatural phrasing, and occasional inaccuracies. One participant stated: *"ChatGPT seems somewhat lacking in human writing ability due to its very rigid grammar"* (P1). Another noted: *"Sometimes [it is] inaccurate and its grammar is rigid"* (P2). This indicates that students did not perceive AI as a flawless substitute for human judgement and recognised quality risks when AI output is adopted uncritically.

Variation in Technological Competence

Participants differed in their ability to use AI effectively. Some highlighted the importance of prompt clarity—*"This AI can be used effectively if we provide clear commands"* (P2)—while others reported confusion and lack of understanding: *"Honestly, I'm confused… I don't understand it at all"* (P5). This variation suggests that benefits from AI are partly dependent on students' digital fluency and prompt-writing skills.

Challenges and Barriers to AI Integration

Three challenges were most salient: (1) inconsistent or variable responses across prompts, (2) a learning curve in understanding how to prompt AI effectively, and (3) limited institutional support. One participant described response inconsistency: *"Every time we give commands… the answers… are always different"* (P4). Others emphasised that successful use requires experience and practice: *"Since I am still new… I don't fully understand it yet"* (P5). Participants also noted the absence of clear guidance from their institutions, raising concerns about using AI in everyday learning contexts without a reliable framework.

Recommendations for Future Use

Participants recommended using AI as a supporting tool rather than a single authority, emphasising the need to cross-check AI outputs with credible sources. For example: *"Don't rely solely… because ChatGPT isn't always correct"* (P1). Another participant stated: *"I might continue using it, but I also need support from other websites or journals"* (P3). These suggestions indicate students' preference for balanced, critical, and multi-source learning practices.

To facilitate a clearer understanding of how students' experiences with AI-supported writing unfold, the qualitative findings are synthesised in Figure 2, which presents a process-oriented flow model of AI-supported academic writing practices. The model illustrates that students' engagement with AI does not occur as a single, isolated action, but rather as a progressive and interconnected process that begins with initial AI adoption and develops through multiple stages of learning support, perceived learning processes, and learning outcomes. Importantly, the model also highlights the reflective and critical dimension of AI use, as well as the constraints and moderating factors that shape students' experiences.

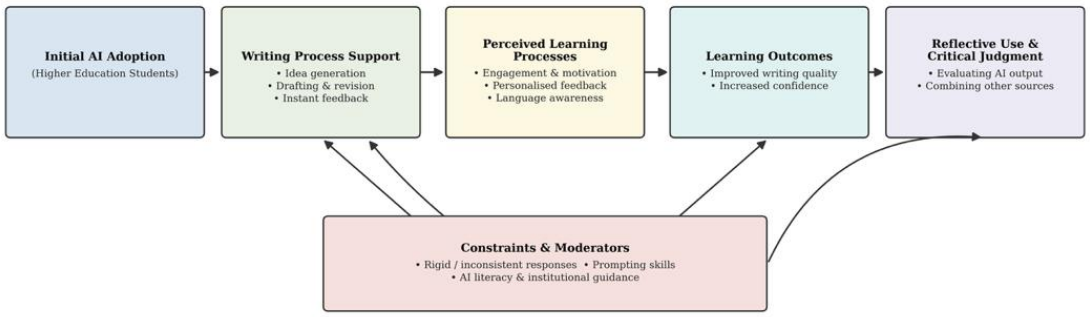

Figure 2. Process-Oriented Flow Model of AI-Supported Academic Writing Practices

Figure 2 presents a process-oriented flow model that illustrates how AI-supported academic writing practices unfold among higher education students over time. The model begins with initial AI adoption, reflecting students' entry point into using AI tools as part of their academic writing activities. As indicated by the first directional arrow, AI adoption leads to writing process support, where AI is primarily used to assist idea generation, drafting and revision, and to provide instant feedback. This stage captures students' practical engagement with AI as a tool that reduces initial writing barriers and accelerates revision processes.

The model then shows a progression from writing process support to perceived learning processes, highlighting how instrumental AI use translates into learning-related experiences. At this stage, students report increased engagement and motivation, exposure to personalised feedback, and heightened language awareness. These processes reflect not merely task completion, but active cognitive involvement in writing, suggesting that AI contributes to how students experience and regulate their learning during writing tasks.

Subsequently, the flow advances to learning outcomes, where the perceived learning processes result in improved writing quality and increased confidence. This stage represents the tangible outcomes of AI-supported writing, indicating that sustained interaction with AI can enhance both the quality of written work and students' affective responses to academic writing. The model further extends to reflective use and critical judgment, illustrating that students do not passively accept AI outputs. Instead, they evaluate AI-generated content and combine it with other academic sources, demonstrating learner agency and critical engagement.

Importantly, the model incorporates constraints and moderators that operate across multiple stages of the process. Factors such as rigid or inconsistent AI responses, students' prompting skills, and levels of AI literacy and institutional guidance influence how effectively AI supports writing processes and outcomes. The arrows from this component to both process and outcome stages emphasise that the educational value of AI is conditional rather than automatic. Overall, the diagram portrays AI-supported academic writing as a dynamic, iterative process shaped by both enabling practices and contextual constraints.

Discussion

This study contributes to the growing body of research on artificial intelligence in higher education by offering a process-oriented and learner-centred understanding of how AI-based applications, particularly ChatGPT, support academic writing practices. By integrating students' lived experiences with established theoretical and empirical work, the findings reveal that AI use in academic writing operates through interconnected cognitive, affective, and regulatory processes, rather than as a purely technical or productivity-driven tool.

AI as a Cognitive and Motivational Entry Point in Academic Writing

Consistent with prior studies (Sari, 2023; Gonzalez & Young, 2022), the findings demonstrate that AI-based applications play a significant role in reducing cognitive barriers at the early stages of writing, particularly during idea generation and initial drafting. Participants' descriptions of AI as a "starting point" suggest that AI functions as a cognitive load reducer, enabling students to focus on higher-order writing tasks such as organising arguments and refining language. This supports Sari's (2023) assertion that AI writing tools enhance engagement by easing the mental demands of brainstorming and revision, while also aligning with Gonzalez and Young's (2022) findings that real-time feedback fosters intrinsic motivation and experimentation in writing.

The motivational effects observed in this study further resonate with self-determination theory, as immediate feedback and rapid response cycles appear to increase students' sense of competence and control over the writing process. Rather than replacing effort, AI appears to lower entry anxiety, encouraging students to engage more actively with writing tasks.

Personalisation, Scaffolding, and Self-Regulated Learning

A central contribution of this study lies in demonstrating how AI-supported feedback is experienced as personalised and adaptive, corroborating theoretical arguments advanced by Lee and Trim (2020), Zawacki (2019), and Luckin (2016). Participants' ability to identify errors, reflect on weaknesses, and independently revise their work suggests that AI functions as a scaffolding mechanism, supporting learners within their zone of proximal development.

This finding aligns strongly with Hwang and Chang's (2021) work on AI-assisted learning environments, which emphasises AI's role in strengthening self-regulated learning. Similarly, Baker (2016) argues that AI systems can tailor feedback based on learner performance, a claim substantiated by participants' reports of targeted suggestions that addressed individual writing needs. Roll's (2015) assertion that AI enhances learners' capacity to monitor progress and set goals is also reflected in students' growing independence and reflective engagement with their writing processes.

Language Development and Writing Quality Enhancement

Participants' perceived improvements in grammar, vocabulary, coherence, and sentence structure echo findings from Kumar (2020), Xu (2022), and Almusharraf (2021), all of whom report that AI-supported writing tools contribute to enhanced linguistic accuracy and writing confidence. Importantly, the present study extends this literature by showing that language improvement is not merely a by-product of automated correction, but rather emerges through iterative interaction, reflection, and revision.

However, consistent with Almusharraf (2021) and Gao (2022), students also recognised that AI-generated text may lack depth, originality, and stylistic nuance. This duality reinforces the notion that AI is most effective when positioned as a supportive co-agent, rather than a substitute for human judgment or creativity.

Learner Agency, Critical Judgment, and Ethical Awareness

Contrary to deficit-oriented narratives suggesting passive reliance on AI, the findings reveal strong evidence of learner agency and critical evaluation. Students actively assessed AI outputs, recognised inaccuracies, and triangulated AI-generated suggestions with external academic sources. This mirrors Iskender's (2023) concern that uncritical reliance on AI may undermine editing skills, while simultaneously demonstrating that such risks can be mitigated when learners possess adequate AI literacy.

The importance of critical engagement also aligns with Lin's (2021) argument that AI-generated text lacks human reasoning and requires interpretive oversight. The study therefore supports a balanced pedagogical framing of AI, where ethical awareness and evaluative judgment are integral to AI-supported learning practices.

Technological Competence, Inequality, and Institutional Mediation

The variation in students' technological confidence observed in this study reflects findings by Zhang (2022) and Lee (2021), who argue that AI benefits are unevenly distributed and highly dependent on users' digital literacy. Students who understood how to formulate precise prompts reported more effective AI use, while others experienced confusion and frustration. This disparity underscores a critical equity issue: without structured support, AI may amplify existing digital divides.

Moreover, participants' concerns regarding inconsistent AI responses resonate with Kasneci's (2023) findings on variability in AI outputs, as well as Zawacki's (2019) observation that effective prompting remains a challenge in educational contexts. These challenges are further compounded by limited institutional guidance, a concern echoed by Liu (2021) and Park (2022), who caution that the absence of organisational frameworks can hinder meaningful AI integration in education.

Implications for Sustainable and Responsible AI Integration

Participants' recommendations for future AI use align with Jones (2021) and Hwang (2020), who advocate for blended learning ecologies in which AI complements, rather than replaces, traditional academic resources. Students' emphasis on cross-checking AI outputs and consulting scholarly sources highlights a growing awareness of responsible AI use and reinforces the need for institutional policies that promote ethical literacy, critical thinking, and reflective practice.

Taken together, the findings position AI-supported academic writing as a dynamic, iterative, and mediated process, shaped by cognitive scaffolding, learner agency, technological competence, and institutional context. By integrating empirical evidence with established theories of scaffolding, self-regulated learning, and AI literacy, this study advances a more nuanced understanding of AI's role in higher education—one that moves beyond simplistic narratives of efficiency or dependency toward a model of responsible, reflective, and pedagogically grounded AI use.

CONCLUSION

This study examined how artificial intelligence–based applications are experienced, perceived, and negotiated by higher education students in the context of academic writing. Drawing on in-depth qualitative interviews and synthesised through two complementary framework diagrams, the findings demonstrate that AI-supported writing is best understood not as a single technological intervention, but as a process-oriented and mediated learning practice shaped by cognitive, affective, and contextual factors.

The results show that AI-based applications, particularly ChatGPT, play a meaningful role in supporting students' writing practices by reducing initial barriers to writing, enhancing engagement and motivation, and providing personalised feedback that supports language development. When used reflectively, AI contributes to improved writing quality and increased confidence, indicating its potential to function as a form of cognitive and affective scaffolding. Importantly, the study also reveals that students are not passive recipients of AI output. Instead, they demonstrate agency through critical evaluation, selective adoption of AI suggestions, and the integration of additional academic sources, underscoring the importance of AI literacy and ethical judgment in AI-supported learning.

At the same time, the findings highlight persistent challenges that constrain the educational value of AI, including inconsistent responses, rigid language output, variations in technological competence, and limited institutional guidance. These constraints indicate that the benefits of AI are conditional rather than automatic, and that without appropriate pedagogical and institutional support, AI use may reinforce inequalities or encourage superficial engagement.

Overall, this study contributes a process-oriented qualitative model that advances understanding of how AI supports academic writing in higher education. By foregrounding learner agency, reflective practice, and contextual moderators, the study moves beyond binary narratives of AI as either beneficial or harmful. Instead, it positions AI as a pedagogical resource whose value depends on how it is embedded within learning design, supported by institutional frameworks, and aligned with principles of responsible and reflective academic practice.

Future research may build on these findings by examining AI-supported writing across diverse disciplinary contexts, exploring longitudinal impacts on writing development, and investigating how structured instructional interventions can enhance students' critical and ethical engagement with AI tools. Such efforts are essential to ensuring that AI integration in higher education remains pedagogically grounded, equitable, and oriented toward meaningful learning.

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