

Cultivating Reflective Students: Human-Centered Pedagogy in Technology-Driven Classrooms

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ABSTRACT

This study explores the ways in which technology-driven classrooms might foster reflective students through human-centered learning process. 15 students of IAIN Bone participated in the study, which used a qualitative approach. Semi-structured interviews and classroom observations were used to gather data in order to investigate how students' use of digital technology is influenced by reflective learning activities. To find patterns in both lecturer's teaching strategies and students' reflective replies, thematic analysis was carried out. The results show that students' capacity to use technology critically and morally, as opposed to dependency, was enhanced by reflective learning. Additionally, lecturer showed a better understanding of the moral implications of using technology into her lessons. The study's result that in a time when automation and artificial intelligence predominate, human-centered pedagogy, bolstered by reflective practice, can preserve the human element of learning. It suggests implementing organized reflection exercises in AI-assisted classrooms to support students' growth in accountability, empathy, and moral discernment when using technology.

Keywords: *Human-Centered Pedagogy, Reflective Students, Technology-Driven Classrooms.*

1) INTRODUCTION

Technology is drastically changing how schools function in today's educational environment. With the promise of increased efficiency, adaptive feedback, and personalization, artificial intelligence (AI), large-language models, and other digital tools are being incorporated into education more and more. However, there is growing fear that the human components of learning critical thinking, ethical reasoning, and empathy may be neglected as classrooms become more technology-driven. In order to address this, researchers and educators are advocating for a human-centered pedagogy that centers technological integration around students' moral development, agency, and introspection.

For deep learning, self-control, and ongoing development, reflective learning the process by students critically assess their own thoughts, behaviors, and beliefs has long been acknowledged as essential (Li, 2023). In addition to enabling new forms of reflection (such as video-based reflection and AI-mediated discourse), technology also offers rich data and feedback that promote metacognitive awareness, making reflection even more powerful when integrated with digital tools (Novoa-

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Echaurren et al., 2025). However, the problem still exists: how can lecturers create technologically advanced classrooms that encourage introspection rather of relying on just machines?

That question is the driving force behind the current investigation. The human element of learning must be maintained and even strengthened in environments where automation and artificial intelligence predominate. A convincing picture is provided by human-centered pedagogy, which sees AI and digital technologies as collaborators in a reflective process rather than as substitutes for human reasoning. Recent frameworks, for instance, stress learner autonomy, educator monitoring, and openness in AI-assisted design (Li, Fang, Zhang et al., 2025), confirming that humans should continue to play a key role in pedagogical decision-making.

Furthermore, there is growing evidence that carefully incorporated AI can improve students' capacity for reflection. Conversational agents like ChatGPT can act as "objects-to-think-with," supporting critical thinking and idea comprehension in STEM education, as demonstrated by Vasconcelos and dos Santos (2023). In a similar vein, Wei, Wang, Koszalka, Lee, and Liu (2025) discovered that pre-service lecturers' capacity for deeper reflective thought was enhanced by generative AI-supported digital storytelling.

These results imply that, when applied effectively, AI can increase rather than decrease students' moral and intellectual involvement. AI integration is not without its challenges, though. Particularly with LLM (Large Language Model)-based teaching tools, systematic studies draw attention to ethical issues as privacy, bias, and transparency (Yan, Sha, Zhao, Martinez-Maldonado, et al., 2023). The potential of AI could be compromised by unanticipated effects in the absence of intentional, human-centered design. Therefore, research into pedagogical methods that emphasize introspection and moral reasoning in technologically advanced environments is crucial.

Furthermore, lecturer development continues to be an essential component. Lecturers must reflect in order to apply human-centered, reflective teaching in AI-enhanced situations. Research on intelligent teaching analytics demonstrates that pre-service lecturers can enhance their professional development and pedagogical understanding through organized, data-driven collaborative reflection (International Journal of Educational Technology in Higher Education, 2025). Additionally, sustained lecturer learning is supported by reflective practice based on digital resources like peer-AI systems, dialogic reflection, and portfolios (Xerri, 2025; Subasman, 2024). There is a lack of qualitative research,

particularly in higher education settings, on how students engage in reflective learning in actual, technology-driven classrooms.

Additionally, little is known about how instructors handle ethical dilemmas when incorporating AI and how reflective practices affect students' behavior on the internet. Thus, this study investigates how human-centered pedagogy might foster reflective students in technology-driven classrooms through the use of organized reflecting activities. More precisely, it looks on (1) how reflective learning activities influence students' usage of digital technology and (2) how lecturers modify their pedagogical approaches in response to moral and ethical considerations.

In doing so, this study advances human-centered pedagogy and educational technology. It provides empirical understanding of how reflection might be methodically included into AI-rich learning environments to enhance lecturer agency and student growth. Such an investigation is not only topical but also crucial for developing students who act morally, think critically, and stay at the core of their own education at a time of growing automation.

2) METHODS

Research Design

In order to investigate how human-centered pedagogy and reflective learning techniques influence students' interaction with technology in a technology-driven classroom, this study used a qualitative research approach. Since the goal of the study was to obtain an extensive understanding of students' experiences, perspectives, and reflective behaviors when interacting with digital tools rather than to quantify learning results, a qualitative approach was chosen. Examining complex social and educational processes is a good fit for qualitative research, especially in contexts where interpersonal relationships and moral issues are crucial.

Research Site and Participants

The study was carried out at Indonesia's public Islamic university, IAIN Bone. The study concentrated on a single English language education class that used a variety of digital tools and AI-assisted platforms in addition to reflective learning activities.

Fifteen undergraduate students in all took part. Purposive sampling, which is suitable when participants have particular traits relevant to the topic being studied, was used to choose them. All

students were able to constructively address their reflective practices and technological involvement because they had all previously used digital technology for learning, including Learning Management Systems, mobile applications, and AI tools like ChatGPT. The course lecturer was also observed because the data reviewed included her teaching strategies and choices about technology integration.

Research Instruments

Three main instruments were used in this study:

1. Semi-Structured Interview Guide

This instrument consisted of open-ended questions designed to explore students' experiences with reflective activities and their technology use. The guide included prompts addressing:

- a. students' understanding of reflection,
- b. how reflective tasks influenced their decisions when using digital tools,
- c. ethical or moral considerations they encountered, and
- d. their perceptions of AI-assisted learning.

The semi-structured format allowed flexibility, enabling the researcher to probe deeper into responses while keeping the interviews focused on the research objectives.

2. Classroom Observation Checklist and Field Note Template

A structured observation sheet was used to document key behaviors and instructional strategies related to reflective learning and technology use. The checklist focused on:

- a. instances when the lecturer prompted reflection,
- b. students' responses to reflective prompts,
- c. digital tools used during the lesson,
- d. signs of critical or passive technology use, and
- e. classroom interactions involving technology.

Alongside the checklist, a field note template allowed the researcher to capture contextual details, spontaneous events, and classroom dynamics that might not fit neatly into predetermined categories.

3. Reflective Learning Documents

Students' reflective worksheets, reflective journals, and written responses submitted during class were collected as supporting data. These documents provided insight into how students articulated their reflective thinking in writing and complemented the interview and observation data.

These instruments were reviewed by two experts in qualitative research and language education to ensure content validity and alignment with the study's objectives.

Data Collection Procedures

Data collection occurred over a six-week period, combining interviews, observations, and document analysis.

Semi-Structured Interviews. Interviews with the 15 students were conducted individually, lasting 20–30 minutes. The interviews were conducted in Indonesian to ensure clarity and comfort for the participants. All interviews were audio-recorded (with consent) and later transcribed verbatim.

Classroom Observations. Observations were carried out during regular class meetings. The researcher took a non-participant role to avoid disrupting the teaching process. The observation checklist and field notes were used to record: teaching strategies, patterns of digital tool usage, reflective interactions, and student engagement.

Document Analysis. Students' reflective worksheets and written work were collected and examined to support triangulation. These documents offered additional evidence regarding how students expressed critical and ethical considerations in technology use.

Data Analysis

The data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-step model:

1. Familiarization with data
2. Generating codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes, and
6. Producing the final report.

Both interview transcripts and observation notes were coded inductively. Patterns related to reflection, critical technology use, moral reasoning, and the lecturer's human-centered strategies were identified and grouped into overarching themes. Document data were used to support or clarify emerging themes. To strengthen analytical rigor, the study applied triangulation, reflexive journaling, and member checking with selected participants.

3) RESULTS AND DISCUSSION

Results

Five main themes emerged from the examination of interview transcripts and classroom observations, illustrating how human-centered pedagogy facilitated reflective learning in a technologically advanced classroom. These themes show how students' behavior, awareness, and critical response to AI and digital tools have changed.

Enhanced Critical Digital Awareness Through Structured Reflection

One key finding was that students were able to transition from passive technology use to more critical and deliberate involvement with the help of organized reflection activities, including reflective journals and guided questioning. Before the intervention, the majority of students said they used technology mainly for speed or convenience. As one person clarified:

“Usually, I just use Google or AI because it is fast. I don’t really think deeply about what it gives me. I just accept it.” (Student 4)

However, after several cycles of reflective practice, students began to articulate concerns about accuracy, reliability, and ethical implications. A student commented:

“During the reflection, I realized I often copy ideas from AI without thinking. Now I try to check if the information is correct and fits my own understanding.” (Student 11)

This change was corroborated by observations made in the classroom: students started posing more insightful questions during class discussions, such as how to assess AI-generated information or spot bias in online texts. These actions demonstrated a shift away from dependence on technology and toward critical digital literacy, which is developed through analytical processes.

Growing Ethical Sensitivity in Technology Use

The growth of ethical awareness, especially with regard to plagiarism, data privacy, and the moral implications of automated production, was another major issue. Numerous students stated that engaging in reflection exercises enabled them to identify unethical behavior in their own online activity. For example:

“Before, I didn’t think much about plagiarism because AI made everything easy. But when we reflected, I realized I should be responsible for what I submit.” (Student 7)

Similarly, concerns about digital footprints and privacy emerged:

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"I learned that not all apps are safe. In the reflection, I wrote that I should be more careful because some platforms take our data." (Student 1)

Additionally, the lecturer showed a high level of ethical awareness by regularly asking students to think about the wider implications of using technology. Observational notes documented numerous situations in which she helped students consider the ethical implications of AI-assisted learning, including academic integrity, creativity, and justice.

Increased Students' Responsibility

Students became more proactive and responsible in making decisions about their learning tools and strategies. Students mentioned feeling more "in control" of technology, rather than perceiving it as an unquestioned necessity. As one participant stated:

"I used to rely on my phone all the time. But after reflecting, I feel like I should decide when technology helps me and when it distracts me." (Student 3)

Another student explained how reflective questioning encouraged more independent decision-making:

"The lecturer asked us why we chose certain apps for learning. I never thought about it before. Now I choose tools that really support my goals." (Student 14)

Such comments indicated a growing self-regulatory capacity students were not only critically evaluating technology but also taking ownership of their learning choices, a hallmark of reflective and autonomous students.

Human-Centered Classroom Strengthened Engagement

The human-centered instructional approach characterized by empathetic dialogue, personalized feedback, and relational teaching played a major role in supporting reflective learning. Students consistently highlighted the lecturer's supportive stance as a factor that made them feel "safe" to express uncertainty or critique their own technology habits. One student shared:

"The lecturer always listens to our experiences with technology. She doesn't judge us. It makes me more open to talk honestly about how I use AI." (Student 5)

Another added:

"Reflection is easier because the class feels like a community. We are encouraged to share, not just answer." (Student 13)

Observation notes recorded moments where the lecturer validated students' concerns and guided them gently toward deeper reasoning. This emotional safety amplified the effectiveness of reflection, enabling students to articulate vulnerabilities such as over-reliance on AI without fear of judgement.

Reflection as a Pathway to Meaning-Making and Moral Value

The final theme emphasized students' growing ability to make meaning from their learning experiences and to exercise moral discernment. Reflective activities encouraged them to connect classroom content, personal values, and technological behaviors. A student described this shift:

"The questions during reflection made me connect what I feel, what I value, and what technology asks me to do. I start thinking: Is this the right way?" (Student 10)

Another student expressed a sense of internal responsibility:

"AI is helpful, but I must still think as a human. I cannot lose my own judgment." (Student 9)

These reflections reveal the central insight of the study: reflective learning enabled students to position themselves as ethical agents rather than passive consumers of technology.

Discussion

The results of this study show that students' critical engagement with technology, ethical awareness, learner agency, classroom connectivity, and moral judgment are all greatly influenced by the integration of structured reflective practice within a human-centered educational framework. Each of the five topics is covered in detail in this discussion, which also places the results within larger discussions concerning human-centered and reflective pedagogy in technology-driven learning environments and links the findings to recent research.

Critical Digital Awareness as a Key Outcome of Reflection

The first topic demonstrated how students were encouraged to shift from passive use of digital and AI tools to more critical participation through organized reflection. This is in line with recent research on critical digital literacy, which highlights the necessity for students to question the ideological and epistemic aspects of digital content instead of taking it at face value (Pangrazio, 2019; Pangrazio & Sefton-Green, 2020; Selwyn, 2016).

Findings of Teichert (2021), who contends that reflective thinking helps students comprehend how digital technologies impact knowledge production, are complemented by students' reflections concerning challenging AI-generated information. In a similar vein, Littlejohn and Hood (2018)

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emphasize that reflective procedures assist students in identifying implicit biases and beliefs present in digital platforms.

Critical AI literacy has become a pressing issue in higher education, with academics like Holmes (2022) and Luckin (2021) contending that students need to learn how to assess the accuracy, openness, and limitations of AI systems. Manca (2020) asserts that critical reflection can counteract the inclination of AI tools to foster shallow interaction, and the students in this study displayed precisely these shifts moving from dependence to awareness.

Additionally, the study backs up Hinrichsen and Coombs' (2014) model of digital literacy, which emphasizes the importance of reflection in understanding, evaluating, and ethically utilizing digital resources. These theoretical models are reflected in students' transition from careless use to critical assessment, indicating that reflection is essential to the development of responsible digital users rather than a supplementary tool.

Ethical Sensitivity and Responsible Digital Behaviour

Students' ethical awareness, particularly with regard to plagiarism, authorship, transparency, and digital privacy, has significantly increased, according to the second topic. This result is consistent with educational research's growing focus on digital ethics. For instance, Floridi and Cowls (2019) contend that moral reasoning regarding automation and algorithmic processes must be developed by students in AI-integrated learning settings.

Students' thoughts on plagiarism are related to research that demonstrates how using AI-generated content might mask authorship and make it difficult to distinguish between academic dishonesty and assistance (Cotton et al., 2023; UNESCO, 2023). Participants exhibited what Zhou and Guo (2023) refer to as "ethical metacognition" a heightened awareness of their duty in digital interactions by thinking back on their own behaviors.

Concerns regarding data privacy also align with research by Henderson et al. (2020) and Wong (2021), who emphasize that students are frequently unaware of how educational technology gather and use personal data. Students were able to critically analyze these risks through reflection, establishing themselves as aware digital citizens as opposed to helpless data subjects.

The lecturer's heightened ethical awareness is consistent with studies that demonstrate how important lecturers are in influencing students' ethical thinking. According to Howard and Banjade

(2021), students become more conscious of the moral implications of digital tools when lecturers specifically encourage ethical thought. This study backs up this assertion by showing how student-lecturer discourse integrates ethical learning.

Learner Agency and Independent Decision-Making

The third topic, "enhanced learner agency," embodies the fundamental ideas of self-regulated learning, in which students take charge of their education by organizing, assessing, and keeping track of their activities (Zimmerman, 2015; Panadero, 2017). The introspective exercises inherently promoted metacognitive skills including self-awareness and strategic decision-making, even though the study did not specifically address metacognition.

This result is consistent with the Self-Determination Theory of Ryan and Deci (2017), which holds that learner autonomy increases when people consider their options. In line with the findings of Jivet et al. (2020), who discovered that reflective tasks in digital learning settings increase students' sense of control and diminish algorithmic nudging, reflection enabled students to make thoughtful judgments regarding the tools that support their aims.

Additionally, human-centered teaching is essential for promoting freedom. According to academics like Cornelius-White (2007) and Noddings (2013), dialogic, relational teaching is the foundation of empowerment. The study's reflective sessions supported the claim that human-centered teaching fosters responsible autonomy even in highly technologized situations by assisting students in articulating their digital habits, challenging them, and selecting alternative ways.

Human-Centered Pedagogy as the Emotional Framework for Reflection

The importance of relational, human-centered pedagogy in facilitating meaningful reflection was emphasized in the fourth theme. In line with Rogers' (1995) humanistic views, which emphasize empathy, unconditional regard, and psychological safety as necessary for deep learning, students reported feeling heard, respected, and emotionally safe.

This result is in line with more recent viewpoints from Gkonou and Mercer (2017), who contend that an essential component of successful pedagogy is emotional support, particularly in situations where students must deal with technological ambiguity. A number of academics caution about possible depersonalization as digital education grows (Bond et al., 2021; Knox, 2020). However, this study

shows that technology settings can stay deeply relational when lecturers embrace human-centered methods, such as discourse, empathy, and flexible connections.

Human-centered pedagogy acted as the facilitating condition that made reflective practice possible. Students' willingness to disclose vulnerabilities in their technology use reflects findings by Liu and Huang (2022), who observed that psychological safety significantly increases students' depth of reflection in blended classrooms.

Reflective Practice as a Route to Moral Value and Meaning-Making

The sixth theme showed how moral judgment was aided by reflection, assisting students in making connections between their own values, academic standards, and technology practices. This procedure is consistent with Mezirow's (2000) transformative learning theory, which holds that reflection encourages students to question beliefs and establish fresh viewpoints based on moral and intellectual autonomy.

AI systems run the potential of reducing students' ethical choices by encouraging automated solutions, according to academics like Popenici and Kerr (2017) and Long & Magerko (2020). The study's responses explicitly address this worry: students stressed the importance of maintaining human judgment and avoiding an excessive dependence on AI—a subject that Holmes (2022) highlights.

Furthermore, the growth of ethical judgment is consistent with studies by Ryan & Ryan (2015) and Kember et al. (2008), who discovered that students can combine the ethical, emotional, and cognitive aspects of learning through deep reflection. In technology-driven classrooms, where ethical issues including plagiarism, authorship, and bias frequently arise, this integration is especially crucial (Williamson & Eynon, 2020).

All things considered, this theme supports the notion that reflective learning fosters human agency, responsibility, and moral clarity in addition to cognitive development—qualities that are becoming more and more crucial in AI-mediated education.

4) CONCLUSIONS

This study shows that students' critical, ethical, and independent engagement with digital and AI tools in technology-driven classrooms may be greatly improved by using structured reflection practices within a human-centered educational framework. Through dialogic classroom interactions, guided

questioning, and reflective journaling, students became more conscious of their technology habits, questioned the accuracy of information produced by artificial intelligence, and realized the moral implications of their digital behaviors. The results demonstrate that reflection enhances students' feeling of accountability, agency, and moral judgment in addition to developing cognitive insight, all of which are critical for navigating quickly changing digital learning settings. Because it allowed students to engage in reflective activities with honesty and thoughtfulness, the lecturer's role in creating a supportive and relational learning environment was equally important.

More broadly, the study emphasizes how crucial it is to maintain the human aspect in learning environments that are becoming more and more automated and artificially intelligent. Technology undoubtedly has advantages, but it cannot take the place of the introspective, moral, and humane values that define meaningful learning. When combined with reflective practice, human-centered pedagogy offers a potent way to guarantee that students continue to be engaged, critical, and morally grounded participants in their own learning processes. Structured reflection should be positioned as a fundamental pedagogical method to develop students who can utilize technology carefully, ethically, and in accordance with human values as educational institutions continue to implement AI-assisted learning technologies.

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