

AI as an interactive reflective coach to foster students' critical reflection

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Abstract

Critical reflection (CR) is widely recognised as a foundation for deep learning in higher education, yet students often struggle to engage in reflective processes that move beyond description. This qualitative study explores higher education students' experiences with reflection, the challenges they encounter, and the perceived potential of artificial intelligence (AI) to support CR. Semi-structured interviews with eight undergraduate students revealed structural, emotional, and individual constraints that limit reflective depth, including time pressure, stress, and mismatches between prescribed reflection formats and personal preferences. While AI was initially used mainly for linguistic support, students perceived strong potential for AI as an adaptive, dialogic reflective coach aligned with Gibbs' Reflective Cycle. When optional and non-directive, AI-guided scaffolding was seen as capable of supporting deeper, more personalised, and more critical reflection while preserving learner agency.

Keywords: *Critical reflection; higher education; AI-supported reflection; Gibbs' Reflective Cycle; reflective coaching; learner agency*

1. Introduction

It has become obvious in the past decades that critical reflection (CR) is a prerequisite for learning in higher education (HE) (e.g. van Rensburg et al., 2018). University students are expected to engage in autonomous learning, think critically about their own performance, and take responsibility for their personal and professional development (Byrne et al., 2009). Reflective thinking and learning are skills that support conscious growth through the interpretation of experiences and contribute to the students' academic and career success. Therefore, Higher Education Institutions (HEIs) need to prepare their students to be self-directed learners and agents of their own personal development. This involves critical

evaluations of their learning experiences, assessment of their knowledge and skills, identifying points for improvement and setting targets and directions for further development.

A large body of research has been conducted on the importance of reflection and its correlation with learning and development in HE (e.g., van Rensburg et al., 2018). However, there is still a lot to reveal about the cognitive and emotional process students go through while engaging in reflection on learning. Also, little attention has been paid to the pedagogical considerations of teaching students how to reflect critically, and the difficulties students face to make their reflection meaningful, critical and deep (e.g., Ryan, 2013). Hence this paper aims 1) to explore the challenges HE students encounter when conducting reflection on their learning and development; and 2) to find new approaches leveraging AI to assist students in performing CR which supports deeper learning and development.

2. Theoretical background

2.1. Critical reflection as a foundation for academic growth

In educational contexts, reflection typically involves recalling and evaluating one's experiences to improve personal understanding and professional practice; it is often descriptive and focused on identifying what occurred and how one might act differently in the future (Dewey, 1938; Lynch, 2000). Critical reflection (CR), by contrast, goes beyond this surface-level analysis to interrogate the underlying assumptions, normative frameworks, and sociocultural or institutional conditions that shape one's interpretations and actions. CR therefore emphasizes questioning taken-for-granted beliefs, recognizing power relations, and supporting transformative learning rather than incremental improvement (Brookfield, 2017; Mezirow, 1991; Schön, 1983). While reflection promotes self-awareness, CR fosters deeper epistemological change by encouraging learners and educators to reconsider the broader contexts that inform their practices.

CR, as a higher-order thinking skill, draws on a combination of critical thinking and evaluation skills. CR can serve as a foundation for sustained reflective practice. Reflective practice is a systematic process in which individuals critically examine their experiences to integrate action with informed judgment. Thus, reflective practice is an ongoing, theory-informed mode of inquiry that supports deeper understanding, adaptive expertise, and continuous academic and professional growth (Bowne et al., 2010). Reflective learning helps to raise awareness of students' development, to set goals, and to understand how the learning process becomes more effective. Developing a habit of reflective practice supports self-assessment, self-regulation, the maintenance of motivation, the overcoming of learning obstacles, and the conscious development of professional and individual practice.

2.2. Challenges of critical reflection

Although CR is widely acknowledged as a catalyst for transformative learning, its implementation poses several significant challenges for students and educators alike. A central difficulty lies in the requirement to question deeply held assumptions, values, and professional identities – an often-uncomfortable process that may provoke resistance or emotional defensiveness (Brookfield, 2017). Moreover, CR requires advanced cognitive skills, such as abstract reasoning, evaluative judgment, and the capacity to synthesize multiple perspectives, which may not be fully developed in all students (Mezirow, 1991). Time constraints within academic programmes further complicate the process; meaningful CR is iterative and dialogic, necessitating structured opportunities for dialogue, feedback, and guided analysis that are often difficult to sustain in pressured learning environments (Schön, 1983). Educators also face challenges in modelling CR and teaching students how to perform CR in a meaningful way (Butler et al., 2026). Also, assessing CR poses a further challenge, as its depth and quality are difficult to measure using traditional assessment criteria and may be influenced by learners' willingness to disclose personal or sensitive insights (Ryan, 2013). Consequently, while CR is essential for fostering transformative and ethically grounded professional practice, its enactment requires intentional scaffolding, supportive learning environments, and pedagogical approaches that acknowledge both the cognitive and emotional demands involved.

2.3. Addressing the challenges of critical reflection

Overcoming the challenges of CR requires intentional pedagogical design and structured support mechanisms that guide learners through the cognitive and emotional obstacles of the process. Teacher facilitation is particularly crucial; educators play a central role in modelling reflective questioning, scaffolding analytical skills, and creating psychologically safe environments in which learners feel supported to examine uncomfortable assumptions (Brookfield, 2017; Ryan, 2013). Structured reflection models – such as Gibbs' Reflective Cycle (Gibbs, 1988) or the DEAL model (Ash & Clayton, 2009) – can further provide clear stages and prompts that help learners move beyond description toward deeper critical engagement. Embedding dialogue-based or interactive reflection opportunities, such as peer discussions, collaborative journaling, or dialogic seminars, has also been shown to reduce resistance and enhance learners' capacity to consider multiple perspectives by making reflection a shared, relational process rather than an isolated task (Butler et al., 2026).

Emerging evidence suggests that artificial intelligence (AI) tools may offer additional support in scaffolding CR. AI-based writing assistants or conversational tutors can provide individualized prompts, feedback, and iterative questioning that encourage deeper levels of analysis, particularly for students who lack confidence or experience with abstract reasoning (Goyal, 2025). When implemented ethically and transparently, such tools can function as one-to-one supports that extend opportunities for guided reflection beyond classroom time,

complementing – not replacing – the pedagogical role of the teacher. Ultimately, addressing the challenges of CR requires a combination of structured models, dialogic engagement, targeted guidance, and innovative technological tools that collectively foster an environment conducive to transformative learning.

3. Methods

Our research aimed to explore the ways HE students approach reflective practices during their studies, what difficulties they encounter when conducting CR on their learning and development, and what their perceptions are about AI-assisted reflection. Therefore, this study seeks to answer the following research questions (RQs):

1. What challenges did higher education students face during the reflection process?
2. How can AI-guided scaffolding, aligned with Gibbs' Reflective Cycle, support higher education students in developing critical reflection on their learning processes?

Our research aimed to explore HE students' personal experiences, solutions, and opinions of their reflection practice. Therefore, this qualitative study involved in-depth semi-structured interviews (Kvale, 1996) with university students during the autumn/winter semester of AY2025/2026. The interviews followed the interview guide approach (Kvale, 1996). Participants were recruited for the interviews using a stratified purposeful sampling strategy (Creswell, 2009) with the aim of including students from various reflection competence. Altogether, eight bachelor students participated in the study from two European universities majoring in Human Resources or Educational Science. Students were between 18-20 years of age, and all had actively engaged in reflections during their university studies.

The study adhered to the internal ethics protocol of the authors' universities academic scholarship practices. Before collecting data, the participants were provided with an information sheet outlining the study's objectives and procedures, and their consent was obtained. Participation was voluntary, and interviewees had the freedom to withdraw from the study at any time. The interview transcripts were analysed using the method of thematic content analysis (Creswell, 2009) using manual coding. Codes were reviewed, compared across cases and refined through constant comparison, resulting in emergent themes. Themes were developed based on shared patterns across interviews rather than frequency alone. The focus of the study was on the unique perspectives and experiences of the participants involved, and caution should be exercised when applying or generalizing these findings to broader contexts.

4. Results and discussion

4.1. Challenges of individual student reflections

The findings indicate that students generally regard reflection as meaningful and beneficial for learning, yet their reflective engagement is constrained by a combination of structural, and individual factors. These constraints primarily affect the depth, continuity, and critical quality of reflection rather than students' motivation to engage in reflective practice.

A central challenge concerns time pressure and the positioning of reflection activities within seminar structures (Schön, 1983). Reflection was often scheduled at the end of seminars, when students' cognitive resources were already depleted due to ongoing task demands. As a result, students further reported that the quality of reflection depended strongly on stress levels, mood, and mental readiness. Under stressful conditions, reflection tended to remain superficial, whereas deeper engagement required time and emotional availability. Accordingly, students commonly located their reflective engagement in the mid-range of depth. Another significant challenge related to the prescribed reflection format applying the Gibbs Reflective Cycle (1988), which was supposed to be in a written format. Interviewee 5 and 7 expressed a preference for auditory or dialogic reflection, describing written reflection as less conducive to deep engagement. Thus, there was a perceived lack of individualization regarding the reflection model to apply. Students expressed a desire for greater freedom in choosing both the medium and model of reflection, and some disengaged partially from reflective tasks due to these constraints. Finally, predefined guiding questions of the Gibbs Reflective Cycle (1988) were evaluated as helpful for the reflection process, particularly for less experienced students. However, interviewees 6 and 8 experienced difficulties in applying the model to their reflective context. Overall, these findings suggest that limitations in student reflection stem less from the concept of reflection itself (Brookfield, 2017) than from contextual constraints (Butler et al., 2026) and insufficient alignment with individual reflective practices, which collectively inhibit the development of deeper, critical reflection.

4.2. Perception of AI use in reflection

AI was rarely used during formal, seminar-based reflection, but was used more often during reflection as a home assignment. When used during reflection, AI was largely limited to providing linguistic support, such as improving writing performance by reformulating statements or converting voice-recorded thoughts and reflections into written text. Another application involved the facilitation of preliminary brainstorming and the generation of initial ideas. Some students verified that their reflections were aligned with both Gibbs' reflective circle and the assignment requirements, rearranging their statements according to the AI feedback received.

Students generally conceptualised AI as a valuable additional layer of reflection, particularly in situations where the reflective process stagnates or becomes repetitive (Goyal, 2025). Across the sample, students recognised the considerable potential of AI to act as an external cognitive stimulus to help overcome reflective impasses. By receiving AI-generated input, students reported reduced reliance on others as reflective counterparts, thereby increasing autonomy and accessibility in reflective practice. A central perceived advantage of AI was its support for dialogic and auditory forms of reflection. Students noted that conversing with AI was more closely aligned with their reflective preferences than written formats alone. Engaging with AI as a conversational partner was described as qualitatively different from solitary reflection. It enabled learners to articulate, revisit and reframe their thoughts in a more dynamic and iterative way. Beyond its role as a dialogue partner, AI was also perceived as capable of offering adaptive, personalised support (Goyal, 2025). Students emphasised the importance of AI systems that first identify individual reflective preferences and then adapt the mode and structure of reflection accordingly. This adaptability was associated with a more personalised and flexible reflective process that accommodates written, spoken and hybrid modalities.

When asked specifically about using AI as an interactive reflective coach, all students agreed that AI could guide learners through successive reflective phases, posing targeted follow-up questions and providing meta-level feedback on the depth of reflection before progression to subsequent stages. At the same time, however, students articulated clear boundaries regarding AI involvement. They considered excessive, intrusive or poorly timed intervention to be counterproductive, particularly in stressful situations, as it could undermine learners' sense of reflective ownership.

5. AI as an interactive reflective coach to foster students' critical reflection

These results are consistent with the potential applications of AI in education discussed in the literature, such as providing instant feedback and acting as personalised tutors, however, these tools are currently primarily used for language learning (Goyal, 2025; Zhang, 2024; Loos et al., 2023). To encourage critical reflection among students using AI for language modelling, an interactive reflective coach appears to be a highly effective tool. For example, ChatGPT can provide instant feedback on students' responses at every stage of the Gibbs' Reflective Cycle (1988), assessing how well their answers correspond to the guiding questions provided for each stage. Furthermore, this interactive reflective coach can provide feedback on the depth of reflection and pose follow-up questions if necessary. These instant, personalised interactions could support students in reflecting on their personal and professional learning.

The following prompt allows ChatGPT to act as an interactive reflective coach in the manner it was just presented: "Give me a reflection framework, but don't write any content for me. Ask questions according to Gibbs' Reflective Cycle and comment on my answers in regard to my

level of critical reflection.” The following extract below is an example for Stage 1 (description) of the reflection model:

Feedback on your current response

“A discussion with my colleague went sideways.”

Level of reflection: Very low / pre-descriptive

Right now, this sits **below Gibbs' Description stage**. Why: 1. It's **vague** (“went sideways” is an interpretation, not an observation). 2. There is **no context**, sequence, or identifiable actions. 3. It compresses the whole event into a single judgment, which blocks analysis later. This isn't wrong, but it gives you **nothing to critically work with yet**. Think of it as a blurry photograph. We need focus before interpretation.

Let's strengthen Stage 1: Description

Still **no feelings, no causes, no evaluations** yet. Answer these, concretely: 1. Where did the discussion take place (e.g. meeting, email, informal conversation)? 2. What was the discussion about? 3. What specifically happened that made you feel it “went sideways”? (What was said or done, by whom?) 4. How did the discussion end? 5. What was the immediate outcome afterward?

Your turn:

Respond to these questions. Once you do, I'll assess whether you're fully in **descriptive reflection** or starting to drift into **analysis**, and I'll show you how to deepen it before we move to the next Gibbs stage.

6. Conclusion

Using ChatGPT as an interactive reflective coach, providing individual feedback and interactions to align students' answers with each phase of the Gibbs Reflective Cycle, carries substantial potential to foster deeper, more individualised and critical reflection while preserving students' sense of authorship and control over their reflective processes. This could be further enhanced by using ChatGPT's built-in voice feature. This would enable students to switch from written to interactive audio reflections according to their personal reflection style. Nevertheless, this setup cannot overcome all the structural challenges. The learning environment still needs to be organised in a way that gives students enough time to reflect on their learning. Individual challenges, such as timing and mood, cannot be resolved either. Furthermore, ethical concerns about sharing personal insights with AI must be considered before implementing this approach. Teachers and students alike should be aware of the dangers regarding personal data protection, since they are sharing more information than if they were simply using AI to help them rewrite their reflections.

Future research should focus on examining the effectiveness of using ChatGPT as an interactive reflective coach, e.g. through empirical studies comparing the quality of critical reflection of AI supported reflections with regular written reflections. Beyond effectiveness, further research should address both structural and individual aspects that shape AI-supported reflective practice. On a structural level, studies should examine how AI-guided reflection can be meaningfully embedded within course design, considering factors such as timing, workload, and assessment practices, as well as ethical and data-protection requirements. On an individual level, research is needed to explore how learners' reflective preferences, emotional states, stress levels, and cognitive load influence the usefulness of AI-guided scaffolding, and how adaptive systems can respond to these differences without becoming intrusive or undermining reflective autonomy.

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