Assessment Practices with Generative Artificial Intelligence: Pedagogical Innovation and Faculty Development in Higher Education

Sandra Fernandes[1], Mário Martins[2]

[1] Department of Psychology and Education, Portucalense University, Porto, Portugal
[2] Portal Forma-te, Portugal

Email: sandraf@upt.pt, mariosantosmartins@gmail.com

Abstract

Generative artificial intelligence (AI) is challenging established approaches to student assessment in higher education, creating both pedagogical opportunities and ethical concerns. This study explores teachers' perceptions of assessment, feedback, and the role of generative AI, with the aim of informing professional development and the integration of generative AI in assessment design and practices. The research was conducted at Portuguese higher education institution, within a six-hour training programme organised by the Pedagogic Innovation Office. The study was guided by three research questions: how do teachers conceptualise student assessment; how do they value feedback within assessment practices; and how do they perceive the potential and risks of generative AI in assessment. Data were collected through a questionnaire composed of 12 closed questions addressing: Conceptions of student assessment; Feedback practices; Attitudes towards generative AI in assessment. The instrument functioned as a diagnostic tool to inform the training design and research analysis. A total of 46 valid responses were obtained from participants enrolled in the programme, corresponding to a response rate of 83.6%. Descriptive analysis was conducted to identify dominant patterns in participants' responses. The results indicate a strong orientation towards formative assessment, with teachers primarily viewing assessment as a means to support learning and guide teaching decisions rather than as a solely summative process. Feedback is consistently perceived as a core component of meaningful assessment, although its implementation is often constrained by workload and time limitations. Participants demonstrate a cautious yet open attitude towards generative AI, recognising its potential to support assessment and feedback practices, while simultaneously expressing concerns related to ethical use, student dependency, and reduced critical thinking. These findings highlight the importance of ethically grounded approaches to assessment supported by targeted professional development in higher education.

Keywords: Higher Education, Generative Artificial Intelligence, Teacher Professional Development, Student Assessment, Feedback Practices

1 Introduction

Generative artificial intelligence (AI) is challenging established approaches to student assessment in higher education, creating both pedagogical opportunities and ethical concerns. Recent research highlights that generative AI is reshaping educational practices at multiple levels, from assessment design to institutional policy, raising questions about epistemic integrity, authorship, and cognitive engagement (Chiu, 2024; Lo, 2023). Systematic reviews indicate that the impact of generative AI in higher education is neither uniformly disruptive nor purely beneficial, but contingent upon pedagogical framing and institutional guidance (Mai et al., 2024; Ahmed et al., 2024). The shift from assessment of learning to assessment for learning repositions evaluation as an integral component of the learning process (Earl & Katz, 2006; Fernandes, Abelha & Ferreira-Oliveira, 2023). Formative assessment emphasises transparency of criteria, iterative feedback, and opportunities for self-regulation. In the context of generative AI, formative principles acquire renewed relevance. Feedback is widely recognised as one of the most influential factors in student achievement. However, higher education institutions frequently face structural constraints—such as workload and time limitations—that restrict dialogic and iterative feedback practices. Generative AI introduces new possibilities for timely formative approaches. Yet its pedagogical value depends on intentional integration and critical mediation. Rather than relying solely

on prohibition strategies, institutions are increasingly encouraged to redesign assessment tasks to incorporate transparent and critical AI use. Concerns about academic integrity and authorship have been widely documented, particularly in relation to students' use of AI-generated texts and the difficulty of distinguishing between human and machine-generated outputs (Waltzer et al., 2024). However, emerging research suggests that purely control-oriented approaches may be insufficient, advocating instead for pedagogical redesign and transparent integration strategies (Cacho, 2024; European Commission, 2022). Sustainable transformation of assessment practices depends on faculty capacity and institutional support. Recent studies analysing university teachers' beliefs about generative AI indicate heterogeneous attitudes, ranging from cautious openness to concern about learning quality and academic standards (Cabellos et al., 2024; Nikolic et al., 2024). These findings reinforce the importance of faculty development initiatives grounded in empirical diagnosis of institutional contexts (Fernandes et al., 2023). Professional development initiatives provide spaces for collaborative reflection, experimentation, and co-design. By engaging teachers in redesign activities, institutions can foster curriculum innovation grounded in pedagogical coherence rather than reactive regulation.

In the context of a Portuguese private higher education institution, the growing presence of generative AI in students' academic practices (Araújo et al., 2025) led the Pedagogic Innovation Office to implement a structured faculty development programme centred on assessment redesign. Rather than adopting restrictive or purely defensive responses, the initiative aimed to promote a pedagogically intentional and ethically informed integration of AI into assessment practices. Within this framework, the present study pursues three main objectives: to examine how teachers conceptualise student assessment; to analyse how feedback is understood and enacted within assessment practices; and to explore faculty perceptions regarding the potential and risks associated with the use of generative AI in assessment contexts. By addressing these objectives, the study seeks to provide an empirically grounded understanding of institutional readiness for AI-integrated assessment redesign. Furthermore, it positions faculty development as a strategic lever for curriculum transformation, contributing to broader discussions on active learning and pedagogical innovation in higher education.

2 Methodology

This study explores teachers' perceptions of assessment, feedback, and the role of generative AI, with the aim of informing professional development and assessment design. The research was conducted at a private higher education institution, located in the north of Portugal. The study took place within a six-hour training programme organised by the Pedagogic Innovation Office and structured into three two-hour sessions. The study was guided by three research questions:

1) How do teachers conceptualise student assessment?
2) How do they value feedback within assessment practices?
3) How do they perceive the potential and risks of generative AI in assessment contexts?

Faculty members from diverse disciplinary areas participated in the diagnostic survey administered prior to the training. Data were collected through a structured questionnaire comprising 12 closed-ended items addressing three analytical dimensions: conceptions of student assessment, feedback practices, and attitudes towards generative AI in assessment contexts. The instrument served both as a diagnostic tool to inform the design of the faculty development programme and as an empirical basis for subsequent research analysis. A total of 46 valid responses were obtained from participants enrolled in the programme, corresponding to a response rate of 83.6% (55 participants enrolled). For data analyses, descriptive statistical analysis was conducted to identify

dominant response patterns. Participation was voluntary and anonymous. Data were used exclusively for research and institutional improvement purposes.

3 Results

The findings are organised into three analytical dimensions aligned with the questionnaire structure: (1) Conceptions of assessment; (2) Feedback practices; and (3) Attitudes towards generative AI.

3.1 Conceptions of Assessment

In regard to the conceptions of assessment, data from faculty reveal a predominantly formative conception of assessment. When asked about the primary purpose of assessment (figure 1), 37.0% indicated that assessment serves mainly to improve teaching and adjust strategies, 32.6% selected monitoring and guiding learning, 15.2% emphasised motivating and engaging students and only 8.7% prioritised certifying results and comparing performance. Thus, nearly 85% of participants associate assessment primarily with developmental purposes rather than summative certification. The relatively low emphasis on certification (8.7%) is particularly significant, suggesting a pedagogically progressive orientation.

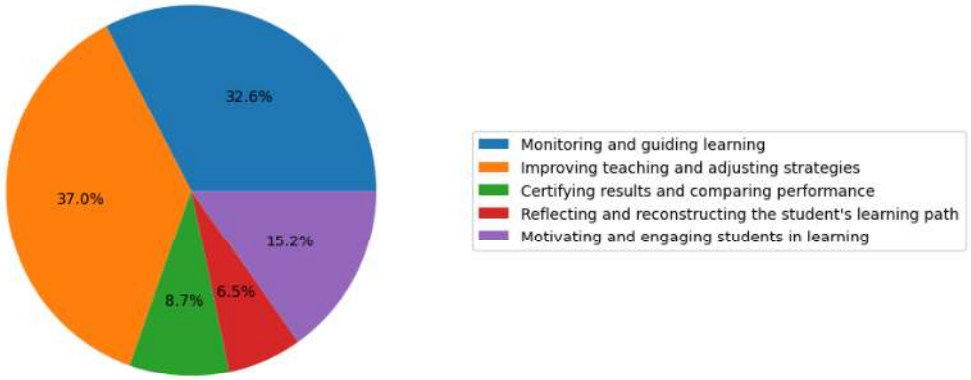


Figure 1. Distribution of responses regarding the primary purpose of assessment

Regarding assessment moments, results shown on figure 2 indicate that 52.1% integrate three or more assessment moments across a course, 17.4% report continuous assessment embedded in learning activities and only 2.2% rely on a single final assessment moment. This confirms alignment with distributed and process-oriented assessment approaches.

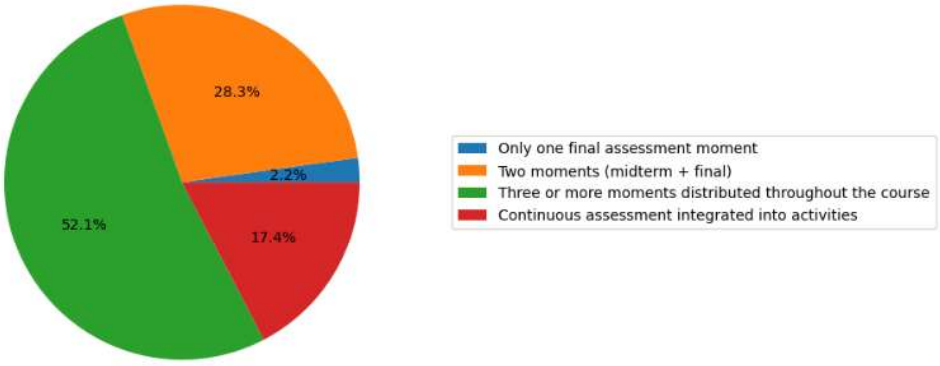


Figure 2. Distribution of assessment moments integrated within a curricular unit.

However, when asked about the main assessment method used (indicate only one) to assess students, in an open-ended question of the survey, results show that tests remain as the most frequently used instrument (approximately 39–40% when aggregating variations). This coexistence of formative conceptions and reliance on traditional written tests constitutes one of the most revealing findings of the study. It suggests that while pedagogical beliefs are progressive, assessment formats may not yet be fully aligned with those conceptions.

When asked about the main challenges in the assessment process (excluding AI), 37.0% of participants identified time and workload as the main difficulty, 19.6% reported difficulty in assuring justice and coherence in assessment decisions and 17.4% difficulties in assessing processes rather than products (see figure 3).

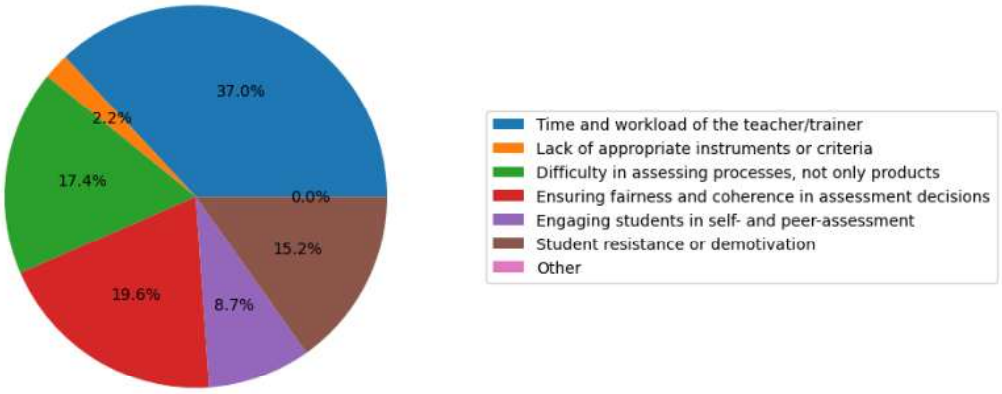


Figure 3. Perceived main challenges in current assessment practices (excluding AI)

3.2 Feedback Practices

In student centred learning approaches, feedback emerges as a strong pedagogical priority. When participants were asked about what they associate to student feedback, 71.8% of participants selected guidance on how to improve performance, 13.0% associated feedback mainly with grades, and 6.5% explicitly linked it to supporting self-regulation (see figure 4).

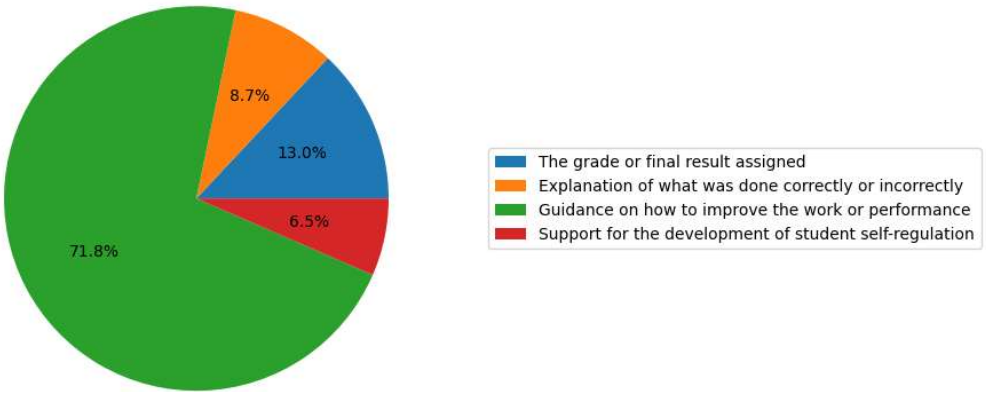


Figure 4. Teachers' perceptions associated to student feedback.

This strong emphasis on improvement-oriented feedback strongly aligns with formative assessment theory. In terms of the frequency of the feedback given (figure 5), 56.5% of participants referred that they provide individualised feedback frequently, 21.7% always provide it and only 4.3% rarely do so. Thus, over 78% of respondents report frequent or constant individualised feedback practices.

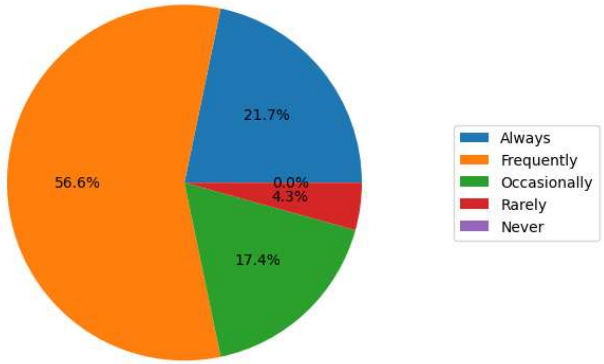


Figure 5. Frequency of individualised feedback provided by the teacher.

When analysing the mode of delivery of feedback (figure 6), data from faculty reveal innovation potential. The results indicate that 52.2% primarily provide oral feedback, 26.1% rely on written comments, only 4.3% use digital or AI-supported tools. This low integration of digital mediation—despite the strong value attributed to feedback—highlights a structural gap between pedagogical intention and technological support. It represents a clear opportunity for pedagogical innovation.

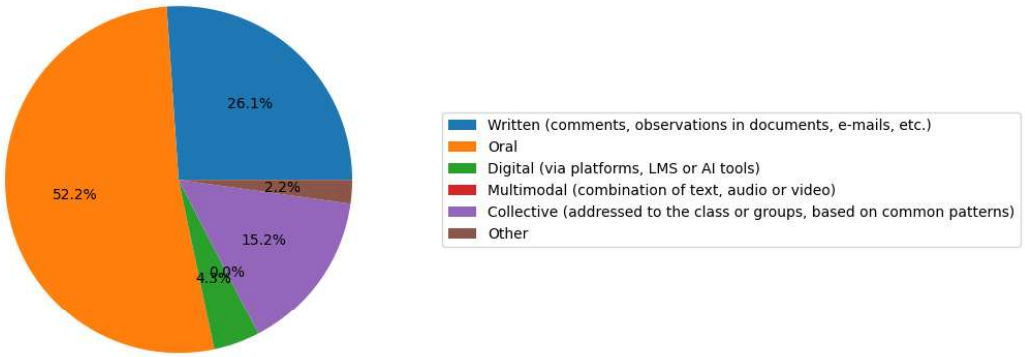


Figure 6. Primary mode of feedback delivery adopted by teachers.

The limited use of technologically mediated feedback contrasts sharply with the strong formative orientation previously identified. While teachers value feedback highly, digital tools—including AI— they have not yet been systematically integrated to support its scalability and sustainability.

3.3 Attitudes Towards Generative AI

When questioned about the frequency of the use of AI tools in the assessment process (planning, feedback, co-assessment, etc.), results shown on figure 7 highlight that 32.6% never use AI in assessment contexts, 26.1% rarely use it, 26.1% use it sometimes and only 15.2% report frequent use. Nearly 60% of respondents report never or rarely using AI in assessment contexts, while only 15.2% indicate frequent use. This confirms that AI integration remains at an exploratory stage. However, given the predominantly formative orientation observed in earlier results, this limited use cannot be interpreted as resistance but rather as a need for structured pedagogical guidance and institutional support. Among those who have used AI, faculty indicated, in the open-ended question, that they use it to create assessment instruments, some for planning tasks or adapting rubrics, and very few to generate formative feedback. Interestingly, AI is more frequently used for design and

preparation than for direct feedback or evaluation. This suggests that teachers currently perceive AI primarily as a planning assistant rather than an evaluative agent.

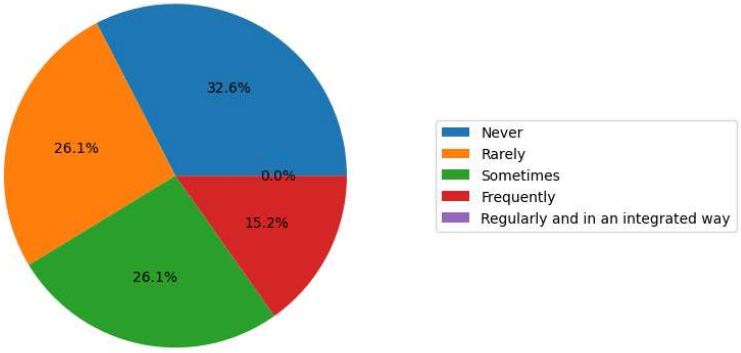


Figure 7. Frequency of AI Use in Assessment Contexts

Regarding the main risks perceived by faculty about the use of AI in student assessment, figure 8 shows that 39.1% of participants identify cognitive losses and reduced critical thinking as the main risk, 26.1% emphasise uncritical or excessive student use, 19.6% fear dehumanization and loss of pedagogical sensitivity, and only 6.5% prioritise ethical concerns such as bias or privacy.

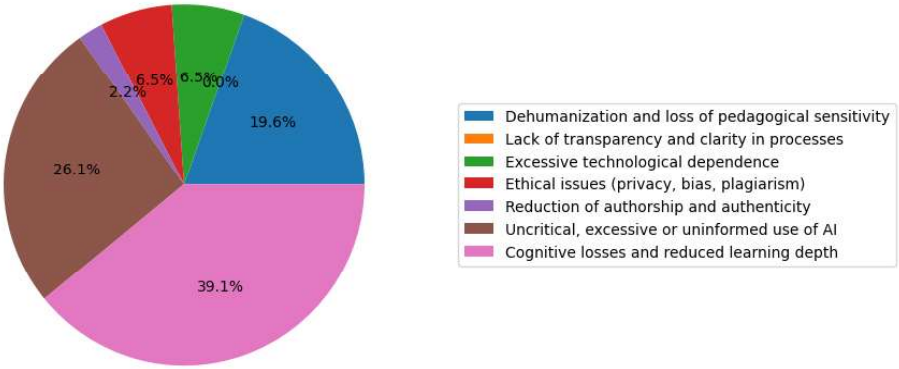


Figure 8. Perceived Main Risks of AI in Assessment

The predominance of cognitive concerns over plagiarism or ethics is particularly interesting. It indicates that faculty concerns are primarily pedagogical rather than regulatory. This aligns with recent findings indicating that faculty concerns increasingly focus on learning depth and epistemic quality rather than solely on misconduct detection (Stone, 2024; Gruenhagen et al., 2024). This suggests a shift from integrity fear toward pedagogical reflection. The emphasis on cognitive depth reinforces the importance of designing AI-integrated assessment tasks that foreground reasoning, justification, and reflection. When reflecting about the teacher's role in the AI era (figure 9), 45.7% believe the teacher should integrate AI as technical and reflective support without replacing pedagogical judgement, 30.4% emphasise guiding responsible student use, and only 13.0% frame the role primarily as ensuring ethics and authorship.

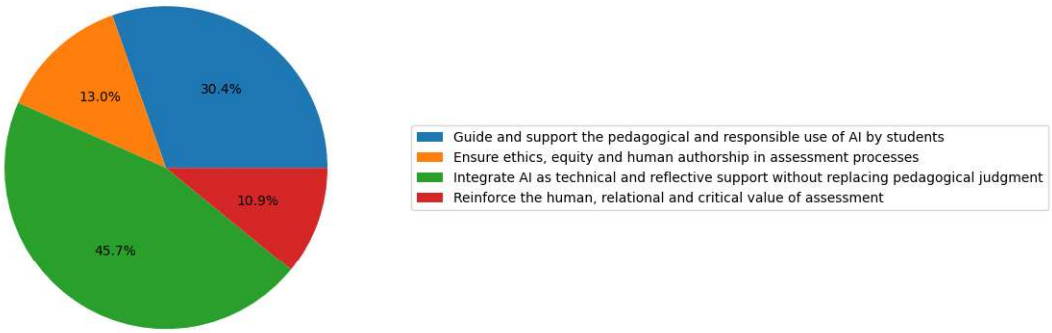


Figure 9. Perceived Role of the Teacher in the AI Era

This finding is one of the most significant in the dataset. Nearly half of respondents already conceptualise AI integration as pedagogical mediation rather than control. This orientation creates an important opportunity for faculty development initiatives.

4 Discussion and Conclusions

This study examined teachers' conceptions of assessment, their understanding of feedback practices, and perceptions of generative AI in assessment contexts. The findings corroborate recent literature suggesting that generative AI functions less as a disruptive force and more as an accelerator of pre-existing pedagogical tensions, particularly those related to assessment authenticity and feedback sustainability (Chiu, 2024; Lo, 2023). Regarding the first research question of the study, the results show that teachers predominantly conceptualise assessment as formative. Nearly 85% associate assessment with improving teaching and guiding learning, while only a small minority prioritise certification. The majority integrate multiple assessment moments across the semester, reinforcing distributed and process-oriented approaches. However, the continued reliance on written tests reveals a tension between formative beliefs and traditional assessment instruments. This misalignment suggests that innovation challenges lie more in redesign practices than in changing pedagogical conceptions. Concerning the second research question, feedback is clearly valued as a core pedagogical strategy. Most participants associate feedback with guidance for improvement, and over 78% report frequently or always providing individualised feedback. Nevertheless, feedback practices remain largely oral or written, with minimal integration of digital or AI-supported tools. When considered alongside workload pressures—identified as the main assessment challenge—this reveals a sustainability issue. Faculty commitment to feedback is strong, but its long-term viability may require structured technological support. With respect to the third research question, AI adoption remains limited, as nearly 60% report using AI rarely or never in assessment contexts. However, responses do not indicate ideological resistance. AI is primarily used for planning and preparation rather than evaluation, suggesting cautious experimentation. The most frequently perceived risk is cognitive superficiality and reduced critical thinking (39.1%), followed by uncritical use (26.1%). Ethical concerns are comparatively less emphasised. This distribution reframes the AI debate as pedagogical rather than regulatory. This pattern resonates with broader international evidence showing that both faculty and students perceive generative AI as a tool whose educational value depends largely on instructional design and guided use (Johnston et al., 2024; Cavazos et al., 2024). Rather than rejecting AI outright, educators appear to seek frameworks that preserve critical thinking and intellectual authorship. Faculty are less concerned with control and more with safeguarding cognitive depth. Moreover, nearly half of respondents conceptualise their role as integrating AI as reflective support without replacing pedagogical judgement, signalling openness to mediated and intentional AI integration.

Beyond answering the research questions, the findings reveal an innovation gap: teachers hold formative beliefs and value feedback highly, yet operational integration of AI and redesign of assessment formats remain limited. The main barriers appear structural (workload, time constraints) rather than conceptual. In this context, generative AI acts as a catalyst that exposes pre-existing tensions between pedagogical ideals and institutional conditions. The study carries important implications for practice. First, institutions should prioritise systematic assessment redesign rather than focusing exclusively on AI regulation. Second, AI-supported feedback scaffolds may help reconcile high pedagogical commitment with workload realities. Third, AI literacy should be embedded within curricula to address concerns about cognitive depth and critical thinking. This recommendation aligns with international ethical guidelines advocating responsible and transparent AI integration in teaching and learning (European Commission, 2022). Embedding AI literacy as a curricular outcome shifts the focus from prohibition toward informed and reflective engagement. Finally, faculty development should move beyond technical training and focus on pedagogical design, ethical reasoning, and collaborative co-creation.

The instrument functioned both as a diagnostic tool and as a research instrument. Diagnostically, it informed the design of the faculty development programme by identifying prevailing conceptions, concerns, and readiness levels. As a research tool, it provided empirical grounding for analysing institutional assessment culture in the context of AI integration. This dual function illustrates how professional development initiatives can simultaneously support institutional improvement and generate scholarly insight (Fernandes et al., 2023). In conclusion, when supported by structured faculty development, generative AI can function as a catalyst for pedagogical innovation and curriculum transformation. Sustainable integration requires institutional alignment, ongoing professional development and assessment models that foreground process, reflection, and critical engagement.

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