

Response to Community Comments

Community comment	Responses
I want to begin by acknowledging the value of the manuscript. The study focuses on a potentially publishable geoscience education case in "a recently established university in the Northern Cape Province of South Africa" and in a "resource constrained and under researched context". That setting matters. The manuscript also identifies real institutional and pedagogical constraints, including "absence of dedicated laboratory facilities" and "Language and literacy barriers". These features could make the article useful to readers, especially if the contribution is framed as a careful account of implementation, constraints, and transferable lessons rather than as evidence of broad institutional validation. At the same time, I don't think the current version can support its central claims. The reviewers differ mainly in emphasis. The methodologist sees the evidentiary flaws as most serious. The ethics reviewer foregrounds participant protection. The theoretical and structural reviewers stress underdeveloped framing and presentation. I agree that the manuscript evidence supports all three concerns. These are not minor revisions.	Thank you to the reviewer for the thorough, thoughtful, and constructive evaluation of the manuscript. The recognition of the significance of documenting geoscience curriculum implementation within a recently established university in the Northern Cape Province of South Africa, particularly within a resource-constrained and under-researched higher education context is greatly appreciated. The review has provided valuable guidance that substantially improves the revised manuscript. All the concerns have been carefully considered and incorporated into the revised the manuscript accordingly. The current version has been reviewed to support the central claims. Methodology has been made more explicit. Steps taken to protect the identify of participants have been more elaborately presented. Framing and presentation have been more explicitly given with aid of theory and literature.
The ethics approval and student protection procedures need to be documented much more clearly. I recognize that South African research ethics procedures may differ from Canadian procedures, so I'm not assuming that one national process should be applied to another context. My concern is that the manuscript currently states that the study was conducted with "consent from the dean of faculty", but it does not make clear whether this constituted formal research ethics approval, institutional exemption, or another recognized process for using student records and feedback in publication. The statement that "participation was voluntary" is also too general for an instructor linked	In order to address the reviewer's concerns regarding the description of ethical procedures and participant protection, the revised manuscript has been expanded the ethics section to clearly document the relevant ethics procedures followed. The section explicitly explains the process through which participants were informed about the study, and how voluntary participation was ensured taking into account the following: 1) The timing and process of informed consent. 2) Measures implemented to minimise coercion in a lecturer-student research context. 3) Procedures used to protect participant confidentiality and anonymity.

study with "13 participants". The manuscript needs to explain how consent was obtained, when it was obtained in relation to grading, and what safeguards were in place to reduce coercion and social desirability bias. The figure labelled "Unedited student's email to lecturer" is especially concerning. In a class of 13, an unedited individual email may be identifiable, even without a name. The authors need to provide clear evidence of ethics approval or exemption, consent procedures, anonymisation steps, and explicit permission for any quoted student communication.	Furthermore, the figure previously labelled "Unedited student's email to lecturer" has been removed and replaced with anonymised excerpts that cannot reasonably be linked to individual participants. Only data for which appropriate permissions were obtained were included in the analysis.
The central effectiveness claim also needs to be substantially reframed. The abstract states that "the hybrid delivery model can enhance students' theoretical comprehension, practical competencies, preparedness for professional practice, and sustainable societal involvement." However, the study is described as a "qualitative case study design" using "curriculum documents, assessment records, peer review reports, and students' feedback". This design may support a descriptive case of implementation and student perceptions, but it does not establish enhancement unless there is a baseline, comparator, longitudinal evidence, or a clearly justified learning outcomes analysis. Claims such as "This positive outcome is attributed to" the hybrid model and alignment should therefore be removed or rewritten as cautious, context specific indications.	The abstract, discussion, and conclusion sections have been revised to avoid causal language and broad claims of educational enhancement. Statements suggesting that the hybrid delivery model "enhanced" theoretical comprehension, practical competencies, professional preparedness, or societal engagement have been revised and supported with more cautious interpretations grounded in the available evidence (Table 2). The manuscript now positions the findings as indications derived from participant experiences (Fig. 6), curriculum documentation, assessment evidence (Table 2), and quality assurance processes. References to positive outcomes are framed as perceived benefits and observed implementation outcomes rather than demonstrated causal effects.
The manuscript also needs to separate student satisfaction, quality assurance, and learning. The manuscript reports that "Students' feedback collected from 13 participants" showed "high satisfaction", and that curriculum legitimacy was "validated through moderation". These are useful sources of evidence, but they do not independently demonstrate learning gains, field competence, or professional readiness. I would encourage the authors to provide an explicit map from learning outcomes to assessments, rubrics, samples or summaries of student work, and the interpretation of that evidence. Without that map, claims	The revised manuscript now explicitly distinguishes between: a) Student perceptions and satisfaction (Fig. 6b) b) Quality assurance and external moderation outcomes (Fig. 5) c) Evidence related to student learning and competency development (Table 2). The revised version of the manuscript incorporates a curriculum alignment framework that maps learning outcomes to assessments and associated evidence (Table 1). The revised discussion clarifies the limitations of each evidence source and avoids treating student satisfaction or moderation outcomes as direct proxies for learning gains.

about "practical competence" and "conceptual understanding" remain overstated.	
The qualitative analysis is not yet auditable. The manuscript states that the qualitative data followed a "thematic analysis approach" and lists criteria such as "curriculum alignment, pedagogical approaches, assessment practices, and implementation challenges". However, it does not show who coded the data, how themes were generated, whether negative cases were considered, or how researcher positionality was managed. The authors should include a codebook, a theme table, representative extracts, and a reflexive statement.	The methodology section has been substantially expanded to provide: a) A detailed description of the analysis process (Fig. 5) b) The development and refinement of themes (Table 1) c) Examples of representative data extracts (Fig. 8) Table 1 and Table 2 are added to improve transparency and traceability of findings.
Several important elements also remain under specified. Phrases such as "pre-recorded online learning materials leveraging smart technologies" and "AI generated feedback" do not identify the platforms, frequency, workflow, or pedagogical purpose. Because geology "relies heavily on experiential learning, field based and laboratory practicals", the manuscript needs to specify which field and lab activities actually occurred. This is especially important because "Fieldwork faced logistical challenges" that caused "delays and subsequent cancellations". Similarly, the statement that "Industry experts were invited" is not enough to evidence professional readiness unless those activities are linked to competencies, assessments, and outcomes.	The revised manuscript now provides detailed descriptions of: a) The digital platforms and technologies used to support pre-recorded learning materials (field photos, digital maps, cross sections) b) The nature, timing, and pedagogical purpose of AI assisted feedback after the first theory test and after the first field trip. c) The specific field-based activities undertaken, including learning objectives and constraints encountered (methodology) d) Laboratory-related activities that were conducted despite infrastructural limitations (Table 1) e) The logistical challenges affecting fieldwork implementation f) Industry experts contributions were integrated into learning outcomes, competency development, and assessment activities.
In the end, I see promise in the manuscript, especially because of its setting and the realities it documents. However, the current version needs major revision before it can be considered publishable. I would encourage the authors to reposition the article as a careful, ethics grounded case study of curriculum implementation in a resource constrained geoscience education context, with more modest claims, clearer methods, stronger participant protection, and more transparent evidence.	The overall framing of the manuscript has been revised to meet qualitative case study of geology curriculum implementation. Greater emphasis is now placed on documenting classroom and field trip realities, implementation challenges, adaptive field trip strategies, and lessons that may be transferable to similar emerging higher education contexts. The revised manuscript adopts a more cautious interpretation of both theory and field trip findings (Table 2), explicitly acknowledges methodological

	limitations, and avoids claims that extend beyond the available evidence.
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