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Manuscript ID: egusphere-2025-2248

Title: *Digital Field Representations as a Holistic Approach to Experiential Learning in High Arctic Geoscience Field Education*

Response to the Editor and Reviewers

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Dear Editor,

We sincerely thank you and the reviewers for the thorough and constructive evaluation of our manuscript. The comments from RC1 and RC2 have significantly strengthened the theoretical coherence, methodological clarity, and overall structure of the study.

In this revised version, we have carefully addressed all major and minor points raised. Below, we summarize the principal revisions undertaken in response to the review process. Detailed point-by-point responses to individual reviewer's comments are provided separately.

1. Strengthened Theoretical Integration (Experiential Learning Theory)

A primary concern raised by the reviewers was the need for clearer and more consistent integration of Experiential Learning Theory (ELT) throughout the manuscript.

In response, we have:

- Integrated ELT directly into the Introduction rather than presenting it as an isolated theoretical subsection.
- Clarified how ELT functions as an interpretive lens guiding the study, rather than as a decorative framework.
- Explicitly connected ELT stages (concrete experience, reflective observation, abstract conceptualization, active experimentation) to the temporal integration of VFEs (pre-field, in-field, post-field).
- Reorganized the Results and Discussion sections to interpret findings through ELT in a structured and consistent manner.

These changes ensure that ELT now frames the research questions, informs the analysis, and guides interpretation of findings.

2. Clarified Operationalization of “Novelty Space”

The reviewers requested clearer conceptual and analytical treatment of novelty space.

In the revised manuscript, we have:

- Positioned novelty space explicitly within the theoretical framing in the Introduction.
- Clarified that novelty space is interpreted through indicators of preparedness and

- orientation, rather than directly measured via cognitive load instruments.
- Reframed claims to emphasize that VFEs may contribute to managing perceived novelty rather than eliminating it.
- Refined the Discussion to describe VFEs as redistributing cognitive resources rather than reducing experiential richness.

This clarification strengthens conceptual precision and avoids overinterpretation of the data.

3. Improved Alignment Between Research Questions and Methods

The reviewers emphasized the need for stronger alignment between research questions and empirical instruments.

To address this, we have:

- Revised Section 3 to clearly map each research question to specific survey components.
- Added a structured overview table linking research questions, instruments, scales, sample sizes, and analytical sections.
- Clarified the timing of pre-field, post-field, and TAM instruments.
- Strengthened the explanation of the mixed-methods design.

These revisions make the research design more transparent and analytically coherent.

4. Clarified the Role of the Technology Acceptance Model (TAM)

Reviewers raised questions regarding the purpose and positioning of TAM within the study.

In response, we have:

- Clarified that TAM serves as a prerequisite assessment of technological usability and acceptance.
- Explained its relevance as an enabling condition for pedagogical integration.
- Positioned TAM results as foundational to interpreting perceived educational impact.

This strengthens the conceptual logic linking technological acceptance to experiential learning outcomes.

5. Reorganized Results for Greater Analytical Clarity

The Results section has been restructured to:

- Explicitly address the research questions in separate subsections.
- Clearly distinguish between usage patterns, technology acceptance, and perceived educational impact.
- Reduce interpretive discussion within the Results section.
- Improve figure integration and narrative coherence.

This restructuring enhances readability and strengthens analytical flow.

6. Refined Discussion and Conclusions

In response to reviewer concerns regarding overstatement and scope:

- Claims regarding inclusivity and sustainability have been carefully framed as implications rather than demonstrated outcomes.
- The complementary (rather than substitutive) role of VFEs has been emphasized.

throughout.

- The Conclusions have been refined to clearly articulate the study's contribution to understanding how digital tools redistribute experiential learning processes across time and context.

7. Transparency and Limitations

We have strengthened the limitations section by:

- Explicitly acknowledging reliance on self-reported perceptions.
- Clarifying that novelty space was inferred rather than directly operationalized.
- Highlighting the contextual specificity of the High Arctic setting.

This ensures methodological transparency and appropriate scope of inference.

Summary

We believe that the revised manuscript addresses the core conceptual, methodological, and structural concerns raised during review. The study now presents:

- A coherent theoretical framing grounded in experiential learning theory.
- A clearly articulated interpretation of novelty space.
- Transparent research design and instrument alignment.
- A balanced and cautious discussion of implications.
- A refined articulation of the study's contribution to digital geoscience education.

We are grateful for the reviewers' insightful feedback, which has substantially improved the manuscript.

We respectfully submit the revised manuscript for your consideration and look forward to your further evaluation.

Kind regards,

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