Qeios

Peer Review

Review of: "On the Impact of Technology on University Analysis"

Md Akamul Bari[1]

1. Faculty Of Business, Multimedia University, Malaysia

Hi and thank you very much, Reinhard Oldenburg, for your contribution to seeing the impact of technology on university analysis.

This work addresses a significant gap in mathematics education: bridging the transition from high school calculus to precise university-level analysis.

- Introducing GeoGebra at this advanced level is novel, since most prior studies focus on secondary or introductory calculus.

There are some **strengths of this work**

- Clear explanation of the pedagogical motivation: improving student understanding of proofs, continuity, differentiability, and convergence.
- Rich integration of theory (variation theory, Duval's representation registers) with practice through GeoGebra tasks.
- Use of voluntary computer exercises created a natural experimental split, avoiding ethical concerns.
- Results show a statistically significant positive effect ($p = 0.014$) on tasks aligned with GeoGebra support.

There are some **limitations observed in your work**

- Small sample size ($n = 23$) reduces the reliability and generalizability of findings.
- Data collection issues (missing engagement variables) limited deeper analysis.
- The regression model's explained variance ($R^2 = 0.44$) is promising but still leaves many influencing factors unaccounted for.

It would be great if you could **improve further based on the below points**

doi.org/10.32388/Y5KAH7

- Replicate with larger cohorts across multiple institutions to validate results.
- Incorporate mixed methods such as student interviews and classroom observations to capture qualitative insights.
- Explore long-term retention and transfer of concepts, not only immediate performance.
- Provide explicit comparisons with other technologies (e.g., Mathematica, Python) to position GeoGebra's unique benefits.

Declarations

Potential competing interests: No potential competing interests to declare.