Review of: "Improving Learning Outcomes through Well Designed MCQ Tests"

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Potential competing interests: No potential competing interests to declare.

The introduction provides a solid foundation for the paper by effectively outlining the challenges faced in engineering education and proposing a promising solution through an intelligently designed MCQ test methodology. However, there are opportunities to improve clarity, depth, and completeness to enhance the overall impact of the introduction.

Key Areas for Improvement:

Clarity and Depth:

- While the introduction effectively identifies the challenges posed by large class sizes and the limitations of traditional assessment methods, there is room to provide more detailed insights into the specific mechanisms and components of the proposed MCQ test methodology.
- Further elaboration on how the proposed methodology addresses the identified challenges, including the process of question selection, administration, and feedback mechanisms, would enhance the clarity and depth of the introduction.

Contextualization and Relevance:

- The introduction effectively contextualizes the challenges within the broader landscape of modern education, including the impact of population growth and the COVID-19 pandemic.
- However, to strengthen the relevance of the paper, the authors could consider elaborating on specific examples or case studies illustrating the challenges faced by teachers and students in engineering education.

Integration of Past Research:

- The introduction successfully integrates past research findings to support the proposed solution, particularly regarding the impact of question randomization on exam performance.
- To further strengthen the integration of past research, the authors could provide more detailed references and insights into relevant studies, methodologies, and findings, highlighting their significance in shaping the proposed approach.

Experimental Validation:

- The mention of controlled experiments conducted at two universities adds credibility to the proposed methodology. However, there is an opportunity to provide more detailed insights into the experimental design, methodology, and key findings.

- Including a brief summary or discussion of the experimental results, including statistical analysis and practical implications, would enhance the comprehensiveness and impact of the introduction.

Link to Outcome Based Education (OBE):

- The introduction effectively connects the proposed methodology with the concept of Outcome Based Education (OBE), emphasizing the importance of measuring student learning outcomes.
- To further strengthen this link, the authors could provide more detailed insights into how the proposed MCQ test methodology aligns with the principles of OBE, including its impact on curriculum design, assessment strategies, and student engagement.

Recommendations for Revision:

1. Provide a more detailed explanation of the proposed MCQ test methodology, including its specific components, processes, and mechanisms.
2. Include specific examples or case studies to illustrate the challenges faced by teachers and students in engineering education.
3. Enhance the integration of past research by providing more detailed references and insights into relevant studies and findings.
4. Provide a brief summary or discussion of the experimental results to highlight the practical implications of the proposed methodology.
5. Further elaborate on how the proposed MCQ test methodology aligns with the principles of Outcome Based Education (OBE), including its impact on curriculum design and student learning outcomes.

I suggest including the below up-to-date citations:

https://www.mdpi.com/2079-9292/10/6/727

https://www.mdpi.com/2079-9292/11/13/2004