

# Normalization of the Motivational and Metacognitive Beliefs Scale for Secondary School Students Regarding Online and Offline Mathematics Learning Environments

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## 1. Round 1

### 1.1. Reviewer 1

Reviewer:

The introductory paragraph does a good job of contextualizing the shift to online learning. However, the sentence "This paradigm shift has been further accelerated by the global COVID-19 pandemic..." could benefit from more detail on how this acceleration occurred in specific contexts (e.g., education systems in developed vs. developing countries). This would provide a more nuanced view of the global impact.

The sentence "the shift has not only changed how education is delivered but has also highlighted the importance of understanding students' motivational and metacognitive beliefs in these new learning contexts" is key. It would benefit from references to studies that have specifically examined the interplay between these beliefs and online learning contexts. Adding citations here would strengthen the claim.

The sentence "Motivational beliefs, including self-efficacy, goal orientation, and intrinsic motivation, are critical factors..." could be more concise. Consider breaking it into two sentences for clarity. Additionally, it would be useful to briefly define each of these terms (self-efficacy, goal orientation, etc.) to ensure the reader understands their relevance to the study.

The introduction to self-regulated learning (SRL) is appropriate, but it would be helpful to link SRL more explicitly to both motivational and metacognitive beliefs. A clearer connection between SRL and how these beliefs interact could help readers understand the theoretical framework better. You may also want to cite more recent literature on SRL in online learning environments.

The challenges mentioned in this paragraph are important, but the sentence "These challenges can be particularly pronounced in under-resourced settings" could be expanded. How might the specific barriers in under-resourced settings impact students' engagement and motivation? Examples from relevant studies could illustrate this point further.

The study employs a convenience sampling method, but it is important to acknowledge the potential limitations of this approach. While convenience sampling is common, it may introduce selection bias. Consider discussing how this bias might affect the generalizability of the findings, and provide a justification for its use in this particular context.

You mention the use of Cronbach's alpha to measure reliability, which is appropriate. However, providing more information on how the scales were adapted for the context (e.g., the translation process for non-English instruments) would increase the transparency and rigor of the methodology.

The inclusion of 10 faculty members to confirm the content and face validity is commendable. To improve this section, it would be useful to explain the specific criteria they used to assess the validity of the questionnaires. Was there a specific rubric or set of guidelines followed in the review process?

The mention of "the Morgan table" for sample size calculation is appropriate, but it would be helpful to briefly explain why this table was chosen over other methods, such as statistical power analysis. This would clarify your methodological choice for readers who are unfamiliar with the Morgan table.

Authors uploaded the revised manuscript.

## 1.2. Reviewer 2

Reviewer:

The claim "Cultural factors, for example, can significantly influence how students perceive and engage with online learning" is important, but it would be stronger if you added specific examples or references. Are there studies focusing on particular cultures where online learning is less effective due to traditional educational values?

When discussing the flipped classroom model, you mention that its effectiveness varies. To provide clarity, include more specific evidence of when it works and when it doesn't, or refer to studies that have identified key conditions for its success. It would strengthen your argument to highlight particular variables (e.g., class size, subject matter, or technological tools used).

The paragraph effectively ties motivational beliefs to the subject of mathematics. However, the statement "Mathematics is often perceived as a difficult subject" could benefit from referencing studies that have empirically demonstrated this perception. Adding such references would support the claim with evidence.

The paragraph effectively discusses the challenges students face in online mathematics learning. However, the sentence "The use of technology in these environments, such as interactive simulations and online assessments, can also play a role in shaping students' motivational beliefs" would be more persuasive if you referenced studies that support these claims, particularly those that highlight the impact of technology on motivation.

The descriptive analysis results are presented clearly, but the meaning behind the mean scores could be explored further. For example, you mention "moderately high levels of motivational and metacognitive beliefs" but do not interpret what this suggests about students' general engagement with the learning environment. Are these results typical, or do they indicate room for improvement?

While you report the mean and standard deviation for both motivational and metacognitive beliefs, it would enhance the clarity of your findings to provide more context about how these scores compare to prior research. For example, how do these scores compare to those found in similar studies, and what might this suggest about the effectiveness of the learning environments under study?

The discussion of the results could benefit from deeper engagement with the literature. For instance, you mention the higher scores in metacognitive beliefs in online environments. This could be compared to findings from other studies, particularly those that suggest a lack of motivation in online contexts, to provide a more balanced perspective

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## **2. Revised**

Editor's decision after revisions: Accepted.

Editor in Chief's decision: Accepted.