Review of: "Influence of Meta-cognition, Self-efficacy, and Self-regulated Learning on Students' Achievement in Biology in Ibadan, Nigeria"

Ronesh Rajcoomar

Potential competing interests: No potential competing interests to declare.

Abstract- Whilst self-efficacy showed a positive correlation with student achievement, metacognition did not align similarly, leading to a metacognitive miscalibration. Self-regulated learning, on the other hand, is the application of metacognition and self-regulation to learning tasks. Self-efficiency and self-regulation link the affective domain to the metacognitive process. This research sees the learning process as a multidimensional process that has a different impact on the student's achievements. The findings are very intriguing in the sense that they do not fully align with much other research which shows a strong alignment with metacognition and achievement in biology. Despite self-regulation and self-efficiency having their distinct definitions in this research, analysis the results show a significant difference in the impact these processes have on achievement in biology when compared to metacognition.

Introduction: The introduction does not build strongly on the context of the research. It mentions general information on metacognition. Despite the components of metacognition in most research being similar, the concept of metacognition is phrased differently in various research articles. What are the similarities and differences in which this article views metacognition in terms of other research articles? How do the citations used fully describe how the authors view metacognition? Why are there no citations and explanations on the concepts of self-efficiency and self-regulation? This should be included to capture the readers' interest and provide a prerequisite understanding of the research.

Research problem: Why is biology crucial to national development?

"…Mohammed (2022) argues that poor knowledge of reading comprehension is unconnected to the absence of meta-cognition strategies." How is this relevant to this study? How is reading comprehension linked to the study and achievement of biology?

Again, there is no information on what this study means by self-efficiency and self-regulation. Why is there a need to link these concepts to metacognition? What did previous studies say about self-efficiency and self-regulation and their impact on students' achievement in biology?

Research focus: How can this research improve achievement in biology and career prospects? There need to be credible reasons for the problems in order to develop solutions. Is this research focusing on solutions to a pre-existing problem? Is this research searching for the problem of poor achievement in biology? Is this research finding the problem and motivating a solution? What is unique about this research?

“Enhances the students’ learning and metacognitive awareness in biology and boosts their self-efficacy, which can make them become self-regulated learners.” How did the authors intend to achieve this goal?

Research questions: In the abstract or the introduction, there is no mention of gender and the learning processes. If this is part of the focus, it needs to be explained above, and the reason for this. If the research questions are thoroughly explored, could the authors do this in two separate articles?

Research methodology: What is “descriptive research of a survey type”? Is this a quantitative methodology? Why was this approach used? How effective is this approach in terms of this article?

How do the schools compare to the majority of the schools in the region? Describe the socio-economic and cultural correlation of the population sample. More information is needed about the types of schools studied.

Instrument and data collection: How were the instruments validated?

Explain the Likert scale in more detail. What do the other numbers mean? You only explained 1 and 7.

More details may be written about the questionnaires, including the categorisations of the questions and the intended recipients of the questionnaires. Is there no metacognitive survey for the students? MAIT is used for teachers. MAI is used for students.

More explanation regarding the Cronbach Alpha is required. What do the Chronbach Alpha values mean? How did the BAT align with what the pupils should know? Different schools teach biology at different rates and sequences. How fair was the test for most pupils?

Data analysis:

The methodology does not help me understand the findings of Table 2. How was metacognition for students measured? MAIT assesses metacognition for teachers and not students. Metacognition has different parts to it. I don’t see how one number is used to come up with one descriptor for metacognition. This needs to be explained fully.

More information in the research methodology is required for readers to get a deeper understanding of the analysed data.

The discussion seems to be a literature review. There should be a literature review as part of the study in a separate section.

Conclusion: The conclusions do not align with the research focus.

Limitations:

See comments on research methodology in terms of describing schools' research. Don’t you think mixing public and private schools will lead to invalid conclusions?

There are major shortcomings in just using questionnaires. Respondents may over-inflate their metacognitive awareness.

Metacognition is a consequence of a psychosocial environment that is an interrelation of sociocultural factors and individual thought and behavior. Metacognition may sometimes be observed, and questions may be inaccurate in assessing its components. Many respondents may not know what metacognition is. Therefore, observing meta-skills with participants, filling in the MAI, and interviewing participants may yield more valid conclusions.