

# Review of: "Trends in Malaysian Adolescents' Mathematics Performance Across Two Decades: What Factors Matter?"

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**Potential competing interests:** No potential competing interests to declare.

The paper presents the results of a secondary data analysis of TIMSS data, aiming to provide insights into student- and school-related factors that underlie the decline in TIMSS mathematics performance among Malaysian eighth-grade students. However, in its current form, the paper lacks clarity in its introduction, findings, and discussion. To enhance readability, authors might consider reorganizing the content, avoiding redundancy, providing specific explanations for notable findings, and adding a section on implications.

## Abstract

- **Rationale:** The abstract could provide a clearer justification for why this research is necessary. Specifically, it could emphasize the relevance of studying the relationship of individual and school factors with adolescents' mathematics achievement. Authors might consider rephrasing to highlight this importance.
- **Use of "Research" vs. "Literature":** Replacing the word "literature" with "empirical research" can help accurately convey the focus of the study. The goal is to analyse existing empirical evidence rather than general literature.
- **Implications Statement:** Adding a concise statement in the abstract that outlines the implications of the research findings can give readers a preview of the practical significance of your study.

## Introduction

- **Updated Literature:** A revisit of the literature section is needed to provide more recent sources that support the main arguments. For instance, the paper could present studies published after 2015 that discuss students' reliance on calculators and their struggles with fundamental math skills. This will strengthen the position and demonstrate the relevance of the research.
- **Statement Justifying the Research Aim:** A clear and concise statement needs to be inserted before the existing aim of the study. For example, "Given the persistent decline in mathematics performance among Malaysian eighth-grade students, this study aims to examine trends from 1999 to 2019. By identifying key factors influencing these patterns using TIMSS data, we seek to shed light on the reasons behind this decline."
- **Clarifying the Focus on Individual and School Factors:** In the current introduction, an explanation is missing of how this analysis is focused on individual and school factors, explaining how these factors relate to the decline in student math achievement rather than other factors, such as cognitive functioning, school ethos, policy, or curriculum. This will help readers understand the context and motivation behind the research.

- The introduction consists of the following six paragraphs, which can be labeled as follows

Paragraph 1: Focus of the Malaysian education system and its achievement.

Paragraph 2: The Participation of Malaysia in TIMSS, and the aim of current study.

Paragraph 3: Malaysian adolescent students' achievement in TIMSS

Paragraph 4: An Overview of the Educational System in Malaysia

Paragraph 5: Demographic characteristics of Malaysian students with a specific focus on language

Paragraph 6: The research aim

- These paragraphs lack coherent transitions from one to the next and fail to justify why readers should be acquainted with their content. The introduction also contains repetitive statements regarding the research aim, which should be avoided to enhance clarity.
- Readers would benefit from a concise and well-organized introduction that focuses solely on information relevant to the paper's aim. For instance, it may not be necessary to delve into details about the educational system of Malaysia or the demographic characteristics of Malaysian students.

#### **Subtitle: 1.1. School effectiveness model for student mathematics achievement**

- The separate line right after the first paragraph can be added, as it does not contain different content.
- The following two separate but incomplete paragraphs can be combined coherently.

"Many professions value employees' experience, including education where teacher experience is important (King Rice, 2010). Research shows a strong link between teacher experience and higher student achievement, as well as improved test scores and behavior (Ladd & Sorensen, 2017).

Studies show no correlation between teaching experience and academic performance in math and science (Zhang, 2008; Đerić et al., 2022). Contrary to expectations, experienced teachers do not necessarily have a greater impact on student achievement. The most significant growth in teacher effectiveness occurs in the first three years of their career (Akiba et al., 2007)."

Note: Ensure that the cited references are listed in alphabetical order see: Zhang, 2008; Đerić et al., 2022.

#### **Subtitle 1.2. Effects of student level factors on student mathematics achievement**

- The subtitle repeats the word "student." An alternative title could be: "Effects of Individual Factors on Student Mathematics Achievement".

- The content of this subtitle needs to be reorganized according to individual and school factors.
- The sentence, “Two important factors that affect a student’s achievement are expectancy and values” can be replaced with “Expectancy and values are two critical factors impacting student mathematics achievement.”
- The definition of expectancy could be followed by the two lines that are currently three paragraphs below it. see:

“Academic performance has been extensively studied in relation to students’ educational expectations (Chepete, 2008; Pinquart & Ebeling, 2020). A significant finding was that having high educational expectations for future studies was identified as a predictor of academic performance (Park & Park, 2006)”

- Conceptual definition: How the definition of “expectancy” is different from “self-efficacy beliefs”. In the current paper. “Expectancy refers to a student’s confidence in their ability to succeed”. This definition is not distinguishable from self-efficacy. A distinguishable definition of expectancy is needed.
- Combination: The following paragraphs can be merged with the paragraphs that precede them to improve readability.

“In the PISA 2012 evaluation, Malaysian students showed higher instrumental motivation and mathematical interest compared to the OECD average, but also had higher mathematics anxiety (OECD, 2014). Additionally, the intrinsic value of students was linked to the complexity and quantity of math problems, while math anxiety had a negative effect on problem complexity (Guo et al., 2020).”

“Girls have lower anxiety towards math, but this can lead to a negative perception of the subject (Hannula, 2002). Boys pursue math for practicality and career prospects, while girls enjoy it more (Williamson, 2004). Confidence in math abilities is linked to better performance in Malaysia (Ismail & Awang, 2009; Nga et al., 2012; Authors, 2011).”

## **Title: 2. Research Questions**

- The first two lines of the first paragraph under the title can be omitted for an audience of teachers, researchers, or policymakers.
- Instead of solely stating the limitations of existing research, the paper should clearly state the justification for conducting this new research.

## **Title: 3.2. Measures**

- “The five plausible values..”, what makes them plausible? It is not stated how they are plausible.
- Redundancy in the following statement “Many items (e.g., 215 items in TIMSS 2007) were used to extend the coverage of the mathematics content and measure the trends across the TIMSS assessments, many items (e.g., 215 items in TIMSS 2007) were used (Olson et al., 2008).”

### **5.1. Summarizing the findings**

- A mistype in the title, should be “summarizing”

The paper can omit the findings summary, since it wouldn’t clarify or add further details.

## 5.2. School effectiveness theory & 5.3. Expectancy value theory

- I could not understand why the two theories are added to the discussion section instead of the introduction sections.

### Explanations for notable findings

An explanation for the following outstanding findings is missing:

1. "Students who more frequently spoke the language of the test at home achieved lower scores in the four waves of TIMSS; however, this trend changed in 2015 and 2019". The provided explanations are about external factors (school's location, school quality, and SES). However, an explanation related to language itself is needed.
2. "Teacher teaching experience significantly correlated with mathematics achievement in 2019, and the correlation was negative... however, after controlling for the student-level factors, the relationship between teacher-teaching experience turned positive" How do we interpret this finding? Is there a negative relationship between student-level factors and teacher-level factors in general? Explanations for this finding are needed.

### Implications

The paper would be stronger with an additional section devoted to implications of the findings.