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Addressing the PISA 2022 Results: A Call for Reinvigorating Indonesia's Education System

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Abstract

The 2022 Programme for International Student Assessment (PISA) results depict a significant decline in the academic performance of Indonesian 15-year-olds in mathematics, reading, and science. The results position Indonesia's scores among the lowest since the country first participation in 2001. This editorial examines the implications of these results, drawing on data presented in PISA 2022, which illustrate the downward trend in performance and the widening gap between different socioeconomic groups. It argues for urgent educational reforms aimed at overhauling the current curricular frameworks, enhancing teacher training, and ensuring equitable educational opportunities. Specific strategies to achieve these goals include implementing the Merdeka Curriculum to promote student-centered learning, integrating educational neuroscience-based interventions to address learning disabilities, and leveraging intelligent tutoring systems and social media for collaborative learning. Additionally, developing localized assessments like the Indonesian Madrasah Competency Assessment and the Assessment of Indonesian Student Competence ensures alignment with international standards while addressing local needs. Through a comparative analysis with OECD averages and higher-performing nations, this piece highlights the necessity for Indonesia to adopt international best practices while tailoring them to local contexts. The ultimate goal is to equip Indonesian students with the skills necessary to meet both current and future challenges, thus improving their outcomes in subsequent PISA assessments and fostering national development. This article calls on policymakers, educational leaders, and stakeholders to engage in a concerted effort to address these educational deficiencies with the seriousness they deserve.

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THE URGENT NEED FOR EDUCATIONAL REFORM IN INDONESIA

The Program for International Student Assessment (PISA), conducted every three years by the OECD, evaluates the knowledge and skills of 15-year-old students nearing the end of their compulsory education (Abdullah & Peters, 2015). The primary aim of PISA is to assess students' competencies in key subjects of Mathematics, Science, and Reading, with the goal of preparing them to actively engage in social and economic life. This assessment has become a

significant tool in the global education policy landscape, contributing to what is termed the 'global governing complex' by the OECD (Li & Morris, 2022). PISA provides a platform for comparing educational systems internationally, allowing countries to benchmark themselves against global educational standards (Sousa et al., 2019). The assessment focuses on evaluating what students can do with the knowledge they have acquired, reflecting the efficacy of the education system in preparing students for future challenges (Araujo et al., 2017).

The PISA 2022 results have unveiled a concerning trend in the educational achievements of Indonesia's youth, highlighting a significant downturn in performance across mathematics, reading, and science. The data, drawn from a vast cohort of 15-year-olds, illustrate a decline to levels not seen since the early 2000s, demonstrating a critical juncture for the nation's educational policy. Indonesia's performances in the PISA 2022 assessment are detailed in Figures 1 and 2. These figures reveal that Indonesian students' scores were not only receding compared to previous years but also lagging considerably behind the OECD averages, signaling an urgent need for introspection and reform within the educational frameworks.

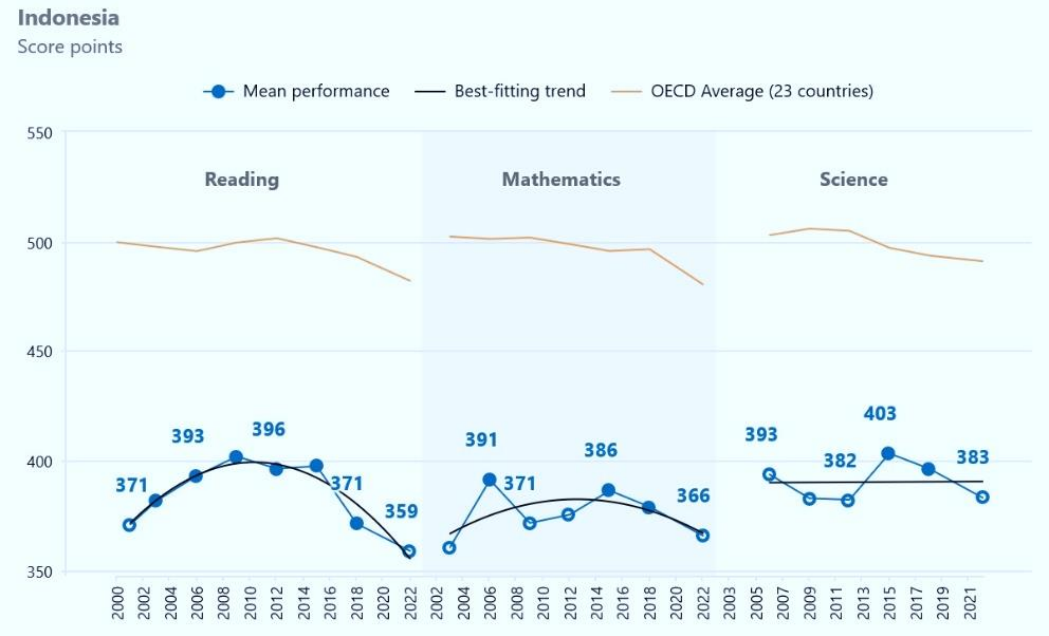

Figure 1. Trends in performance in mathematics, reading, and science (OECD, 2023).

One of the key aspects of PISA is its role in shaping educational accountability systems, focusing on students' mastery of cognitive skills and comparing this with formal curriculum-based assessments (Labaree, 2014). The assessment has been instrumental in providing insights into effective policy and practice strategies associated with higher learning outcomes, contributing to the continuous improvement of education systems (Ercikan et al., 2015). PISA's influence extends to the construction of standards for student and national success, with a focus on what constitutes a successful student or nation in the global education market (Serder & Ideland, 2016). Additionally, PISA has been used to study the effectiveness, efficiency, and equity of education systems, revealing insights into the relationship between educational expenditure and student performance (Rupérez et al., 2019).

Moreover, PISA has introduced various innovations over the years, such as the 2018 measure of global competence, which aims to define and shape the understanding of what it means for young individuals to be globally competent (Idrissi et al., 2020). By incorporating global competence assessment, PISA aims to equip students with the necessary skills, attitudes, and values to contribute in creating an inclusive and sustainable world (Cobb &

Couch, 2022). The assessment has also been instrumental in influencing education policies worldwide, with the OECD's PISA for Schools variant comparing school-level performance internationally (Lewis, 2017). Through its transnational benchmarking system, PISA encourages educational stakeholders to use the assessment results to reflect on and improve the education systems and practices (Hanberger, 2014).

In the Indonesian context, the impact of PISA has been profound. According to the PISA results in 2018, Indonesia's performance in reading, mathematics, and science was relatively low compared to other participating countries. Specifically, Indonesia was ranked 73rd for reading quality, 71st for mathematical ability, and 74th for science proficiency out of 79 countries (Haryuniati & Suranto, 2021). These rankings showed there is substantial room for improvement in Indonesia's education system to enhance students' competencies in these key subject areas.

Analyzing the impact of PISA on Indonesia, studies showed that the country's performance in reading competence has been a focal point. Studies on the PISA results obtained by Indonesia, particularly focusing on reading competence from 2000 to 2015, highlighted the need for improvements in this critical skill area (Nugrahanto & Zuchdi, 2019). The PISA rankings have also revealed that Indonesia's reading scores were 72nd out of 77 countries, math scores were 72nd out of 78 countries, and science scores were 70th out of 78 countries in the 2018 assessment (Wibowo et al., 2020). These findings demonstrate the importance of addressing literacy challenges to enhance overall educational outcomes in Indonesia.

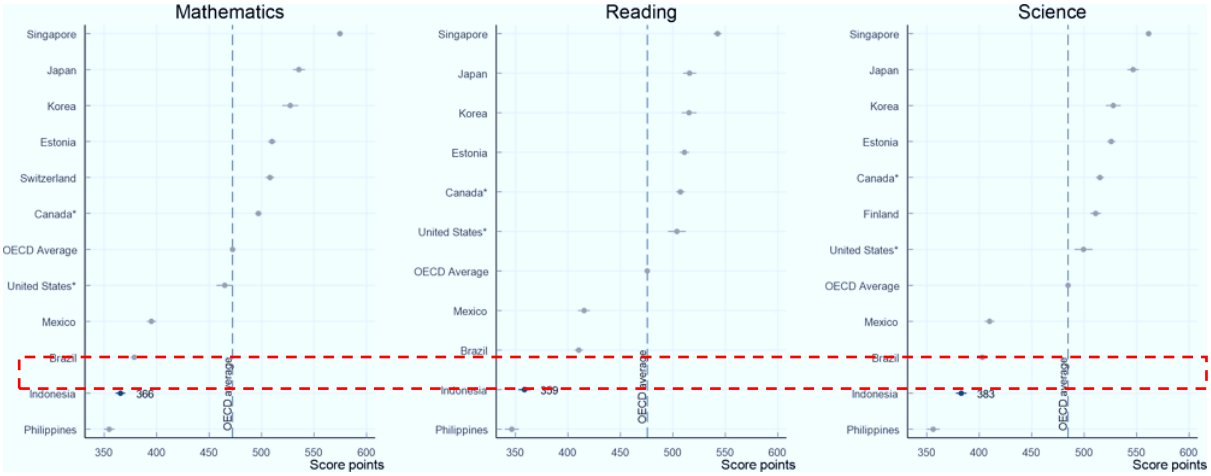

Figure 2. Mean performance in mathematics, reading and science (OECD, 2023).

Moreover, Indonesia's performance in mathematical competencies has been a subject of analysis. While there was a significant increase in the achievement of mathematical competencies among Indonesian students between 2012 and 2015, the overall performance still fell below the average of the OECD (Sukoco & Suharjo, 2019). The PISA rankings have consistently shown that Indonesia needs to focus on developing basic mathematical literacy skills to bridge the gap with top-performing nations (Sari et al., 2023). This highlights the importance of targeted interventions to strengthen mathematical abilities among Indonesian students.

In terms of scientific literacy, Indonesia's PISA results have reflected a need for improvement. The 2018 PISA rankings placed Indonesia at 70th out of 78 countries in scientific literacy, indicating a lower proficiency level compared to many other nations (Dewi & Haryani, 2022). The data from PISA assessments have consistently pointed towards the low scientific literacy of Indonesian students, emphasizing the necessity of enhancing science

education to boost overall academic performance (Kalsum et al., 2023). Addressing the challenges in scientific literacy is crucial for equipping students with the necessary skills to succeed in an increasingly competitive global landscape.

IMPROVING EDUCATIONAL PERFORMANCE AND SOCIO-ECONOMIC IMPACT IN INDONESIA

The PISA 2022 results have revealed a concerning decline in Indonesia's educational performance, suggesting the need for an urgent and robust response to reverse these trends. In mathematics, only 18% of students achieved at least Level 2 proficiency, a stark contrast to higher-performing regions where the majority of students surpass this basic threshold (De Silva & Sumarto, 2018). Similarly, disparities are evident in reading and science, where Indonesian students' proficiency levels remain alarmingly low (see Figure 3). This systemic underperformance hints deficiencies not only in curriculum design but also in the delivery and contextualization of educational content. To address these issues, we believe that comprehensive curricular reforms that enhance critical thinking and problem-solving skills are essential.

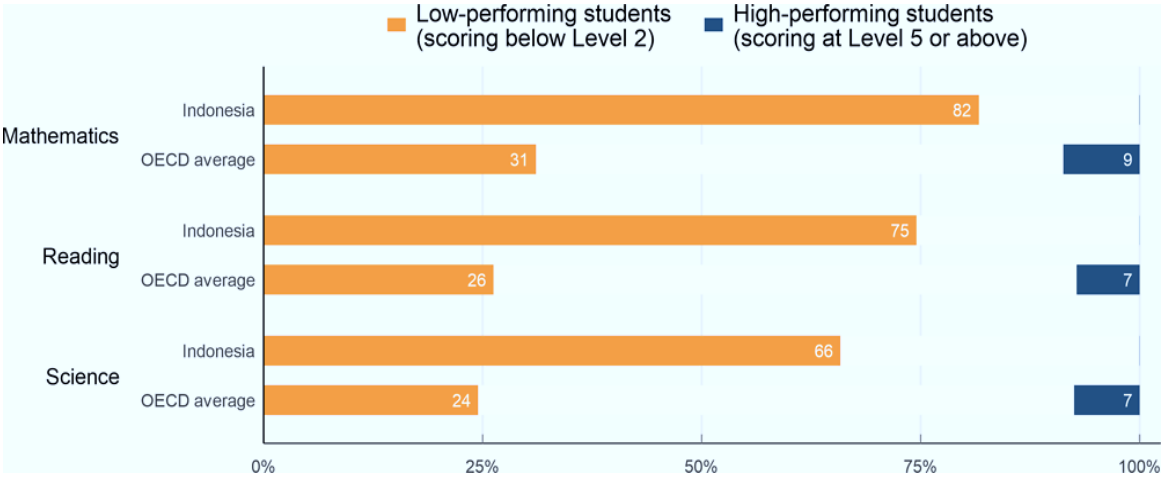

Figure 3. Top performers and low-performing students in mathematics, reading and science (OECD, 2023).

Curriculum reform plays a pivotal role in improving educational performance. By aligning the curriculum with global best practices and focusing on developing critical thinking, problem-solving, and analytical skills, Indonesia can better prepare students for success in subjects like mathematics as suggested elsewhere (Nasution et al., 2020). Integrating real-world applications and practical examples into the curriculum can enhance students' understanding and engagement with mathematical concepts, fostering a deeper level of learning (Nobari et al., 2018). Additionally, educational neuroscience-based interventions can address learning disabilities and improve overall academic achievement in mathematics (Fathiazar et al., 2020). For instance, by incorporating neuroscience principles into the curriculum, educators can tailor instructional strategies to improve attention structures, enhance learning capacities, and boost academic performance in mathematics.

The PISA 2022 results also reveal significant socio-economic disparities in educational performance. Students from lower socio-economic backgrounds consistently perform worse than their more affluent peers, as evidenced by Figure 4. Socio-economic status, including factors such as household income and parental education levels, significantly influences students' academic performance (Santero et al., 2019). Addressing these disparities is hence crucial to ensuring equitable access to quality education. Studies have highlighted the

importance of maternal education, household income, and rural-urban location in shaping educational outcomes, emphasizing the need for targeted interventions to bridge these gaps (Härkönen et al., 2018).

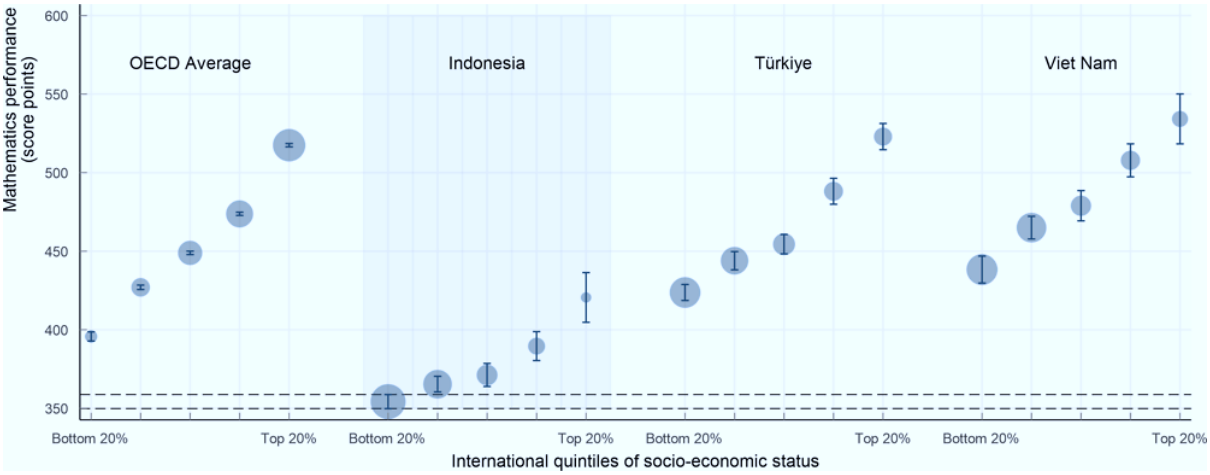

Figure 4. Mean performance in mathematics, by international quintiles of socio-economic status (OECD, 2023).

One critical aspect of addressing socio-economic disparities is the implementation of targeted interventions that improve access to quality education in underserved regions. For example, increasing the coverage of skilled birth attendants and promoting community engagement can positively impact educational outcomes by ensuring better health and well-being for children and mothers (Idris, 2019; Khusun et al., 2022). Additionally, developing programs that empower parents to support their children's education, particularly in disadvantaged areas, can significantly narrow the educational achievement gap. Research has shown that parental socio-demographic factors, such as education levels and income, influence students' academic performance (Abduh et al., 2023). Enhanced parental engagement can create a more conducive learning environment, which improves students' academic outcomes.

Leveraging technology might be crucial in addressing educational disparities and enhancing student engagement. For instance, intelligent tutoring systems can support learners in developing working memory capacity in e-learning environments by providing personalized feedback, adaptive learning experiences, and targeted interventions (Mamoun et al., 2018). Furthermore, utilizing social media platforms for collaborative learning can enhance student engagement, promote knowledge sharing, and improve academic performance through peer-to-peer learning (Al-Rahmi et al., 2015). These approaches would create interactive and engaging learning environments that cater to diverse student needs.

Learning analytics offer another valuable tool for improving educational outcomes. By analyzing educational data, educators can identify patterns, predict learning outcomes, and tailor instructional strategies to meet individual student needs (Tsai, 2016). This data-driven approach could provide insights into student performance and behavior, enabling educators to implement targeted interventions that enhance academic performance. Moreover, promoting self-assessment practices can empower students to take ownership of their learning process. Self-assessment tools such as rubrics and reflective journals, students help in monitoring their progress, set learning goals, and reflect on their academic performance, leading to improved learning outcomes in mathematics and other subjects (Papanthymou & Darra, 2018). Improving digital literacy among educators is also seen essential for creating engaging and interactive learning environments. Providing training and mentoring in digital

learning literacy can equip educators with the skills to effectively integrate e-learning tools, fostering a more dynamic and responsive educational experience (Setiaji et al., 2021). Schools can better support diverse student needs and improve overall academic performance.

Addressing the decline in educational performance in Indonesia requires a comprehensive and multi-faceted approach. By implementing targeted curriculum reforms and addressing socio-economic disparities, Indonesia can work towards improving educational outcomes and better preparing students for future challenges. These efforts are crucial for fostering a more inclusive and equitable education system, ultimately enhancing the nation's competitive edge. The PISA 2022 results point out the urgent need for Indonesia to undertake comprehensive educational reforms in two main approaches: (1) By focusing on curriculum enhancements that promote critical thinking and problem-solving skills, and (2) by addressing socio-economic disparities through targeted interventions and the effective use of technology. These reforms are essential not only for elevating student performance but also for ensuring that all students, regardless of their socio-economic background, have access to quality education. By adopting a holistic approach that integrates curriculum reform, technological innovation, and socio-economic support, Indonesia can create a more robust and inclusive education system.

Critics might argue that global assessments like PISA do not fully encapsulate the educational values and objectives specific to Indonesia, advocating for a localized approach to assessing student performance. While it is valid that educational assessments should reflect local contexts and needs, the consistent participation of Indonesia in PISA provides valuable longitudinal data that tracks educational outcomes over time, offering insights crucial for policy formulation. Moreover, the international benchmarking provided by PISA allows Indonesia to gauge its educational standards against global norms, highlighting areas of strength and opportunities for improvement. Thus, while localizing education is crucial, the insights from international assessments serve as a catalyst for targeted reforms aimed at elevating educational practices to meet both local and global standards.

In the Indonesian educational context, unique localized assessments and educational objectives cater to the specific needs and challenges of the country. One such example is the Indonesian Madrasah Competency Assessment (Asesmen Kompetensi Minimum Indonesia - AKMI), developed for schools under the Ministry of Religious Affairs. This assessment is tailored to schools under religious auspices and is aligned with both PISA and the National Assessment (AN) system (Amalia, 2023). The AKMI serves as a localized assessment tool focusing on competencies relevant to the religious education sector in Indonesia.

Another localized assessment method designed by the Ministry of Education and Culture is the Assessment of Indonesian Student Competence (AKSI). This prototype assessment evaluates students' competencies in alignment with international standards, potentially incorporating elements inspired by assessments like PISA (Wahyuni, 2023). By integrating components from global assessments into localized tools like AKSI, Indonesia can ensure its educational objectives align with international benchmarks.

Furthermore, the Indonesian government has been developing students' critical thinking skills through learning, as highlighted by the Education Quality Assurance Agency (LPMP) (Faisal et al., 2023). This focus on critical thinking aligns with the objectives of assessments like PISA, which emphasize higher-order thinking skills and problem-solving abilities. It equip students with the skills necessary to excel in assessments like PISA and navigate complex real-world challenges.

The Indonesian education system has been working on enhancing students' mathematical literacy and attitudes (Karolina et al., 2022). By focusing on mathematical

literacy and fostering positive attitudes towards mathematics, Indonesia aims to improve students' performance in mathematics-related assessments like PISA. This localized objective reflects a targeted effort to address specific areas of improvement identified through international assessments.

The Indonesian education system has also been developing PISA-like problems to assess students' mathematical communication and problem-solving abilities (Marwanda et al., 2021). By creating localized assessments that mirror the format and content of PISA, Indonesia can better prepare students for such evaluations without sacrificing the local contexts.

While critics are correct in noting that global assessments like PISA may not fully capture local educational values and objectives, the benefits of participating in such assessments are significant. The insights gained from PISA enable Indonesia to benchmark its educational performance globally, identify areas for improvement, and implement targeted reforms. Localized assessments like AKMI and AKSI, combined with a focus on critical thinking and mathematical literacy, ensure that Indonesia's educational strategies are both globally informed and locally relevant. This balanced approach would allow Indonesia to enhance its educational system, ultimately benefiting its students by preparing them for both national and global challenges.

THE POTENTIAL LONG-TERM IMPACT

The PISA 2022 results serve as a stark reminder of the pressing challenges within Indonesia's education system. The data not only reflect immediate academic deficiencies but also signify potential long-term repercussions for the nation's socio-economic development. It is imperative for policymakers, educators, and stakeholders to collaborate comprehensively to overhaul the existing educational frameworks. By focusing on enhancing teacher training, revising curricula to incorporate critical thinking and problem-solving skills, and ensuring equitable access to quality education, Indonesia can aspire to not only improve its standing in future PISA assessments but, more importantly, equip its young population with the necessary skills to thrive in a rapidly evolving global landscape. This concerted effort will ensure that the educational setbacks highlighted in the latest PISA results are addressed with the urgency and seriousness they warrant.

The current educational performance in Indonesia will affect the country's socio-economic landscape in the long term. The quality of education and academic outcomes play a crucial role in shaping the future workforce, driving economic growth, and influencing social development. The proposed reforms aimed at improving educational performance are essential in mitigating potential negative consequences and fostering positive socio-economic outcomes. One potential long-term impact of the current educational performance in Indonesia is its influence on economic growth and development. Education indicators such as public expenditure on tertiary education, enrollment rates, and the quality of the educated workforce directly impact economic growth (Maneejuk & Yamaka, 2021). Indonesia can cultivate a skilled workforce, attract investments, and drive innovation, ultimately contributing to sustainable economic development.

The socio-economic implications of educational performance are closely linked to factors such as poverty, inequality, and health outcomes. Education, sanitation, and healthcare somewhat affect child malnutrition in Indonesia (De Silva & Sumarto, 2018). Improving educational outcomes can lead to better health and well-being, reduced poverty, and enhanced access to healthcare, thereby positively impacting the socio-economic conditions of the population. Furthermore, the relationship between education and socio-economic development is multifaceted, encompassing aspects such as job creation, income

generation, and social mobility. Foreign direct investment and economic growth were proven positively correlated with education, health, and socio-economic development (Akbar et al., 2021). By investing in education and improving educational performance, Indonesia can hence create opportunities for socio-economic advancement, reduce unemployment, and enhance overall well-being.

The long-term impacts of educational performance extend to areas such as gender equality, environmental sustainability, and community resilience. Education plays a crucial role in promoting gender equality and economic development (Usman & Lestari, 2018). By ensuring equal access to quality education, Indonesia can empower women, reduce gender disparities, and foster inclusive socio-economic growth. The environmental and socio-economic implications of educational performance are interconnected. Investing in human capital through education can stimulate economic growth, promote sustainable development, and address socio-economic challenges (Rahman, 2020). By leveraging Indonesia's digital economy, enhancing human capital, and supporting education initiatives, the country can build a resilient socio-economic framework that adapts to changing global dynamics.

In response to the issues highlighted by the PISA results, Indonesia has been undertaking various educational reforms. One significant reform is the implementation of the Merdeka Curriculum by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristekdikti). This curriculum focuses on independent learning through curriculum reform, promoting student-centered approaches that enhance critical thinking skills and foster a more engaging and effective learning environment (Kusumawardani et al., 2022). This reform aligns with the need to address the deficiencies identified by the PISA results. Furthermore, the Indonesian government has been making efforts to globalize higher education graduates through curriculum reforms, such as the KKNI-based ELT curriculum in Islamic higher education institutions (Sukirman, 2022). By aligning the curriculum with global standards and perspectives, Indonesia aims to equip students with the skills and knowledge necessary to succeed in a competitive global landscape, addressing the need for improved educational outcomes highlighted by PISA. Additionally, the focus on mathematical literacy and attitude among students, as evidenced by studies analyzing gender differences in mathematical literacy, reflects a targeted effort to address specific areas of improvement identified through international assessments like PISA. By emphasizing mathematical literacy and fostering positive attitudes towards mathematics, Indonesia aims to enhance students' performance in mathematics-related assessments and improve overall academic outcomes.

The potential long-term impacts of current educational performance on the socio-economic landscape highlight the importance of these reforms. By implementing student-centered approaches, globalizing higher education, emphasizing mathematics literacy, and developing localized assessments, Indonesia can enhance educational outcomes and align with international standards. This balanced approach will ultimately prepare Indonesian students for success in a rapidly changing world, fostering a prosperous and equitable socio-economic future.

Author Contributions

The authors have sufficiently contributed to the study, and have read and agreed to the published version of the manuscript.

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Declaration of Interest
The authors declare no conflict of interest.

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