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Analyzing Curriculum Change Policies in Indonesia: "A Review on Mathematics Subject"

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Abstract: Curriculum reform is a reflection of a dynamic education system, particularly in responding to the demands of the times, global needs, and national challenges. Each shift in curriculum policy has brought significant implications for the structure, approach, and learning outcomes-especially in core subjects such as mathematics. This study aims to identify major changes in mathematics curriculum policy over time in Indonesia. The research employs a qualitative approach through a literature review of academic journals. The data analysis techniques used include data reduction, data display, and verification (Miles & Huberman: 1994). The finding reveals several key insights**:** (i) the average duration between curriculum changes is 7 to 8 years, with the shortest period lasting only two years namely in 2006, during the implementation of the 1994 and KBK curricula; (iii) since 2006, students have increasingly sought learning resources beyond their teachers, a shift that coincided with the introduction of the KBK curriculum. Further innovations in learning resources began with the implementation of the K-13 curriculum. (iv) different curricula emphasize distinct learning approaches-KTSP focuses on procedural mastery, the K-13 curriculum emphasizes conceptual understanding, while the Merdeka Curriculum promote flexibility in learning. These findings underscore the importance of aligning curriculum reforms with the evolving needs of teachers and students. To be effective, reforms must be supported by adequate resources and comprehensive training. This study contributes to a deeper understanding of how curriculum policies influence mathematics education, offering insights for policymakers to design stable, inclusive, and impactful curricula that improve learning quality and equip with essential 21st-century skills.

Keywords: *Curriculum changes, mathematics, primary education, PISA result, learning resources*

Abstrak: Penelitian ini menggunakan pendekatan kualitatif melalui studi literature dari laporan resmi dan jurnal akademik. Temuan penelitian mengungkapkan beberapa hal penting: (i) rata-rata jeda waktu antar perubahan kurikulum di Indonesia adalah sekitar 7 hingga 8 tahun, dengan perubahan tercepat terjadi dalam dua tahun dan yang terlama berlangsung hingga dua belas tahun; (ii) skor PISA matematika tertinggi Indonesia yaitu 391 dicapai pada tahun 2006 saat penerapan Kurikulum 1994 dan KBK; (iii) sejak tahun 2006, siswa semakin aktif mencari sumber belajar di luar guru, sebuah perkembangan pada saat dikenalkan KBK. Inovasi dalam sumber belajar mulai berkembang lebih lanjut pada masa implementasi Kurikulum 2013 (K-13); dan (iv) setiap kurikulum menekankan pendekatan pembelajaran yang berbeda-KTSP berfokus pada penguasaan prosedural, K-13 menekankan pemahaman konseptual, sedangkan Kurikulum Merdeka menawarkan fleksibilitas dalam belajar.

Kata Kunci: perubahan kurikulum, matematika, pendidikan dasar, PISA, sumber belajar

INTRODUCTION

The curriculum is the backbone of a nation's education system, playing a crucial role within the educational program (Prihantoro, 2014). It can be understood as substance, system, and field of study. As a system, the curriculum comprises documents and learning tools and is embedded within the broader educational and societal systems. As a continuous field of study,

curriculum development enriches and advances theoretical foundations in the discipline. Curriculum changes prepare competitive generation while fostering strong character to face global challenges. Curriculum changes require extensive preparation. For instance, research by Mackinlay (in Enika) found that it took 18 months, including focus group discussions (FGDs), to shift elementary school teachers' responses to curriculum changes in England (Wulandari & Jailani, 2020). Moreover, effective curriculum management is essential in determining the success or failure of education (Hasanah, 2019).

This complexity in curriculum development and change can be seen across different countries, including Indonesia. Every country has a unique curriculum, shaped by various factors such as natural conditions and cultural attributes specific to the nation. A well-designed curriculum can significantly impact a country's progress. However, nations, including Indonesia, may undergo multiple curriculum transitions to find the most effective one. Since gaining independence, Indonesia has undergone numerous curriculum reforms, each characterized by its distinctive focus and approach, influenced by political, cultural, and technological shifts.

The curricula that have been implemented in Indonesia since its independence include Curriculum 1947, Curriculum 1952, Curriculum 1964, Curriculum 1968, Curriculum 1975, Curriculum 1984, Curriculum 1994, Curriculum 2004 (KBK), Curriculum 2006 (KTSP), Curriculum 2013, and the Merdeka Curriculum. As of 2023, the current curriculum in Indonesia is the Merdeka Curriculum. The decision by the Ministry of Education and Culture to discontinue the 2013 curriculum for primary and secondary education has sparked controversy (Nugraheni, 2015). This change aims to adapt to progress and evolving educational needs. The process of changing curricula is influenced by various factors, including policy shifts, political dynamics, and societal needs (Wirianto, 2014). Additionally, the Indonesian government has experienced changes in leadership, from the Old Order to the current administration. The evolution of Indonesia's educational curriculum reflects a continuous quest to improve the quality of education while responding to societal and global demands.

In addition, the effectiveness of curriculum implementation can be assessed through various indicators, including outcomes from the Program for International Student Assessment (PISA), a global exam conducted every three years. Indonesia has participated in PISA since 2000, but its results have consistently ranked in the lower tiers (Pratiwi, 2019), particularly in mathematics. These outcomes reveal persistent challenges in curriculum implementation and resource distribution. For instance, Curriculum 2013 aimed to foster higher-order thinking skills (HOTS) and critical analysis, yet implementation disparities across regions hindered its success. The introduction of the Merdeka Curriculum, emphasizing flexibility and personalized learning pathways, marks a pivotal step towards addressing these gaps. This study focuses on a historical and comparative analysis of curriculum changes in Indonesia, with particular attention to mathematics education and its implications for improving student outcomes.

One of the contributing factors to Indonesia's low PISA results is the selection of textbooks (Fuadi et al., 2020). Textbooks are a crucial component of the curriculum and closely linked to learning resources, influencing the effectiveness of the educational process. Consequently, the development of mathematics textbooks used by teachers and students directly impacts the implementation of the curriculum in Indonesia. Therefore, it is essential to analyze the development of mathematics textbooks in alignment with the current curriculum.

The most recent shift, the Merdeka Curriculum, was introduced in 2021 as part of the broader Merdeka Belajar initiative, designed to provide flexibility and support personalized learning pathways for students. The goal is to foster an education system that nurtures critical

thinking, creativity, and adaptability—skills increasingly required in today's globalized world. Similarly, Finland's curriculum adopts a holistic approach, integrating cross-disciplinary skills that align with the demands of a globalized world (Bărnuțiu-Sârca & Ciascai, 2022). In addition, Singapore's centralized training programs provide lessons in mitigating disruptions caused by frequent curriculum changes. However, Indonesia's consistent underperformance in PISA, especially in mathematics, highlights the ongoing challenges faced by the country in aligning its curriculum with international standards (OECD, 2023). This issue is compounded by disparities in educational resources, particularly in rural areas, where access to quality materials and digital infrastructure is limited.

Despite the extensive curriculum reforms that have taken place in Indonesia, scholarly discussions analyzing these changes remain limited. In accordance with this, Mailizar et al., (2014) noted that there is relatively little literature available on Indonesian education, particularly in its historical change and development. In addition, This scarcity is also reflected in the limited number of indexed publications; for instance, a search using the keywords "curriculum changes" AND "Indonesia" AND "mathematics" yielded only a few results in the Scopus Database. These findings underscore the need for a more in-depth and systematic of curriculum transitions in Indonesia, especially in relation to mathematics education.

Mathematics education begins as early as the elementary level, and even during early chilhood. Therefore, the curriculum implemented must be aligned with the cognitive developmental needs of primary schools students. In this context, learning resources should meet specific criteria: they must be effective, contextual, engaging for students, and incorporate elements of local culture. When mathematics instruction is connected to students' real-life experiences and cultural contexts, it becomes more meaningful and accessible-moving beyond rote memorization or abstract computations.

Based on the previous discussion, there is a clear need for scientific studies that examine education policies in Indonesia, particularly those related to curriculum development. Such research can offer valuable insights for policymakers in designing and implementing more effective curriculla, especially in the field of mathematics. Accordingly, this study focuses on the development of curricula in Indonesia, with a specific emphasis on mathematics education. The central research question addressed in this study is, what are the major shifts in Indonesia"s mathematics curriculum policy over time, and how are these changes influenced by student performance (e.g., PISA results) and the development of learning resources?

METHOD

In this study, the approach used was a qualitative research approach. This approach is chosen because it allows the researcher to investigate complex and multifaceted phenomena in their natural setting. The aim of the study is to review the literature published in some academic resources. The study presented in this paper is based on a relevant literature analysis (desk analysis). The selection of literature is based on two criteria: (1) the literature used as the foundation is directly related to the research question to be addressed, and (2) the content of the literature is considered valid and credible. Based on these criteria, several sources of literature were selected. This is academic journals for Google Scholar from 2014 to 2024 related to the research problem.

This method is useful for gathering information about the phenomenon under investigation, and for identifying existing gaps or areas of disagreement in the literature. The researcher conducted a thorough review of academic articles, books, and other relevant literature in order to

gather a broad understanding of the phenomenon and to identify any relevant themes or patterns. The research employs a qualitative approach through literature review from academic journals. The data analysis techniques used are data reduction, data display and verification (Miles & Huberman: 1994).

FINDINGS AND DISCUSSION

The present study examines the evolution of the Indonesian national curriculum, highlighting both its advancements and persistent challenges. These fluctuations have led to inefficient use of resources, including budget and time. Since Indonesia's independence, there have been eight curriculum changes resulting in a total of 11 different curricula.

Curriculum 1947. *Rentjana Pelajaran 1947*, emphasized character development among Indonesian citizens. It consists of a list of subjects, teaching hours, and an outline of instruction (Iramdan & Manurung, 2019). Following Indonesia's independence, many aspects of society required improvement, including education. Consequently, this curriculum did not fully prioritize the educational content and remained influenced by the Dutch educational system.

Curriculum 1952. *Rentjana Pelajaran Terurai 1952*, provided more detailed subject content in line with Law No. 4 of 1950. The material is connected to everyday life and is organized using a syllabus. The education and teaching system was designed to reflect the desires and aspirations of the Indonesian people at that time. In 1950, high schools were categorized into three streams: SMA A (Languages), SMA B (Mathematics and Natural Sciences), and SMA C (Social Sciences). This classification was revised in 1961 to include cultural, social, mathematics, and natural sciences streams (Muhadi et al., 2017).

Curriculum 1964. *Rentjana Pendidikan 1964,* promoted active and creative learning focused on problem-solving and character development rooted in Pancasila. It employed a method of collective leadership and included the celebration of Hari Krida (Sports Day) every saturday.

Curriculum 1968. This curriculum retained a political orientation and offered only nine subjects: Physical Education, Religious Education, Civics, Indonesian Language, and Arithmetic. It was primarily theoretical in nature, with a correlated subject curriculum designed to ensure that material covered in lower levels of education aligned with what was taught at higher levels. During this period, high school streams were limited to two options: the Science and Natural Sciences stream (Pas-Pal) and the Literary-Social-Cultural stream.

Curriculum 1975. This curriculum represented an improvement over the 1973 curriculum, which had focused on the Pioneer Project for Development Schools. The 1975 curriculum was centralized and developed by the government, with schools responsible for its implementation. In high schools, three streams were offered: Science (IPA), Social Sciences (IPS), and Language.

Curriculum 1984. Known as the CBSA (Active Student Learning Method) Curriculum, this curriculum introduced specialization at the high school level, incorporating both core and elective subjects. It also added a subject on the history of the nation's struggle (PSPB). The available specializations in high school included Physics (A1), Biology (A2), Economics (A3), and Language and Culture (A4) (Muhadi et al., 2017). Notably, mathematics was not included as a separate specialization.

Curriculum 1994. This curriculum marked a shift toward emphasizing subjects and problem-solving skills, along with a transition to a four-month semester system. It continued the practice of streaming students into science, social science, and language programs. Middle schools were renamed SLTP, while high schools became SMU. The subject on the history of the struggle for independence (PSPB) was removed. Subsequently, the 2004 Curriculum (KBK) was revised

and improved in 1997, with high school students being streamed into language, science, and social science programs during their second year.

Curriculum KBK (2004). KBK stands for Competency-Based Curriculum. Under this curriculum, SLTP was renamed SMP, and SMU became SMA. It emphasizes the mastery of various competencies, allowing schools the freedom to organize curriculum components as they see fit. Students have become more proactive in seeking learning resources beyond their teachers, leading to a shift towards a more student-centered teaching approach. The focus is on learning outcomes and diversity, and the four-month academic period was replaced with a semester system.

Curriculum 2006 (KTSP). Curriculum 2006, also known as the Unit Level Curriculum, is decentralized, allowing schools to develop the curriculum under the guidance of the local education department. The government sets the competence standards (SK), basic competencies (KD), and assessment standards (SKL), while schools are responsible for their development. Additionally, teachers have the freedom to create their own lesson plans (RPP).

***Curriculum 2013*.** This curriculum emphasizes character education, the development of knowledge competencies, and a balance among cognitive, affective, and psychomotor aspects. It is designed to be relevant to contemporary needs and to use learning facilities efficiently. The curriculum has undergone revisions, resulting in the addition or removal of some topics. The changes in Curriculum 2013 encompass four key elements: (1) standards of graduate competencies, (2) standards of content, (3) standards of learning processes, and (4) standards of assessment (Prihantoro, 2014). The standards of learning processes shifted their focus from exploration, elaboration, and confirmation to observing, questioning, processing, presenting, summarizing, and creating. In 2017, the management of high schools was transferred to the provinces in accordance with the Regional Governance Law (Law No. 23). One of the challenges in implementing this curriculum is the difficulty teachers face in adapting lesson plans for high school mathematics classes (Amin et al., 2020).

***Curriculum Merdeka*.** Launched in 2021, the Merdeka Curriculum is part of the larger Merdeka Belajar initiative from the Ministry of Education, Culture, Research, and Technology, which includes the School Driving program as its seventh episode (Aprima & Sari, 2022). The core focus of the Merdeka Curriculum is independent learning, featuring diverse intracurricular learning opportunities. It employs project-based learning to develop students' soft skills and character. During the learning process, teachers have the freedom to select various teaching aids and concentrate on essential materials. This curriculum offers greater flexibility for both teachers and students, with numerous teaching aids available thanks to its project-based and character-oriented approach. Additionally, the Merdeka Curriculum has had a positive influence on mathematics learning (Fianingrum et al., 2023).

In any change, shortcomings in implementation are inevitable, making ongoing curriculum adaptation necessary for better outcomes (Iramdan & Manurung, 2019). Generally, the curriculum in Indonesia has shown improvement over time. The transitions between curricula can be assessed through the timeline of changes, PISA results, and the availability of learning resources. Furthermore, the development of curricula in Indonesia is closely linked to political developments.

Review of period

Despite these systematic shifts and pedagogical improvements, curriculum changes in Indonesia cannot be viewed solely through the lens of educational theory or internationa; benchmarks. Instead, they are deeply embedded within the broader socio-political context of each era. The development and implementation of each curriculum are often shaped by the prevailing political climate and the influence of key actors in power. For example, during the New Order

period, a powerful alliance formed between bureaucratic officials and their corporate clients, leading to the emergence of large domestic conglomerates owned by families or associates of senior bureaucratic figures, whose competitiveness relied heavily on their political connections. Although democratization has resulted in a growing separation between political authority and bureaucracy, it has simultaneously opened opportunities for new actors to influence policy-making (Rosser, 2018). The presence of political interests often diverts policymakers' attention toward expanding the scope of the education system rather than improving its quality. The transition of the curriculum in Indonesia can be analyzed through its duration and the political developments during each period, as illustrated in the table below:

Table 1. The change period and government in terms of curriculum

No	Changes	Period	President	Span
1	Curriculum changes from 1947 to the 1952 curriculum	6 years	Soekarno	"Orde lama"
2	Curriculum changes from 1952 to the 1964 curriculum	12 years	Soekarno	"Orde lama"
3	Curriculum changes from 1964 to the 1968 curriculum	4 years	Soeharto	"Orde baru"
4	Curriculum changes from 1968 to the 1975 curriculum	7 years	Soeharto	"Orde baru"
5	Curriculum changes from 1975 to the 1984 curriculum	9 years	Soeharto	"Orde baru"
6	Curriculum changes from 1984 to the 1994 curriculum	10 years	Soeharto	"Orde baru"
7	Curriculum changes from 1994 to the 2004 curriculum	10 years	Megawati	"Gotong Royong"
8	Curriculum changes from 2004 to the 2006 curriculum	2 years	Susilo Bambang Yudhoyono	"Reformasi"
9	Curriculum changes from 2006 to the 2013 curriculum	7 years	Susilo Bambang Yudhoyono	"Reformasi"
10	Curriculum changes from 2013 to the merdeka curriculum	10 years	Joko Widodo	"Indonesia maju"

Based on Table 1, Indonesia has experienced curriculum changes under ten different administrations. Each administration has approached curriculum transition differently. For instance, during Megawati's presidency, there were no changes to the curriculum, whereas Susilo Bambang Yudhoyono's presidency saw two changes within a relatively similar timeframe. Additionally, Table 1 indicates that the average duration for curriculum changes is between 7 to 8 years, with the shortest duration being 2 years and the longest extending to 12 years. This observation aligns with Wirianto's assertion that political factors can significantly influence curriculum development (Wirianto, 2014).

Curriculum reforms in Indonesia have often been influenced by shifts in political leadership. For example, during the New Order era under President Soeharto, the focus was on centralized educational governance, which constrained innovation at the school level. In contrast, the decentralization policies of the Reformasi era introduced school-based management under the KTSP curriculum, enabling localized adaptation. However, frequent political changes have also led to inconsistencies, as seen in the rapid transitions from the KTSP to the 2013 Curriculum and subsequently to the Merdeka Curriculum. Policymakers must prioritize stability and evidence-based planning to mitigate the disruptive effects of these shifts on educational outcomes.

Frequent curriculum changes in Indonesia, averaging 7–8 years, place considerable strain on teachers and schools. Adapting to new frameworks often requires significant retraining and resource investment, which can disrupt teaching continuity. To ensure the sustainability of reforms, it is crucial to establish long-term roadmaps with clear benchmarks and phased implementation plans. Additionally, incorporating feedback mechanisms involving teachers and students can help refine curricula without necessitating drastic overhauls.

The transition from the 2013 curriculum to the Merdeka curriculum represents a strategic recovery effort following the Covid-19 pandemic. In mathematics, the Merdeka curriculum closely aligns with constructivist learning principles (Nurulaeni & Rahma, 2022). This approach aims to make learning more enjoyable, with teachers focusing on facilitating the learning process rather than simply delivering content.

Review of PISA result

In Indonesia, consistently low PISA scores over recent years have spurred curriculum reforms aimed at strengthening educational outcomes. To better equip students for global challenges and enhance classroom quality, the government has incorporated higher-order thinking skills into the curriculum. Initiatives such as the 2013 Curriculum directly address PISA results by focusing on competency development and practical learning applications, with the goal of elevating national academic performance. This approach aligns closely with findings from Pratiwi's six-month study, which indicates that Indonesia's curriculum changes are well-aligned with PISA standards (Pratiwi, 2019).

Table 2. PISA results on math scores in terms of curriculum

No	Year	PISA score	Curriculum
1	2000	333	Curriculum 1994
2	2003	360	Curriculum 1994
3	2006	391	Curriculum 1994 & KBK
4	2009	371	KTSP
5	2012	375	KTSP
6	2015	386	Curriculum 2013
7	2018	379	Curriculum 2013 revised
8	2021	366	Merdeka curriculum

Source: (OECD, 2023)

Based on Table 2, Indonesia scored 371 in mathematics in 2009, which increased slightly to 375 in 2012, reflecting a gain of 4 points over the three-year period (OECD, 2023). However, Indonesian students' mathematics scores have consistently remained below 400. This low ranking in the PISA test suggests issues in the curriculum's implementation. In 2018 Indonesia was ranked 7th from the bottom or in 73rd position out of 79 participating countries (Amaliya & Fathurohman, 2022). In 2021, the mathematics literacy score declined from 379 to 366. Despite the drop in score, Indonesia moved up five places in the ranking compared to the previous assesment.

Moreover, In 2006, Indonesia achieved its highest PISA score during the implementation of the Curriculum 1994 and KBK. The KBK laid a stronger foundation for competency mastery, higher-order thinking approaches, and teacher autonomy, while political and bureaucratic interference was still relatively limited. The PISA assessment includes higher-order thinking skills (HOTS) questions derived from Bloom's Taxonomy, yet our curriculum still largely neglects these types of questions. Currently, students are mainly required to memorize formulas in mathematics, which represents the lowest level of Bloom's Taxonomy. Therefore, one alternative is to begin

implementing all the indicators outlined in the Program for International Student Assessment (PISA) to enhance mathematical literacy from an early age (Hewi & Shaleh, 2020).

While Indonesia's PISA mathematics scores improved slightly during the KTSP period, the stagnation observed from 2015 to 2018 under the 2013 Curriculum highlights persistent challenges in integrating higher-order thinking skills (HOTS). To address this, the Merdeka Curriculum should adopt a structured approach to embedding HOTS through problem-based learning and formative assessments. Additionally, teacher professional development programs focusing on question design and innovative pedagogical strategies could accelerate progress toward improved mathematical literacy. During the transition from the 2006 curriculum to the 2013 curriculum, Indonesia's education system implemented integrative thematic learning across all subjects at the elementary school (SD) level. This approach led to positive outcomes, as mathematics was taught in conjunction with other subjects. Evidence of this progress can be seen in the 2015 PISA results, where Indonesia's mathematics score increased to 386.

Under the implementation of the 2013 curriculum, Indonesia participated in PISA twice, in 2015 and 2018. In 2015, Indonesia's PISA mathematics score was 386. However, by 2018, Indonesia ranked 75 out of 81 surveyed countries, with a mathematics score of 379 (OECD, 2023), representing a decline of seven points. One of the suspected causes for the persistently low quality of learning in Indonesia is the inadequate evaluation of both the learning process and the outcomes. Mapping by indicators reveals that, overall, scores for indicators related to the topic of Geometric Construction are particularly low (Singkam et al., 2022).

In 2022, the 2013 curriculum began to be replaced by the Merdeka Curriculum. This change has generated both advantages and disadvantages. For instance, some teachers, who have grown accustomed to the old curriculum, face challenges in adjusting the mathematics material to fit the new curriculum. As a temporary solution, many schools are currently implementing a dual curriculum. This approach aligns with Jamiin's (2015) research, which highlights how a dual curriculum can help create a generation with enhanced knowledge and understanding, ultimately achieving national education goals (Jamiin, 2015).

It is widely recognized that one of the primary objectives of mathematics education is to develop problem-solving abilities (Risma et al., 2017). In comparison to developed countries, the mathematics learning process in Indonesia tends to be abstract, focusing primarily on achieving student competency and emphasizing learning outcomes. In contrast, the curriculum in Japan prioritizes problem-solving skills and the development of students' logical thinking abilities (Hamidah et al., 2021). With each curriculum change, efforts are made to enhance the mathematics learning process, particularly to improve performance in international assessments such as TIMSS and PISA. A key distinction between the 2013 curriculum and the Merdeka Curriculum lies in the project-based learning approach and the assessment system focused on evaluating student understanding (Zafirah et al., 2024).

Overall, the PISA questions are designed to assess critical thinking skills, problem-solving abilities, and the application of concepts in real-life situations, rather than merely focusing on memorization or basic math skills. The KBK curriculum may have produced better results at the time due to its emphasis on foundational competencies that are relatively easier for students to master. In contrast, the K-13 and Merdeka Curricula, which aim to align with international standards like those of PISA, require time for effective implementation, allowing students to become accustomed to analysis-based questions. The Merdeka Curriculum holds the potential to enhance the quality of mathematics learning through a more flexible, student-centered approach. However, its success depends on substantial support, including improving teacher competence,

ensuring stability in educational policies, and fostering a strong learning culture among students. If these aspects are continuously addressed, Indonesia's PISA results could improve in the future.

Learning resources review

These consistently low PISA scores in mathematics point not only to issues in curriculum design and implementation but also to the quality of learning resources available to both teachers and students. Learning resources such as textbooks, teaching guides, and digital content play a crucial role in translating curriculum objective into effective classroom instruction. According to Government Regulation Number 32 of 2013, textbooks serve as the primary resource for achieving Core Competencies and Basic Competencies. Furthermore, the selection of textbooks significantly influences the level of mathematical literacy among students (Fuadi et al., 2020). Inadequate or poorly designed resources can hinder the development of students' mathematical understanding and higher-order thinking skills, which are essential for performing well in international assesments like PISA. Therefore, analyzing the development of student learning resources during curriculum changes is essential.

Table 3. Learning resources review

No	Period	Learning resources
1	During the curriculum change from 1984 to 1994	The math textbook questions for linear equations in one variable material (SMP) did not require high mathematical activity because the types of questions were not diverse. The percentage of open-ended questions was small, applying basic knowledge or skills directly and without context in everyday life (Raditya & Iskandar, 2020).
2	The KBK curriculum (2006)	students have become more active in finding learning sources other than teachers, and the teaching method has shifted towards a more student-centered approach. The handbooks used by students vary greatly, and teachers are free to determine what books students use. In this era, Indonesian students got the highest PISA score in math
3	The 2013 curriculum	i. students are expected to actively participate in solving problems and protecting the environment by having a polite character (Prihantoro, 2014) ii. Mathematics textbooks should be adjusted to the 2013 curriculum, meaning they should have content that corresponds to the core and basic competencies and be presented in an attractive and easy-to-understand manner for students. iii. according to Attachment of Permendikbud Number 8 of 2016, the basic competencies in the curriculum must be described in accurate, in-depth, and complete material descriptions. iv. This year, teacher and student textbooks are available online by the government and can be accessed anywhere. In addition, textbooks can be obtained from several mathematics textbook publishers such as Erlangga, Yudhistira, Tiga Serangkai, and Grasindo v. There are many revisions and other innovations in mathematics learning resources
4	Merdeka Curriculum	Learning resources in the Merdeka Curriculum also emphasize ethnomathematics and computational thinking skills (Zafirah et al., 2024)

During the KBK period, mathematics resources primarily consisted of textbooks and other printed materials provided by the government or developed by educators. These textbooks frequently emphasized foundational competencies and tended to adopt a traditional approach,

concentrating on practice exercises and fundamental theories. While some teachers might have used simple manipulatives to reinforce basic mathematical concepts, the range of educational resources largely remained confined to printed materials and conventional teaching aids.

Numerous revisions and innovations have emerged in mathematics learning resources. In line with the 2013 curriculum, the nation's cultural diversity can serve as a valuable innovation in the mathematics learning process (Darmayasa, 2018), particularly through the integration of ethnomathematics (Lidinillah et al., 2022). Ethnomathematics was introduced in Indonesia in the 1980s, and its organizational framework was established in 2018 (Manik, 2020). This approach brings students closer to their surrounding culture. For instance, Krakatoa Cilegon batik can be utilized as a learning resource for mathematics at the junior high school level (Amalia et al., 2021), while the exploration of mathematical concepts in Batik Truntum Surakarta further exemplifies this integration (adi). Consequently, incorporating ethnomathematics as a learning resource has become a focal point for mathematics education researchers in Indonesia. The mathematical topics explored within these cultural contexts encompass statistics, trigonometry, vectors, algebra, coordinate geometry, transformation geometry, calculus, logic, and probability.

Despite these innovative efforts to contextualize mathematics learning through local culture, their implementation faces significant challenges, particularly in areas with limited educational resources. There are gap resource allocation between urban and rural schools results in unequal learning opporunities, which in turn affects student outcomes. The unbalanced distribution of educational resources, especially between urban and rural areas, constitutes a universal problem in the world (Chen, 2024). Schools in remote area often lack trained teachers, up-to-date textbooks, and technological support, making it difficult to implement competency-based curricula that foster higher-order thinking skills. In mathematics education specifically, limited access to contextualized and engaging learning materials can hinder students' conceptual understanding dan problem-solving abilities.

Recognizing these disparities, the Merdeka Curriculum seeks to bridge the gap by promoting a culturally responsive pedagogy through ethnomathematics. The Merdeka Curriculum's emphasis on ethnomathematics offers culturally responsive approach to teaching mathematics. For instance, using traditional batik patterns to teach geometry not only contextualizes mathematical concepts but also fosters a sense of cultural pride among students. Additionally, digital tools like GeoGebra and online platforms provide opportunities for interactive and personalized learning. However, the uneven distribution of these resources remains a significant barrier, necessitating targeted investment in digital infrastructure and teacher training in underprivileged areas.

In addition, a study conducted by Prasmesti in 2017 analyzed the learning resources for Realistic Mathematics for Class VIII in SMP and MTs, as well as the Mathematics Concepts and Applications 2 (BSE) textbooks. These were categorized as "very good" and "good," respectively (Prasmesti, 2017). The analysis of PISA results and learning resources suggests that curriculum changes generally reflect the evolution of societal and technological advancements. Some scholars argue that a quality curriculum should align with contemporary developments (Hasanah, 2019). Therefore, it is essential to implement curriculum changes, including in Indonesia.

The implementation of the Merdeka Curriculum, upon analysis, demonstrates a more effective alignment with the cultural context of education. However, policymakers and education practitioners must address certain considerations to ensure the proper implementation of the Merdeka Curriculum and its potential to enhance the 2013 curriculum in primary education (Mawati & Arifudin, 2023). Furthermore, learning resources within the Merdeka Curriculum place

a strong emphasis on ethnomathematics and the development of computational thinking skills (Zafirah et al., 2024). In addition, Educators implemented various strategies, including outdoor learning experiences, reconfiguring classroom layouts to facilitate more dialogue and interaction, promoting collaboration through group work, and utilizing the school environment as a valuable resource for learning. Teachers could also adapt the learning resources with local materials (Randall et al., 2022).

Curriculum changes present opportunities to enhance the quality of mathematics education and foster the development of 21st-century skills (Ramadhani et al., 2024). Consequently, teachers and mathematics education students aspiring to enter the teaching profession must improve their readiness to proficiently master and effectively apply mathematical computer applications in the learning process (Sugilar et al., 2023).

Last three years focusing on mathematics in primary education

Elementary school serves as the primary foundation for learning mathematics before students advance to higher levels. Alongside the development of national education, the approach to teaching mathematics has evolved in line with the implementation of various curricula. These curricula are designed to enhance the quality of learning and student outcomes. Curriculum changes impact not only teaching approaches but also influence content and assessment methods. The following outlines the historical development of mathematics education in elementary schools through the three main curricula that have been implemented: the School-Based Curriculum (KTSP), the 2013 Curriculum (K13), and the Merdeka Curriculum.

Elementary Mathematics in the School-Based Curriculum (KTSP). KTSP was introduced in 2006 in response to the demands for educational decentralization in Indonesia. KTSP grants schools the autonomy to design curricula based on local potential and students' needs (Depdiknas, 2006). In the context of mathematics, KTSP emphasizes mastery of fundamental skills such as arithmetic, measurement, and geometry. The primary focus of KTSP is on achieving basic competencies outlined in the Graduate Competency Standards (SKL).

According to Soedjadi (2000), the approach to mathematics instruction during the KTSP period tended to be more procedure-oriented, with practice exercises focusing on arithmetic and logic problem-solving. Procedural skills, such as mastery of addition, subtraction, multiplication, and division, were central to elementary mathematics instruction (Soedjadi, 2000). A distinctive feature of KTSP is the freedom given to teachers to select teaching methods suited to the needs of their students.

In addition, schools and teachers were granted greater autonomy in designing and selecting educational resources tailored to local needs. While textbooks continued to serve as the principal resource, teachers gained increased flexibility to incorporate supplementary materials, such as worksheets, manipulatives, or contextually relevant resources from the surrounding environment. Some schools began to employ visual media and basic teaching aids, yet the integration of technology in mathematics instruction remained constrained. KTSP encouraged educators to adopt more creative approaches in resource selection, although the execution of these practices varied significantly.

Elementary Mathematics in the 2013 Curriculum.

The 2013 Curriculum (K13) was implemented with the aim of enhancing students' competencies in critical, creative, and innovative thinking. This curriculum introduces an

integrative thematic approach, where several subjects are taught in a unified manner (Kemendikbud, 2013). In this context, mathematics is integrated with other subjects such as science and Indonesian language to provide a more holistic and contextual learning experience**.** Moreover**,** this curriculum focus on rote memorization and a greater emphasis on conceptual understanding. Students are encouraged to engage more in exploration and group discussions to gain a deeper understanding of mathematical concepts (Mulyasa, 2013). This approach aims to develop students' problem-solving abilities and relate mathematics to everyday life.The 2013 Curriculum also introduces authentic assessment, where students' learning outcomes are evaluated based on projects or assignments that require them to apply mathematical concepts in real-world contexts. In this regard, K13 adopts a project-based learning approach and assessment that focuses not only on final outcomes but also on the learning process.

Educational resources underwent further diversification. In addition to structured textbooks provided by the government, the curriculum advocated for the use of various media, including videos, presentations, and manipulatives, to facilitate scientific-based learning. The introduction of project-based and inquiry-oriented methodologies within K-13 spurred an increase in the utilization of interactive educational resources. Digital resources and technology began to be incorporated in some schools, particularly in urban areas, although access remained uneven across the nation.

Elementary Mathematics in the Merdeka Curriculum. In 2021, the Merdeka Curriculum was gradually introduced in various schools across Indonesia. This curriculum emphasizes learning flexibility and provides greater freedom for teachers to adjust the content and teaching methods according to the abilities and interests of their students (Kemendikbud, 2021). In the Merdeka Curriculum, mathematics instruction focuses more on developing conceptual understanding and critical thinking skills rather than merely procedural problem-solving. Moreover, mathematics education within this curriculum aims to build strong numerical literacy and support students in applying mathematics in their daily lives. The learning approach emphasizes deep understanding through the exploration of fundamental mathematical concepts such as numbers, operations, geometry, and statistics.

The Merdeka Curriculum offers a more varied and flexible array of educational resources for mathematics. Educators are afforded greater autonomy to select or develop resources that align with the specific needs of their students and classroom contexts. The curriculum highly encourages project-based learning and the integration of technology. In addition to traditional textbooks, educators are advised to utilize a range of digital resources, applications, and online learning platforms that support students' comprehension of mathematical concepts. Tools such as GeoGebra and educational games are increasingly being employed in certain schools to elucidate abstract concepts. Furthermore, the Merdeka Curriculum emphasizes the importance of contextual learning resources, enabling educators to connect mathematical concepts to real-life situations relevant to their students.

Moreover, The Merdeka Curriculum's emphasis on project-based learning and flexibility parallels key elements in Singapore's mathematics curriculum, which prioritizes information technology, creative-critical thinking, and problem-solving skills. Finland encourages free exploration and integrates mathematics with broader themes, while Singapore focuses on structured, skill-specific instruction. However, unlike these nations, Indonesia faces unique challenges in scaling innovative practices due to disparities in teacher competency and resource availability. Addressing these gaps could help bridge the performance differences highlighted by

PISA results, where Singapore consistently ranks in the top 5 while Indonesia remains below the global average**.**

The Merdeka Curriculum's alignment with constructivist principles reflects a shift toward student-centered learning (Refi Mariska & Abdul Khobir, 2023), where knowledge is actively constructed rather than passively received. By encouraging exploration and discovery in mathematics, the curriculum fosters deeper conceptual understanding. This approach is supported by Vygotsky's theory of scaffolding, which emphasizes the role of guided interaction in cognitive development. However, effective implementation requires robust teacher training programs to equip educators with the skills needed to facilitate constructivist learning environments.

The Merdeka Curriculum has a positive influence on mathematics education by achieving the goals of learning mathematics, which include understanding concepts and applying mathematical procedures in everyday life and solving mathematical problems (Fianingrum et al., 2023). Furthermore, the Merdeka Curriculum also provides students with the opportunity to explore their interests and talents through elective modules that can be tailored to individual needs. In the context of mathematics, students can choose topics that interest them for further exploration. This differs from previous approaches that were more uniform in terms of content and teaching methods. Table 4 presents the main differences among the three curricula in mathematics education.

Table 4. The Change of Three Recent Curricula

No	Curriculum	The Main approach	Focus of learning	Evaluation
1	KTSP	Procedural	Mastery of fundamental skills outlined in the Graduate Competency Standards.	Written exam
2	Curriculum 2013	Integrative thematic	Conceptual understanding and problem solving	Authentic assessment
3	Merdeka Curriculum	Flexible and individual	Development of numeracy literacy	Formative assessment

The historical trajectory of curriculum reforms in Indonesia reveals significant progress intertwined with persistent challenges These changes reflect efforts to improve the quality of mathematics education in Indonesia so that students not only master basic skills, but are also able to think critically and apply mathematics in everyday life.

Political shifts have often influenced the design and implementation of curricula, with periods of rapid changes, such as during the transition from the KTSP to the 2013 Curriculum, placing immense pressure on educators and schools. While these reforms were well-intentioned, aiming to integrate global educational standards like those reflected in PISA, the frequent transitions disrupted continuity in teaching practices. An analysis of Indonesia's PISA performance over the years indicates slight improvements in mathematics scores during certain curriculum periods, such as the KTSP, yet the overall progress remains sluggish. This stagnation can be attributed to several factors, including inadequate teacher training, limited access to quality resources in rural areas, and a persistent reliance on rote learning.

CONCLUSION

Curriculum changes in Indonesia have significantly influenced mathematics education, including at the primary schools level, particularly in laying the foundation for students' numeracy literacy. In general, curriculum revisions occur every 7 to 8 years, with political dynamics being

one of the main driving factors. In practice, the shortest interval between curriculum changes has been two years, while the longest has reached twelve years. Despite multuple revisions, Indonesia's performance in international assessments such as PISA has not shown consistent improvement in mathematics. On the other hand, mathematics learning resoucers have undergone a transformation-from traditional textbooks to more contextua; approaches through the integration of ethnomathematics and the use of digital tools. This transformation reflects ongoing efforts to enhance the quality of mathematics education and respond to the demands of 21st-century competencies.

The history of mathematics education within Indonesia's national curriculum reflects a series of major transformations shaped by evolving curriculum policies over time. In response to these dynamics and the ongoing challenges in the field, several strategic recommendations can be proposed. First, policymakers should establish a long-term roadmap for sustainable and coherent curriculum reform. Second, mathematics teacher training programs should focus on enhacing higher-order thingking skills (HOTS), both in designing and solving complex problem. Third, The development of contextualized and digital learning resources must be prioritized-particularly for schools in disadvantaged, remote, and outermost (3T) areas-to ensure equitable access to high-quality education for all students.

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