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Comparison of Teaching Content on Inequalities between China and Indonesia

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ABSTRACT

In this study, we select inequality content from a set of Indonesian instructional materials and compare it with the corresponding inequality content in the People's Education Press (PEP) textbooks. The comparison is significant because the two education systems represent distinct pedagogical approaches that differ historically, culturally, and epistemologically. Moreover, they are grounded in contrasting educational philosophies. PEP follows a Chinese tradition emphasizing formal structure, systematic practice, and deductive reasoning that moves from worked examples to general rules. In contrast, the Indonesian *Kurikulum Merdeka* is rooted in Freudenthal's Realistic Mathematics Education (RME), which encourages contextual modeling and meaning-making prior to the introduction of formal symbols. By comparing the topic of inequalities—an abstract concept with specific operational rules (such as reversing the inequality sign when multiplied by a negative number)—we can observe how these approaches lead to different learning experiences. Do students discover rules through structured exploration, or are they expected to apply rules within real-world contexts after the concepts are presumed to be understood? In Indonesia, inequalities are taught primarily in Grade 11 of senior high school, under the assumption that students already possess a mature level of abstract reasoning. In China, however, inequality-related content is distributed across multiple stages of elementary and secondary schooling. Both countries have undergone substantial curriculum reforms aimed at improving mathematical proficiency and educational equity, yet their textbooks continue to reflect distinct pedagogical philosophies and cultural priorities. By examining the differences across these dimensions, we hope to provide useful insights for the teaching of inequality-related content

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Introduction

In terms of population, Indonesia is the fourth largest country in the world. Under the "Belt and Road Initiative," scientific and cultural exchanges between China and Indonesia are increasingly strengthening. The second author of this article is an exchange student from Indonesia engaged in mathematics education research. Also, addressing social and economic inequalities through education is a central concern for policymakers and educators worldwide. In both China and Indonesia, the curriculum, pedagogy, and policy contexts reflect ongoing efforts to mitigate disparities related to ethnicity, geography, gender, and socioeconomic status. Comparative analysis of teaching content on inequalities (Zhu, 2010; Sulistyaningrum & Tjahjadi, 2022) in these two populous, diverse nations is crucial for understanding how educational systems respond to structural challenges and for identifying pathways to more equitable learning environments (Yang et al, 2014).

In secondary school mathematics education and teaching, textbooks are inevitably an important content component and an important object of mathematics education research. In terms of their function, textbooks are the medium for classroom teaching activities aimed at educational goals. In curriculum theory, research on textbooks in the modern sense started relatively late. Research on textbooks generally falls into three categories: research on the textbook itself, how textbooks are influenced by other factors, and how other factors influence textbooks (Chang & Silalahi, 2017). In recent years, many scholars have compared Chinese and foreign mathematics textbooks through specific knowledge content (Wang & Lu, 2018; Qin, 2019). This article takes the knowledge content of "Linear Inequalities in One Variable" as an example, selecting two types of textbooks to compare their differences and connections in terms of mathematical content presentation, and the configuration of examples and exercises. Through qualitative and quantitative analysis, we study the similarities and differences in the handling of specific knowledge content in the two textbooks, hoping to provide a reference for our teaching of related content (Wang & Cao, 2015).

This broader context of educational equity directly frames the specific investigation presented in "Comparison of Teaching Content on Inequalities between China and Indonesia." While the article primarily focuses on the mathematical concept of *inequalities* (e.g., linear inequalities in one variable), this mathematical topic serves as a microcosm for understanding differing pedagogical philosophies that indirectly address educational inequality. To the best of our knowledge, no study has examined this particular pairing nor investigated how these materials allocate instructional emphasis on symbolic procedures, contextual representations, or reasoning-based tasks in the topic of inequalities. while educational equity is frequently discussed at the policy level, the literature rarely connects textbook structures directly to equity outcomes in students’ learning opportunities. By comparing the cognitive demands and contextual accessibility of inequality-related tasks, we highlight how textbook design may advantage or disadvantage particular groups of learners, thus linking instructional materials to educational equity more concretely.

The study highlights a divergence in approach: China's PEP edition textbooks emphasize mathematical abstraction, rigorous reasoning, and scientific context, potentially favoring students with strong academic preparation often found in well-resourced urban centers (Li, 2020; Liang et al, 2022). In contrast, the Indonesian online learning materials prioritize "life situations" and "personal life" contexts, aiming to make abstract concepts accessible to a broader range of students by grounding mathematics in daily reality, a strategy consistent with Freudenthal's Realistic Mathematics Education (Thrung et al, 2019; Rohma & Jupri, 2024). This difference in content presentation, deductive and abstract versus inductive and contextual, reflects deeper systemic choices about how best to engage diverse learner populations. By

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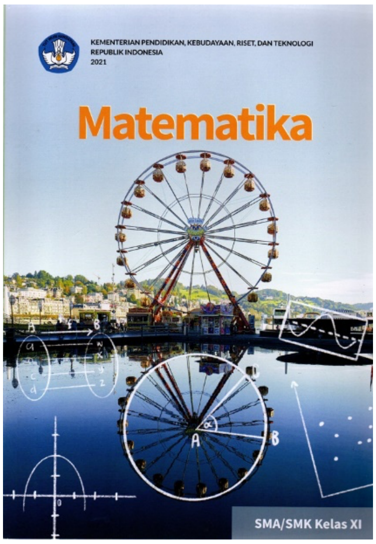
analyzing these curricular choices, the paper contributes to the larger discourse on how educational content itself can be structured to either reinforce academic hierarchies or promote inclusivity, thereby linking the technical teaching of mathematical inequalities to the broader mission of addressing educational inequality.

In Chinese secondary school mathematics teaching, inequality teaching is divided into two stages. One stage is in the second semester of the first year of junior high school (Grade 7), where content related to inequalities includes linear inequalities in one variable and systems of linear inequalities in one variable. The other stage is in the first semester of the first year of high school (Grade 10), mainly focusing on quadratic inequalities in one variable. The primary and secondary school system in Indonesia is basically the same as in China, following a 6-3-3 system. The timing of the appearance of inequality knowledge is basically consistent with that of China; however, in the 7th grade, inequalities are only given a preliminary introduction with low requirements. In China's primary and secondary mathematics teaching system, although the study of inequalities in the first year of junior high (Grade 7) is not the main content, there is a complete introduction to the content. Therefore, we selected the *Compulsory Education Textbook: Mathematics, Grade 7, Vol. 2* compiled and published by the People's Education Press (hereinafter referred to as the PEP Edition) as the research object. For the Indonesian textbook, we selected the Grade 11 Online Learning Material (hereinafter referred to as the Indonesian Online Edition) which is popular among teachers and students.

Method

Type of Research

In terms of research methods, we adopt a combination of qualitative and quantitative methods. In the qualitative research, we compare the similarities and differences in the presentation methods of the two textbooks through several aspects: introductory examples for inequality learning, introduction of inequality symbols, properties of inequalities, and methods for solving inequalities. The study was conducted in Capital Normal University from on-line textbook Merdeka Belajar (Left) and PEP's (Right).



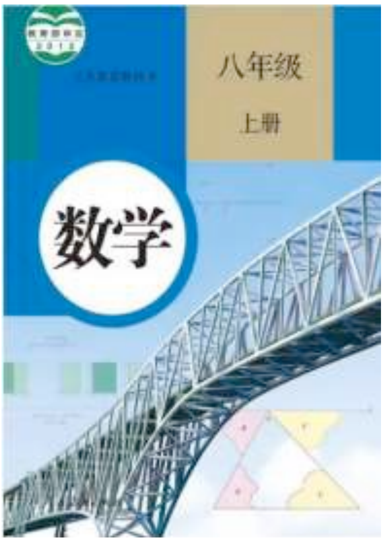


Figure 1. Merdeka Belajar Textbook (https://static.buku.kemdikbud.go.id/content/pdf/bukuteks/kurikulum21/Matematika-BS-KLS-X.pdf) and PEP's Press (https://pan.baidu.com/s/1uR1RIv-CKkF0GOb-xVtEjg?pwd=qwdb

In terms of quantitative research, the objects of our comparative study are the examples and exercises in the textbooks. Inequality problems are generally relatively small; if a large problem contains several relatively independent sub-problems, we count them as sub-problems. Comparing examples and exercises respectively, we adopt the exercise comparison model from Literature (Guo, 2024). Both datasets were first analyzed independently and then integrated through joint interpretation, comparing narrative representations with statistical frequency patterns to triangulate findings.

Research Instrument

We developed a coding rubric to maintain consistency between coders, and any multi-part problem with independent sub-tasks was coded as separate units to avoid counting bias. The instrument comprised four dimensions. The Cognition dimension captures the type of thinking required in a task, ranging from recalling established rules, applying concepts in familiar situations, to exploring patterns or extending ideas through open-ended reasoning, where higher levels indicate stronger conceptual engagement. The Background dimension assesses how problems are contextualized, whether they appear as abstract exercises, draw on personal experiences, reference common social scenarios, or are situated in formal scientific settings, helping us evaluate how textbooks support context-based mathematical literacy. The Operations dimension reflects the level of procedural complexity, from tasks requiring no calculation, basic numerical computation, simple symbolic manipulation, to multi-step algebraic transformations, revealing whether the material emphasizes procedural skills or symbolic abstraction. Lastly, the Reasoning dimension examines the depth of logical thinking, ranging from direct rule-based solutions, to tasks that require simple justification, or those that demand multi-layered argumentation or validation of mathematical properties, indicating the extent to which textbooks foster analytical and deductive reasoning. This dimension identifies whether a textbook encourages deductive and analytical thinking. The levels of observation dimensions and assignment descriptions are as follows:

Tabel 1. Level Dimensions and Assignment

Dimension	Level 1	Level 2	Level 3	Level 4
Cognition	memorization	understand	Explore	
Background	No background	Personal life	Common sense	Scientific Context
Operations	No operation	Numerical computation	Simple symbolic operations	Complex symbolic operations
Reasoning	No reasoning	Simple reasoning	Complex Reasoning	

Data Collected

Data were collected in three stages: (1) Text identification, we focus on inequality materials, sections, and examples pertaining to inequalities were extracted. (2) Task segmentation, each example and exercise was segmented into problem units. Multi-part items were split based on conceptual independence and (3) Coding application, two trained coders independently classified each task according to the four dimensions. Coding disagreements were resolved through discussion; consensus was documented to increase reliability. Comparing mathematics textbooks from Indonesia and China offers a unique lens into how two populous, culturally diverse nations approach the dual goals of academic rigor and societal contextualization in mathematics education. Both countries have undergone significant curriculum reforms aimed at improving mathematical proficiency and equity, yet their textbooks reflect distinct pedagogical philosophies and cultural priorities.

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Data Analysis

To analyze how inequality concepts are presented, we applied thematic synthesis. We compared the two textbooks across four predefined instructional dimensions: introductory examples, introduction of inequality symbols, properties of inequalities, and methods for solving inequalities. Within each dimension, semantic patterns, sequencing of concepts, visual supports, and emphasis on worked examples were compared. The qualitative analysis focused on pedagogical orientation (procedural vs. conceptual) and degree of scaffolding. Quantitative data consisted of coded exercise items. We conducted a descriptive statistics (frequency counts and percentages) across each dimension and level, distribution comparisons between textbooks, and pattern inspection across cognitive/operational/ reasoning complexity. These analyses aimed to reveal structural tendencies, such as a book's inclination toward procedural tasks or context-rich reasoning. Qualitative and quantitative findings were integrated through parallel triangulation. Narrative patterns from the qualitative analysis were used to interpret whether frequency distributions were aligned with the textbook's instructional orientation. For instance, if a textbook emphasized symbolic methods in the narrative, we examined whether higher proportions of symbolic-operation tasks appeared quantitatively. This integration yielded convergent, divergent, or complementary evidence across sources.

Research Findings

Comparing mathematics textbooks from Indonesia and China offers a unique lens into how two populous, culturally diverse nations approach the dual goals of academic rigor and societal contextualization in mathematics education. Both countries have undergone significant curriculum reforms aimed at improving mathematical proficiency and equity, yet the textbooks reflect distinct pedagogical philosophies and cultural priorities.

Introductory Examples of Inequalities

How to introduce new knowledge is a problem meticulously designed and considered by both teachers and textbook compilers. In the PEP Edition, the introductory example for inequalities is a car driving problem involving three quantities: distance, speed, and time. The distance is fixed at 50 kilometers, the time allowed is at most 40 minutes, and the speed is to be determined. Therefore, there are basically three types of inequalities listed, and the textbook presents two of them. In the Indonesian Online Edition, a shopping example is used:
Ravi goes to the market with 200 Rupiahs to buy rice. A pack weighs one kilogram and sells for 30 Rupiahs. If x represents the number of packs to buy, then his total cost is 30x. Because he can only use the money he has to buy rice, he cannot spend more than 200 Rupiahs (Why?). Therefore, $30x < 200$. Obviously, this expression is not an equation; it has no equals sign.

Comparing the knowledge background of examples and exercises is a common element in textbook comparative research, which can be divided into mathematical background, life background, cultural background, scientific background, etc. Comparatively speaking, the PEP Edition emphasizes mathematical situations, learning inequalities to use mathematics to solve scientific problems. The Indonesian Online Edition focuses more on life situations, emphasizing that inequalities are actually representations of life problems, which is consistent with the concepts of mathematics education in Indonesian primary and secondary schools. The "(Why?)" in the parentheses is very much like our "thinking questions," but here the question is embedded in the situation, which is conducive to students' understanding.

In Chinese mathematics textbooks, the highlighted concept of "culture" often does not refer to ethnic traditions or festivals, but rather to a rigorous and disciplined academic culture.

Cultural context in Chinese textbooks is strongly influenced by broader national educational goals, namely building a solid mathematical foundation and preparing students for high-level competition, particularly the university entrance examination (高考). This is clearly reflected in the presentation of mathematical problems, which is highly systematic, structured, and efficient. The cultural narrative constructed emphasizes perseverance, formal logic, and the achievement of high academic standards, reflecting Chinese society's expectations of academic excellence as the primary pathway to social mobility.

In contrast, mathematics textbooks in Indonesia take an approach that reflects the nation's heterogeneity. Considering the highly diverse cultural backgrounds of students, Indonesian textbooks tend to incorporate examples that are relevant to students' daily lives and local experiences. This approach aims not only to teach formulas, but also to "ground" mathematics so that it feels closer and more tangible. By incorporating culturally relevant elements whether traditional markets, mutual cooperation (*gotong royong*), or local social phenomena, Indonesian textbooks strive to help students see the relevance of mathematics within their own cultural context, thereby reducing the distance between abstract concepts and the realities they encounter. Overall, there is a fundamental philosophical difference in how culture is treated in the textbooks of the two countries. While China uses cultural context to reinforce standardization and competition readiness, Indonesia uses cultural context as a bridge to foster relatability and inclusiveness in mathematics learning.

This section should present the research results clearly and in detail. The findings may be organized according to the results of each research phase, the outcomes addressing each research question, or other appropriate arrangements, as long as the presentation clearly reflects the research conducted. The research findings should be supported by empirical evidence.

Introduction of Inequality Symbols

The PEP Edition uses common inductive concepts, "Expressions that use < or > to represent size relationships like this," while the symbols >= and <= are used directly later without special explanation. In the Indonesian Online Edition, inequalities are defined with the help of equations; replacing the equals sign in an equation with an inequality sign makes it an inequality. In addition, names are given to inequalities containing >= or <=, called "relaxed" inequalities, while inequalities connected by the symbols > or < are called strict inequalities. Neither textbook discusses inequality signs further; they are just mentioned briefly. Interestingly, the knowledge listed before inequalities in both textbooks is solving equations. Borrowing well from the knowledge content of the previous stage is something to pay attention to in teaching. In the general context of Chinese, "Equation" (方程) and "Inequality" (不等式) seem unrelated. The word "Equation" comes from ancient times, while "Equal" (等) is a modern daily life character. How to prepare well? It may be necessary to clarify the relationship between "equations" and "equalities." Additionally, greater than and less than relationships are concepts in daily life. Students have already encountered symbols for greater than, less than, and unequal in elementary school. However, neither textbook reflects this; they handle it as entirely new knowledge.

Properties of Inequalities

The properties of inequalities involve adding, subtracting, multiplying, or dividing the same quantity on both sides of the inequality. Both textbooks provide these properties through induction and also explain that the purpose of using these properties is to solve inequalities. The PEP Edition contains some thinking questions in the form of fill-in-the-blanks to find

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patterns; whereas the Indonesian Online Edition is only slightly different: it first writes out the properties, then writes the differences of adding/subtracting and multiplying/dividing same quantities on both sides of an inequality that does not contain letters. Of course, this also hints at an analogy with solving equations. From a more abstract viewpoint, the former is inductive, and the latter is deductive. The choice of method is related to the maturity of students' thinking. The systematic study of inequalities in China begins in the 7th grade of junior high school, with quadratic inequalities studied in high school, while the Indonesian textbook places the study of inequalities in the 11th grade, followed immediately by "Linear Inequalities in Two Variables," which is the most preliminary content of linear programming.

Solving Inequalities

In the PEP Edition, the idea of solving inequalities runs through the entire process, using terms such as "add (subtract, multiply, or divide) on both sides," "transposing terms," "direction of inequality sign," "on the number axis," etc. Related terms also include "unknowns," "combining like terms," "making the coefficient 1," etc. In the Indonesian Online Edition, only after introducing the properties of inequalities, the process of solving inequalities is directly demonstrated, noting the properties used at each step, without explaining the solving process. The textbook is intended for students to read, so explanations and illustrations of the calculation and solution process are necessary. However, the degree must be grasped; excessive explanation may bring about the opposite effect.

In the description of solution sets, the Indonesian Online Edition devotes a large amount of space to explaining integer solutions of inequalities, because the examples mostly come from common life knowledge, asking for the possible "number of items." In the PEP Edition, there are no problems asking for integer solution sets, only inequality relation expressions are mentioned.

Table 2. Statistical Analysis of Examples and Exercises

Example problems from People's Education Press	Indonesian web version example questions	People's Education Edition Exercises	Indonesian online exercises
10	13	76	26

We will conduct a quantitative comparative analysis of the examples and exercises in the two textbooks. First, the total number of examples and exercises in both textbooks is as follows: In terms of total quantity, the People's Education Press edition has a significantly larger number of exercises, which is consistent with the textbook's writing style: while introducing knowledge, it includes small questions for observation, thinking, and practice, aiming to help students understand mathematical concepts. In the section on linear inequalities in one variable, the calculation difficulty is not high; most exercises involve integer arithmetic operations.

Referring to the example and exercise difficulty model in reference (Bao, 2002), we compared the two textbooks. The dimensions selected here are cognition, background, operation, and reasoning. The statistical results of the number of examples and exercises at each level are shown in the Table 3

Table 3. Statistical Results of the Number of Examples and Exercises

	level	Example problems from People's Education Press	Indonesian web version example questions	People's Education Edition Exercises	Indonesian online exercises
Cognition	Memorization	2	5	14	20
	Understand	8	8	56	6

	Explore	0	0	6	0
Background	No background	2	12	67	20
	Personal life	1	1	2	4
	Common sense	7	0	7	2
	Scientific Context	0	0	0	0
Operations	No operation	5	0	15	4
	Numerical values	5	13	50	22
	Simple symbolic operations	0	0	10	0
	Complex symbolic operations	0	0	1	0
Reasoning	No reasoning	2	5	20	12
	Simple reasoning	7	8	45	13
	Complex Reasoning	1	0	11	1

In terms of cognitive dimension, the difficulty level of the example problems in both textbooks is significantly higher than that of their respective exercises. The weighted average difficulty of the example problems and exercises in the People's Education Press textbook is 1.8 and 1.5, respectively, while the weighted average difficulty of the example problems and exercises in the Indonesian online textbook is 2.5 and 1.9, respectively. Structurally, this is because the example problems are mostly complex application problems, involving the transformation of situational relationships into inequalities.

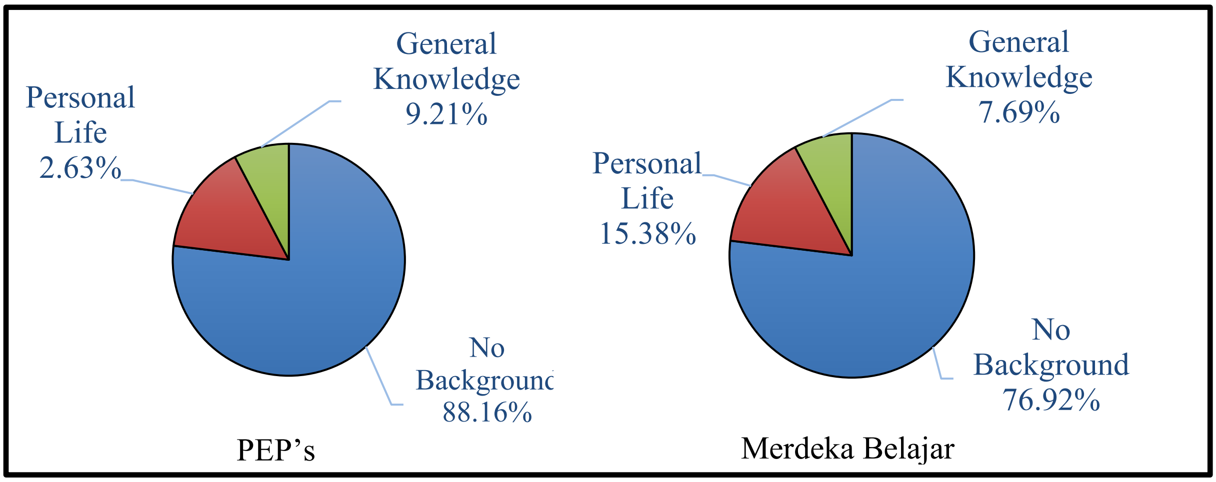

Figure 2. Level Distribution of The Exercises in the two versions PEP's and Merdeka Belajar

In terms of exercises, the majority are without background information, which is related to the concept of inequalities. Larger and smaller, more and less are concepts easily understood by students, requiring little background knowledge to grasp the inequalities. In the sections with background information, the People's Education Press exercises mainly focus on common sense, such as school activities. In contrast, Indonesian textbooks tend to focus on personal life, including shopping and learning.

In the example problems, 80% of the questions in the People's Education Press edition have background information, mainly focusing on general knowledge, which is significantly different from the background level of the exercises. The vast majority (92%) of the example problems in the Indonesian online textbook do not have background information; the focus is

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on expressing and solving inequalities. This is consistent with the fact that the example problems are more difficult in terms of knowledge recognition than the exercises.

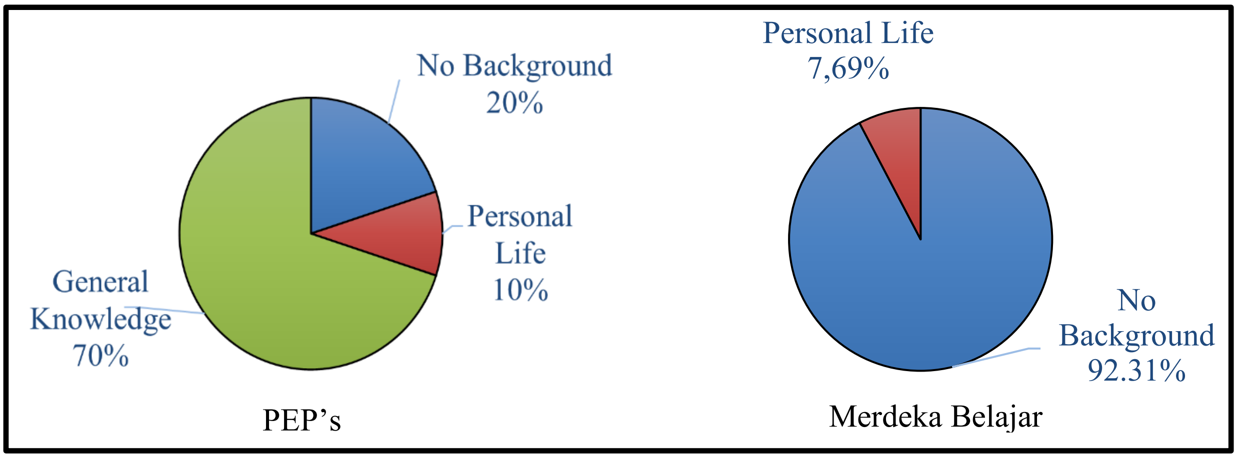

Figure 3. Knowledge Recognition

The People's Education Press textbook includes some symbolic calculations (including parametric inequalities) in its exercises, while the Indonesian textbook does not. This results in the Indonesian online textbook having statistically lower difficulty levels in terms of computational complexity. However, the introductory examples and explanations of inequality properties contain many parametric inequalities, but these are not included in the statistical analysis. We have compiled a list of the weighted average difficulty levels of the two textbooks in the reasoning dimension, as follows:

Table 4. Level of Difficulty of The Two Textbooks

Example problems from the textbook	Indonesian web version example questions	People's Education Edition Exercises	Indonesian online exercises
1.23	1.31	1.85	1.58

The most notable difference is in the exercises in the People's Education Press edition, which are largely due to the large number of complex word problems. From a conceptual perspective, this is related to our emphasis on solving practical problems. Finally, we conducted a simple one-way ANOVA on the relative proportions of different difficulty levels of the exercises in the two textbooks, obtaining a p-value of 0.27. Therefore, there are some differences in the difficulty of the exercises. (Due to the small total number of examples, they are not statistically significant and are therefore not presented here.

The comparative analysis reveals that while both China and Indonesia incorporate themes of social and economic inequalities in their curricula, their approaches differ significantly due to distinct socio-political contexts and policy influences. China's education system, with its strong central governance and Marxist ideological orientation, often emphasizes standardized, exam-focused pedagogy that reflects urban-rural and ethnic minority disparities. In contrast, Indonesia's curriculum reforms, particularly those under the Merdeka Curriculum, promote a more critical, student-centered approach aiming to address local cultural diversities and rural educational deficits. Methodologically, diverse approaches have been used to investigate these issues, yet a need remains for integrative, cross-national research that fully captures the interplay between policy, classroom practices, and student outcomes.

Table 5. Comparative Features of Teaching Content on Inequalities

Feature	China	Indonesia
Policy Influence	Centralized, Marxist, hukou system	Decentralized, critical, school zoning
Curriculum Themes	Ethnic, rural-urban, gender, social protection	Income, education, gender, urban-rural
Pedagogy	Exam-focused, teacher-led, digital innovation	Student-centered, project-based, critical
Textbook Content	Contextualized, higher cognitive demand	Open-ended, lower cognitive demand
Equity Barriers	Institutional, resource, hidden curriculum	Infrastructure, teacher support, admin gaps
Research Gaps	Classroom activities, cognitive impacts	Same as China

Since 7th-grade students are still transitioning from concrete to abstract thinking, the inductive approach is very effective. Students are encouraged to observe patterns in specific cases before concluding the general rule. In the PEP material illustration, a series of fill-in-the-blank problems is presented. The goal is for students to "discover" on their own that multiplying by a negative number reverses the inequality sign. This pattern is then generalized into a formal property. In the *Kurikulum Merdeka*, because this topic is taught in 11th grade (senior high school), students are assumed to already have mature abstract reasoning. A deductive approach—presenting the rule first and then applying it—is more efficient and goes straight to the core of the mathematical structure. This shows that even though the mathematical property is exactly the same (universal), the way the material is delivered depends greatly on *who* is being taught (the students' age) and *what* the material is preparing them for (the next level of curriculum).

Discussion

Understanding these differences on teaching content is crucial for informing future curriculum development, especially in addressing persistent educational disparities related to urban–rural divides and ethnic minority inclusion (Huang et al, 2021; Peng & Song, 2014). From a cognitive perspective, the findings clearly show a consistent gap between the difficulty of example problems and the exercises that follow them in both textbooks. In the Chinese People's Education Press textbook, the example problems have a weighted difficulty of 1.8, compared to 1.5 for the exercises. The Indonesian online textbook shows a similar pattern but with overall higher difficulty levels: the example problems average 2.5 and the exercises average 1.9. These numbers are not just statistical differences—they reflect how the learning experience is intentionally staged. The examples in both textbooks tend to be complex, often requiring students to translate real-world scenarios into mathematical inequalities. In other words, students are expected to grapple with challenging, conceptually rich tasks first, before

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applying what they learned to relatively easier practice exercises. Structurally, this design suggests that the example problems are meant to model high-level reasoning, while the exercises help reinforce the techniques introduced.

The broader comparative analysis highlights that China and Indonesia integrate the theme of social and economic inequality in their mathematics curricula, but for very different reasons and through different educational philosophies. In China, mathematics curriculum reform reflects broader social and educational policies in the curriculum standards and their implementation are strongly shaped by national governance and socio-cultural contexts (Wang et al, 2017). Mathematics teaching is consequently high in rigor and designed to reflect societal issues such as urban–rural divides or ethnic minority disparities (Li & Wu, 2017; Li, 2009). The emphasis on standardized knowledge can give students a clear academic direction, yet it may also limit opportunities for contextual or critical engagement beyond what is tested.

By contrast, The implementation of student-centered, differentiated mathematics teaching under Merdeka Belajar aims to respond to diverse learner needs and local contexts, potentially increasing relevance and equity in mathematics instruction (Greer et al, 2009; Rohmatulloh, 2023, Nurhayati et al, 2025). These reforms aim to empower educators and address local cultural dynamics, particularly outside major urban centers. Rather than mirroring national political narratives, the Indonesian system seeks to cultivate agency, cultural relevance, and local problem-solving. The result is a curriculum that encourages exploration, reflection, and adaptability in classroom practice. Although both countries teach inequality-related themes, Indonesia tends to treat them as social realities students should think about, while China frames them as systemic issues students must learn to interpret within a fixed educational structure. Despite the variety of research methods used to study these systems, there is still a need for cross-national work that better connects policy design, classroom experience, and student achievement.

In terms of how mathematical content is presented, key features in the textbooks further reflect these differences. Chinese textbooks contain many contextual problems that embed mathematics into scenarios familiar to students. This approach helps them see how mathematical structures exist beneath everyday situations and serves as a bridge between abstract concepts and concrete realities (Huang et al., 2021). Indonesian textbooks, however, tend to include more open-ended questions. These questions do not direct students to a single procedure or fixed answer; instead, they invite students to explore diverse strategies, express their reasoning, and consider multiple pathways to a solution. The content of the People's Education Press textbook is more mathematical, while the Indonesian online version is closer to students' daily life. The multiple representations of concepts are highly emphasized in Indonesian mathematics education (Yurniwati, 2018).

The structure of tasks also mirrors this divergence. Indonesian textbooks offer a broader range of task types, which can appeal to different learning preferences and allow students to navigate mathematics in ways that feel natural to them (Purnomo et al., 2023). Meanwhile, Chinese textbooks focus on developing conceptual understanding through deliberate sequencing: students first learn the underlying idea, then practice core techniques, and finally apply them in problems that call for explanations, visual representations, or alternative solution methods (Son & Hu, 2016). This layered approach can build deep mathematical comprehension, but it may also require a high level of cognitive endurance from learners.

This pattern is confirmed when we look more carefully at levels of cognitive demand. Studies have shown that Chinese textbooks tend to assign tasks that are above average difficulty internationally, pushing students to solve more demanding problems and reason mathematically at a deeper level (Cao & Wu, 2021). Indonesian textbooks, in contrast, often include tasks that call for basic understanding or straightforward application (Yang & Sianturi, 2017). These tasks may support student confidence and inclusiveness, especially for learners who struggle with mathematics, but they may also limit opportunities to develop high-order thinking. Singaporean textbooks, another benchmark for mathematical rigor, lean more toward the Chinese model, presenting consistently high cognitive demands and a strong focus on reasoning (Yang & Sianturi, 2017).

Finally, both textbook systems recognize that students' culture, values, and identity play an important role in shaping how mathematics is learned. Material in both Indonesian and Chinese textbooks is presented in ways that resonate with students' contexts. This makes the content more accessible and helps learners connect mathematical concepts with their social environments. However, even here, the intent is distinct. In China, cultural references often reinforce collective narratives and shared national goals. In Indonesia, cultural integration is more pluralistic, reflecting linguistic diversity, local traditions, and decentralized educational practices. Overall, the findings illustrate that the cognitive structure of the textbooks, their pedagogical approaches, and their socio-cultural orientations are deeply intertwined. The differences are not merely technical, they express divergent philosophies of education and society. Understanding these nuances highlights the importance of integrative research that goes beyond curricular documents and asks how these differences shape real learning experiences and educational outcomes.

Conclusion

By comparing the difficulty levels of examples and exercises in the knowledge content of linear inequalities in one variable in the two versions, in general, the difficulty of the People's Education Press textbook is slightly higher, which confirms the conclusion of most Chinese and foreign mathematics textbooks. The content of the People's Education Press textbook is more mathematical, while the Indonesian online version is closer to students' daily life. The multiple representations of concepts are highly emphasized in Indonesian mathematics education. From the above research, we also gain the following insights into the teaching of linear inequalities in one variable: (1) The number of inequalities with parameters can be reduced; (2) In the example demonstrations, the explanation of the inequality rules can be more concise. Understanding the rationality of the inequality rules and how to correctly apply the rules are two learning tasks that should be reasonably arranged. (3) It is necessary to clarify the learning objectives of inequalities. Which is more important, the reasoning or the representation of inequalities?

Some articles or learning materials, labeled as being written for students, contain numerous "enhancement" claims, stating that certain practices require specific abilities, and that learning these abilities will develop them. This raises the question: what is the basis for these claims? What is their purpose? Textbooks are for students; many textbooks begin with the greeting "Dear students," yet this point is rarely discussed in textbook research articles. The above is the beginning of a comparative textbook article, which we hope will be further refined later. "Formal target worlds (curriculum objectives) and actual classroom teaching activities are connected to a certain extent through textbooks." Comparative analysis of teaching materials from different regions is one method of textbook research. In any case, we must be clear: student-centeredness is the fundamental function of textbooks and general learning materials.

This study also has several limitations. The analysis is based on a single series of PEP textbooks and one version of Indonesian online learning materials. Such a narrow sample restricts the representativeness of the findings and does not capture the diversity of editions, publishers, or instructional platforms within either educational system. The study examines inequalities exclusively at the level of textbook content, without triangulating classroom

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enactment or instructional mediation. Variation in teacher practices, lesson pacing, and student interpretation may substantially alter how textbook tasks are experienced in real learning environments. Although the comparative analysis suggests that the PEP materials exhibit a higher degree of mathematical abstraction, these claims are not supported by quantitative measures, performance data, or cognitive load indicators. May this study, provides a reference and literacy space for presenting inequality material.

Conflict of Interest

The authors declare that there is no conflict of interest.

Authors' Contributions

The first author, Z.X., contributed to resources, review, editing, and visualization. The second, D.R., contributed to conceptualization, formal analysis, writing, review, and editing. The percentage contributions to the conceptualization, preparation, and revision of this manuscript are as follows: Z.X.: 40% and D.R.: 60%.

Data Availability Statement

The authors declare that data sharing is not applicable, as no new data were created or analyzed in this study.

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