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Atemporal Discourse as a Managerial Burden: Implications for Physics Teachers' Time Management

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Abstract: *The Merdeka Curriculum idealises the emergence of critical-thinking students. However, when high cognitive demands are present in textbooks, such as the features 'Let's Think Critically!' and 'Let's Discuss!', without transparent time allocation (atemporal), it creates threatening dissonance. This study reveals this paradox: why does idealistic discourse lead to unsupported managerial burdens for Physics teachers? This study aims to critically analyse the implications of the dimension of temporality (instructional time management) in the Merdeka Curriculum Physics textbook for Grade XII Senior High School/MA. Specifically, this study fills a research gap by highlighting the threat of time management uncertainty caused by features that demand high-level cognitive reasoning and discussion, namely 'Let's Reason Critically!' and 'Let's Discuss!'. Using Critical Discourse Analysis (CDA), the primary data sources focused on imperative instructional units that were atemporal (did not specify duration) but demanded complex activities, such as quantitative analysis and evaluation of electrical circuit designs. The results showed a significant dissonance between the textbook's idealistic demands and the minimal managerial support. The 'Let's Think Critically!' and 'Let's Discuss!' features contain high cognitive demands but almost always lack clear time allocations. This gap (Demand Scale 5 vs. Support Scale 1) effectively shifts the burden of operational curriculum and emergency time management to teachers.*

Keywords: *atemporal discourse, critical discourse analysis, physics textbooks, temporal dissonance, time management*

Wacana Atemporal sebagai Beban Manajerial: Implikasi bagi Pengelolaan Waktu Guru Fisika

Abstrak: Kurikulum Merdeka mengidealkan lahirnya siswa yang bernalar kritis. Namun, ketika tuntutan kognitif yang tinggi hadir dalam buku teks, seperti fitur "Ayo, Bernalar Kritis!" dan "Ayo, Berdiskusi!", tanpa alokasi waktu yang jelas (atemporal), hal ini menciptakan disonansi yang mengancam. Penelitian ini menyingkap paradoks tersebut: mengapa wacana idealis justru berujung pada beban manajerial yang tidak didukung bagi guru fisika? Penelitian ini bertujuan untuk menganalisis secara kritis implikasi dimensi temporalitas (pengelolaan waktu instruksional) dalam buku teks Fisika SMA/MA Kelas XII Kurikulum Merdeka. Secara spesifik, studi ini mengisi kekosongan penelitian dengan menyoroti ancaman ketidakpastian dalam manajemen waktu yang diakibatkan oleh fitur yang menuntut penalaran dan diskusi kognitif tingkat tinggi, yaitu "Ayo, Bernalar Kritis!" dan "Ayo, Berdiskusi!". Menggunakan Analisis Wacana Kritis, sumber data utama difokuskan pada unit-unit instruksi imperatif yang bersifat atemporal (tidak mencantumkan durasi waktu) namun menuntut aktivitas yang kompleks, seperti analisis kuantitatif dan evaluasi rancangan rangkaian listrik. Hasil penelitian menunjukkan adanya disonansi yang signifikan antara tuntutan buku teks yang idealistik dan dukungan manajerial yang minim. Fitur "Ayo, Bernalar Kritis!" dan "Ayo, Berdiskusi!" memuat tuntutan kognitif yang tinggi, namun hampir selalu tidak menyertakan alokasi waktu yang jelas. Kesenjangan ini (Skala Tuntutan 5 vs. Skala Dukungan 1) secara efektif memindahkan beban kurikulum operasional dan pengelolaan waktu darurat kepada guru.

Kata kunci: analisis wacana kritis, buku teks fisika, disonansi temporal, manajemen waktu, wacana atemporal

INTRODUCTION

Amidst the idealism of the Merdeka Curriculum, which prioritises critical thinking, a fundamental question arises. Why do the atemporal instructional features in physics textbooks implicitly shift the burden of unsupported time management, threatening the effectiveness of classroom learning?.

The implementation of the Merdeka Curriculum in Indonesia is characterised by a focus on providing flexibility (diversity) in learning design (Putri & Pranata, 2024; Munawarah & Rahayu, 2025; Yafie et al., 2024). The aim is to produce students with the Pancasila Student Profile, one of whose main characteristics is critical thinking skills. Leading textbooks, such as Physics for Senior High School/MA Grade XII, are developed by the Book Centre as "living documents" that support curriculum implementation, with an emphasis on fostering curiosity, critical thinking, and applied learning.

This Grade XII Physics textbook is rich in interactive and instructional features designed to train scientific process skills and thinking skills (Sarah & Suwarma, 2022). These features include "Let's Think Critically!" and "Let's Discuss!" (as part of the Activities feature or other additional features). “Let's Think Critically!" Feature is presented in each chapter to encourage students to analyze the application of physics concepts. Meanwhile, discussion is encouraged throughout various activities to train collaboration and teamwork skills in problem-solving (Saengrith et al., 2022), for example, in activity 2.4. Designing a Light Circuit.

The critical thinking and in-depth discussion presented in the "Let's Think Critically!" and "Let's Discuss!" features (especially in Activities) mostly lack clear time allocations. Activities that require complex analysis, such as designing series-parallel circuits and evaluating them (Activity 2.4) or explaining the working principles of tools (Activities 3.1, 4.2, 4.5), are high-level cognitive processes that require substantial time. These mental processes are potentially helpful for current intelligence tests (IQ) for assessing human abilities, diagnosis, and intervention (Thatcher & John, 2021; Wallsten, 2024). The absence of realistic duration guidelines creates a risk of time management uncertainty, implicitly forcing teachers and students to allocate undefined time within the limited framework of Physics class hours.

Contemporary instructional patterns and high cognitive demands are evident in several chapters, namely: (1) Complex Critical Thinking Demands: Critical questions are often presented after the introduction of a concept without an estimated time for completion (Bean & Melzer, 2021). Example: in Chapter 1, "Let's Think Critically!" asks students to explain why ink deflects when passing through a deflection plate, followed by Activity 1.6, which requires in-depth quantitative analysis (calculating electric fields and potential differences) assuming a parabolic trajectory and Newton's Second Law, but without any indication of time. (2) Demands for In-Depth Discussion and Analysis: Activities requiring group discussion and comprehensive evaluation are presented openly (Akyıldız & Ahmed, 2021; Matlala, 2025). Example: Activity 2.4 asks students to discuss various lamp circuit designs and evaluate which is optimal, a task that requires significant discussion, calculation, and analysis time. (3) Lack of Time Management Guidance: The instructional text only lists the names of the activities and their objectives, but there is no indication of how long the analysis, discussion, or evaluation phases should ideally take.

Physics lessons in secondary schools often face challenges in balancing mastery of essential concepts with the implementation of time-consuming process skills activities (Caraig & Quimbo, 2022; Gumilar & Ismail, 2023). When textbooks do not provide time limits for critical analysis and discussion (qualitative activities), teachers face a dilemma:

whether to sacrifice the depth of discussion to cover the material or to spend unplanned time at the risk of violating the lesson allocation (Yolanda & Pranata, 2024). This situation often leads to superficial discussions and rushed critical analysis, undermining the quality of meaningful learning.

Studies on Merdeka Curriculum textbooks in Physics tend to focus on analyze the suitability of the content to the Learning Outcomes or the availability of virtual project/experiment features. Content suitability analysis serves as a quality assurance and strategic guide in the education process (Akyıldız & Ahmed, 2021; Ramezani & Mostafavi, 2025). However, research that explicitly analyzes the implications of the temporality dimension (instructional time management) for features that target critical thinking and discussion remains a significant gap. This study aims to fill this gap by using Critical Discourse Analysis (CDA) to examine the power relations and managerial impact of undefined time discourse.

The phenomenon of time management uncertainty (independent variable) in this instructional discourse can be examined using Social Cognitive Theory and Instructional Design Theory. Critical reasoning and discussion are high cognitive load activities that require (planned) rest time and measured interaction time (Thatcher & John, 2021; Wallsten, 2024). The absence of transparent time allocation undermines the effectiveness of instructional scaffolding, thereby hindering the achievement of critical reasoning and student collaboration (dependent variables) (Gunawardena & Wilson, 2021).

The novelty of this research lies in its critique of the hidden time-control mechanisms embedded in cognitive features in the Merdeka Curriculum Physics textbook. By highlighting the phrases 'Let's think critically!' and 'Let's discuss!', this research reveals how language that appears participatory imposes an unsupported managerial burden on teachers.

The urgency of this research is to demonstrate, critically, that the threat of time management uncertainty can be the biggest obstacle to achieving the objectives of the Merdeka Curriculum, namely, fostering a culture of critical thinking. The results are essential in providing evidence-based input to textbook authors and the Book Centre to include accurate time estimates for each cognitive activity, thereby supporting effective and consistent time management across schools.

Theoretically, this study enriches the study of textbook literacy and CDA in science curricula, with a particular focus on temporal discourse. In practice, the results of this study will benefit physics teachers by helping them develop realistic lesson plans and providing precise recommendations for textbook authors to revise activity instructions to be more detailed and support optimal curriculum implementation. Based on these issues, this study will deeply analyze how the atemporal discourse in the features "Let's Think Critically!" and "Let's Discuss!" causes uncertainty in time management in Physics classes.

METHOD

This study employs a qualitative approach with document analysis and critical discourse analysis (CDA) (Blommaert & Bulcaen, 2000; Tannen et al., 2015). The primary data source is the Physics textbook for Senior High School/MA Grade XII Merdeka Curriculum (Sarah & Suwarma, 2022). The study material focuses on all instructional features, including the imperative discourse "Come on, Think Critically!" and "Come on, Discuss!", as well as other activities that implicitly require high-level cognitive discussion/analysis (e.g., Activity 2.4: Designing a Light Circuit). The data selection technique applied was purposive sampling of documents, with the unit of

analysis the entire instructional text, which was atemporal (did not specify a duration) but required complex cognitive activities such as analysis, evaluation, and discussion. The data collection procedure involved documentation and close reading to extract and classify imperative discourse units related to critical reasoning and debate, and to identify the absence of time parameters.

Data analysis techniques use the Critical Discourse Analysis (CDA) model, in which analysis emphasises criticism of social practices and discursive practices to reveal how the language of persuasion ("Come on") works as a hidden time control that imposes a managerial burden on teachers, as well as analysing the thematic cohesion between high cognitive demands and minimal procedural support. Data validity is ensured through data/source triangulation (comparing instructions with the objectives of the Merdeka Curriculum and the physics context) and repeated analysis. The research procedure was carried out in stages, starting from determining the unit of analysis, collecting textual data, and tri-dimensional discourse analysis, to formulating implications as illustrated in Figure 1. Research ethics were maintained by ensuring the objectivity of the analysis and the integrity of the textbook as an official product of the Textbook Centre.

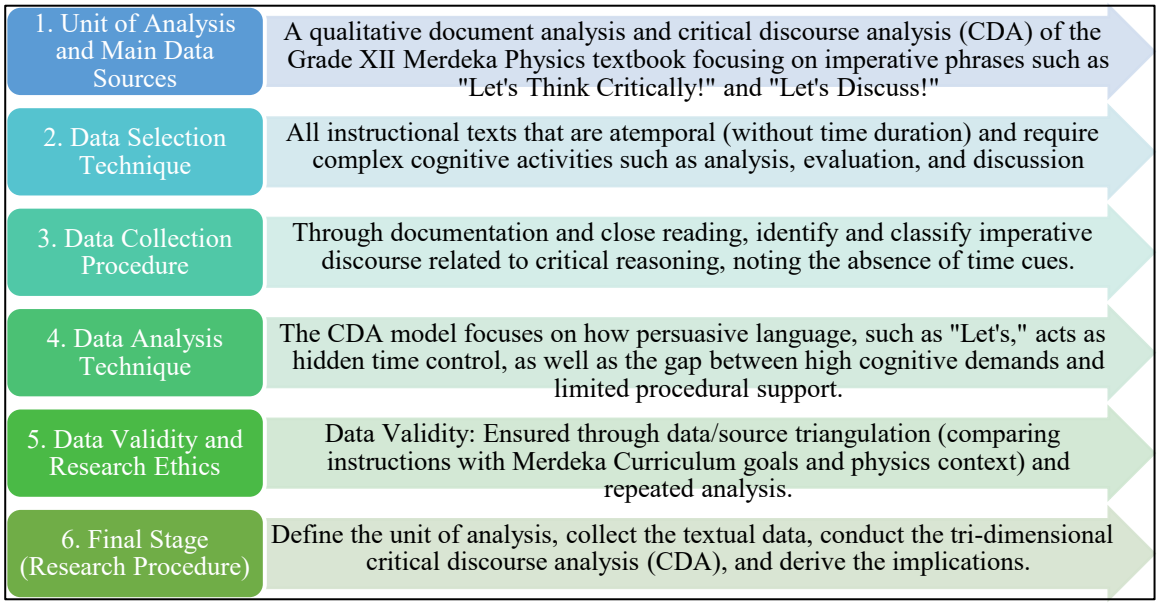

Figure 1. Research Procedure

RESULTS AND DISCUSSION

The analysis of the Grade XII Physics textbook reveals several patterns related to the design of critical thinking and collaborative discourse, particularly in how cognitive demands, instructional support, and time-allocation structures are across chapters.

The "Let's Think Critically!" discourse tends to contain high cognitive demands without time constraints.

In the Grade XII Physics textbook, Let's Think Critically! The Feature is always present in the core concept subsections and aims to increase curiosity and critical thinking. However, analysis of this discourse reveals an imbalance between cognitive demands and support for time management.

There is no estimated completion duration. There are no time references accompanying instructions such as "Observe both images... then explain the differences

in how the deflection systems work...". There is no systematic step-by-step guide to help students break down significant problems, except for the instructions for solving calculation problems in the Activities section. The questions are analytical and complex, requiring substantial time to answer. For example, explain why printer ink deflects when it passes through the deflection plate analysing which printer deflection system is best based on the principles of static electricity. Analysing the type of charge from particle trajectories (Chapter 3) requires analysis of the kind of magnetic force and the right-hand rule. Analysing whether a circuit requires other components (resistors) in designing an optimal lighting circuit.

Based on the above findings, it can be concluded that this discourse encourages students to engage in higher-order thinking, in line with the book's objectives, but is not supported by a clear time-management structure for completing the reasoning and writing complex arguments within the limits of class time.

The discourse "Let's Discuss!" Emerges as a Collaborative Activity, But Also Without Time Limits and Interaction Scenarios

Collaborative activities and discussions are emphasised in the book to train collaboration and cooperation skills. However, when discussion instructions appear, time management is almost always missing. For example: (1) Discussion to determine what factors influence the magnitude of the electric force between two charges (Activity 1.1). (2) Discussion on designing various series-parallel circuits of 5 lamps and evaluating which design is optimal (Activity 2.4. Designing Lamp Circuits). (3) Discussion of the conditions under which induced EMF is generated and the factors that determine it (Activity 3.5).

However, the analysis shows that: (1) There is no recommended time allocation for the discussion, reasoning, or conclusion phases. (2) There are no discussion achievement targets related to time (e.g., time boxes). (3) There are no rubrics to help teachers determine the ideal amount of time for activities to avoid disrupting the flow of material.

Based on the above findings, the absence of time limits means this activity can take up most of the class time if not strictly regulated by the teacher, thereby pressuring teachers to cut discussion time and resulting in suboptimal collaboration and idea exchange. Time management is critical to learning because it lays the foundation for productivity, reduces stress, and improves academic achievement (Ghafar, 2023; Lin & Chen, 2025).

Both Discourses (Critical Reasoning and Discussion) Position Teachers as Facilitators Without Time Management Guidelines

Textbooks provide basic learning elements such as concept explanations, experimental activities, and comprehension questions (Örnek & Alaam, 2025). However, there is a lack of instruments that support instructional time management. The book does not include Specific time allocations for each activity, either for recall ("Let's Recall!") or for analysis ("Let's Think Critically!"). The ideal duration for complex discussions (e.g., Activity 2.4, which includes discussion, analysis, and evaluation of a series). Time management strategies or minimum-maximum duration recommendations for managing inquiry- and discovery-based activities.

Based on the above findings, it can be concluded that teachers are left to interpret for themselves "how long this activity should last," creating uncertainty about learning time management and forcing them to improvise without adequate technical guidance. Time management is critical in Critical Thinking and Discussion because allocating sufficient time helps in conducting in-depth research and constructing logical arguments (Critical

Thinking), as well as ensuring that the presentation and response to ideas are carried out in a structured and efficient manner within the specified time limit (Discussion) (Richards et al., 2020). Critical thinking skills are an essential competency in the 21st century, because critical thinking is the main target in learning (Pramudita et al., 2025).

Complex tasks require more time than the learning time allocated in the Merdeka Curriculum

Many activities require more time than the 45-90 minutes generally allocated. Examples of complex activities: (1) Exploring PhET simulations that require internet access and data collection (e.g., Activity 1.1 on Coulomb's Law or Activity 1.7 on Parallel Plate Capacitors). (2) Applied projects at the end of chapters (e.g., creating an electrical circuit application product in Chapter 2). (3) Applied problem-solving that requires qualitative and quantitative analysis (e.g., analysing how an inkjet printer works in Activity 1.6).

Based on the above findings, it can be concluded that these activities often occur in the middle of a subchapter, thereby disrupting the teacher's timeline and causing a "narrowing of concept elaboration time". This ideal critical learning discourse does not consider the time cost of limited class hours. Considering time costs in learning because time is a limited and non-renewable resource (Antonova & Aksyonov, 2020; Shofiullah et al., 2024), measuring time costs helps us prioritise the most efficient and high-impact learning methods to achieve academic goals optimally.

Uncertainty in Time Allocation Leads to Potential Inequality Between Classes

The absence of time standards in instructions allows for wide variations in field implementation (Malkoc & Tonietto, 2019). Classes with teachers skilled at time management may be able to complete core activities, whereas classes with teachers who are weak at time management may not complete complex activities (Lin & Chen, 2025). This results in "learning loss" or an imbalance in achieving learning objectives, particularly in the development of the Pancasila Student Profile (critical thinking and collaboration).

Based on the above findings, critical discourse increases the potential for differences in learning quality between classes and schools, which runs counter to the spirit of equalising educational quality in the Merdeka Curriculum. There is a need for equitable support and adequate teacher training across all academic units so that the implementation of the Merdeka Curriculum does not create new disparities but rather truly achieves quality equality by emphasising students' independent reasoning (Alemu et al., 2021; Fasinro, 2024).

These findings highlight structural inconsistencies between the textbook’s pedagogical intentions and its practical executable design, indicating the need for further interpretation regarding their implications for classroom implementation. Issues that are elaborated in the following Discussion section based on critical analysis of the threat of time management uncertainty.

From the Perspective of Critical Discourse Analysis (CDA): The Book Presents the Discourse of "Independent Learning" but Ignores the Reality of Classroom Time.

The instructional discourse in the features "Let's Think Critically!" and "Let's Discuss!" are an ideological manifestation of the Merdeka Curriculum, which emphasises independence, reasoning, and collaboration. However, the textual embodiment of this discourse shows significant dissonance with the classroom's temporal reality.

The discourse of Let's Think Critically! Implies that students are ready to engage in high-level reasoning (such as analysing the trajectory of ink in an inkjet printer or determining the direction of a magnetic field) within an undefined duration.

The discourse Let's Discuss! Calls for collaboration (for example, designing an optimal lighting system in Activity 2.4), but does not impose any restrictions on the structure of the dialogue or the estimated duration of the discussion.

Based on the above findings, it can be concluded that this physics textbook constructs an idealistic discourse of "independence and collaboration," but does not mediate how these ideas can be realistically achieved in school time management. The absence of time planning transforms imperative instructions into cognitive demands without logistical support (Malkoc & Tonietto, 2019), leaving the burden of coordination entirely on teachers and students.

Discourse Construction Encourages Exploratory Activities that Conflict with Curriculum Requirements

Critical features and discussions in the Grade XII Physics textbook often include complex exploratory activities that inherently require a long-time cycle. Complex critical and collaborative activities (e.g., applied case analysis, simulations, and problem solving) require: (1) Preparation time: Understanding the case scenario (e.g., a car electrical system) or preparing tools and materials (e.g., resistors, LEDs, batteries). (2) Working time: Performing multi-step calculations or conducting experiments/simulations (e.g., Activity 2.1, which requires seven steps of activity, data processing, graphing, and analysis). (3) Discussion time: Collaborate to compare results and evaluate designs (e.g., Activity 2.4). (4) Reflection time: Relating results to Physics concepts (e.g., Reflection at the end of the chapter).

Based on the above findings, it can be concluded that there is a tension between the "in-depth exploratory activities" proposed by the book and the "limitations of class time" (which the book does not acknowledge). This can lead to a reduction in the depth of concept elaboration in class to complete compulsory tasks. This has the potential to sacrifice students' substantial understanding and critical reasoning skills for the sake of curricular administration (Alemu et al., 2021; Antonova & Aksyonov, 2020).

Discourse on Activities That Do Not Consider Students' Cognitive Load

The tasks assigned in “Let's Think Critically!" Feature and discussion activities often involve a high cognitive load, but the instructional discourse fails to provide adequate temporal scaffolding. The mental load increases because: (1) Multi-level problem-solving activities: For example, in Activity 1.6 in Chapter 1, students are asked not only to explain deflection, but also to determine the magnitude of the electric field and potential difference, assuming a parabolic trajectory and “Hukum 2 Newton” Represents a complex integration of concepts (Indana Zulfa et al., 2025). (2) Lack of step-by-step guidance: No suggested time allocation is provided for the analysis and synthesis phases of the solution. (3) Tasks that combine theoretical concepts and contextual phenomena (such as the working principles of mass spectrometers or BIA/Bioelectrical Impedance Analysis).

Based on the above findings, this indicates "an imbalance between cognitive objectives and structural support." The book demands mature output (critical reasoning, reports, projects) but does not provide the managerial tools (time) necessary for quality input and thought processes (Shofiullah et al., 2024).

Unclear Time Allocation Shifts the Burden of Time Management to Teachers

The deliberate lack of clarity in time allocation in the Year 12 Physics textbook effectively shifts the burden of operational curriculum management to teachers, leading to managerial stress. Teachers are positioned as "emergency time managers," who: (1) You must devise your own additional strategy to determine the ideal duration, separate from the official textbook. (2) There is a risk of sacrificing conceptual elements (e.g., reducing lecture time) to accommodate time-consuming exploration and discussion. Alternatively, the depth of debate may be reduced to meet material quantity targets.

The textbook discourse does not provide adequate tools for implementing learning (Fasinro, 2024), thus creating a gap between the idealism of the curriculum and classroom practice.

Ideologically: The discourse assumes complete flexibility of the independent curriculum, even though actual classroom conditions are not uniform.

AWK provides an overview that this instructional discourse is built on a series of idealistic assumptions that do not always apply in the field. The discourse assumes that: (1) All schools have facilities (e.g., multimeters, oscilloscopes, power supplies for Activity 4.1, or materials/tools for GGL induction experiments). (2) All teachers are skilled at time modulation for HOTS (High Order Thinking Skills) activities. (3) All students are ready to undertake HOTS activities that are not time limited.

The implementation gap will widen. Teachers in schools with minimal facilities and management support will find it challenging to reconcile high cognitive demands with the uncertainty of time management imposed by the text (Kvellestad et al., 2021). Such circumstances may exacerbate the implementation gap in curriculum and learning quality between schools with adequate resources and those that are less fortunate.

Based on the results of a qualitative analysis of time management uncertainty, I can illustrate this in the Grouped Bar Chart as shown in Figure 2, which depicts the gap between the demands of textbooks and the available structural support.

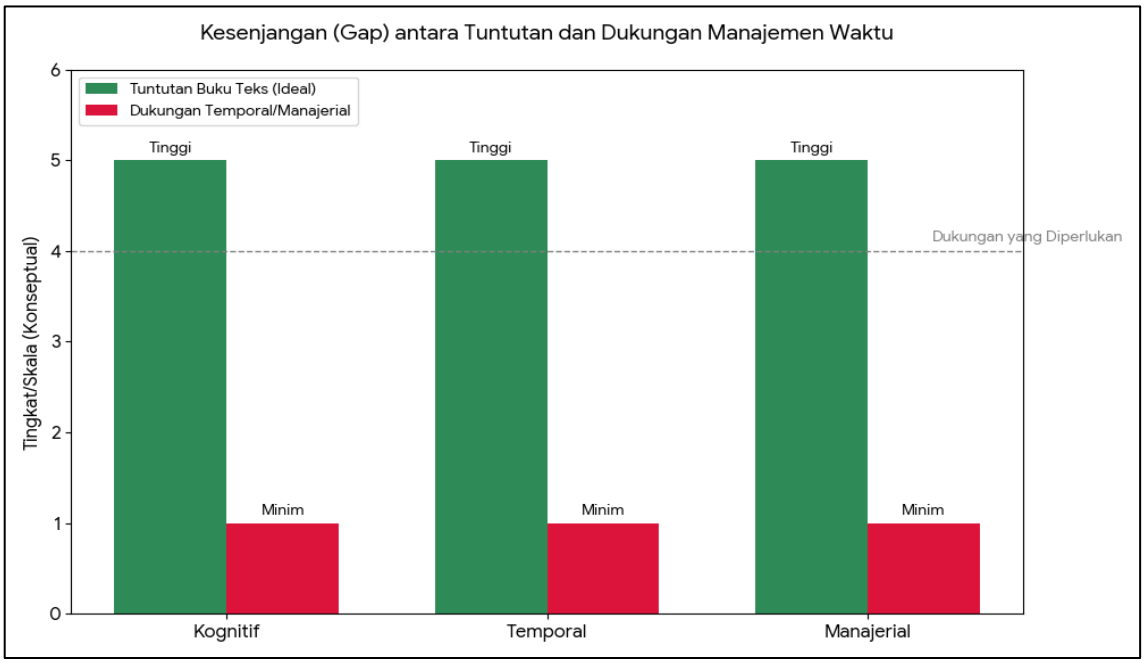

Figure 2. The Threat of Time Management Uncertainty

The diagram (Figure 2) compares the level of demands imposed by the "Let's Think Critically!" and "Let's Discuss!" features with the level of procedural/temporal support provided by the textbook. Textbook Demands (Dark Green): Indicates that demands in all dimensions (Cognitive, Temporal, and Managerial) are at a High level (Scale 5), as the activities require high-level reasoning, substantial time, and complex classroom management. Structural Support (Crimson Red): Indicates that the time management and procedural support provided by the textbook is at a Minimal level (Scale 1), as there is no time allocation, rubric, or guidance to help teachers manage this complexity.

CONCLUSION AND SUGGESTIONS

Based on a critical analysis of the Grade XII Physics textbook in the Merdeka Curriculum, it was concluded that the instructional discourse in the "Let's Think Critically!" and "Let's Discuss!" features creates a significant threat to time management uncertainty. Although idealistically aimed at fostering critical reasoning and collaboration in line with the Pancasila Student Profile, these features are largely atemporal (lack clear time allocations), despite demanding high-level cognitive activities such as analysis, evaluation, and complex discussions. The gap between the book's high demands and the minimal procedural/temporal support turns the instructions into cognitive demands without logistical support, effectively shifting the operational burden of time management to teachers. Consequently, this uncertainty has the potential to sacrifice the depth of concept elaboration in favour of completing compulsory tasks. It exacerbates the potential for disparities in learning quality between classes and schools, thereby hindering the achievement of the goal of equalising education quality in the Merdeka Curriculum.

To address the time management uncertainty identified in this study, future revisions of the Grade XII Physics textbook should provide clearer procedural and temporal guidance for features such as "Let's Think Critically!" and "Let's Discuss!". Suggested pacing and minimal scaffolding would ensure that the high cognitive demands are supported by adequate instructional structure. Additionally, curriculum designers should establish baseline procedural standards across textbooks to reduce variation in implementation between schools. Strengthening textual guidance and teacher support is essential to prevent uneven learning quality and align classroom practice with the Merdeka Curriculum's intended goals.

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