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Fragmented Integration of Natural and Social Sciences Content in Grade V Textbooks under Indonesia's Independent Curriculum

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Abstract. Structural fragmentation in elementary textbooks can weaken interdisciplinary understanding and limit students' ability to interpret real-world phenomena holistically. Under Indonesia's Independent Curriculum, Natural and Social Sciences was introduced to integrate science and social studies, yet little research has examined whether this integration is substantively represented in elementary textbooks. This study investigates how integration is represented in an official Grade V IPAS textbook and how teachers interpret its use in practice. Using a qualitative document-based case study, the research analysed one official Grade V IPAS textbook published in 2021 by Pusat Kurikulum dan Perbukuan and semi-structured interviews with five elementary teachers in Jepara Regency, Indonesia. Data were analysed thematically across three dimensions of fragmentation: content organization, inquiry activities, and assessment tasks. The findings show that integration remains largely administrative rather than conceptual. Science and social studies content is organized in separate chapter sequences, learning objectives, and concluding sections. Inquiry activities mainly direct students toward single-discipline investigation, while assessment tasks evaluate both domains in parallel rather than requiring relational understanding across them. These findings suggest that the formal merger of science and social studies in IPAS has not yet produced conceptually coherent learning materials and highlights the need to strengthen interdisciplinary coherence in content, inquiry, and assessment.

Keywords: structural fragmentation; interdisciplinary integration; IPAS textbook; elementary education; Independent Curriculum

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1. Introduction

The fragmentation of science and social studies content in elementary school learning materials remains a persistent issue in many educational contexts. Taber and Vong (2020) note that instructional materials often present scientific knowledge in isolated segments. Such separation may limit students' opportunities to connect related ideas across domains. Similarly, Armenta and Dominguez (2024) show that fragmented textbook structures tend to separate disciplinary perspectives, even when real-world phenomena require integrated explanations.

As a result, students may perceive knowledge as disconnected domains rather than interconnected systems of understanding. Studies on interdisciplinary textbook design have also highlighted this structural separation and its implications for integrated learning (Kreijkes & Greatorex, 2024). Such instructional structures may hinder students' ability to interpret complex phenomena that require connections between scientific and social perspectives. Empirical studies further indicate that disconnected learning materials can limit students' analytical and problem-solving abilities (Chang et al., 2021). Consequently, conceptual fragmentation in textbooks may reduce opportunities for integrative thinking and meaningful learning experiences in elementary education.

In response to the need for more connected learning, Indonesia introduced the Independent Curriculum [Kurikulum Merdeka], under which science and social studies are integrated into a single subject known as Natural and Social Sciences [IPAS]. This policy aims to reduce rigid disciplinary boundaries and encourage students to understand natural and social phenomena as interconnected aspects of everyday life. By combining these domains, the curriculum seeks to promote holistic learning and interdisciplinary thinking in primary education (Ministry of Education, Culture, Research, and Technology, 2022).

From a theoretical perspective, fragmentation refers to the presentation of learning content in disconnected segments that lack clear conceptual relationships across disciplinary domains. Raffaghelli et al. (2023) explain that fragmented learning structures may hinder the formation of coherent knowledge frameworks because students encounter concepts as isolated units rather than integrated systems of understanding. Such separation may also weaken epistemic coherence, as learners experience knowledge as fragmented information rather than as interconnected explanatory structures. In educational practice, fragmentation may arise from rigid curriculum divisions, textbook structures that separate topics, or teaching approaches that emphasize factual memorization over conceptual relationships (Davies et al., 2021; Nazula et al., 2024).

Interdisciplinary learning is widely recognized as an approach that can connect knowledge across subject areas and support students' understanding of complex phenomena. Drake and Reid (2018) explain that an integrated curriculum enables learners to examine issues from multiple disciplinary perspectives, thereby supporting the development of 21st-century capabilities. **Braat and de Groot**

(2012) argue that interdisciplinary education enables students to integrate perspectives from multiple domains when analyzing real-world issues. Subsequent studies also indicate that interdisciplinary learning environments can improve conceptual reasoning and collaborative problem solving (Liu et al., 2019; Quevedo et al., 2023). In elementary education, interdisciplinary approaches are particularly valuable because they help students relate scientific knowledge to social and environmental contexts. Karali (2021) further shows that interdisciplinary learning approaches can strengthen conceptual relationships and support more integrated understanding. These findings suggest that integrated learning designs have the potential to reduce disciplinary separation and promote more meaningful learning experiences in primary education.

Although interdisciplinary learning has been widely recognized for its educational benefits, translating these principles into classroom materials and instructional resources remains challenging. Lam et al. (2013) suggest that curriculum integration is not easily enacted in classroom practice, particularly when broad policy expectations must be translated into concrete teaching activities. Research on curriculum and textbook alignment also shows that policy-level intentions do not always result in coherent representation within instructional resources (Gokmenoglu et al., 2023).

Nakawa and Kosaka (2025) highlight the importance of aligning textbooks with curriculum guidelines to support cross-curricular learning. Xu and Li (2025) further argue that new curriculum standards often require substantial textbook revision and close mediation between policy, research, and classroom practice. These findings suggest that the challenge of interdisciplinary integration lies not only in classroom implementation but also in how integration is structurally represented in textbooks used for subjects such as Natural and Social Sciences [IPAS]. However, limited research has examined how the architecture of elementary school textbooks may structurally reproduce conceptual fragmentation in Natural and Social Sciences within Indonesia's Independent Curriculum. Previous studies have focused primarily on instructional strategies and classroom practices rather than on the structural organization of learning materials themselves. As a result, it remains unclear whether IPAS textbooks adequately reflect the interdisciplinary connections intended by curriculum policy.

This study therefore investigates the structural fragmentation of Natural and Social Sciences content in Grade V elementary school textbooks used under Indonesia's Independent Curriculum. Specifically, the study addresses the following research questions: (1) How are science and social studies concepts organized in Grade V IPAS textbooks? and (2) To what extent do textbook structures support conceptual connections across disciplinary perspectives? By examining textbook organization, inquiry-based learning activities, and assessment tasks, this study provides empirical insight into how curriculum integration is represented in learning materials and contributes to the literature on interdisciplinary curriculum implementation in elementary education.

2. Literature Review

The integration of IPAS is an important issue in the implementation of the Independent Curriculum. Textbooks are expected to support this integration in classroom practice. Therefore, reviewing previous studies on textbook integration becomes essential.

2.1 Fragmentation of Learning Materials

Within interdisciplinary materials, fragmentation can be examined through the extent to which content, learning activities, and tasks support meaningful connections across disciplinary perspectives. This issue is especially relevant in elementary education, where integrated teaching is still often understood at a relatively surface level as combining subjects rather than building substantive conceptual links across them (Wieselmann et al., 2025). Research on inquiry-based instruction further shows that learning activities are more likely to support conceptual understanding when students' investigations are purposefully designed, guided, and supplemented with appropriate instructional support rather than treated as isolated tasks (de Jong et al., 2023). From this perspective, substantive integration in textbooks should be visible not only in topic selection, but also in how inquiry is structured and how tasks invite learners to connect ideas across domains.

2.2 IPAS Textbooks as Integrative Learning Resources

As an integrated subject in Indonesian elementary education, Natural and Social Sciences [IPAS] is intended to bring scientific and social perspectives into a common learning space [add one local citation if needed]. In textbook design, this means that the material should do more than place science and social studies content in the same volume; it should also support learners in tracing conceptual links across environmental, technological, and social issues. As Lavrenteva and Orland-Barak (2023) show, students' meaning-making is shaped by how text, task, and image are combined within learning materials. Likewise, research by Jiang (2022) indicates that textbook quality is closely related to how tasks are distributed and scaffolded to support higher-order thinking rather than isolated recall. From this perspective, IPAS textbooks function not only as repositories of content but also as mediating tools that shape how integration is experienced in classroom learning.

At the same time, the presence of integrated material in a textbook does not automatically produce integrated learning. Lu et al. (2024) emphasize that inquiry-oriented teaching depends on the purposeful use of questions, tasks, sources, and discussion to guide students' investigation. In a related review, Kumar et al. (2024) show that meaningful inquiry in socio-scientific contexts is closely tied to argumentation, decision-making, and the integration of scientific and social considerations. When inquiry tasks remain compartmentalized, however, learners may still process the material through separate disciplinary lenses, even within an integrated subject. This suggests that the effectiveness of IPAS textbooks depends not only on topic coverage, but also on whether the book consistently links explanations, activities, and questions across domains in ways that support inquiry-based meaning making

2.3 Textbook Integration in the Independent Curriculum Era

The Independent Curriculum [Kurikulum Merdeka] places strong emphasis on competency development, contextual learning, and flexible instructional design in response to students' needs and local contexts [add one local citation if needed]. In reform settings more broadly, however, educational visions do not move into classroom practice automatically. Haug and Mork (2021) show that teachers need accessible teaching resources and modeled instructional strategies to enact reform expectations in daily instruction. In the same vein, Sahlberg (2023) argues that whole-system improvement depends on the quality of the drivers behind reform rather than on policy declarations alone. For textbooks, this policy context creates a clear expectation: integration should be represented not only administratively, through the merger of subjects, but also pedagogically, through coherent explanations, connected tasks, and opportunities for students to relate natural and social dimensions of the same phenomenon.

Recent studies nevertheless suggest that integration under reform conditions can remain uneven when translated into classroom materials and instructional practice. Nalbantoğlu and Bümen (2024) demonstrate that formal curriculum and enacted curriculum are rarely identical, and that teachers need strong pedagogical design capacity to adapt curricular resources productively. Similarly, Farrow et al. (2024) show that the intended elements of curricular design do not automatically lead to high-quality classroom enactment. This implies that evaluating textbook quality in the Independent Curriculum era requires attention not simply to whether science and social studies are combined in one subject, but to the depth of conceptual connection built into the material and its usability in supporting coherent learning.

3. Methodology

This study investigated the structural fragmentation of science and social studies content in the Grade V IPAS textbook used under Indonesia's Independent Curriculum. To address the research objectives, the study applied a qualitative, document-based case study design supported by teacher interviews. This section describes the research design, participants, research instruments, data collection procedure, and data analysis.

3.1 Research Design

This study employed a qualitative, document-based case study to examine the fragmentation of science and social studies content in the Grade V IPAS textbook under the Independent Curriculum. This approach enabled in-depth interpretation of textbook structure, inquiry activities, and assessment tasks while incorporating teacher perspectives on classroom use.

The primary unit of analysis was the Grade V IPAS textbook. The analysis focused on three dimensions: (1) the organization of subject matter, (2) inquiry-based learning activities, and (3) formative assessment questions. Grade V was selected purposively because the textbook contained sufficiently varied content, learning activities, and assessment tasks to support an in-depth analysis of how science and social studies were presented and connected. The textbook was also selected

because of its official status and its relevance to classroom practice within the Independent Curriculum.

3.2 Participants

To complement the document analysis, this study involved five elementary school teachers in Jepara Regency, Central Java, Indonesia. The participants were selected through purposive sampling because the study required information-rich participants who had direct experience using the Grade V IPAS textbook in classroom practice.

Participants were selected purposively using three criteria: they were elementary school teachers, had experience teaching Grade V, and had used the Grade V IPAS textbook in implementing the Independent Curriculum. Teachers who did not meet these criteria were excluded. The five participants provided contextual perspectives for interpreting the textbook findings. Participation was voluntary, informed consent was obtained, and identities were anonymized.

3.3 Research Instruments

Two instruments were used in this study. The first was a document analysis protocol designed to examine the structure of textbook chapters, the organization of topics, the design of inquiry-based activities, and the format of formative assessment questions. The protocol focused on identifying indicators of fragmentation, such as disciplinary separation in content presentation, limited conceptual connections in inquiry activities, and the separation of science and social studies perspectives in assessment tasks.

The interview guide covered teachers' views on content integration, inquiry activities, and formative assessment. Interview responses were documented in written notes for analysis.

3.4 Data Collection

Data collection was conducted in two stages. First, the Grade V IPAS textbook was reviewed systematically to identify how science and social studies content was organized across chapters, how inquiry-based learning activities were designed, and how formative assessment questions reflected interdisciplinary integration. The review examined chapter structure, topic sequences, learning objectives, activity instructions, and question formats to identify patterns of conceptual fragmentation and integration.

Second, semi-structured interviews were conducted individually with the five elementary school teachers to obtain contextual perspectives on textbook use, particularly regarding content integration, inquiry activities, and assessment. Together, the document review and interviews supported triangulation.

3.5 Data Analysis

The data were analyzed using the six-phase thematic analysis framework proposed by Braun and Clarke (2006). This method was selected because it enabled the researchers to identify and interpret recurring patterns related to conceptual fragmentation and interdisciplinary integration in both the textbook

data and the interview data. The analysis involved familiarization, coding, theme generation, theme review, theme definition, and reporting. Interview data were used to support and contextualize patterns identified in the textbook analysis.

Trustworthiness was strengthened through triangulation between textbook analysis and teacher interview data. Credibility was supported by comparing patterns identified in the textbook with teachers' practical perspectives on its classroom use. Dependability was addressed by describing the data collection and analysis procedures clearly and systematically. Confirmability was supported by grounding interpretations in documented evidence from the textbook and interview notes. Transferability was enhanced by providing contextual information about the participants and textbook selection so that readers could judge the relevance of the findings to similar educational settings.

4. Results and Findings

This section presents findings on three dimensions of fragmentation in the Grade V IPAS textbook-content organization, inquiry-based learning activities, and assessment tasks-supported by teacher interviews.

4.1 Structural Fragmentation in the Organization of Science and Social Studies Content

The Grade V IPAS textbook published by the Ministry of Education, Culture, Research, and Technology presents science and social studies content in a structurally separated manner. Each chapter is organized around a single disciplinary focus, and this organization limits opportunities for students to connect concepts across fields. The separation is evident in the arrangement of chapter content, the formulation of learning objectives, and the concluding sections of each chapter. As a result, the textbook provides only limited support for integrating natural and social phenomena within a coherent conceptual framework.

label while still presenting the material in separate disciplinary clusters. Several participants emphasized that the chapters focused on either science or social studies, while others noted that the formal merger of the two disciplines into one subject did not result in substantive integration in the presentation of the material. As one participant stated, *“each chapter focuses solely on either science or social studies”* (Participant A).



Taken together, the textbook analysis and the teacher participants’ responses indicate that the textbook combines science and social studies administratively rather than conceptually. In this case, integration is reflected more in subject labeling than in the meaningful connection of concepts, themes, and explanatory relationships across disciplines. This structural pattern reduces the textbook’s capacity to support interdisciplinary understanding and suggests that the intended integration of the Independent Curriculum remains only partially realized at the level of content organization

4.2 Fragmentation in Inquiry-Based Learning Activities

Inquiry-based learning is expected to enable students to connect concepts across disciplines through observation, discussion, investigation, and problem-solving. In the Grade V IPAS textbook, however, the inquiry-based learning activities remain organized around separate disciplinary domains. Rather than encouraging students to examine a phenomenon through both scientific and social perspectives, the activities direct them toward single-subject exploration. As a result, the textbook provides limited support for interdisciplinary inquiry in classroom learning.

Table 2: Fragmentation in Inquiry-Based Learning Activities

Focus	Student activities	Picture	Explanation						
Science	Observing the process of photosynthesis in green plants	<p>Ayo, Mengamati</p> <p>Sebelum mempelajari bagaimana tumbuhan mendapatkan makanan, mari kita amati dulu tumbuhan yang ada di sekitarmu. Bacalah tabel Amati-Pikirkan-Ingat Tahu seperti ini di buku tugasmu. Lakukan instruksi yang ada dalam setiap tabel.</p> <table border="1"> <thead> <tr> <th>Amati</th> <th>Pikirkan</th> <th>Ingat Tahu</th> </tr> </thead> <tbody> <tr> <td>Apa yang kamu amati pada tumbuhan ini?</td> <td>Apa yang kamu pikirkan setelah melihat tumbuhan ini?</td> <td>Apa yang ingin kamu ketahui dari tumbuhan ini?</td> </tr> </tbody> </table> <p>Setelah semua tabel terisi, lakukan aktivitas berikut. Kita akan tetap mengamati tumbuhan, namun melalui eksperimen sederhana.</p> <p>Alat dan bahan:</p> <ol style="list-style-type: none"> 1. gelas atau mangkuk bening 1 buah, 2. daun segar 1 lembar, 3. air. <p>Cara Kerja:</p> <ol style="list-style-type: none"> 1. Potonglah 1 lembar daun segar yang ada di sekitar halaman sekolahmu. 2. Simpanlah daun segar ke dalam gelas bening. 3. Isi gelas dengan air sampai daun terendam. 4. Simpan gelas di bawah sinar matahari. 5. Diamkan selama 15-30 menit. 6. Gunakan kembali tabel Amati-Pikirkan-Ingat Tahu untuk menuliskan hasil pengamatanmu. 	Amati	Pikirkan	Ingat Tahu	Apa yang kamu amati pada tumbuhan ini?	Apa yang kamu pikirkan setelah melihat tumbuhan ini?	Apa yang ingin kamu ketahui dari tumbuhan ini?	This image is a guide for 5th-grade students to observe the photosynthesis process in green plants (page 9)
Amati	Pikirkan	Ingat Tahu							
Apa yang kamu amati pada tumbuhan ini?	Apa yang kamu pikirkan setelah melihat tumbuhan ini?	Apa yang ingin kamu ketahui dari tumbuhan ini?							
Science	Discuss the human hearing process.	<p>Lakukan Bersama</p> <p>Menjelaskan Skema Bagaimana Telinga Mendengar</p> <ol style="list-style-type: none"> 1. Lakukan kegiatan yang serupa seperti saat kalian menceritakan skema mata di Topik 8. 2. Setelah selesai, coba diskusikan pertanyaan berikut. <ol style="list-style-type: none"> a. Menurut kalian bagian mana dari telinga yang berfungsi untuk melindungi telinga dari benda asing? b. Mengapa saat kita menutup telinga suara yang kita dengar menjadi kecil? (petanjak: lihat kembali cara telinga kita mendengar) c. Apakah kita boleh mendengarkan suara yang terlalu keras? Mengapa? d. Pikirkanlah aktivitas atau pekerjaan yang membutuhkan perlindungan terhadap telinga! 3. Tuliskan hasilnya dalam buku tugas. 	The image is a step-by-step guide to conducting a simple experiment that explains the schematic of how the ear hears (page 32)						

Science	Discuss in groups about energy	 <p>Laksanakan Bersama</p> <p>Berkumpul dengan kelompok kalian dan lakukan kegiatan berikut.</p> <ol style="list-style-type: none"> Diskusikan mengenai hasil kegiatan yang baru dilakukan. Apakah ada perbedaan data yang kalian temukan? Jika ada, cari tahu bersama-sama apa yang membuat berbeda. Setelah itu diskusikan pertanyaan berikut. <ol style="list-style-type: none"> Siapa yang mendapatkan energi paling banyak? Urutkan dari yang paling banyak sampai paling sedikit. Apakah energi yang ditransfer pada jaring-jaring makanan semakin banyak atau semakin sedikit? Mengapa? Menurut kalian, hewan mana yang jumlahnya akan lebih banyak? 	The image shows the discussion guidelines on energy (page 58)
Social	Discussing maritime and agrarian countries	 <p>Laksanakan Bersama</p> <p>Memahami tentang Negara Maritim dan Agraris</p> <p>Berkumpul dengan kelompok yang sudah disepakati bersama guru kalian. Siapkan satu lembar kertas karton atau samson serta alat mewarnai untuk kegiatan ini.</p> <ol style="list-style-type: none"> Guru kalian akan membagi topik yang akan menjadi bahan diskusi kelompok, yaitu negara maritim atau negara agraris. Setelah mendapatkan topik untuk kegiatan ini, bacalah informasi mengenai negara maritim atau negara agraris pada teks di atas. Lalu, lakukanlah diskusi untuk membahas pertanyaan berikut. <ol style="list-style-type: none"> Berdasarkan kondisi geografis, apakah Indonesia bisa dibidang negara maritim/agraris? Mengapa? Apa manfaat dan potensi yang dimiliki oleh negara maritim/agraris? Apa saja yang bisa menyebabkan kerusakan wilayah maritim/agraris? Apa upaya yang perlu dilakukan untuk menjaga kelestarian wilayah maritim/agraris? Tuliskan hasil diskusi kalian pada kertas karton untuk nanti dibaca oleh kelompok lain. 	This image shows the steps of a group discussion activity to understand the characteristics and potential of a maritime or agrarian nation. (page 167)

Note. IPAS-BS-KLS-V.pdf (kemdikbud.go.id)

As shown in Table 2, the inquiry-based activities presented in the textbook do not function as integrated learning tasks. Of the four activities identified, three are oriented toward science-based observation, experimentation, or discussion, while one emphasizes social-studies-based discussion. A specific example of this fragmentation can be seen in activities that ask students to observe photosynthesis or discuss the human hearing process, while other activities ask them to discuss maritime and agrarian countries, without any explicit guidance linking these scientific and social dimensions within the same inquiry sequence. Across the activities presented in Table 2, the same pattern appears consistently: students are asked to investigate or discuss topics within one disciplinary pathway at a time, rather than through an integrated inquiry design. This pattern shows that inquiry is presented as activity-based learning, but not as interdisciplinary inquiry that connects natural and social phenomena in a coherent learning process.

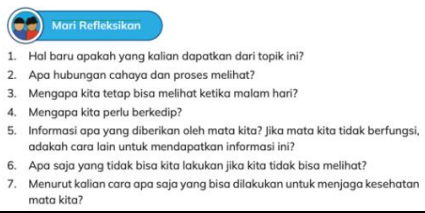
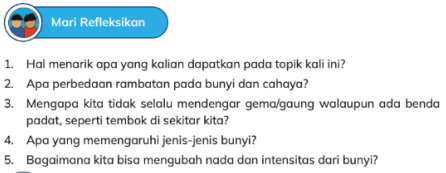
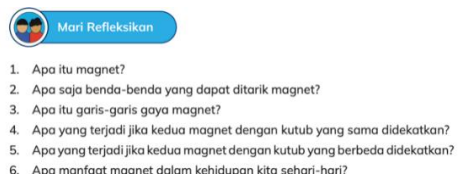
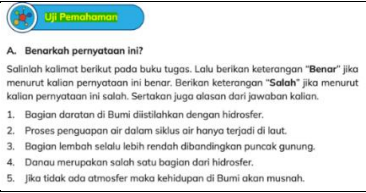
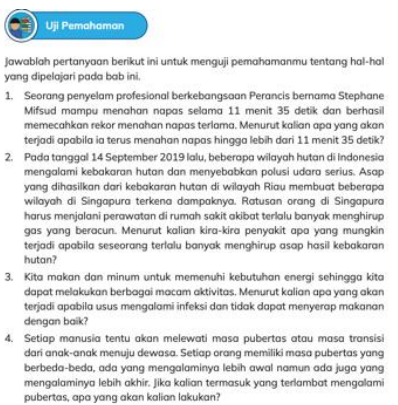
This pattern was also reflected in the responses of all five teacher participants. All five participants described the inquiry-based activities as largely sectoral, with tasks tending to remain within either science or social studies rather than linking the two. Several participants emphasized that the activities directed students to complete experiments, observations, or discussions in one area only, while others noted that projects or group work sometimes appeared collaborative in format but still did not provide conceptual integration between the two disciplines. As one participant stated, “There’s no guidance that encourages students to connect science concepts with social studies” (Participant C).

Taken together, the textbook analysis and the teacher participants’ responses indicate that the inquiry-based activities in the textbook have not yet operationalized the integrative aims of the Independent Curriculum. The issue lies not merely in the presence of different kinds of activities, but in the absence of inquiry designs that require students to relate scientific ideas to social contexts within a single learning process. This pattern limits the textbook’s capacity to support interdisciplinary thinking and suggests that integration at the level of learning activities remains partial and procedural rather than conceptually substantive.

4.3 Fragmentation in Assessment Tasks

Assessment tasks are expected to evaluate students' ability to connect ideas across disciplines and apply their understanding to complex phenomena. In the Grade V IPAS textbook published by the Ministry of Education, Culture, Research, and Technology, however, the assessment tasks remain organized around separate disciplinary domains. Rather than requiring students to relate scientific and social perspectives within a unified context, the questions are generally constructed around single-subject content. As a result, the textbook provides limited support for assessing interdisciplinary understanding.

Table 3: Fragmentation in Assessment Tasks

Type	Focus	Picture	Explanation
Essay Questions	Science	 <p>Mari Refleksikan</p> <ol style="list-style-type: none"> Hal baru apakah yang kalian dapatkan dari topik ini? Apa hubungan cahaya dan proses melihat? Mengapa kita tetap bisa melihat ketika malam hari? Mengapa kita perlu berkedip? Informasi apa yang diberikan oleh mata kita? Jika mata kita tidak berfungsi, adakah cara lain untuk mendapatkan informasi ini? Apa saja yang tidak bisa kita lakukan jika kita tidak bisa melihat? Menurut kalian cara apa saja yang bisa dilakukan untuk menjaga kesehatan mata kita? 	The image contains formative questions for reflection after studying the material topic (page 8)
Essay Questions	Science	 <p>Mari Refleksikan</p> <ol style="list-style-type: none"> Hal menarik apa yang kalian dapatkan pada topik kali ini? Apa perbedaan rambatan pada bunyi dan cahaya? Mengapa kita tidak selalu mendengar gempa/gaung walaupun ada benda padat, seperti tembok di sekitar kita? Apa yang memengaruhi jenis-jenis bunyi? Bagaimana kita bisa mengubah nada dan intensitas dari bunyi? 	The image shows a formative assessment for reflection after studying the topic of sound and its properties (page 32)
Essay Questions	Science	 <p>Mari Refleksikan</p> <ol style="list-style-type: none"> Apa itu magnet? Apa saja benda-benda yang dapat ditarik magnet? Apa itu garis-garis gaya magnet? Apa yang terjadi jika kedua magnet dengan kutub yang sama didekatkan? Apa yang terjadi jika kedua magnet dengan kutub yang berbeda didekatkan? Apa manfaat magnet dalam kehidupan kita sehari-hari? 	The image shows formative assessment as a reflection activity after the magnet material (page 83)
True or False Questions	Science	 <p>Uji Pemahaman</p> <p>A. Benarlah pernyataan ini? Salinlah kalimat berikut pada buku tugas. Lalu berikan keterangan "Benar" jika menurut kalian pernyataan ini benar. Berikan keterangan "Salah" jika menurut kalian pernyataan ini salah. Sertakan juga alasan dari jawaban kalian.</p> <ol style="list-style-type: none"> Bagian daratan di Bumi diistilahkan dengan hidrosfer. Proses penguapan air dalam siklus air hanya terjadi di laut. Bagian lembah selalu lebih rendah dibandingkan puncak gunung. Danau merupakan salah satu bagian dari hidrosfer. Jika tidak ada atmosfer maka kehidupan di Bumi akan musnah. 	The image shows a test of understanding on the Earth material (page 128)
Essay Questions	Science	 <p>Uji Pemahaman</p> <p>Jawablah pertanyaan berikut ini untuk menguji pemahamanmu tentang hal-hal yang dipelajari pada bab ini.</p> <ol style="list-style-type: none"> Seorang penyelam profesional berkebangsaan Perancis bernama Stephane Mifsud mampu menahan napas selama 11 menit 35 detik dan berhasil memecahkan rekor menahan napas terlama. Menurut kalian apa yang akan terjadi apabila ia terus menahan napas hingga lebih dari 11 menit 35 detik? Pada tanggal 14 September 2019 lalu, beberapa wilayah hutan di Indonesia mengalami kebakaran hutan dan menyebabkan polusi udara serius. Asap yang dihasilkan dari kebakaran hutan di wilayah Riau membuat beberapa wilayah di Singapura terkena dampaknya. Ratusan orang di Singapura harus menjalani perawatan di rumah sakit akibat terlalu banyak menghirup gas yang beracun. Menurut kalian kira-kira penyakit apa yang mungkin terjadi apabila seseorang terlalu banyak menghirup asap hasil kebakaran hutan? Kita makan dan minum untuk memenuhi kebutuhan energi sehingga kita dapat melakukan berbagai macam aktivitas. Menurut kalian apa yang akan terjadi apabila usus mengalami infeksi dan tidak dapat menyerap makanan dengan baik? Setiap manusia tentu akan melewati masa pubertas atau masa transisi dari anak-anak menuju dewasa. Setiap orang memiliki masa pubertas yang berbeda-beda, ada yang mengalaminya lebih awal namun ada juga yang mengalaminya lebih akhir. Jika kalian termasuk yang terlambat mengalami pubertas, apa yang akan kalian lakukan? 	The image shows a test of comprehension at the higher-order thinking skill level because each question requires analysis of the chapter "How We Live and Grow." (Page 160)

Essay Questions	Social Studies		The image shows a test of understanding of the material on Indonesia as a maritime and agricultural country (page 189)
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Note. IPAS-BS-KLS-V.pdf (kemdikbud.go.id)

As shown in Table 3, the assessment tasks presented in the textbook do not function as integrated evaluation tools. The questions continue to separate science and social studies content, even though both are formally placed within the same subject framework. A specific example of this fragmentation can be seen in the way assessment items address natural phenomena in one set of questions and social issues in another, without requiring students to connect the two within the same analytical task. Across the assessment tasks presented in Table 3, the same pattern appears consistently: the questions are placed in one textbook, but they are still structured through separate disciplinary pathways rather than through integrated evaluative design. This pattern shows that the textbook does not yet assess students' ability to build conceptual relationships between scientific and social dimensions of the same issue.

This pattern was also reflected in the responses of all five teacher participants. All five participants described the assessment tasks as still emphasizing either science or social studies, rather than encouraging students to integrate both perspectives in answering questions. Several participants noted that the questions were grouped or presented according to disciplinary focus, while others emphasized that even when they appeared together in one section, the substance of the questions remained separate. As one participant stated, "The questions are usually separated" (Participant C).

Taken together, the textbook analysis and the teacher participants' responses indicate that the assessment tasks in the textbook have not yet supported the substantive integration intended by the Independent Curriculum. The issue lies not only in the format of the questions, but also in the absence of evaluative tasks that require students to analyze relationships between natural and social dimensions of the same phenomenon. This pattern limits the textbook's capacity to assess higher-order interdisciplinary understanding and suggests that integration at the level of assessment remains formal rather than conceptually substantive.

5. Discussion

The findings of this study showed that the analyzed Grade V IPAS textbook was characterized by three interrelated forms of structural disconnection: segmented content organization, non-relational inquiry design, and separated assessment tasks. Taken together, these patterns suggest that the integration of science and social studies operates more at a symbolic curricular level than at the level of conceptual and epistemic coherence.

This pattern reflects what Lam et al. (2013) describe as the difficulty of translating integrative curriculum intentions into concrete instructional materials. It also resonates with concerns about curriculum-textbook misalignment and the challenge of embodying cross-curricular goals in textbook structures (Gokmenoglu et al., 2023). As (Nakawa & Kosaka, 2025) further emphasize, cross-curricular learning depends not only on policy statements but also on how integrative aims *are* materially represented in learning resources. Therefore, the present findings suggest that curriculum integration may remain largely declarative unless it is translated into coherent structures of content, inquiry, and assessment.

The first issue emerged in the structural organization of the textbook itself. The separation of chapter sequencing, learning objectives, and chapter conclusions showed that science and social studies were combined administratively without being reorganized conceptually. In other words, the textbook reflected subject consolidation rather than conceptual reorganization. Rather than creating thematic bridges across domains, it retained disciplinary isolation in the way knowledge was selected, sequenced, and summarized.

This reflects what Cohen et al. (2024) identify as a recurring weakness in interdisciplinary work: integration remains fragile when it is not supported by explicit curricular design. A similar argument is advanced by Kanmaz (2022) who stresses the need for coherent integrative models, while Singh et al. (2024) highlights the importance of an epistemic framework that connects disciplinary perspectives. Therefore, this finding indicates that the limitation of integration begins not only in classroom enactment, but in the underlying architecture through which knowledge is structured for learning.

A second issue lies in the pedagogical logic underpinning the inquiry-based activities. Although the textbook incorporates observation, discussion, and investigation, these activities remain structured through disciplinary pathways that do not consistently require students to integrate scientific and social dimensions within a unified inquiry process. Consequently, what appears as active learning at the surface level reflects a deeper non-relational design, where participation is promoted but interdisciplinary meaning-making is not systematically scaffolded. In this respect, the tasks emphasize procedural engagement rather than epistemic integration. This interpretation is in line with Wu et al. (2025) who demonstrate that integrative thinking is fostered not by the simple juxtaposition of collaborative activities, but by the deliberate inclusion of integration scaffolds that connect domains within problem-based learning. It is further supported by Mamun et al. (2020) who found that inquiry-oriented learning environments depend on carefully designed structural and interactional scaffolding to support deeper understanding. Thus, the textbook reveals a pedagogical limitation in which inquiry operates primarily as classroom activity rather than as a fully developed mechanism for interdisciplinary reasoning.

A third issue emerged in the assessment dimension. The persistence of separated questions showed that the logic of evaluation remained disciplinary even when

the subject framework was formally integrated. This matters because assessment does not merely record learning outcomes; it also signals what kinds of understanding are recognized and rewarded. When students are assessed through parallel subject-based tasks, they are not consistently invited to construct explanations that connect natural and social dimensions of the same issue.

As a result, assessment continues to privilege discrete knowledge components rather than integrated understanding of complex phenomena. Cohen et al. (2024) conceptualize interdisciplinary assessment as the evaluation of relational understanding rather than the parallel testing of disciplinary recall, and that distinction *is* highly relevant to the present findings. In this study, the evaluative structure of the textbook continued to privilege separated knowledge performance over cross-disciplinary reasoning. Therefore, this *suggests* a structural limitation in assessment design, through which formal subject integration is not fully realized in the measurement of learning.

Taken together, these findings suggest that the problem of integration is not confined to teacher practice or classroom enactment, but is already embedded in textbook design. Miller (2019) argues that integrated and holistic curriculum can promote deeper and more connected learning by reducing fragmentation and emphasizing meaningful connections across learning experiences, while Kaynar and Kurnaz (2024) demonstrate that interdisciplinary approaches can strengthen students' critical and creative thinking when disciplinary relationships are meaningfully structured.

Building on these lines of scholarship, the present study shows more specifically how structural disconnection is reproduced through chapter sequencing, inquiry design, and evaluative format within a Grade V IPAS textbook. Therefore, the contribution of this study is twofold: empirically, it provides textbook-based and teacher-confirmed evidence that integration may remain superficial even within a formally unified subject; conceptually, it clarifies that symbolic subject integration should not be equated with epistemic integration in learning materials.

These findings also carry important implications for curriculum and textbook development. If interdisciplinary learning is to function substantively, textbook design must move beyond subject packaging toward the deliberate construction of thematic coherence, integrative inquiry tasks, and assessment formats that require students to build relationships across domains. This also implies a need for stronger teacher mediation, since the enactment of integration depends not only on the textbook itself but also on teachers' capacity to interpret, adapt, and extend curriculum materials in practice. This concern is reflected in the literature on professional and interdisciplinary teaching capacity. Ventista and Brown (2023) emphasize the importance of teacher professional learning, while Mosely et al. (2025) highlight the role of teacher expertise in interdisciplinary teaching.

Related concerns are also raised by Wang and Sang (2024). This argument is further reinforced by Voogt et al. (2011), who show that collaborative curriculum

design can strengthen teacher learning and support more deliberate pedagogical decision-making. At the same time, this study is limited to one Grade V IPAS textbook and a small number of teacher participants, and it does not directly examine classroom enactment or student learning outcomes. Future research should therefore combine comparative textbook analysis, classroom observation, and student-focused inquiry in order to determine how structural disconnection in learning materials is reproduced, negotiated, or transformed in actual educational practice.

6. Conclusion

This study showed that the Grade V IPAS textbook developed under Indonesia's Independent Curriculum still reflected structural fragmentation across three interconnected dimensions: content organization, inquiry-based learning activities, and assessment tasks. Although science and social studies were formally combined within a single subject, the textbook continued to organize knowledge, learning processes, and evaluation through separate disciplinary pathways. These findings indicate that integration in the analyzed textbook remains stronger at the level of subject arrangement than at the level of conceptual and epistemic coherence.

The study makes both empirical and theoretical contributions to the literature on interdisciplinary curriculum implementation. Empirically, it provides evidence from textbook analysis and teacher interviews that fragmentation is embedded in the design of Grade V IPAS learning materials rather than emerging only in classroom enactment. Theoretically, it shows that curriculum integration should not be understood merely as subject combination, but as the deliberate construction of coherence across content, inquiry, and assessment. In practical terms, the findings imply that textbook authors and publishers need to design units around shared interdisciplinary themes, policymakers need to strengthen textbook evaluation criteria beyond formal subject labeling, and teachers need clearer pedagogical support to enact integrated learning meaningfully.

This study is limited to one Grade V IPAS textbook and a small number of teacher participants, and it did not examine classroom enactment or student learning outcomes directly. Therefore, the findings should be interpreted as evidence of how integration is represented in textbook design rather than as a general claim about all implementation contexts. Future research should compare multiple IPAS textbooks, examine how teachers enact integrated materials in classroom practice, and investigate how students develop interdisciplinary understanding when learning with more conceptually coherent resources. Ultimately, if the Independent Curriculum aims to promote genuine interdisciplinary learning, integration needs to be realized not only in curriculum policy but also in the design of textbooks that shape everyday teaching and learning.

Conflict of Interest

The authors declare no conflict of interest.

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