Content Analysis of Geography Textbook Using Beck and McKeown Model on Natural Disaster Mitigation

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ABSTRACT

Quality textbooks are essential for developing critical thinking skills in geography education, especially for disaster mitigation in Indonesia's disaster-prone environment. To analyze the content quality of geography textbooks on natural disaster mitigation using the Beck and McKeown model and identify specific weaknesses. Qualitative content analysis with coding techniques was conducted on three geography textbooks for grade 11 students published by Erlangga, Grafindo Media Pratama, and Mediatama. A total of 226 paragraphs were analyzed using six adapted Beck and McKeown categories: problematic discussion, concept density, discourse clarity, main idea focus, example adequacy, and explanation structure. Analysis revealed quality issues across categories: 15.92% of paragraphs failed to present discussable problems, 6.19% contained excessive concepts, 4.86% lacked clear discourse, 3.53% presented multiple main ideas, 0.44% provided inadequate examples, and 1.33% showed illogical arrangements. Overall classification ranged from "good" to "very good" despite significant limitations. While textbooks met basic quality standards, substantial improvements are needed in problem-based content, concept organization, discourse clarity, and logical structuring to enhance critical thinking development for disaster education. This is the first application of the Beck and McKeown model to Indonesian geography textbooks focusing on disaster mitigation, providing a specialized assessment framework for disaster education materials. Findings offer actionable guidance for textbook authors, publishers, teachers, and policymakers to improve geography education quality and disaster preparedness literacy.

INTRODUCTION

One of the determinants of success in learning is using good teaching media. Preparing good learning media can help to achieve learning objectives (Ernawati, 2016). It isn't easy to accomplish the learning process and maximize learning outcomes without good teaching media (Boekaerts, 1999). Teaching media are all media of information, tools, and texts systematically arranged to present complete competencies that will be mastered by students and used in the learning process (Prastowo, 2012).

Textbooks are teaching media used at various levels of Education. Textbooks have an important role in achieving educational goals according to the curriculum (Prastowo, 2012). For teachers, textbooks are an essential tool for delivering topics, but for students, textbooks are used as learning sources (Fitri et al., 2021; Prastowo, 2012). According to Sitepu (Sitepu, 2012), there is no single country that has left textbooks in the learning process, so that learning in the classroom is strongly influenced by the content of the textbooks.

Although textbooks are written and compiled by experts, it is not guaranteed that the textbooks are accurate in structure, content, and alignment with core and basic competencies. A good book is a book that has three characteristics (Prastowo, 2012),

which are using the language for easy understanding, having an interesting presentation, and having content that can describe the objectives and is arranged based on the curriculum. It is also supported by (Lee & Catling, 2015) that a good textbook is a textbook that can stimulate students to think critically and creatively. Textbook content is certainly not only dominated by facts/data and concepts, but it also presents various problems that can be solved by students (Boehrer & Linsky, 1990).

To determine the appropriateness of the textbooks used, the government in the National Education Standards Agency (BSNP) establishes the Textbook Assessment Standards, such as the appropriateness of the content, the feasibility of language, the feasibility of presenting, and the graphics of the textbooks. Textbooks must contain learning media to increase devotion, character, and personality, technological abilities, sensitivity, and aesthetic skills, and improve kinesthetic and health abilities, compiled based on National Education Standards (Peraturan Menteri Pendidikan Nasional Nomor 2, 2008). Textbook assessment standards and the character values are integrated based on content, knowledge, reduction of prejudice, pedagogical equivalence, and school cultural empowerment (Bank & Bank, 1997).

The textbook assessment standard, according to BNSP, is very complex and does not specifically discuss the content used in the textbook. Meanwhile (Bank & Bank, 1997) explained how to integrate character values into textbooks. The study used a textbook assessment based on the Beck and McKeown Model, which contains ten textbook content analyses (Beck et al., 1991). However, the Beck and McKeown criteria could not be fully adopted because they did not fit the current geography textbook content in Indonesia.

Using the Beck and McKeown model is also supported by the problems that occur in the geography textbook. Geography is a field that studies the interaction between nature and humans (Harper, 1990), so that learning geography requires many problems that must be integrated into textbooks to improve students' critical thinking skills. Also, Geography is a field of science that can prepare students to face the competition and challenges of the 4.0 industrial revolution, such as the spatial thinking ability (Aliman et al., 2019). Learning geography can develop students' character to love and be responsible for the environment (Hasanah & Ernawati, 2020). Prof. Edy Purwanto, also conveyed in his speech inaugurating the Professor of Geography Learning at the State University of Malang (UM) in 2010, that some of the problems in Geography textbooks were the unclear concepts and content, which only contained assistive science (90%) (Purwanto, 2010). It is also supported by the research results in England that showed the quality of Geography textbooks used by teachers and students only contains facts, data, and concepts, and this condition will make geography learning in schools not produce graduates who can think critically and follow the demands for 21st-century learning (Jitendra et al., 2001).

Based on preliminary observations from August to December 2019, three Geography textbooks were used for eleven-grade students in High Schools in Padang, published by Erlangga, Grafindo Media Pratama, and Mediatama. The research also conducted initial interviews at High School 8 Padang, High School 7 Padang, High School 15 Padang, and High School 16 Padang in 2019 with several students about the geography textbook used during learning. The interview results proved that students were tired of reading books because the contents could be found on the internet (Hasanah & Ernawati, 2020). During the observation at High School 15 Padang, most students did assignments using the internet to find answers rather than relying on textbooks.

Previous research related to textbook content analysis is the content analysis of K. Wardiyatmoko's High School Geography Textbook, using the Beck & McKeown model, which found that the textbook only contains facts, data, and concepts that cannot be helped. Students learn to solve problems and think critically (Aksa et al., 2018); Content Analysis of Digital Textbooks (BSE)

for Physical Education, Sports, and Health of eighth-grade students in Junior High Schools in Semarang City (Abdulaziz et al., 2014). Comparative Analysis of the Quality of Arabic Textbook Ta'lim Al-Lughoh Al-Arobiyah and Al-'Ashri: Study of Content, Presentation, and Language (Hikmah & Astuti, 2018). Analysis of News Content of Governor Basuki CahayaPurnama's Controversial Statement on the Issue of Blasphemy in Online Media (Sagita, 2017); Need analysis and development of maritime potential teaching materials (Herianto & Ali, 2020; Ridhwan et al., 2019). Analysis of geography textbook questions based on spatial thinking on disaster materials (Panjaitan et al., 2024; Ridha et al., 2019). In addition to analyzing textbooks' content, it is also important to know about the misunderstandings among students about books.

Analysis of textbook content aims to determine the weaknesses of textbooks so that students can easily understand them. Misconceptions in geography textbooks are experienced by hydrological materials such as the nature of water, changes in the phase and cycle of water, the process of cloud formation, and rain (Henriques, 2002). Misunderstanding of Geography textbooks also occurs in weather, climate, and climate change (Ünlü et al., 2011). Students also encountered confusion regarding the understanding of global warming and ozone depletion materials (Chang et al., 2018). Misconceptions of Geography textbooks on organic soil materials (Gerke, 2018). Students also experienced misunderstanding in Geography textbooks on earth and earthquake materials (Francek, 2013). Misconceptions on demographic material in Geography textbooks (Young, 1988). Moreover, misunderstandings on geographic information systems topics (Bampton, 2012) and students' misunderstandings on the Geography course (Ozturk & Alkis, 2010). However, research on the analysis of geography textbook content on natural disaster mitigation material has not been widely discussed.

This study represents the first application of the Beck and McKeown model specifically to Indonesian geography textbooks, focusing on natural disaster mitigation content. The research adapts the Beck and McKeown framework for disaster Education assessment, providing a specialized evaluation tool for materials addressing Indonesia's unique geographical vulnerabilities in the Pacific Ring of Fire context.

Beck and McKeown Model Adaptation for Indonesian Context: The Beck and McKeown model's relevance to Indonesian geography Education stems from its emphasis on: (1) Problem-based content presentation essential for disaster scenario analysis, (2) Concept clarity and organization critical for understanding complex disaster processes, (3) Logical discourse structure necessary for emergency decision-making frameworks, and (4) Coherent explanation sequences vital for disaster preparedness protocols. The model's adaptation for Indonesian geography textbooks considers local disaster types, cultural contexts, and educational system requirements while maintaining the framework's core assessment principles.

Analysis of textbook content on natural disaster mitigation material is critical. Geographical textbooks on disaster mitigation materials can provide knowledge, attitudes, awareness, and skills in dealing with disasters (Abdullah & Maryani, 2024). A good textbook is a textbook that can transform content into students after reading the book. Therefore, this study aimed to analyze the content of geography textbooks on natural disaster mitigation using the adapted Beck and McKeown model to identify specific structural and content weaknesses that may impede students' critical thinking development and disaster preparedness learning.

RESEARCH METHODS

Content analysis research is a type of qualitative research (Caulley, 1992). Content analysis is an assessment technique that allows for replicable and imitable inferences

and validates the data in the context (Krippendorff, 2004). The study analyzed natural disaster mitigation topics in the Geography textbooks used by eleventh-grade high school students in Padang City, published by Erlangga, Grafindo Media Pratama, and Mediatama. The Beck and McKeown model was used to analyze the textbooks, which have been adapted to the existing Geography books in Indonesia (Aksa et al., 2018). The data analysis technique used for this study was a coding technique.

The study focused on the content of the geography textbook using the Beck and McKeown model, so the six Beck and McKeown models are coded according to the order, namely BM.1 not close look at problematic discussion, BM.2 too many concepts, BM.3 what's the point, BM.4 a side that overwhelm the purpose, BM.5 inadequate examples and comparisons, BM.6 poorly ordered components an explanation. To make it easier to determine the criteria, the researcher made a guideline rubric based on the six Beck and McKeown models.

Table 1. Guideline Rubric based on the Beck and McKeown Model

Code	Criteria / Category	Description
BM.1	Not Close Look at Problematic Discussion	Good textbooks can present useful subjects for students to discuss the problems. If the textbook is unable to present useful learning topics for discussion, then the book falls into this category.
BM.2	Too Many Concept	Good textbooks can present the concept clearly and completely in each paragraph. If the textbook presents too many concepts in each paragraph, it falls into this category.
BM.3	What's the Point	Good textbooks can present a clear discourse. If a textbook cannot present learning with a clear discourse, then the book falls into this category.
BM.4	Aside That Overwhelm the Purpose	Good textbooks can present one main idea per paragraph. If a textbook presents more than one main idea per paragraph, then the textbook falls into this category.
BM.5	Inadequate Examples and Comparisons	Good textbooks can present examples and comparisons appropriate to the topic. If the textbook presents examples and comparisons that are not following the topic, then the textbook falls into this category.
BM.6	Poorly Ordered Components an Explanation	Good textbooks can present a logically structured explanation. If a textbook presents explanations that are not logically structured, then the textbook falls into this category.

Source: Modification of Assessment (Aksa et al., 2018)

Adaptation Rationale, the adaptation process considered: Indonesian educational curriculum requirements, Local disaster contexts and terminology, Student comprehension levels in Indonesian secondary Education, and Cultural and linguistic factors affecting textbook interpretation. For more details on the research stages, see Figure 1.
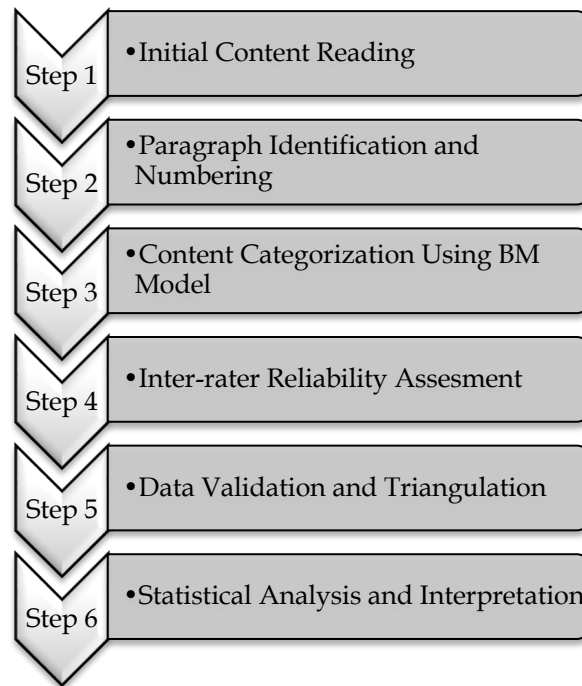
Figure 1. Analysis Framework (Source: Research Data, 2025)

To ensure coding Reliability, three researchers with backgrounds in geography Education independently coded 30 paragraphs. The inter-rater agreement, measured using Cohen's Kappa, reached 0.847, indicating substantial Reliability. Any discrepancies were resolved through collaborative discussion. Content validity was supported by expert review from two geography Education specialists (Dr YS & Dr ER), regular peer discussions within the research team, and member checking through feedback from experienced geography teachers (Ms VM).

Triangulation was applied through multiple sources (textbooks from various publishers), multiple coders, and a combination of quantitative and qualitative approaches to enhance the credibility of findings. The data in this study were Geography textbooks used by eleventh-grade high school students published by Erlangga, Grafindo Media Pratama, and Mediatama on Natural Disaster Mitigation. Each textbook is coded with "E" for Erlangga, "G" for Grafindo Media Pratama, and "M" for Mediatama. According to the paragraph order, each paragraph in the natural disaster mitigation material textbook is coded from 1,2,3 to 3.

The paragraphs analyzed from the three textbooks were 46 paragraphs from Erlangga, 88 paragraphs from Grafindo Media Pratama, and 92 paragraphs from Mediatama, totaling 226 paragraphs. To calculate the percentage of the Beck and McKeown category in the three textbooks, the Formula (1). The results are classified into the final assessment, as shown in the following Table 2.

$$x = \frac{n\ \text{Paragraph}}{226\ \text{Paragraph}} \times 100\% \ . \ . \ . \ . \ . \ (1)$$

Table 2. Quality Classification of Textbook According to the Beck and McKeown Model

No	Value (%)	Classification
1	0 – 20	Very good
2	21 – 40	Good
3	41 – 60	Fairly Good
4	61 – 80	Less good
5	81 – 100	Not good

RESULTS AND DISCUSSION

1.1 Analysis of "Not Close Look at Problematic Discussion" category

Not close look at problematic discussions is the first category of the Beck and McKeown model. Textbooks included are textbooks that do not present useful learning topics for student discussion. The following are the analysis results of learning topics included in a closer look at problematic discussion categories on natural disaster mitigation topics.

Table 3. Indicators in the Not Close Look at Problematic Discussion

Publishers	Topics	Paragraph & Page	No	Code
Erlangga	A. Types and Characteristics of Natural Disasters	3, page 364	1	BM.1.E.3
		4, page 365	2	BM.1.E.4
		13, page 371	3	BM.1.E.13
	B. Disaster Management Cycle	20, page 375	4	BM.1.E.20
		21, page 376	5	BM.1.E.21
	C. Distribution of Natural Disaster-Prone Areas in Indonesia	25, page 379	6	BM.1.E.25
	D. Organizations Role in Natural Disaster Management	26, page 381	7	BM.1.E.26
		27, page 382	8	BM.1.E.27
		28, page 383	9	BM.1.E.28
		29, page 383	10	BM.1.E.29
		30, page 383	11	BM.1.E.30
		31, page 384	12	BM.1.E.31
		32, page 384	13	BM.1.E.32
		33, page 384	14	BM.1.E.33
		34, page 385	15	BM.1.E.34
		35, page 385	16	BM.1.E.35
		36, page 386	17	BM.1.E.36
		37, page 386	18	BM.1.E.37
		38, page 387	19	BM.1.E.38
	E. Community Participation in Natural Disaster Mitigation through Education, Local Wisdom, and Utilization of Modern Technology	47, page 391	20	BM.1.E.47
Grafindo Media Pratama	A. Types and Characteristics of Natural Disasters	7, page 197	21	BM.1.G.7
		10, page 198	22	BM.1.G.10
		39, page 211	23	BM.1.G.39
	B. Disaster Management Cycle	44, page 215	24	BM.1.G.44
		46, page 216	25	BM.1.G.46
		52, page 221	26	BM.1.G.52
	C. Distribution of Natural Disaster-Prone Areas in Indonesia	61, page 224	27	BM.1.G.61
		66, page 226	28	BM.1.G.66
		67, page 226	29	BM.1.G.67

	D. Community Participation in Natural Disaster Mitigation in Indonesia	84, page 233	30	BM.1.G.84
		85, page 233	31	BM.1.G.85
Mediatama	A. Quality and Environmental Quality Standards	36, page 224	32	BM.1.M.36
		41, page 225	33	BM.1.M.41
	B. Implementation of Sustainable Development	89, page 245	34	BM.1.M.89
		90, page 245	35	BM.1.M.90
		91, page 246	36	BM.1.M.91

BM = Beck and McKeown
E   = Erlangga
G   = Grafindo Media Pratama
M   = Mediatama

Based on the table above, 36 paragraphs are included in the "Not Close Look" at problematic discussion category on natural disaster topics in the Geography textbooks published by Erlangga, Grafindo Media Pratama, and Mediatama. The following is the calculation.

$$X = \frac{36 \text{ Paragraphs}}{226 \text{ Paragraphs}} \times 100\% = 15{,}92\%. \ldots (2)$$

It meant that 15.92% of all paragraphs on the natural disaster mitigation topic in the three Geography textbooks are material that do not present problems to be discussed by students. Even though the results are still in an excellent classification, there are still 36 paragraphs that do not present problems. The problems discussed in a textbook can stimulate students to develop critical thinking skills and problem-solving abilities (Marni et al., 2019).

Parts of the textbook content in the "Not LClose look at Problematic Discussion" category can be seen in paragraph 3 of the textbook published by Erlangga (Figure 2). The paragraph in Figure 2 only discussed the concepts and facts about earthquakes, such as definition, scale type, and the types of earthquakes. It is supported by (Jitendra et al., 2001) that textbooks that only contain a collection of facts and data will lead to teacher-centered learning. So that learning Geography is not more than just memorizing facts and concepts.

Textbooks primarily serve as information sources rather than tools for fostering critical thinking. Indonesian textbooks often emphasize content breadth over depth due to traditional design approaches, curriculum demands, exam-focused assessments, and limited teaching experience among authors. This results in passive learning, weak critical thinking skills, poor real-world application, and low student engagement in geography Education (Abdullah & Maryani, 2024; Herianto & Ali, 2020). Consistent with Jitendra et al. (2001), this issue appears globally. However, the 15.92% occurrence in Indonesian textbooks exceeds the 8–12% range in European studies, highlighting greater challenges in developing contexts.

1.2 Analysis of the "Too Many Concepts" category

Too many concepts is the second category of the Beck and McKeown model. Included in the textbooks that present many concepts in each paragraph. The following are the results of the analysis of the excessive number of concept categories in the natural disaster mitigation topics.

Table 4. Indicators of Too Many Concepts

Publishers	Topics		Paragraph & Page	No	Code
Erlangga	A.	Types and Characteristics of Natural Disasters	3, page 364	1	BM.2.E.3
			4, page 365	2	BM.2.E.4
			11, page 369	3	BM.2.E.11
	B.	Disaster Management Cycle	19, page 374	4	BM.2.E.19
			20, page 375	5	BM.2.E.20
	C.	Natural Disaster Management through Education, Local Wisdom, and Utilization of Modern Technology	41, page 389	6	BM.2.E.41
	D.	Community Participation in Natural Disaster Mitigation through Education, Local Wisdom, and Utilization of Modern Technology	44, page 390	7	BM.2.E.44
Grafindo Media Pratama	A.	Types and Characteristics of Natural Disasters	9, page 197	8	BM.2.G.9
			14, page 200	9	BM.2.G.14
			15, page 200	10	BM.2.G.15
	B.	Distribution of Natural Disaster-Prone Areas in Indonesia	49, page 220	11	BM.2.G.49
Mediatama	A.	Environment (Energy Flow, Food Chain, and Biogeochemical Cycle)	22, page 220	12	BM.2.M22
	B.	Quality and Environmental Quality Standards	44, page 226	13	BM.2.M44
	C.	Implementation of Sustainable Development	81, page 239	14	BM.2.M81

BM = Beck and McKeown
E   = Erlangga
G   = Grafindo Media Pratama
M   = Mediatama

Based on Table 4, 14 paragraphs are included in the too many concept category on natural disaster mitigation topics in the geography textbooks published by Erlangga, Grafindo Media Pratama, and Mediatama. The following is the calculation.

$$X = \frac{14 \text{ Paragraphs}}{226 \text{ Paragraphs}} \times 100\% = 6,19\% \ldots \ldots (3)$$

The results showed that 6.19% of all paragraphs on natural disaster mitigation topics present many concepts in each paragraph. A good and not confusing paragraph is a paragraph with only one concept in each paragraph (Rofika, 2018). The concepts in each paragraph make students confused to understand the textbook. Parts of the textbook content in the too many concepts category can be seen in Figure 3.
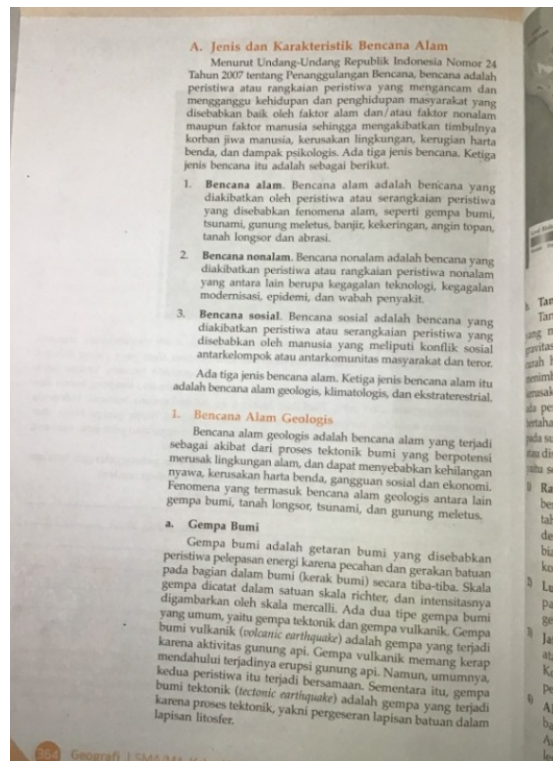
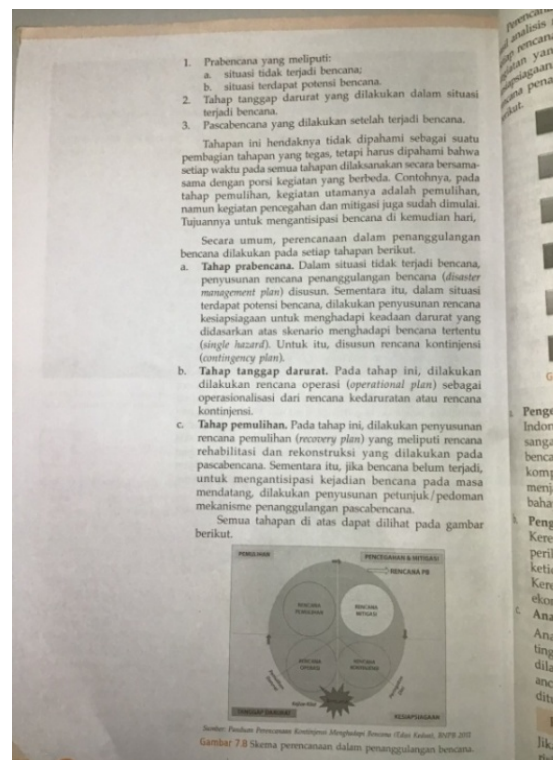Figure 2. Content BM.1.E.3 (Source: Research Data, 2025)

Figure 3. Content BM.2.E.19 (Source: Research Data, 2025)

Based on Figure 3, the paragraph presented the concept of planning stages in disaster management into 3 stages. Each stage used a new concept without any complete explanation, such as disaster management plan, single hazard, contingency plan, operational plan, dan recovery plan. To develop students' understanding, textbooks should recognize the complexity in the content, and the

compression of the text allows little opportunity for elaboration. Adult readers may not need elaboration to understand many concepts in one paragraph because it is assumed that adult readers already have background knowledge of the concepts (Aprilliana, 2015). However, students without background knowledge may ask questions.

Concept overload in textbooks often stems from space constraints imposed by publishers, which lead authors to compress large amounts of content. Additionally, the pressure to cover all curriculum-mandated concepts encourages breadth over depth. Many authors also lack formal training in pedagogy, particularly in cognitive load Theory, and some materials adapted from international sources contribute to content density due to translation issues. This overload hinders students' ability to form meaningful cognitive schemas. When faced with numerous unfamiliar concepts simultaneously, students struggle to process information effectively, resulting in shallow understanding rather than the deep comprehension needed for disaster-related decision-making.

1.3 Analysis of "What's the Point" category

What's the point is the third category of Beck and McKeown's model. Included in this category were textbooks that cannot present learning topics with a clear discourse. The following are the results of the analysis in the what's the point categories in the natural disaster mitigation topics.

Table 5. Indicators of What's the Point

Publishers	Topics	Paragraph & Page	No	Code
Erlangga	A. Types and Characteristics of Natural Disasters	4, page 365	1	BM.3.E.4
		6, page 366	2	BM.3.E.6
		7, page 366	3	BM.3.E.7
		13, page 371	4	BM.3.E.13
	B. Disaster Management Cycle	21, page 376	5	BM.3.E.21
Grafindo Media Pratama	A. Types and Characteristics of Natural Disasters	4, page 195	6	BM.3.G.4
		24, page 203	7	BM.3.G.24
		25, page 203	8	BM.3.G.25
		36, page 210	9	BM.3.G.36
	B. Distribution of Natural Disaster-Prone Areas in Indonesia	52, page 221	10	BM.3.G.52
Mediatama	A. Quality and Environmental Quality Standards	34, page 224	11	BM.3.M.34

BM = Beck and McKeown
E   = Erlangga
G   = Grafindo Media Pratama
M   = Mediatama

Based on Table 5, 11 paragraphs are included in the What's the point category on natural disaster mitigation topics in the geography textbooks published by Erlangga, Grafindo Media Pratama, and Mediatama. The following is the calculation.

$$X = \frac{11 \text{ Paragraphs}}{226 \text{ Paragraphs}} \times 100\% = 4{,}86\% \ldots \ldots (4)$$

Based on the calculation, 4.84% of the paragraphs are included in what's the point category. The results indicated that the textbooks were excellent for presenting a clear discourse on disaster mitigation topics. However, 11 paragraphs did not present the

discourse clearly. Parts of the paragraph included in What's the point category can be seen in Figure 4.

Parts of the textbook content in figure 3 were a paragraph with the code: BM.3.G.2, BM.3.G.3, BM. 3. G. 4 initially presented the definition of natural disasters, the impact of natural disasters, followed by the act so that impacts can be handled and mitigated, and ended with the understanding of mitigation. It showed no connection between one sentence and another, so that the presentation of the discourse seems unclear and not logically structured. It will have a big impact on understanding students who read if the discourse is less clear (Pada et al., 2016).

Problems in discourse clarity often arise from multi-author collaborations that result in inconsistent writing styles, as well as direct translations from foreign texts that disrupt the natural flow of the Indonesian language. The overuse of technical terms without sufficient explanation further complicates comprehension, while limited editorial review weakens the logical coherence of content. In the context of disaster Education, such clarity issues are particularly problematic. Clear explanations are essential for understanding causal relationships and procedural steps in emergency situations. Ambiguous or disjointed discourse can lead to student misconceptions, which may hinder appropriate decision-making during real disaster events.

1.4 Analysis of "Aside that Overwhelms the Purpose" category

Aside from that, overwhelm is the fourth category of the Beck and McKeown model. Included in this category were textbooks that presented more than one main idea per paragraph. The following are the results of the analysis in the 'aside that overwhelms the purpose' categories in the natural disaster mitigation topics.

Table 6. Indicators of Aside that Overwhelm the Purpose

Publishers	Topics	Paragraph & Page	No	Code
Erlangga	A. Types and Characteristics of Natural Disasters	3, page 364	1	BM.4.E.3
		4, page 365	2	BM.4.E.4
		5, page 366	3	BM.4.E.5
		7, page 366	4	BM.4.E.7
	C. Distribution of Natural Disaster-Prone Areas in Indonesia	24, page 378	5	BM.4.E.24
	D. Organizations Role in Natural Disaster Management	26, page 381	6	BM.4.E.26
	E. Natural Disaster Management through Education, Local Wisdom, and Utilization of Modern Technology	42, page 389	7	BM.4.E.42
Mediatama	D. Factors That Cause Global Warming	82, page 239	8	BM.4.M.82

BM = Beck and McKeown
E   = Erlangga
G   = Grafindo Media Pratama
M   = Mediatama

Based on Table 6, 8 paragraphs are included in the aside that overwhelms the purpose category on natural disaster mitigation topics in the geography textbooks published by Erlangga, Grafindo Media Pratama, and Mediatama. The following is the calculation.

$$X = \frac{8 \text{ Paragraphs}}{226 \text{ Paragraphs}} \times 100\% = 3,53\% \ldots \ldots (6)$$

Based on the calculation, 3.52% of the paragraphs are included in the aside that overwhelms the purpose category. It showed that the textbooks are very good at presenting one main idea in each paragraph.

However, 8 paragraphs presented more than one main idea in each paragraph. Parts of the paragraph included in the aside that overwhelm the purpose category can be seen in Figure 5.
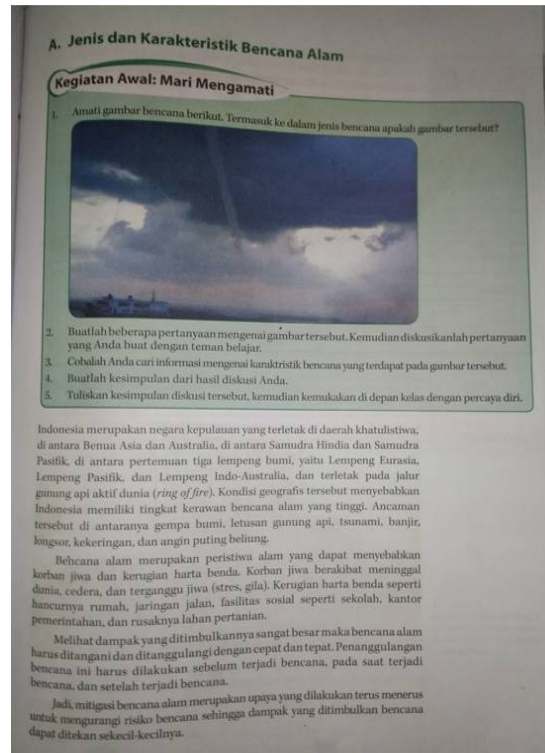

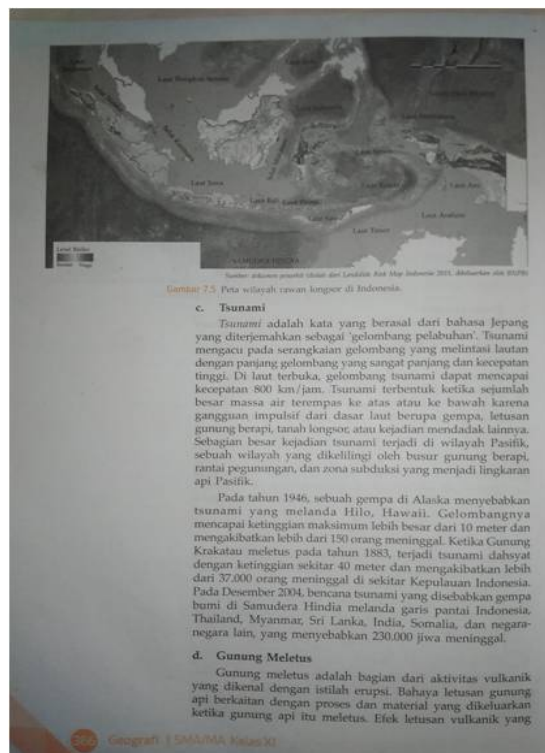Figure 4. Content BM.3.G.2; BM.3.G.3; BM.3.G.4 (Source: Research Data, 2025)

Figure 5. Content BM.4.E.5 (Source: Research Data, 2025)

The BM.4.E.5 paragraph was written about "Tsunami is the word ..." followed by the meaning of the tsunami. Then it is followed by a new sentence about "In the open sea, tsunami waves can reach speeds of 800 km/hour", supported by "Tsunamis are formed when large masses of water". The sentence about "In the open sea, a tsunami wave can reach speeds of 800 km / h" should not be presented, especially because the sentence is not closely related to the main idea, and it sounds like a stand-alone sentence.

The presence of multiple main ideas within a single paragraph can obscure the hierarchy of information, making it difficult for students to identify key points. This issue is critical in disaster Education, where distinguishing between primary and secondary response actions is essential. Such structural problems often stem from

pressures to include dense information, weak adherence to paragraph unity due to limited editorial oversight, and the integration of multiple source materials without adequate synthesis. As a result, students may struggle to form a clear understanding of procedural priorities during emergency situations.

1.5 Analysis of the "Inadequate Examples and Comparisons" category

Inadequate examples and comparisons are the fifth category of Beck and McKeown's model. Included in this category were textbooks that provide examples or comparisons that do not fit the concept. The following are the results of the analysis in the 'inadequate examples and comparisons' categories in the natural disaster mitigation topics.

Table 7. Indicators of Inadequate Examples and Comparisons

Publishers	Topics	Paragraph & Page	No	Code
Erlangga	B. Disaster Management Cycle	20, page 375	1	BM.5.E.20

BM = Beck and McKeown
E   = Erlangga
G   = Grafindo Media Pratama
M   = Mediatama

Based on Table 7, 1 paragraph is included in the inadequate examples and comparisons category on natural disaster mitigation topics in the geography textbooks

published by Erlangga, Grafindo Media Pratama, and Mediatama. The following is the calculation.

$$X = \frac{1\,\text{Paragraph}}{226\,\text{Paragraph}} \times 100\% = 0{,}44\% \ldots \ldots (7)$$

The calculation meant that 0.44% of all paragraphs in natural disaster mitigation topics have examples or comparisons that do not follow the concept. Therefore, the textbooks were classified as excellent in presenting examples that followed the concepts in each paragraph. Parts of paragraphs included in the 'inadequate examples and comparisons' category can be seen in the 20th paragraph published by Erlangga in Figure 5.

The paragraph in Figure 5 presents a disaster management planning scheme that consists of six plans. However, in this book, only four plans are discussed. It is assumed that the textbook writer forgot to discuss the two disaster management schemes. The lack of this material proves that the textbook is less careful in compiling the material and will impact students.

Although only 0.44% of the content was identified as containing inadequate examples, this figure conceals a more

significant issue: the absence of examples in many paragraphs, which was not categorized as a problem in the current coding framework. This omission represents missed opportunities for reinforcing understanding. While the low error rate suggests that existing examples are generally appropriate and aligned with the concepts, their limited overall presence reduces students' ability to grasp abstract ideas and apply knowledge in real-world, especially disaster-related, contexts.

1.6 Analysis of "Poorly Ordered Components: An Explanation"

Poorly ordered components an explanationis the sixth category of Beck and McKeown's model. Included in this category were textbooks that could not present a logical arrangement of explanations. The following are the results of the analysis in the 'poorly ordered components and explanation' categories in the natural disaster mitigation topics.

Table 8. Indicators of Poorly Ordered Components: An Explanation

Publishers	Topics	Paragraph & Page	No	Code
Erlangga	Types and Characteristics of Natural Disasters	4, page 365	1	BM.6.E.4
		13,page 371	2	BM.6.E.13
Mediatama	Pollution, Destruction and Environmental Risk	65, page 232	3	BM.6.M.65

BM = Beck and McKeown
E   = Erlangga
G   = Grafindo Media Pratama
M   = Mediatama

Based on Table 8, 3 paragraphs are included in the poorly ordered components and an explanation category on natural disaster mitigation topics in the geography textbooks published by Erlangga, Grafindo Media Pratama, and Mediatama. The following is the calculation.

$$X = \frac{3 \text{ Paragraphsf}}{226 \text{ Paragraps}} \times 100\% = 1,33\% \ldots \ldots (8)$$

The calculation meant that 1.32% of all paragraphs in natural disaster mitigation topics presented an illogical arrangement of explanations. Therefore, the textbooks were classified as very good in presenting a logical arrangement of each section. However, 3 paragraphs were presented with an illogical explanation. Paragraphs included in the 'poorly ordered components and explanation' category are shown in Figure 6. Most content shows proper logical sequencing. However, 1.33% of the material is poorly organized. This disrupts understanding, especially in disaster preparedness, where step-by-step clarity is crucial.
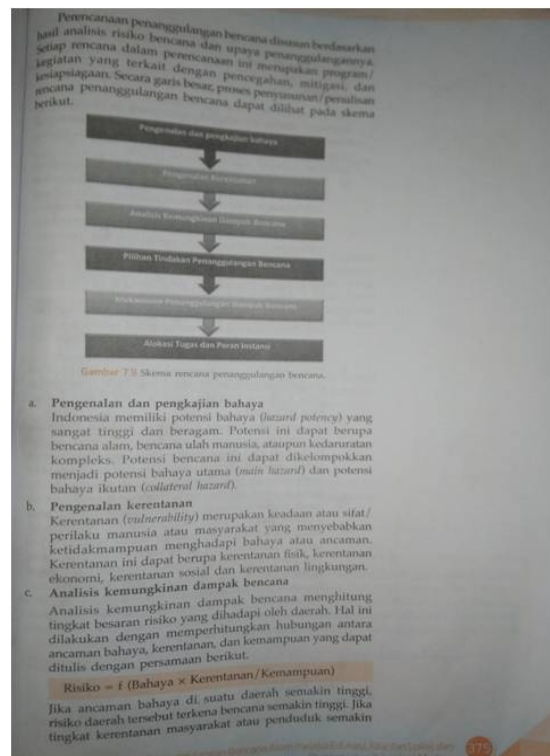
Figure 5. Content BM.5.E.20 (Source: Research Data, 2025)
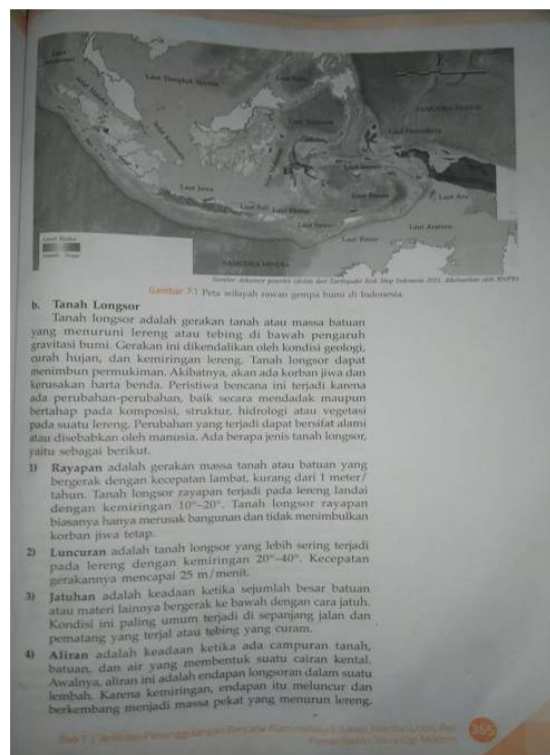

Figure 6. Content BM.6.E.4 (Source: Research Data, 2025)

Explanation (a) Landslides are movements of land or rock masses down a slope or cliff under the Influence of earth's gravity; (b) This movement is controlled by geological conditions, rainfall, and slope; (c) Landslides can fill up settlements; (d) As a result, there will be casualties, and property damage; (e) The catastrophic event occurs because there are changes, either suddenly or gradually in the composition, structure,

hydrology or vegetation on a slope; (f) The change that occurs can be natural or human-induced.

Changing the paragraph order (figure 6) will make the sequence logical, such as (a) Landslides are movements of land or rock masses down slopes or cliffs under the Influence of earth's gravity; (b) This movement is controlled by geological conditions, rainfall, and slope; (e) This catastrophic event occurs because there are changes, either suddenly or gradually in the composition, structure, hydrology or vegetation on a slope; (f) The change that occurs can be natural or human-induced; (c) Landslides can fill up settlements; (d) As a result, there will be casualties and property damage.

2. Research Implications

Based on the content analysis of geography textbooks using the Beck and McKeown model, the following implications can be drawn:

2.1. Theoretical Implications

The findings demonstrate that contemporary geography textbooks still contain structural and content limitations that may impede students' critical thinking development. This research extends the application of the Beck and McKeown model to geography Education, specifically focused on disaster mitigation content, contributing to the theoretical understanding of textbook quality assessment frameworks in specialized subject domains.

2.2. Pedagogical Implications

The identification of specific textbook weaknesses—particularly in presenting problematic discussions (15.92%), managing concept density (6.19%), creating clear discourse (4.86%), organizing main ideas (3.53%), providing adequate examples (0.44%), and structuring logical explanations (1.33%)—provides actionable guidance for: 1) Geography teachers, who should supplement textbook materials with additional learning resources and employ varied instructional strategies to compensate for identified deficiencies. 2) Educational institutions should develop comprehensive teacher training programs focusing on the critical evaluation of instructional materials. 3) Students who would benefit from an improved textbook design that better supports the development of analytical thinking skills related to disaster mitigation.

2.3. Practical Implications for Publishers and Authors

The detailed content analysis offers specific improvement pathways for textbook development, including: 1) Incorporating more problem-based scenarios that stimulate critical discussion. 2) Presenting concepts with appropriate depth rather than breadth in each paragraph. 3) Ensuring clear discourse organization with logical progression of ideas. 4) Limiting each paragraph to a single main idea with supporting details. 5) Providing contextually relevant examples that accurately illustrate concepts. 6) Structuring explanations in a coherent, logical sequence.

2.4. Policy Implications

This research suggests the need for: 1) More rigorous quality control mechanisms in the textbook approval process. 2) Refinement of the National Education Standards Agency (BSNP) assessment criteria to more specifically address content organization and critical thinking development. 3) Establishment of collaborative review processes involving subject matter experts, teachers, and educational psychologists before textbook publication. 4) Regular revision cycles for textbooks based on classroom implementation feedback.

These implications collectively underscore the importance of viewing textbooks not merely as repositories of information but as essential tools for developing higher-order thinking skills necessary for disaster preparedness and mitigation in an increasingly vulnerable environment (Afrian et al., 2025; Fitri et al., 2021).

CONCLUSION

Based on the analysis using the Beck and McKeown model, the natural disaster mitigation content in geography textbooks published by Erlangga, Grafindo Media Pratama, and Mediatama still contains paragraphs characterized by several issues:

1. Lack of in-depth discussion on problematic content
2. Overload of concepts within single sections
3. Unclear main points
4. Irrelevant asides that distract from the core message
5. Inadequate examples and comparisons
6. Poorly structured explanations

Despite these weaknesses, the three textbooks are still categorized as good according to the Beck and McKeown framework. Further research is recommended to include books from other publishers, as this would provide a more comprehensive understanding of content quality across the geography Education landscape. In addition, geography teachers are encouraged not to rely exclusively on textbooks; instead, they should implement suitable instructional strategies to foster students' critical and analytical thinking skills. To support this effort, government intervention is essential in regulating textbook development, particularly to ensure alignment with the intended learning objectives outlined in the national curriculum.

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