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From Sustainability Topics to Opportunities for Learner Action: A Cross-Grade Content Analysis of Indonesian Senior High School English Textbooks

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ABSTRACT

Although sustainability has received increasing attention in English language teaching and textbook research, less is known about how sustainability-related content is pedagogically developed across consecutive grade levels in Indonesia's current Merdeka Curriculum textbooks. This study examines how sustainability is represented and pedagogically developed across three official Indonesian senior high school English textbooks for Grades X–XII. Using hybrid deductive–inductive qualitative content analysis, guided by a study-specific coding framework and supported by descriptive quantitative summaries, 290 sustainability-related analytical segments were identified and examined in terms of thematic coverage and pedagogical depth. Sustainability was represented through social, environmental, and economic concerns, although thematic emphases varied across grades. The health and well-being theme was the most frequent overall, Grade XI showed the broadest thematic range, and Grade XII placed greater emphasis on energy, climate, digital responsibility, and economic participation. Of the 239 segments coded within the three pedagogical-depth categories, 45.2% were classified as Knowledge, 36.0% as Critical Reflection, and 18.8% as Opportunities for Learner Action. Separately, 51 of all 290 sustainability-related segments (17.6%) were classified as No Sustainability-oriented Pedagogical Demand (NPD). The cross-grade comparison did not reveal a cumulative progression toward increasingly reflective or action-oriented pedagogical demands. Instead, pedagogical depth varied unevenly across grades, indicating a need for stronger continuity among Knowledge, Critical Reflection, and Opportunities for Learner Action across the textbook series.

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1. INTRODUCTION

Sustainability has become an important concern in education because students are expected not only to understand current social, environmental, and economic issues but also to develop the capacity to respond to them responsibly. Education for Sustainable Development (ESD) supports this broader purpose by connecting Knowledge with values, decision-making, and action. Sustainability education, therefore, should not stop at providing information about issues such as climate change, inequality, health, or responsible consumption. Sass et al. [1] argue that quality education for sustainability should contribute to action competence by developing relevant Knowledge and competencies, willingness to contribute, confidence in one's capacity for change, and confidence in the possible impact of sustainability actions. Empirical studies reinforce the importance of this action-oriented dimension. Sass et al. [2] found that students' perceptions of action-oriented sustainability education were significantly associated with their self-reported action competence, while Torsdottir et al. [3] reported positive relationships between students' school experiences of influencing society and several aspects of action competence. These findings suggest that sustainability learning needs to create room not only for understanding an issue but also for examining it, considering possible responses, and relating those responses to learners' own contexts.

English language education provides a relevant setting for such learning because language activities can bring social, cultural, environmental, and global concerns into meaningful communication. Reading, discussion, writing, presentations, and projects allow students to use English while engaging with issues that extend beyond linguistic Knowledge. Yu et al. [4] show that sustainability has been incorporated into English language teaching (ELT) through curriculum design, classroom activities, teacher preparation, and assessment. From a more critical perspective, Micalay-Hurtado and Poole [5] propose an eco-critical language awareness approach in which learners examine how language constructs ecological issues and connect sustainability with their own communities and lived experiences. In Indonesia, Mambu [6] similarly discusses the integration of the Sustainable Development Goals (SDGs) into critical English language teaching and learning. Zulkarnain et al. [7] further developed and tested an English curriculum model that combined SDGs, twenty-first-century skills, character education, reflective learning, and collaborative projects. That study focused on curriculum model development and classroom implementation. The present study addresses a different but related concern: the sustainability-related content and learning opportunities already embedded in the official English textbooks themselves.

Textbooks deserve particular attention because they influence both the content students encounter and the forms of learning activity through which that content is explored. Vitta [8] describes textbook analysis as an established form of quality control in ELT and applied linguistics, with its scope extending beyond language proficiency to broader cultural and educational concerns. Sustainability-oriented textbook studies reflect this wider interest. Lasekan et al. [9], for example, examined SDG-related themes across language skills and considered their potential connections with sustainability competencies. Arslan and Curle [10], working with the English high school curriculum and textbooks in Türkiye, found that

ESD-related learning objectives were predominantly cognitive and called for greater attention to socio-emotional and behavioral dimensions. Taken together, these studies suggest that identifying sustainability content is only one part of the analysis; it is also necessary to examine the forms of engagement that textbook materials make available to learners.

This distinction becomes clearer in studies that examine what learners are invited to do with environmental or sustainability-related material. Abid [11] analyzed environmental language-learning tasks in the *Super Minds* textbooks and found that functional environmental literacy was more prominent than operational forms of engagement. Huang [12], in a study of a university-level German-as-a-Foreign-Language textbook, similarly argues for examining not only which sustainability topics appear but also how they are framed and translated into pedagogical tasks. Related patterns have been reported in other EFL textbook studies. Cristovão et al. [13] found that environmental materials in Brazilian secondary-school EFL textbooks could contribute to eco-awareness but offered limited support for critical environmental literacy and preparation for action. Xiong [14] reported a comparable pattern in Chinese secondary-school EFL textbooks, where environmental topics mainly promoted awareness rather than active participation or transformational practice. More recently, Lee and Nguyen [15] found that the behavioral component of environmental literacy was the least represented dimension across 15 Vietnamese ELT textbooks. Although these studies use different analytical frameworks, they converge on an important point: the presence of an environmental or sustainability topic does not necessarily mean that learners are being asked to examine it critically or consider possible responses.

Research in Indonesia provides an important point of comparison. Triyono et al. [16] examined textual, visual, and environmental education dimensions in a government-issued Grade XII EFL textbook. They found that the material was largely oriented toward basic ecological awareness, with relatively limited representation of higher-level environmental skills and contribution. Gavilan Tatin et al. [17], examining six official elementary-school EFL textbooks under the Merdeka Curriculum, likewise found that ecological Knowledge was present but that skill development, evaluation, and active participation received less attention. At the lower-secondary level, Habibbillah and Sakurai [18] analyzed 68 Merdeka Curriculum textbooks across subjects and identified a progression in climate-related material across Grades VII–IX, while also noting limited representation of climate issues in specific Indonesian local contexts. Together, these studies demonstrate growing attention to sustainability and environmental education in Indonesian textbook research. However, they address different educational levels, subject configurations, or analytical dimensions and do not provide a cross-grade account of sustainability across the current official senior high school English textbook sequence.

Against this background, an important question remains: how is sustainability represented and pedagogically developed across the current official Merdeka English textbooks for Grades X–XII as a connected sequence? Existing ELT textbook research has examined environmental discourse, sustainability themes, environmental literacy, and different forms of environmental education content, but less is known about how thematic coverage and pedagogical demands vary across successive senior high school grade levels.

This study takes a broad view of sustainability by considering social and economic concerns alongside environmental ones. It also recognizes that similar topics can involve substantially different pedagogical demands. One passage may primarily provide information about an issue, while another task may ask learners to examine competing perspectives, evaluate consequences, or formulate a possible response. The central question is therefore not simply whether sustainability appears in the textbooks, but what kinds of engagement the materials explicitly invite. A cross-grade analysis also allows possible progression to be examined without presuming that higher grade levels necessarily provide deeper or more action-oriented engagement.

To examine these differences, the study uses pedagogical depth as an analytical concept, operationalized through three categories: Knowledge, Critical Reflection, and Opportunities for Learner Action. The framework is informed by research on action competence [1]–[3] and by textbook studies that distinguish exposure or awareness from more critical and action-oriented forms of engagement [11], [12], [15]–[17]. Knowledge refers to texts and activities that primarily introduce, describe, explain, or support understanding of a sustainability issue. Critical Reflection includes tasks that require learners to examine causes and consequences, compare perspectives, evaluate arguments or alternatives, or engage with underlying values. The third category, Opportunities for Learner Action, includes activities that invite learners to propose responses, make decisions, develop solutions, plan initiatives, or consider concrete forms of action. These categories are analytical rather than developmental. The analysis therefore does not assume that every sustainability-related task should culminate in action or that pedagogical depth necessarily increases from Grade X to Grade XII.

This study contributes by bringing two related but analytically distinct dimensions of sustainability integration into the same cross-grade analysis: thematic breadth and pedagogical depth. Thematic breadth concerns the range of sustainability issues represented in the textbooks, whereas pedagogical depth concerns the forms of engagement learners are explicitly invited to undertake in relation to those issues. Examining these dimensions together makes it possible to distinguish broad thematic representation from substantive pedagogical engagement and to consider how the relationship between the two varies across consecutive grade levels. This perspective can also help identify where greater continuity may be needed in future curriculum and materials development.

Accordingly, this study conducts a cross-grade content analysis of the official Indonesian senior high school English student textbooks for Grades X, XI, and XII. It has three objectives: to identify the sustainability-related themes represented across the textbooks; to examine the pedagogical demands associated with sustainability-related texts and tasks through the categories of Knowledge, Critical Reflection, and Opportunities for Learner Action; and to compare the distribution of these forms of engagement across grade levels in order to identify cross-grade patterns, curricular gaps, and pedagogical opportunities.

2. METHOD

This study employed a hybrid deductive–inductive qualitative content analysis supported by descriptive quantitative summaries to examine sustainability representation and the forms of pedagogical engagement provided in Indonesian senior high school English textbooks. Qualitative content analysis was selected because it provides a systematic basis for defining analytical units, developing coding categories, and interpreting patterns across textual materials [19]. The deductive component involved the sustainability inclusion criteria, the Sustainable Development Goals (SDGs) as a broad reference framework, and the pedagogical-depth categories established before full coding. The inductive component involved identifying specific sustainability issues within the textbook corpus and grouping them into broader thematic clusters. Comparable content-analytic approaches have been used in studies of sustainability and environmental education in language textbooks [9], [12], [15]–[18].

The corpus comprised three official student textbooks developed for English learning under the Indonesian Merdeka Curriculum: *Bahasa Inggris: Work in Progress untuk SMA/SMK/MA Kelas X* [20], *Bahasa Inggris: English for Change untuk SMA/MA Kelas XI* [21], and *Bahasa Inggris: Life Today untuk SMA/MA Kelas XII* [22]. All three were published in 2022. The three books constituted the complete defined corpus for the Grade X–XII sequence examined in this study; no sampling procedure was applied. The analysis was restricted to the student books and excluded teacher guides and separately published supplementary materials. Data collection began with the screening of all instructional content, including reading passages, dialogues, questions, exercises, writing activities, reflections, and projects. Visual elements were not coded independently but were consulted when necessary to interpret an associated text or task. Page references followed the printed pagination of the textbooks.

The textbook corpus formed part of a broader research program on sustainability-oriented English language education in Indonesia, from which a curriculum-development study has previously been reported [7]. The present article constitutes a distinct re-analysis of the textbook corpus using different research questions and a separate analytical framework focused on sustainability themes, pedagogical depth, and cross-grade patterns. Classroom observations, focus-group data, model-validation data, and teacher or student responses reported in the earlier study were not used in the present analysis. The present study was therefore based solely on documentary textbook data and involved no human-participant or personal data.

A segment was included when its main semantic content showed an explicit or contextually clear connection to a recognizable social, environmental, or economic sustainability concern represented within the 17 SDGs of the 2030 Agenda [23]. The term *sustainability* itself did not need to appear. A segment was not included merely because it could be loosely associated with an SDG; isolated vocabulary and incidental references without a substantive sustainability connection were excluded. The unit of analysis was the smallest independently meaningful instructional unit. A coherent passage or dialogue was retained as one segment when it served a unified instructional function, whereas independent questions or sub-tasks were coded separately when they required different forms of

engagement. Where multiple demands were independently meaningful, they were segmented separately; where they formed an inseparable prompt, classification followed the principal explicit learner requirement. Explicit specification of analytical units is important because variation in units can make textbook comparisons difficult to interpret [24]. Screening and segmentation produced 290 sustainability-related analytical segments.

Each segment was recorded by textbook, grade, unit or chapter, printed page number, activity type, specific sustainability code, broader theme, dominant SDG, and pedagogical category. Specific sustainability issues identified during first-cycle coding were subsequently grouped into broader themes on the basis of semantic similarity. For example, material concerning healthy lifestyles and personal health was grouped under Health and Well-being, primarily associated with SDG 3. When a segment was related to more than one SDG, one dominant SDG was assigned according to its primary semantic focus. This procedure reduced overlap and double counting while allowing secondary relationships with other SDGs to remain conceptually acknowledged.

Pedagogical depth was operationalized through three study-specific analytical categories: Knowledge, Critical Reflection, and Opportunities for Learner Action. The framework was informed by research on action competence [1]–[3] and by textbook studies distinguishing informational or awareness-oriented engagement from more reflective and action-oriented forms [11], [12], [15]–[17]. Knowledge referred to material that primarily introduced, identified, described, explained, or supported understanding of a sustainability issue. Critical Reflection included tasks requiring learners to analyze causes or consequences, compare perspectives, evaluate arguments or alternatives, examine values, or justify positions. Opportunities for Learner Action included tasks asking learners to formulate responses, make decisions, develop solutions, plan initiatives, recommend action, or undertake a concrete response. These categories were analytical rather than developmental and were not intended to measure learners' action competence itself. Table 1 presents the operational coding framework used to classify pedagogical depth.

Table 1. Coding Framework for Pedagogical Depth

Category	**Operational Definition**	**Typical Indicators**
Knowledge	Introduces, identifies, describes, explains, or supports understanding of a sustainability issue.	identify, describe, explain, define, recognize, recall
Critical Reflection	Requires learners to examine causes, consequences, perspectives, values, arguments, or alternatives.	analyze, compare, evaluate, justify, examine perspectives, weigh alternatives
Opportunities for Learner Action	Requires learners to consider, formulate, plan, recommend, design, or undertake a response to a sustainability issue.	propose, decide, plan, design, recommend, solve, campaign, formulate a response

Note. No Sustainability-oriented Pedagogical Demand (NPD) was recorded separately when sustainability-related content appeared without a substantive sustainability-learning function. NPD was not treated as a fourth level of pedagogical depth. The indicators shown in the table served as interpretive cues rather than automatic coding rules; final classification was based on the substantive function or demand of the complete text or task.

A single-coder procedure was used. Before the final dataset was established, the coding guide was piloted on materials from all three grade levels and refined to clarify category boundaries, particularly between Knowledge and NPD and between Critical Reflection and Opportunities for Learner Action [19]. Classification was based on the substantive function of the complete text or task rather than on activity labels or individual verbs. Thus, a project was not automatically classified as Opportunities for Learner Action, and the verb *discuss* did not automatically indicate Critical Reflection. To support coding dependability, ambiguous cases and previously coded segments were revisited against the final operational definitions after the coding rules had been finalized. No independent second coding was conducted; accordingly, no intercoder agreement coefficient was calculated.

Following coding, frequencies and percentages were calculated for sustainability themes and pedagogical categories. Theme frequencies were based on all 290 sustainability-related segments. Percentages for Knowledge, Critical Reflection, and Opportunities for Learner Action were calculated from the 239 segments assigned to these three pedagogical-depth categories. NPD was reported separately against the full corpus of 290 sustainability-related segments and was not included in the pedagogical-depth denominator. Cross-grade comparisons emphasized relative distributions because the textbooks contained different numbers of sustainability-related segments. No inferential tests were applied because the research questions were descriptive and comparative and the three textbooks constituted the complete defined corpus rather than a probability sample. The findings are therefore interpreted as pedagogical affordances of the textbook materials rather than as evidence of classroom practice, student learning, or sustainability behavior.

3. RESULTS AND DISCUSSION

3.1. Sustainability-Related Themes across Grades X-XII

Across the three textbooks, 290 sustainability-related analytical segments were identified: 51 in Grade X, 164 in Grade XI, and 75 in Grade XII. The coding yielded ten broader thematic categories covering social, environmental, and economic dimensions of sustainability. Table 2 shows how these categories were distributed across the three grade levels. The distribution varied considerably: some themes appeared in more than one textbook, whereas others were concentrated within a single grade.

Health and well-being was the most frequent theme overall, accounting for 82 segments (28.3%), but it appeared only in Grades X and XI. Grade X had a particularly concentrated thematic profile, with 37 of its 51 sustainability-related segments (72.5%) addressing health and well-being. These segments occurred mainly in the chapters *Sports and Health* and *Healthy Foods* and covered physical and mental health, nutrition, self-care, healthy eating, and everyday lifestyle choices [20]. Sustainable communities and civic responsibility formed the other substantial area of Grade X content, including activities related to public space, graffiti, property, and community responsibility. Inclusion and equitable participation appeared only occasionally, including material involving athletes with disabilities. Grade X was therefore centered largely on sustainability concerns connected with personal well-being and everyday social life.

Table 2. Distribution of Sustainability-Related Themes across Grades X–XII

Sustainability-related theme	Dominant SDG	Grade X n (%)	Grade XI n (%)	Grade XII n (%)	Total n (%)
Health and well-being	SDG 3	37 (72.5%)	45 (27.4%)	0	82 (28.3%)
Climate action and environmental stewardship	SDG 13	0	28 (17.1%)	21 (28.0%)	49 (16.9%)
Responsible consumption and waste management	SDG 12	0	43 (26.2%)	0	43 (14.8%)
Financial literacy and economic participation	SDG 8	0	25 (15.2%)	15 (20.0%)	40 (13.8%)
Digital citizenship and social responsibility	SDG 16	0	4 (2.4%)	18 (24.0%)	22 (7.6%)
Renewable energy and energy access	SDG 7	0	0	21 (28.0%)	21 (7.2%)
Sustainable communities and civic responsibility	SDG 11	12 (23.5%)	8 (4.9%)	0	20 (6.9%)
Biodiversity and terrestrial ecosystems	SDG 15	0	6 (3.7%)	0	6 (2.1%)
Marine sustainability	SDG 14	0	5 (3.0%)	0	5 (1.7%)
Inclusion and equitable participation	SDG 10	2 (3.9%)	0	0	2 (0.7%)
Total		**51 (100%)**	**164 (100%)**	**75 (100%)**	**290 (100%)**

Note. Percentages in the Grade X, Grade XI, and Grade XII columns were calculated from the respective grade totals of 51, 164, and 75 sustainability-related segments. Percentages in the Total column were calculated from all 290 segments. Each segment was assigned to one dominant thematic category for quantitative comparison, although secondary relationships with other sustainability issues or SDGs could also be present.

Grade XI contained the broadest thematic range, covering eight of the ten categories identified in the corpus. Health and well-being and responsible consumption and waste management were the two most prominent themes, representing 27.4% and 26.2% of Grade XI segments, respectively. Climate action and environmental stewardship and financial literacy and economic participation were also substantial components of the textbook. Environmental material addressed domestic waste, recycling, plastic consumption, waste banks, deforestation, marine pollution, tree planting, and Indonesian environmental figures [21]. Personal money management and saving provided contexts for financial literacy, while smaller clusters addressed biodiversity, marine sustainability, sustainable communities, and digital responsibility. Compared with the other two grades, Grade XI distributed its sustainability content across a wider combination of environmental, social, and economic concerns.

Grade XII also showed a relatively concentrated thematic profile. Renewable energy and energy access and climate action and environmental stewardship each accounted for 28.0% of its sustainability-related segments. The remaining material was concentrated in digital citizenship and social responsibility and financial literacy and economic participation. Renewable-energy content addressed hydropower, solar and wind energy, electricity access, energy conservation, and related technological developments. Climate-related material focused on carbon footprints, transportation, food consumption, online shopping, global warming, and individual choices [22]. Other units addressed e-money and the digital

economy, as well as netiquette, privacy, online safety, hate speech, and responsible digital behavior. Grade XII thus concentrated sustainability content around energy, climate, digital responsibility, and economic participation.

The three textbooks do not show a consistent thematic sequence in which the same sustainability concerns are systematically revisited and elaborated from Grade X through Grade XII. Rather, the emphasis shifts across levels: Grade X is strongly oriented toward health and civic concerns, Grade XI covers the widest range of themes, and Grade XII gives greater attention to energy, climate, digital responsibility, and economic participation. A similar pattern was reported by Lasekan et al. [9], who found broad SDG coverage across multiple levels of an EFL textbook series but substantial variation in the representation of individual goals between levels. Broad coverage across a series, therefore, does not necessarily mean that particular sustainability concerns are distributed evenly or developed sequentially across grade levels.

The pattern also differs from the progression in climate-related content reported by Habibbillah and Sakurai [18] for Indonesian lower-secondary Merdeka Curriculum textbooks. Their study identified a more visible progression in climate-related material across Grades VII–IX. In the present senior high school English corpus, no Grade X segments were assigned to the climate-action theme, whereas climate-related content appeared in both Grades XI and XII. This contrast should not be interpreted as evidence that either textbook sequence is pedagogically stronger, since the studies differ in educational level, subject configuration, and analytical scope. It does, however, show that cross-grade development needs to be established through analysis rather than inferred from the ordering of textbook levels.

These results describe where sustainability content appears across the series, but not what learners are asked to do with it. The same broad topic may be presented primarily as information, used as a context for language work, or developed through tasks that ask learners to examine perspectives, justify positions, or consider possible responses. The next section therefore examines the pedagogical depth of the identified sustainability-related texts and tasks.

3.2. Pedagogical Depth of Sustainability-Related Texts and Tasks

Of the 290 sustainability-related analytical segments, 239 were assigned to one of the three pedagogical-depth categories: Knowledge, Critical Reflection, or Opportunities for Learner Action. The remaining 51 segments were classified as No Sustainability-oriented Pedagogical Demand (NPD). In these segments, sustainability-related subject matter was present but served mainly as a context for another instructional purpose rather than as the focus of sustainability learning. NPD was reported separately and was not treated as a fourth level of pedagogical depth. Because the two distributions use different denominators, Table 3 distinguishes percentages calculated from the depth-coded segments from NPD percentages calculated from all sustainability-related segments within each grade.

Table 3. Pedagogical Depth of Sustainability-Related Texts and Tasks

Grade	Knowledge n (% of depth-coded segments)	Critical Reflection n (% of depth-coded segments)	Opportunities for Learner Action n (% of depth-coded segments)	Depth-coded segments n	NPD n (% of all sustainability-related segments)	Total sustainability-related segments n
Grade X	12 (26.1%)	23 (50.0%)	11 (23.9%)	46	5 (9.8%)	51
Grade XI	64 (47.8%)	41 (30.6%)	29 (21.6%)	134	30 (18.3%)	164
Grade XII	32 (54.2%)	22 (37.3%)	5 (8.5%)	59	16 (21.3%)	75
Total	**108 (45.2%)**	**86 (36.0%)**	**45 (18.8%)**	**239**	**51 (17.6%)**	**290**

Note. Percentages for Knowledge, Critical Reflection, and Opportunities for Learner Action were calculated from the depth-coded segments within each grade: 46 for Grade X, 134 for Grade XI, and 59 for Grade XII; percentages in the Total row were calculated from all 239 depth-coded segments. NPD percentages were calculated from all sustainability-related segments within each grade: 51 for Grade X, 164 for Grade XI, and 75 for Grade XII; the overall NPD percentage was calculated from all 290 segments. NPD was not included in the pedagogical-depth denominator.

Knowledge was the largest category overall, accounting for 108 of the 239 depth-coded segments (45.2%), followed by Critical Reflection with 86 segments (36.0%) and Opportunities for Learner Action with 45 (18.8%). Critical Reflection and Opportunities for Learner Action together accounted for 54.8% of the depth-coded segments. The textbooks therefore contained substantial reflective work alongside knowledge-building, although tasks that explicitly invited learners to formulate or undertake responses were less frequent. A similar general tendency has been reported in textbook studies in which cognitive or knowledge-oriented dimensions were more prominent than behavioral or action-related dimensions [10], [15]. Because those studies use different analytical categories, their percentages are not directly comparable with those reported here.

Grade X showed the strongest relative emphasis on Critical Reflection, which accounted for half of its 46 depth-coded segments. These activities often asked learners to justify choices, compare alternatives, or relate health, well-being, and public-space issues to their own experience. Opportunities for Learner Action were also present. In the *Health Campaign* project, for example, students select a health issue and target audience, consider supporting sources, design a campaign poster, and publish it through a medium of their choice [20, pp. 73–74]. The task does not show whether students later change their health behavior, but it does give them an explicit opportunity to formulate and communicate a response through English.

Grade XI contained more knowledge-building while still providing substantial opportunities for Reflection and response. Knowledge accounted for 47.8% of the depth-coded segments, while Critical Reflection and Opportunities for Learner Action together made up slightly more than half. Informational material addressed waste, plastic pollution, waste banks, healthy lifestyles, and environmental figures. Some accompanying tasks moved beyond comprehension by asking learners to consider possible responses or communicate environmental messages. In Unit 4, for example, students are asked to create a digital or non-digital poster presenting their own future actions to save the environment [21, p. 179]. Grade

XI therefore combined extensive informational content with repeated opportunities for reflective and action-oriented engagement.

Grade XII had the highest proportion of Knowledge, at 54.2%, while Critical Reflection accounted for 37.3% and Opportunities for Learner Action for 8.5%. The lower proportion of Opportunities for Learner Action should not be interpreted as evidence that Grade XII was less cognitively demanding. Several tasks required learners to evaluate competing claims and justify a position. In Unit 4, students consider arguments from several sources and identify the source with which they agree most strongly, explaining their choice in relation to their own position and the arguments presented [22, pp. 204–205]. The demand in this task is reflective and argumentative rather than action-oriented. A later reflection asks how learners can help address global warming after studying carbon footprints [22, p. 207], providing a more explicit opportunity to consider a personal response.

Critical Reflection and Opportunities for Learner Action therefore need to remain analytically distinct. Comparing arguments, examining consequences, or defending a position may involve substantial critical work without asking learners to formulate something they themselves could undertake. The QUEST framework likewise treats Knowledge, perspectives and values, informed decision making, and possible action as related but distinguishable aspects of action competence [1]. Knowledge and Reflection are not weaker forms of engagement simply because they do not culminate in immediate action.

NPD captures a different relationship between sustainability content and instructional purpose. Fifty-one segments, or 17.6% of the full corpus, contained sustainability-related subject matter without giving that subject matter a substantive sustainability-learning function. NPD accounted for 9.8% of Grade X segments, 18.3% of Grade XI segments, and 21.3% of Grade XII segments. One Grade XI activity, for example, asks students to correct simple-present-tense sentences such as “Siti seldom eat healthy foods” and “Nina and Bani learns how to live a healthy life” [21, p. 128]. Healthy living provides the semantic context, but the instructional demand concerns grammatical accuracy rather than understanding, evaluating, or responding to the health issue.

Methodologically, NPD makes it possible to separate the visibility of sustainability-related content from sustainability-oriented pedagogical engagement. Sustainability-related language may appear in an exercise without making the sustainability issue itself something learners are asked to understand, examine, or respond to. This treatment is more restrictive than approaches that regard sustainability-related grammatical material as a possible resource for developing sustainability awareness or competence. Lasekan et al. [9], for example, discuss the potential contribution of grammatical concepts and exercises to sustainability competencies while also stressing the importance of connecting grammar meaningfully with sustainability content. In the present analysis, a grammar or vocabulary activity was classified as Knowledge, Critical Reflection, or Opportunities for Learner Action only when engagement with the sustainability issue formed part of the instructional demand; otherwise, it remained NPD.

Huang [12] uses a different classification scheme. In the university-level German-as-a-Foreign-Language textbook examined in that study, approximately 47% of sustainability-related segments were classified as awareness-oriented, 26% as participation-

oriented, and 27% as transformative. These percentages should not be compared directly with the present results because Huang's awareness category includes comprehension, Reflection, and discussion and therefore overlaps with more than one category used here. The contrast shows that apparently similar labels for sustainability engagement can rest on different analytical boundaries. The next section considers whether the distribution of Knowledge, Critical Reflection, and Opportunities for Learner Action shows a consistent cross-grade pattern.

3.3. Cross-Grade Patterns, Curricular Gaps, and Pedagogical Opportunities

The cross-grade comparison does not show a steady shift toward more reflective or action-oriented pedagogical demands from Grade X to Grade XII. Opportunities for Learner Action declined from 23.9% in Grade X to 21.6% in Grade XI and 8.5% in Grade XII, while Knowledge increased from 26.1% to 47.8% and 54.2%, respectively. Critical Reflection also did not follow a linear pattern, accounting for 50.0% of the depth-coded segments in Grade X, 30.6% in Grade XI, and 37.3% in Grade XII. The sequence therefore does not show a cumulative pedagogical progression toward increasingly reflective or action-oriented engagement.

The three textbooks instead differ in the forms of sustainability-related engagement they provide. Grade X gives considerable space to Reflection and response around health, well-being, and civic concerns. Grade XI combines the broadest thematic range with substantial knowledge-building and continued Opportunities for Learner Action. Grade XII has the smallest proportion of Opportunities for Learner Action, but several of its activities involve argumentation, evaluation, and reasoned judgment, particularly in relation to energy and climate. The larger proportion of Knowledge in Grade XII should therefore not be interpreted as evidence of lower cognitive demand. The difference lies in the type of engagement required rather than in a simple increase or decrease in pedagogical difficulty.

Theme composition may account for part of this variation, although the present analysis cannot establish a causal relationship. Personal-health material in Grade X was often connected with learners' routines, choices, and immediate experience, whereas several Grade XII activities on energy and climate were organized around evidence, competing claims, and reasoned judgment. These differences support examining sustainability integration in ELT textbooks along two related but analytically distinct dimensions: thematic breadth and pedagogical depth. Thematic breadth concerns the range of sustainability issues represented, whereas pedagogical depth concerns what learners are explicitly asked to do with those issues. A textbook may therefore cover a wide range of sustainability concerns without necessarily providing more opportunities for critical Reflection or learner response. The NPD category further clarifies this distinction by identifying cases in which sustainability is visible in the language of an exercise without becoming part of its substantive instructional demand. Liu et al. [25], in their analysis of 12 series of Chinese university English textbooks, likewise considered both the range of environmental content and the ways in which that content was presented.

The textbooks already contain materials that could support stronger continuity across Knowledge, Critical Reflection, and Opportunities for Learner Action. Informational

material can provide a basis for examining causes, consequences, competing perspectives, or local relevance, while other tasks can invite learners to compare possible responses, make reasoned choices, or formulate responses of their own. This does not mean that every sustainability-related task should culminate in an action project, nor does it imply that the three categories must occur in a fixed developmental sequence. Rather, greater continuity would mean giving learners recurring opportunities across grade levels to encounter sustainability issues through different forms of engagement.

Glas et al. [26] found that English-language textbooks used in Chile contained elements that could support motivation for environmental action, while also identifying limitations in problem-focused framing and support for engaged collective citizenship. Although their framework differs from the one used here, both analyses distinguish between presenting sustainability problems and providing learners with opportunities to consider participation or possible responses. This concern is also relevant to research on action competence. Sass et al. [2] found that students' experiences of action-oriented sustainability education were positively associated with their self-reported action competence, while Torsdottir et al. [3] reported positive relationships between upper-secondary students' experiences of influencing society and aspects of action competence. These studies concern students' educational experiences rather than textbook content, so their findings cannot be used to infer comparable outcomes from the textbooks analyzed here.

The interpretation of the present findings remains limited to textbook affordances. The analysis identifies what the materials explicitly make available, not how teachers use them or what students ultimately learn from them. A task classified as Knowledge may become more reflective through teacher questioning or follow-up discussion, while a task that appears action-oriented may receive only superficial treatment in practice. Huang [12] similarly emphasizes the role of classroom mediation in realizing the sustainability potential of textbook materials. Classroom-based research is therefore needed to examine how teachers and learners actually engage with these materials. Within the textbook series itself, the cross-grade gap concerns continuity rather than topic absence: sustainability-related content is present across the three grades, but the connections among Knowledge, Critical Reflection, and Opportunities for Learner Action remain uneven.

4. CONCLUSION

This study examined sustainability representation and pedagogical development across three official Indonesian senior high school English textbooks for Grades X–XII. The 290 sustainability-related segments covered social, environmental, and economic concerns, but their distribution differed across grades. Grade X concentrated mainly on health, well-being, and civic concerns, Grade XI showed the broadest thematic range, and Grade XII gave greater attention to energy, climate, digital responsibility, and economic participation. The same sustainability concerns were therefore not systematically revisited and developed across the three grade levels.

Pedagogical depth also varied across the series. Of the 239 depth-coded segments, 45.2% were classified as Knowledge, 36.0% as Critical Reflection, and 18.8% as Opportunities for Learner Action. Opportunities for Learner Action declined across grades,

while Knowledge became more prominent. This pattern does not imply lower cognitive demand in Grade XII, where several tasks required argumentation and evaluation. A further 51 of the full 290 segments (17.6%) were classified as No Sustainability-oriented Pedagogical Demand (NPD). The findings therefore distinguish two related dimensions of sustainability integration: thematic breadth and pedagogical depth. NPD adds a further distinction between the presence of sustainability-related content and substantive sustainability-oriented engagement. For curriculum development, the main issue is not simply adding more sustainability topics, but strengthening continuity among Knowledge, Critical Reflection, and Opportunities for Learner Action across grade levels.

The study was limited to official student textbooks; teacher guides and supplementary materials were excluded, visual elements were not coded independently, and assigning one dominant SDG may simplify multidimensional content. The analysis also relied on a single coder, and the findings concern textbook affordances rather than classroom practice or learning outcomes. Future research could use independent coders, include teacher guides and multimodal analysis, examine how teachers and learners engage with sustainability-related materials in classrooms, compare official and commercially published textbooks, and investigate whether later textbook editions develop stronger cross-grade continuity.

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