An analysis of the cognitive rigour of questions used in secondary school English language textbooks in Singapore

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Abstract

Textbooks are an essential component in the classroom, making it extremely crucial to regularly evaluate textbooks used in schools so that their pedagogical contributions towards the teaching and learning processes can be guaranteed. The study aimed to identify and analyse the cognitive levels of questions available in Secondary Three *All About English* textbooks, which have been used in Singapore since 2013. The objective of carrying out the analysis was to determine the overall cognitive rigour of questions, using a matrix superimposing two taxonomies: Revised Bloom's Taxonomy and Webb's Domain-of-Knowledge (DOK) model. The sample of this study consisted of questions from the Express and Normal Technical (NT) English language textbooks published by Hodder Education, where 346 questions were analysed in total. The cognitive rigour matrix was used in the classification of the questions. The results revealed that in the Express level textbook, most questions were within the cell [2,3] (35.9%), consisting of *Understand* and "Strategic Thinking" questions. In contrary, for the Normal Technical level textbook, most questions were within the cell [5,4] (17.6%), consisting of *Evaluate* and "Extended Thinking" questions. Overall, there was a good mix of Lower-order thinking skill (LOTS) and Higher-order thinking skill (HOTS) questions. However, not all cognitive levels were clearly varied, with an overemphasis on *Understand* and *Evaluate* questions, neglecting *Remember* and *Apply* questions. In light of the results, it is recommended that coursebook writers should incorporate questions of varied cognitive demands. We recommend that teachers should regularly evaluate the effectiveness of school textbooks so that there is closer alignment between the curriculum and the textbooks that teachers use in the classroom.

Keywords:	Cognitive rigour, coursebook analysis, coursebook evaluation, types of questions

1.   Introduction

Over the past few decades, the evolution of the English Language syllabuses in Singapore has been shaped by the progress in research regarding language and pedagogy, in conjunction with changes in national concerns and policies (Lim, 2002). In the eighties, the English syllabus was centred upon developing students' basic functional literacy in English. In order

to achieve the country's need for a well-read workforce at that time, the teaching of English was carried out through a stringent and rigid method of the syllabus, with little emphasis catering to varied student needs and profile (Lim, 2002). However, Wagner (2008) asserts that in order to thrive in the global information economy today, additional skills such as thinking critically and skills to problem-solve will need to be taught in school.

In 1997, the "Thinking School, Learning Nation" initiative was rolled out to schools, with a key strategy being the addition of critical and creative thinking skills into the Singapore school curriculum (Leen, Hong, Kwan, & Ying, 2014). Today, the current 2010 English syllabus has seen a shift towards developing students to become competent members of the knowledge-based economy. This is achieved through the enhancement of students' literary techniques, information literacy and critical skills "…to communicate effectively, using the internationally acceptable standard of English, appropriate for different purposes, audiences, contexts and cultures" (Curriculum Planning & Development Division, 2010, p. 10).

The English curriculum, which used to emphasize the teaching of discrete grammar items and words through a bottom-up, part-to-whole approach, has now transitioned into a more holistic, book-based, whole-part-whole approach, where students are regarded as active, critical and creative learners with teachers whose job is to facilitate and differentiate learning materials according to the students' diverse needs and capabilities.

1.1   Overview of the Textbook Situation in Singapore

In Singapore, English textbooks are a resource tool utilized by teachers when designing the scheme of work or adapted as learning resources to be used in lessons. Prior to 2001, where textbooks are concerned, the syllabuses for primary and secondary school English were aided by textbooks written by former Curriculum Development Institute of Singapore (CDIS) of the Ministry of Education (MOE) (Lim, 2002). Today, the private sector has been tasked with the role of textbook writing, where publishers would be provided snippets of the subject's syllabus in order to produce their own textbooks. Subsequently, school personnel would be given the choice to select the textbooks to be used in their respective schools. According to the latest approved textbook list by MOE, there are currently only three approved English textbook titles for the Secondary level, namely *All About English* (for all streams in Secondary 1-4), *English Access* (Secondary 1 and 2 Normal Technical only) and *English Empowers* (Secondary 1 and 2 Express and Normal Academic only).

Although the intention of delegating the role of textbook writing to the private sector was to provide a greater variety and choice for schools, it became apparent that the textbooks were unable to effectively embody the syllabus' goals and objectives (Lin, 2003). For example, these textbook writers might not have actually comprehended the thought processes and underlying pedagogical approaches which shaped the crafting of certain goals in the syllabus. In her review of primary school textbooks, Teo (2002) states that while they cosmetically represented the revised and updated syllabus, publishers did not necessarily offer resources in alignment to the syllabus' philosophy.

1.2   Analytical Frameworks for Analysing Questions

In this research article, a cognitive rigour matrix, designed by Hess, Jones, Carlock, and Walkup (2009) which superimposes both The Revised (Bloom's) Taxonomy (Anderson & Krathwohl, 2001) and Webb's (1997) Depth-of-Knowledge (DOK) model, was chosen as the framework for analyzing the questions in the English textbooks.

   These two models are frequently used in the educational domain for evaluating curriculum, instruction, assessment and materials (Coleman, 2011). Bloom's taxonomy takes into account six levels for analysing the goals of the cognitive domain among students: *Remember, Understand, Apply, Analyze, Evaluate* and *Create*. This taxonomy is hierarchical, with *knowledge, comprehension* and *application* categorized as 'Lower-order questions' and *analysis, synthesis* and *evaluation* as 'Higher-order questions' (Feng, 2013). While Bloom's taxonomy describes the necessary thinking processes when answering a question, the DOK model accounts for the complexity of content comprehension and the type of skills needed to fulfill a question's requirements from its inception to finale (Hess et al., 2009). Webb's DOK model provides an alternative perspective of cognitive complexity by analyzing the kind of subject material being assessed in a question and the required task students set out to answer (Webb, 1997).

   The combination of these two models, through a Cognitive Rigour Matrix (CRM), forms an overall comprehensive structure for defining questions' rigour, thus providing a holistic approach to analyzing the questions. CRM has been used a tool by educators and curriculum planners as a strategy for analyzing instructional materials because of its significant potential in enhancing the planning of instructions and assessments being carried out in the classroom (Hess et al., 2009).

1.3   Research Focus

As stated earlier, one objective of the current English syllabus is to equip students with the literacy and critical skills to communicate effectively and purposefully using the internationally acceptable standard of English (Curriculum Planning & Development Division, 2010). To achieve this, it is necessary to trigger students' thinking by ensuring that they are able to move on from merely factual recall or procedural levels, and to take part in higher-order thinking skills, such as the application, analysis, evaluation and creation of knowledge.

   While the recent shifts in the goals of the syllabus have been encouraging, there is the challenge of translating the goal of this new syllabus into appropriate textbooks for students (Mee, 2002). In order to embrace the notion of 'students as active thinkers and learners' in our schools today, teachers should be aided by quality textbooks to provide students the opportunities to remember, understand, apply, analyze, evaluate and create the learning material in the form of questions. The types of questions that educators engage students in, aided by the questions posed in textbooks, to a large extent, impact the type and level of thinking processes which pupils are exposed to and able to practice on a daily basis (Chin, 2004). This calls for the need to investigate if the questions used in textbooks today are aligned with the objectives of the English curriculum to lead students from a situation of

merely memorizing material, to the ability of engaging in higher-order thinking skills.

Despite the fact that the *All About English* textbooks have been approved by MOE to be officially used in secondary schools since 2013, studies evaluating these textbooks in their alignment to the objectives of the English curriculum seem inadequate in the body of literature. Taking into account the fact that the period approved for *All About English* textbooks is set to be renewed in 2019, it is timely to assess and evaluate the present textbooks used in schools.

The results from the textbook's evaluation would be able to help teachers better comprehend which levels of questioning are emphasized in the textbook to develop students' thinking, enhancing the effective usage of these textbooks. Lastly, the results from this paper will be a good indicator for future English textbook writers regarding the form, level and efficacy of the questions required in a textbook to develop higher-order thinking in students, a skill required in the 21st century.

We therefore set out to address the following three research questions to assess the extent to which the textbooks promote students' thinking:

1. Which levels of the 'Revised Bloom's taxonomy' are represented in the questions in the textbooks?
2. Which levels of the 'Webb's Depth-of-Knowledge (DOK) model' are represented in the questions in the textbooks?
3. What is the overall distribution of the cognitive rigour posed by the textbook questions?

1.4   Literature Review

A multitude of studies in various countries have been carried out in order to explore the types of cognitive processes used in textbooks' questions of various subjects, with the usage of Bloom's taxonomy as a tool for classifying and analysing the questions. Recent research in this field includes studies conducted by Sunggingwati (2003), Riazi and Mosallanejad (2010), Igbaria (2013), Tarman and Kuran (2015), and Adli and Mahmoudi (2017), which have repeatedly shown that textbooks, ranging from high-school to master's levels, still have a preponderance of lower-order questions of remembering and understanding. This is despite the fact that education experts have repeatedly stressed the importance to include an impartial number of both LOTS and HOTS questions catered to students' standards for enhancing students' achievement (Freahat & Smadi, 2014). While LOTS questions can help boost students' attainment of factual knowledge and strengthen the fundamentals of students in their attainment of higher cognitive levels, HOTS questions should be utilized to stimulate students' thinking and enhance their development of intellectual skills to solve problems and make decisions.

Furthermore, a study done by Adli and Mahmoudi (2017) also highlighted the worrying trend that textbooks, which supposedly cater to a range of learners' profiles, tended to combine a mix of LOTS and HOTS question types undiscriminatingly. For example, results from the study conducted by Tarman and Kuran (2015) showed that textbook questions catered for higher-ability students did not intentionally include a higher number of cognitively

demanding questions catered for the student profile. However, questions of varying cognitive levels used in textbooks serve as a platform to improve students' comprehension of the text (Freahat & Smadi, 2014) as the cognitive level of a question has shown to promote an interplay between pupils' current schema and the comprehension material (Wixson, 1983). This makes it imperative for the types of questions in the textbook to deliberately take into account the varying aptitude levels of students. It is therefore unsurprising that a common recommendation that these authors have towards textbook publishers is to place more emphasis on questions that encourage an impartial mix of LOTS and HOTS processes, tailored to the learners' abilities.

      While Bloom's taxonomy proves to be a useful model to categorize questions according to their cognitive complexity, it suffers limitations because it incorporates verbs for the differentiation of taxonomy levels although numerous verbs may be included at several levels of complexities. For example, the context in which the verb is situated in modifies the meaning of the sentence. Although a verb might be categorized as requiring LOTS in one context (e.g., *recognizing* a definition of a scientific term), the exact same verb may actually be requiring HOTS in an alternative context (e.g., *recognizing* circumstances which could lead to conflicts in a particular situation) (Stanny, 2016). Regardless of context, there are numerous words used in questions that might have several connotations and meanings, resulting in uncertainty about the level of cognitive skill intended by the writer when classifying the questions. This has led to the lack of articulation of the complexities the taxonomy might have unintentionally brought about (Hess et al., 2009). To address the problem, a novel model to examine the rigour posed by questions, the Depth-of-Knowledge model (DOK) by Webb (2002), was developed to include the depth of students' comprehension and the complexity of the content in the required task. A variety of DOK level descriptors were developed for various subjects such as English (Hess, 2004), Science (Hess, 2006) and Social Studies (Hess, 2005). However, as there was a lack of a straightforward and direct correspondence relating to Bloom's taxonomy and the DOK model, a matrix was formed to superimpose the both of them (Hess, 2006). The resulting cognitive rigour matrix connects the two schemata, providing teachers a model to analyse the rigour expected from the questions. Since then, studies have been conducted using the CRM to analyze homework questions, quizzes and worksheets (Hess et al., 2009).

      Lastly, while most studies only used Bloom's taxonomy to analyze questions in textbooks, Parker and Hurry (2007) incorporated the use of Blosser's (1991) taxonomy to further analyze the reading comprehension questions based on whether they were 'open' or 'closed', thus providing insight into the form in which questions were being asked. While few studies have used Blosser's taxonomy as a means to categorize questions, such a model could perhaps illustrate additional methods in which textbook publishers could hinge on, in order to differentiate question types for students of varying learning abilities.

2.   Method

2.1   The Textbooks

The target textbooks under evaluation is the *All About English* Secondary Three Express and Normal Technical textbooks published by Hodder Education in 2012. The textbooks are divided into six sections, each section targeting a specific learning objective derived from the 2010 English Syllabus for Secondary School students. Table 1 indicates the topics covered in the Express and Normal Technical textbooks, respectively. For this research, only two out of the six sections (boldfaced) in each textbook were randomly chosen to have their learning objectives and questions analyzed. In this case, the first two chapters were chosen for the Express textbook, and chapters 2 and 5 chosen for the Normal Technical textbook.

Table 1
Contents page of the Secondary Three Express and Normal Technical "All About English" textbooks

Secondary Three Express	Secondary Three Normal Technical
1 **Using Language to Persuade**	1 Using Language to Interact Socially
2 **Using Language to Inform**	2 **Using Language to Inform**
3 Using Language to Evaluate	3 Using Language to Explain
4 Using Language to Express Thoughts and Feelings	4 Using Language to Entertain
5 Using Language to Interact with Others	5 **Using Language to Persuade**
6 Using Language to Entertain	6 Using Language to Communicate for Work

2.2   Student Profile

In the Singapore context, Secondary Three textbooks are catered to 15-year old students. At the secondary level, Singapore students are streamed into one of the three streams (Express, Normal Academic and Normal Technical) based on their Primary School Leaving Examination results. The 'Express' stream is referred to as the higher-ability stream and students would sit for an academically rigorous 'O' level national examination in Secondary Four. On the other hand, students in the 'Normal Technical' stream are referred to as less 'academically-inclined' (Moo, 1997) and have to sit for a comparatively less academically rigorous 'N' level national examination.

The level 'Secondary Three' has been specifically chosen because it is a critical stage for students, where they begin to intensively prepare for the national exams. Students at this level should be adequately exposed and provided the foundation to LOTS and HOTS questions in order to further their thinking skills when entering Secondary Four. Therefore, the examination of the questions found in Secondary Three textbooks would shed light on the extent in which students of that level are exposed to lower- and higher-order thinking skills.

2.3   Data Collection and Analysis

The data required for this study were collected in two stages:

a. **The First Stage:** One copy of each of the Secondary Three Express and Normal Technical *All About English* textbooks was obtained. All 346 questions from the relevant sections in the textbooks were collated and categorized based on Bloom's taxonomy and Webb's DOK levels. The analysis of the Normal Technical textbook consisted of pages 42-77 and 160-195. Similarly, the Express textbook was analysed, consisting of pages 2-42 and 48-90. The questions were listed and analysed according to the level of the cognitive domain based on the cognitive rigour matrix.
b. **The Second Stage:** After all the questions were categorized, the frequencies of each level of Bloom's taxonomy/Webb's DOK model were organized into graphs and tables.

2.4   Unit of Analysis

Questions form the unit of analysis for this research. The questions analysed in this paper consist of sentences with an interrogative form (Cotton, 1988). Most questions started with WH- stems (i.e., 'who', 'what', 'which', 'where', 'when', 'why' and 'how'), together with a question mark at the end.

In this research paper, Directed Content Analysis was used as the primary research method to code the types of LOTS and HOTS questions used in the English textbooks. Content analysis necessitates the establishment of various categories. The data collected are slotted into the categories and the number of occurrences in which they are found in a text are finally tabulated (Joffe & Yardley, 2004). This form of analysis is noted as a methodical system to compress numerous words into a fixed number of content categories founded on explicit definitions of each category (Berelson, 1952; Krippendorff, 2018). The directed approach to content analysis uses existing theories, which in this case include the Revised Bloom's taxonomy and Webb's DOK model, to derive initial coding categories and operational definitions for each category.

3.   Results

Distribution of Questions Based on the Revised Bloom's Taxonomy: Secondary Three (Normal Technical or NT)
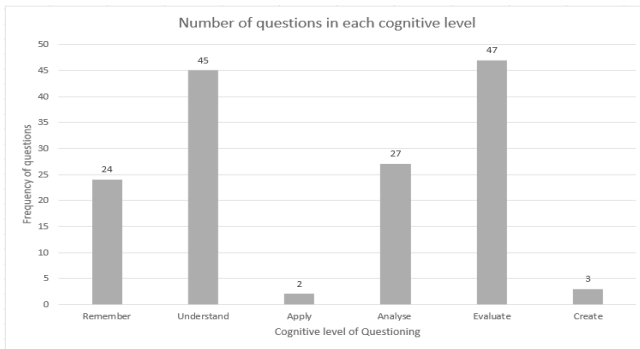
Figure 1. *Frequencies of questions in the six levels of the cognitive domain in the Revised Bloom's Taxonomy in Chapters 2 and 5 in the Normal Technical textbook "All About English"*
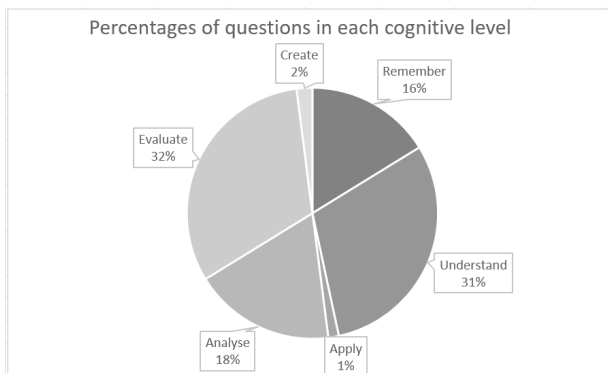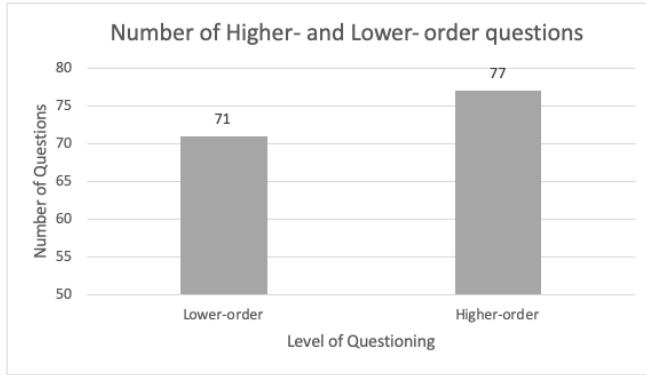

Figure 2. *Percentages of the questions in the six levels of the cognitive domain in the Revised Bloom's Taxonomy in Chapters 2 and 5 in the Normal Technical textbook "All About English"*

Figure 1 shows the frequencies and Figure 2 shows the percentages for the questions represented in each level in the NT textbook. The occurrences in the table range from 2-47, with percentages ranging from 1%-32%. The levels that appeared most frequently were *Evaluate* and *Understand*, with percentages of 32% and 31%, respectively. *Apply* and *Create* received the lowest percentage at 1% and 2%, respectively. The last two levels *Remember* and *Analyse* appeared at almost equal percentages at 16% and 18%, respectively.

Overall Distribution of Higher- and Lower-order Questions in the Normal Technical Textbook *All About English*


Figure 3. *Frequencies of higher- and lower-order questions in the Normal Technical textbook "All About English"*

Based on Figure 1, the two categories of Lower- and Higher-order questions were tabulated. From Figure 3, the results show that the textbook generally places a greater emphasis on the higher-order thinking processes at a frequency of 77 questions, as compared to 71 lower-order questions only. However, the difference between the two is small.

**Distribution of Questions Based on the Revised Bloom's Taxonomy: Secondary Three (Express)**
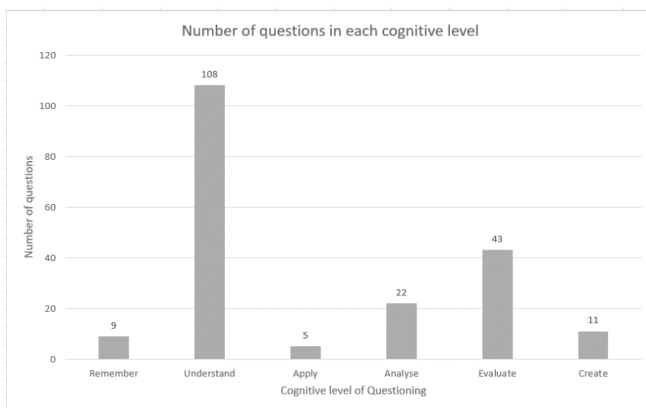
Figure 4. *Frequencies of questions in the six levels of the cognitive domain in the Revised Bloom's Taxonomy in Chapters 1 and 2 in the Express textbook "All About English"*
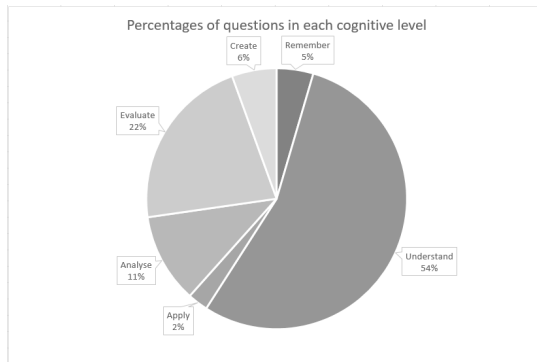
Figure 5. *Percentages of the questions in the six levels of the cognitive domain in the Revised Bloom's Taxonomy in Chapters 1 and 2 in the Express textbook "All About English"*

The frequencies in Figures 4 and 5 ranged greatly from 5-108, with percentages ranging from 2%-54%. The level that dominated the figures was *Understand*, with a percentage of 54%. The second more represented level was *Evaluate*, with a percentage of 22%. The level represented the least was *Apply*, at 2%. The rest of the levels, *Analyse*, *Create* and *Remember* had percentages of 11%, 6% and 5%, respectively.

Overall Distribution of Higher- and Lower-order Questions in the Express Textbook *All About English*
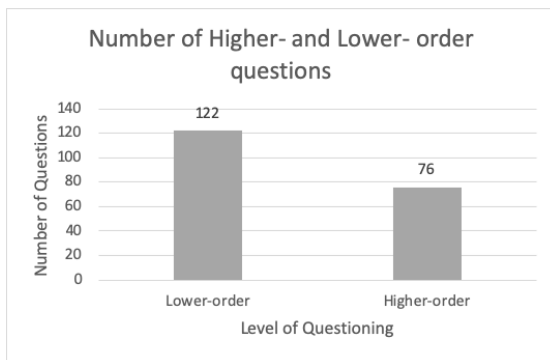
Figure 6. *Frequencies of higher- and lower-order questions in the Express textbook "All About English"*

Figure 6 shows the frequencies of higher- and lower-order questions in the Express textbook. It is evident that lower-order questions appeared more frequently at 61.7% (122 questions), as compared to 38.4% (76 higher order questions).
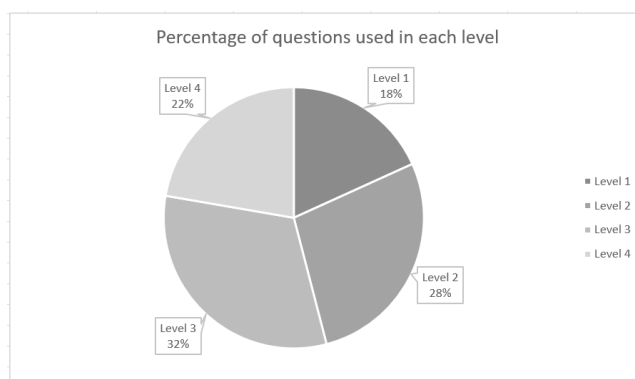
Distribution of Questions Based on Webb's Depth-of-Knowledge (DOK) Model
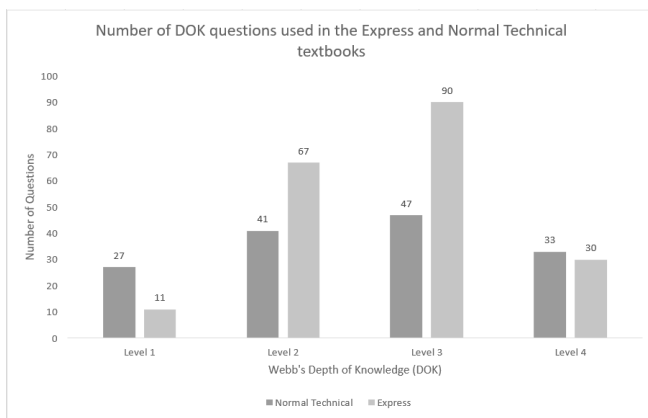
Figure 7. *Frequencies of questions in the four levels of Webb's DOK Model in the Express and Normal Technical textbooks "All About English"*

Figure 7 shows the frequencies of the four levels of the DOK model in the Normal Technical and Express textbooks. In general, both textbooks show the highest number of Level 3, 'Strategic Thinking' questions; followed by Level 2, 'Skills and Concepts' questions; Level 4, 'Extended Thinking' questions; and finally Level 1, 'Recall and Reproduction' questions.

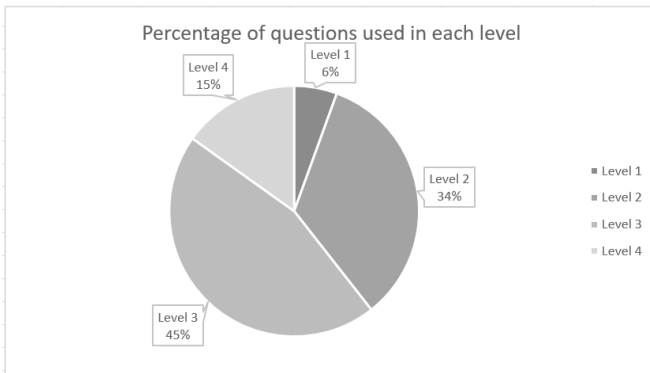## Distribution of Questions According to the DOK Model: Secondary Three (Normal Technical or NT)

Figure 8. *Percentages of the questions in Webb's DOK Model in Chapters 2 and 5 in the Normal Technical textbook "All About English"*

Figure 8 represents the percentages of the four levels in Webb's Depth-of-Knowledge (DOK) model. Generally, the levels are quite evenly distributed. The level that appeared most frequently was Level 3, at 32%. Level 2 and Level 4 questions were represented at 28% and 22%, respectively. Level 1 questions appeared the least, at 18% only.

Distribution of Questions According to the DOK Model: Secondary Three (Express)

In Figure 9, there is once again a large disparity between the levels of questions asked in the textbook. Level 3 dominates the number of questions, with a total of 45%. On the other hand, Level 1 received the lowest percentage of only 6%. Level 2 and Level 4 were 43% and 15%, respectively.

Figure 9. *Percentages of the questions in Webb's DOK Model in Chapters 1 and 2 in the Express textbook "All About English"*

Overall Distribution of the Cognitive Rigour Questions
Secondary Three (Normal Technical)

Table 2
Density plot of the cognitive rigour of questions posed in the Secondary Three Normal Technical English textbook "All About English"

1 Remember	8.1%	5.4%	2%	0.7%
2 Understand	0.7%	14.2%	14.2%	1.4%
3 Apply	0.7%	0%	0.7%	0%
4 Analyse	6.1%	2.7%	6.8%	2.7%

Table 2 continued...

	1 Recall & Reproduction	2 Basic Application of Skills/ Concepts	3 Strategic Thinking	4 Extended Thinking
5 Evaluate	1.4%	4.7%	8.1%	17.6%
6 Create	1.4%	0.7%	0%	0%

Table 2 indicates that the questions posed in the Normal Technical textbook has a majority of questions correlating to the [5,4] cell, at 17.6%. There is also a relatively high number of questions in the [2,2] and [2,3] cells, at 14.2% each.

Secondary Three (Express)

Table 3
Density plot of the cognitive rigour of questions posed in the Secondary Three Express English textbook "All About English"

	1 Recall & Reproduction	2 Basic Application of Skills/ Concepts	3 Strategic Thinking	4 Extended Thinking
1 Remember	2%	2.5%	0%	0%
2 Understand	0.5%	15.7%	35.9%	2.5%
3 Apply	0%	1.0%	0%	1.5%
4 Analyse	1.0%	5.6%	3.5%	1.0%
5 Evaluate	0.5%	5.0%	6.1%	10.1%
6 Create	1.5%	4.0%	0%	0%

Table 3 indicates that the questions posed in the Express textbook has a preponderance of questions correlating to the [2,3] cell, at 35.9%. It is also evident that there is also a relatively high number of questions in the [2,2] and [5,4] cells, at 15.7% and 10.1%, respectively.

4.   Discussion

The results of the study revealed a number of interesting findings. Firstly, there is a preponderance of questions which emphasize lower-level thinking processes in the Express stream textbook *All About English*. In Figure 6, 61% of the questions required LOTS, while 39% required HOTS. This finding is in line with the results of past research discussed in the literature review, which shows that the majority of textbook questions consist of lower-order cognitive processes, such as *Knowledge* and *Comprehension*. Nonetheless, a higher number of LOTS compared to HOTS questions ought not to affect the judgement of the textbook being analysed. For example, Bloom, Englehart, Furst, Hill, and Krathwohl (1956) stressed the need to offer LOTS questions to pupils as a foundation for them to subsequently progress on to higher levels of cognition.

Besides, by using Webb's DOK model as an added layer to analyze the nature of these questions, we found that the majority of the lower-order *Understand* questions are categorized under 'Level 3', whereby students exercise 'Strategic Thinking' and not merely the application of skills and concepts. For example, in Table 3, a large percentage of questions fall under the cell [2,3] where students are required to explain and generalize ideas from a text, as well as draw inferences about the text's purpose and intended audience. On page 84 of the textbook analysed, for example, a question writes, 'What do you think the purpose of the writer is? Why do you think so?' and on page 66, 'What kinds of readers do you think will find this extract useful? Why?'. Aside from being able to construct meaning from the texts, students have to make inferences about the author's intention when writing a particular piece of text. Given that the 2010 and future 2020 English syllabuses heavily hinge on students being able to use English appropriately for various purposes and audiences, this might explain the large number of such questions being posed to students.

Moreover, contrary to past research showing that *Evaluate* questions are rarely found in textbooks, it is heartening to find that 22% of the questions are on the *Evaluate* level in the Express textbook. Additionally, most of these questions fall under Level 4, 'Extended Thinking', of the DOK model. In Table 3, 10.1% of the questions fall under cell [5,4], whereby students have to reflect and develop personal judgements after analyzing and evaluating the text or the opinion made by the author. For example, on page 73 of the textbook, there is the following question: 'Recall some information reports that you have read recently. How do you decide if the information given is credible?' While the question asks students to recall information they have seen previously, students have to reflect on the texts they have read, comparing and contrasting various aspects of the texts in order to substantiate their argument of what makes a particular text 'credible'. Once again, the unique mix of *Understand* and *Evaluate* questions is in line with Bloom's idea that comprehension should be a prerequisite for in-depth understanding before students are given the opportunity to be exposed to higher-order processes such as *Evaluate* and *Create* (Forehand, 2010). Therefore, while lower-order processes such as *Understand* were dominant in the Express textbook under study, this research acknowledges the effort placed by publishers to ensure that higher-order cognitive processes are not entirely absent so that students get a mix of lower- and higher-order questions to enhance their learning.

Secondly, another surprising result stems from the fact that the questions posed in the Normal Technical stream textbook have shown a higher percentage of higher-order cognitive processes as compared to lower-order ones. In Figure 2, the most represented cognitive level is *Evaluate*, at 32%, followed by *Understand* questions. While the Express stream textbook has a disproportionate number of *Understand* questions, the Normal Technical textbook proves to have an almost equal mix of *Understand* and *Evaluate* questions. Similarly, when questions were categorized according to Webb's DOK model, Level 3 appeared most frequently at 32%, with Level 1 questions being the least frequent at 18%. The recurring cognitive rigour of questions which students were commonly engaged in the textbook was cell [5,4] in Table 2, whereby students had to constantly reflect and develop personal judgements based on a piece of text they view or read. An instance of such a question is found in the textbook on page 67, 'Use an Internet search engine such as Google to research the various visuals that can be used to present information. How do you decide which one to use?'. It is clear that not only does this question focus on honing students' evaluative skills to make judgements based on criteria and standards, the students are likewise encouraged to connect with technology by browsing internet sites to find various information. Likewise, these questions were mostly open-ended in order to provoke discussions, such as asking students to discuss whether they agreed or disagreed with the author, with no right or wrong answers.

As compared to previous studies, the percentage of *Evaluative* questions are relatively high, especially so for a textbook catered to students who are academically weaker. These findings are incongruent with past research on textbooks written for students who struggle in English, where authors of these textbooks usually pose questions which call for lower thinking processes and lack levels of *Analysis* or *Evaluation* (Igbaria, 2013). It is evident that this NT textbook challenges the assumptions that low-achieving students are unable to engage in higher-order thinking activities as compared to their high-achieving peers. These findings align to a research conducted by Zohar and Dori (2003) which has shown empirical results that all students, regardless of academic ability, who had the chance to participate in HOTS, actually improved significantly relative to their initial grades. While questions in the Express textbook focused more on close-ended ones, where students had to make precise inferences about what a text means, the questions in the NT textbook were often more evaluative in nature, sparking discussions rather than a specific answer.

It is a common practice for publishers of textbooks catered to weaker students to incorporate the traditional teaching of English via the bottom-up approach, where students study the rules of the language in a fixed and structured manner (Assaly & Smadi, 2015). However, this new method of using a functional approach to teaching English reflects the publishers' view of language as a system of communication (Larsen-Freeman, 2000), where language is learned most effectively through real-world discussions which tend to be more interesting and purposeful to students, regardless of their academic ability.

While it is heartening to see a move towards a top-down approach from textbook publishers, one area of concern would be the fact that not all cognitive levels of the questions in the two textbooks were fairly varied. The results show that there was a majority of *Understand* and *Evaluate* questions, but few *Apply*, *Remember* and *Create* questions. For example, there were 108 *Understand* questions and only five *Apply* and nine *Remember* questions in the Express textbook. In a research paper by Armbruster and Ostertag (1993),

they claim that not all questions should require HOTS, as "…the use of factual questions can be defended on the grounds that students need to know certain basic information before they can engage in higher-order thinking" (p. 2). Therefore, having a number of LOTS questions in both textbooks would provide students with lower-level information as a basis for these students to progress on to higher levels of reasoning.

5.   Conclusion

Experts believe that there are three key factors that play an important role in classroom teaching: the teacher, the pupil and the textbook through which the curriculum is enacted. Given that textbooks are fundamental to the educational progress and curriculum, it is crucial for schools to ensure that quality textbooks are put in place to adequately address students' needs in all cognitive processes, where students engage in HOTS questions (Chinoda, 1982).

Based on the analysis of the questions in the two textbooks, we come to the conclusion that the *All About English* textbooks incorporated reading-comprehension questions that necessitated both the lower-level and the higher-level cognitive demands. The cognitive rigour of questions in the textbooks are well aligned with the curriculum's goals regarding the importance of training Secondary Three students, regardless of academic ability, to engage in questions which require higher cognitive demands. Besides preparing students for the national examinations, these skills will eventually contribute to students being able to effectively use English as a system of communication in the workplace and for day-to-day life. This is in accordance to the 2010 English Curriculum which emphasizes critical thinking and skills to communicate effectively using English appropriate for different purposes, audiences, contexts and cultures.

However, one concern would be the finding that not all cognitive levels were clearly varied, with an overemphasis on *Understand* and *Evaluate* questions, neglecting *Remember* and *Apply* questions. Based on the conclusions of this research, it is proposed that coursebook writers incorporate questions of diverse cognitive demands so as to prepare pupils with the capability to accomplish tasks at various cognitive levels in English at the school currently, and the workplace in the future. Next, empirical data should be collected in schools to assess if the cognitive levels of questions in the two textbooks are indeed aligned to the cognitive levels of the students at each stream, and their potential in enhancing students' critical thinking. Finally, it is imperative for similar studies to be conducted on other levels' textbooks regularly in order to evaluate the extent to which these textbooks suit the students' proficiency, taking into consideration the changing nature of the English curriculum in Singapore.

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