

An Investigation of Critical Thinking Manifested in the Questions of EFL Textbooks for Tertiary-Level English Majors of China

American Journal of Education and Learning

Vol. 3, No. 2, 72-84, 2018

e-ISSN:2518-6647



Corresponding Author

Yidi Wu¹

Zhengwei Pei²

^{1,2}College of Foreign Studies, Nanjing Agricultural University, P. R. China

¹Email: 2017115006@njau.edu.cn

²Email: zwei@njau.edu.cn

ABSTRACT

This study aimed at investigating to what extent critical thinking (CT) is manifested in the questions of three English textbooks commonly used in *Intensive Reading* course for undergraduate English majors of China. For this purpose, the after-text reading comprehension questions in *English Through Culture*, *Contemporary College English* and *Think English* were coded and classified based on Bloom *et al.* (1956). Two major findings have emerged. First, as far as the simple questions are concerned, the lower-order questions are more prevalent in the EFL textbooks, but a gradual increase in compilers' awareness of incorporating CT cultivation into textbooks is observed over time, with higher-order questions outnumbering their counterparts in *Think English*. As regards the composite questions, *Think English* has the highest percentages of upward questions, wavy questions and upward waveform questions, three types of composite questions most beneficial to CT cultivation. Therefore, the recently published *Think English* satisfactorily fulfills the educational objective of fostering English majors' CT skills in terms of its questioning design. The study concludes by discussing its implications and suggestions for future avenues of research.

Keywords: *Textbook evaluation, Critical thinking skills, Bloom's taxonomy, Reading comprehension questions, English majors, Chinese universities.*

DOI: 10.20448/804.3.2.72.84

Citation | Yidi Wu; Zhengwei Pei (2018). An Investigation of Critical Thinking Manifested in the Questions of EFL Textbooks for Tertiary-Level English Majors of China. *American Journal of Education and Learning*, 3(2): 72-84.

Copyright: This work is licensed under a [Creative Commons Attribution 3.0 License](https://creativecommons.org/licenses/by/3.0/)

Funding: This study was supported by Fundamental Research Funds for the Central Universities, China (Grant No. SKCX2016004).

Competing Interests: The authors declare that they have no competing interests.

History: Received: 18 June 2018/ Revised: 16 August 2018/ Accepted: 19 September 2018/ Published: 9 October 2018

Publisher: Online Science Publishing

1. INTRODUCTION

Fostering critical thinking (hereafter CT) has presently been put on the agenda of educational endeavors not only in the West but also in Asian countries where CT-oriented programs such as Malaysian *Smart Schools Program*, Singaporean *Program of Thinking Schools, Learning Nation* are established (Richmond, 2007). In 2010, China's Ministry of Education (MoE) issued *The National Guideline for Medium and Long-Term Educational Reform and Development (2010-2020)* (*National Guideline*), placing priority on students' critical thinking and innovative abilities (China State Council, 2010). Afterwards, CT cultivation listed among the core objectives of tertiary education has grabbed attention from academia of teaching English as a Foreign Language (EFL) in China.

As a group of undergraduates majoring in the English language and literature, English majors of China are regrettably criticized for lacking CT. They suffer from CT deficiency due to years of focused EFL teaching on language skills rather than on CT (Huang, 1998). Since the issuance of the *National Guideline*, CT-related studies mushroomed and got published in nine leading foreign language journals of China to improve university EFL learners' CT abilities by exploring the patterns of integrating CT elements into English courses of speaking, reading, writing, and translation, etc., as reported in Yang and Ren (2016) review study, but none of them examined whether the textbooks for these courses facilitate students' CT cultivation or not. To bridge this gap, the present study empirically analyzed three EFL textbooks in hopes of promoting English majors' CT skills from the perspective of textbook compilation. CT is broadly composed of skills and disposition. CT skills concern cognitive skills such as interpretation, analysis, evaluation, explanation, and inference, whereas CT disposition relates to the affective domain, covering inquisitiveness, truth-seeking, open-mindedness, self-confidence and so on (Facione *et al.* (1994). This study focused on CT skills.

2. LITERATURE REVIEW

Albeit the gradual popularity of computer-assisted and multimedia-enhanced EFL instruction with the advancement of college English teaching reform of China, textbooks still remain the core of teaching and testing in Chinese universities (Liu, 2013). EFL textbooks nowadays always come as a package comprising the student's book, teacher's reference book, workbook, and courseware, etc., which teachers find expedient to use in their lectures. Textbooks refer to technical manuscripts prepared in accordance with teaching programs to provide knowledge tailored to the cognitive level of students, presenting content from easy to hard and offering an opportunity for the learner to develop systematically (Tarman and Kuran, 2015). Textbooks have the potential to impact teachers' instructional modes, the content and the style of their class. To meet the increased demand of cultivating EFL learners' CT skills, EFL textbooks are supposed to be compiled to develop higher-level thinking skills.

Constant evaluation of textbooks is of great pedagogic value. As diverse EFL textbooks abound on the local market and are simultaneously adopted by different universities, the necessity arises for textbook evaluation in order to weigh the advantages of one over the others in terms of CT cultivation, which in turn will lead to the adoption of the proper textbook.

2.1. Bloom's Taxonomy

Among the theoretical frameworks in education, Bloom's taxonomy of cognitive domain is widely used for the classification of educational objectives (Tarman and Kuran, 2015). In 1956, Bloom and his collaborators formulated a taxonomy of educational objectives labeled as Bloom's original taxonomy. It was later upgraded by Anderson and Krathwohl to be a revised taxonomy. The original taxonomy subsumes six major categories in the cognitive domain including *knowledge, comprehension, application, analysis, synthesis, and evaluation*. It represents a cumulative hierarchy

in the sense that the six categories of the cognitive process differ in their complexity, with *knowledge* being less complex than *comprehension*, which is less complex than *application*, etc. In other words, *application* is on a higher cognitive level than *comprehension*, which is higher than *knowledge*. The revised taxonomy is a two-dimensional framework: knowledge and cognitive processes. The former most resembles the original *knowledge* category; the latter includes *remember*, *understand*, *apply*, *analyze*, *evaluate*, and *create*, also arranged from simple to complex and from concrete to abstract, in a hierarchical structure (Krathwohl, 2002).

A highly effective way to improve students' thinking skills and cognitive growth in class is through teacher questioning, because questions can motivate students to think and then help achieve the educational goals (Seker and K m r, 2008). Bloom's original taxonomy has been translated into 22 languages, exerting far-reaching influence on global educational practices. It can be used to determine the cognitive levels of questions posed by teachers. How to classify the six categories of questions varies with different research purposes and settings. In this study, they were classified into lower-order and higher-order questions. Lower-order questions correspond to the bottom two categories (*knowledge*, *comprehension*), concerned with knowledge of subject matter or recall of facts and specifics, requiring lower cognitive processes such as memorizing facts, interpreting information, or paraphrasing. Higher-order questions, on the other hand, correspond to top four categories from *application* to *evaluation*, requiring novel answers and thus demanding students' greater effort to think critically about cause and effect relationships and find effective solutions to the problems in complex situations (Renaud and Murray, 2007; Dumteeb, 2009). Higher-order questions are usually considered the most important goals of education (Krathwohl, 2002). They should be addressed more often for the purpose of fostering students' CT skills.

2.2. Relevant Studies

Empirical research in other EFL contexts has been conducted towards examining the manifestation of CT in reading questions of specific English textbooks using Bloom's taxonomy, original or revised. Note that in this study we focused on and employed Bloom's taxonomy instead of other CT models such as Facione's as well as Paul and Elder's. Aside from its far-reaching educational influence and suitability to our research purpose, our literature review shows that more researchers have utilized Bloom's taxonomy to analyze reading questions in textbooks for EFL learning and other subjects.

In Palestine, Alul (2001) investigated the instructional questions in the 8th-grade English textbooks to see whether they enhanced higher-level thinking skills of students. Questions present in the student textbook, workbook and stories were analyzed and compared; results demonstrated a preponderance of lower-order questions in the studied books. Zareian *et al.* (2015) surveyed the types and cognitive levels of 218 questions in two English for Specific Purposes textbooks used in Iranian universities for several academic years in the framework of Bloom's revised taxonomy. They found that the questions were mostly aligned with *remember*, *understand* and *apply* as the three lower-level categories, while *analyze*, *evaluate*, and *create* as the three higher-level categories constituted the lowest frequency in the two textbooks. Results indicate that the textbooks fail to engage learners in the questions requiring higher levels of cognitive learning objectives. Ulum (2016) in Turkey explored to what extent reading comprehension questions in the reading sections of the EFL coursebook *Q: Skills for Success 4 Reading and Writing* by Oxford Publishing are distributed across the lower and higher cognition levels of Bloom's taxonomy. Findings suggested that the coursebook lacked the practice of higher-level cognitive skills. The questions therein are merely on low cognitive levels, covering *knowledge* and *comprehension*, with respective percentages of 51% and 49%.

In Israel, Igbaria (2013) analyzed the WH-questions in the 9th-grade textbook *Horizons* used in the Arab and Jewish sectors. He reported that a total of 244 questions emphasized lower-level thinking skills, while only 137

questions emphasized higher-level thinking skills. Nearly 30% of questions focused on *comprehension*, one type of lower-order questions. Assaly and Smadi (2015) evaluated the cognitive levels of the questions following the reading texts of *Master Class* textbook, and found that about 40% of the questions highlighted higher-level thinking skills, which went with the requirements of the revised 2007 Israeli national curriculum.

EFL textbooks for Jordanian learners at different stages are also under study. The purpose of the Olimat (2015) study was to evaluate a total of 1121 questions in *Action Pack* series English textbooks for 7th, 8th, 9th, and 10th graders and to determine the percentages of the questions on six cognitive levels. Results of the study indicated a preponderance of the low-order questions. Sulaiman and Abdelrahman (2014) study analyzed 655 questions in the 10th-grade English textbooks used during the academic year 2012-2013 to check the distribution of the questions over six cognitive levels of Bloom's revised taxonomy. It turned out that most of the questions were within the first two levels of *remember* and *understand* (55.11%), and the two surveyed textbooks were dominated by lower-order questions. Freahat and Smadi (2014) reported that the reading parts of two high school EFL textbooks (*Action Pack 11*, *Action Pack 12*) and one introductory university EFL textbook (*New Headway Plus Pre-Intermediate*) had a dominant emphasis on questions that involved the lower-level of thinking processes. Reading materials in the university textbook did not show a higher level of thinking, but instead the reading content in the high school textbooks revealed more concentration on higher-order questions.

To recap, cultivation of CT skills seems not to be desirably embodied in EFL textbooks of other countries. Studies by Yun (2010) and Sobkowiak (2016) though not applying Bloom's taxonomy, produced a similar finding. The former study unraveled the EFL textbooks in Korea not being taught primarily to develop CT but as a means of "banking education", while the latter one analyzed 20 English coursebooks in Polish schools only to find their limited capacity to develop students' CT skills.

In China, researchers have realized the role that EFL textbooks play in stimulating students' CT. Xu *et al.* (2015) for example, presented an analysis of a well-received EFL textbook *Science and Technology* published in 2008 Germany and expounded how it successfully integrates the cultivation of CT abilities into the learning of content knowledge and the training of English language skills, in hopes of providing enlightenment for the compilation of textbooks for English majors in China. Nonetheless, few empirical studies are available. Dong (2012) scrutinized *Contemporary College English*, a core textbook for college English majors. Analysis of after-text reading comprehension questions in Volumes 5 and 6 revealed that the ratio of Critical Thinking Training questions to Language Skills Training questions is about 1: 8.3. Dong considered an after-text question requiring analyzing, synthesizing, judging, inferring, and discriminating to be cultivating CT, but did not use a framework for objective classification and analysis.

The present study investigated the after-text reading comprehension questions in three EFL textbooks for English majors by using Bloom's original taxonomy. Its purpose was to examine to what extent CT is manifested in the textbook questioning design and whether the distribution of lower- and higher-order questions can fulfill the educational objective of cultivating CT skills of English majors in Chinese universities. Selecting after-text reading comprehension questions rather than the whole cohort of exercises was to eliminate the effects of vocabulary and grammar practice primarily designed for the improvement of language skills. Generally speaking, exercises of vocabulary and grammar involve recall and practice on new words or grammatical rules; they are more language-oriented than thinking-oriented. Instead, reading comprehension questions provide an opportunity to tap students' CT potential while checking their understanding of the newly learned texts.

3. METHOD

3.1. Research Questions

Three research questions were addressed:

- (1) What is the cognitive distribution of the simple questions in the three EFL textbooks for Chinese undergraduate English majors?
- (2) How do the composite questions (consisting of simple questions in a sequence) cognitively develop in the three EFL textbooks?
- (3) Are there any differences across the textbooks as far as the simple and composite questions are concerned?

Our research into composite questions was inspired by the Chinese scholar Yang (2015) pioneering work. Based on her findings, Yang summarized four modes of cognitive development: lateral, upward, downward, and wavy. The first three pertain to one-way development. Wavy development is subdivided into lateral waveform, upward waveform, and downward waveform.

3.2. Materials

Three textbooks commonly in use for English majors' *Intensive Reading* course in their freshman year were selected as representatives for analysis: *English Through Culture*, *Contemporary College English*, and *Think English*. They have a seal of approval granted by the MoE, all published by Foreign Language Teaching and Research Press, the largest foreign language publishing house located in Beijing. The first volume of each textbook fell into the scope of this study.

Jointly compiled by Chinese and American scholars in 2004, *English Through Culture* is meant to raise learners' cultural awareness via authentic and original English readings while developing their language skills. *Contemporary College English* comes out in 2010, devoted to improving learners' language skills and communicative competence. Published in 2015 after the release of the *National Guideline*, *Think English* is specifically designed to tap learners' CT in the course of promoting their intercultural competence, autonomous learning ability, and humanistic quality.

In each textbook, there are more than ten units. Each unit consists of two reading texts. The first text is usually the main one for classroom teaching, where a list of questions is attached to check students' comprehension of the text. Those reading comprehension questions constituted the materials for our analysis. They are either simple or composite questions. The composite question is made up of several simple questions. The numbers of units and questions in each textbook are displayed in Table 1. "Questions" here refers to the simple questions plus the simple questions involved in the composite questions.

Table-1. Numbers of the Units and Questions in Each Textbook

	English Through Culture	Contemporary College English	Think English	Total
N of units	16	14	15	45
N of questions	282	414	329	1025

3.3. Procedure

We first designed a coding scheme (Table 2) based on the literature surrounding Bloom's taxonomy (i.e., Bloom *et al.*, 1956; Seker and Kömür, 2008; Dumteeb, 2009; Yang, 2015). The first author, after getting acquainted with the coding scheme, made a tally sheet and then coded the questions in all the units. Several days after the first round of coding, she double-checked the results of classification. Disagreements were discussed between the two authors and revisions were made. Finally, to increase the coding reliability, the first author coded the sample of

revised questions in the second round of coding again for the third time prior to data analysis, with a two-week interval. The intra-coder agreement rate was 0.91.

Table-2. Coding Scheme Based on Bloom's Original Taxonomy

Category	Definition	Question words/patterns	Examples
Knowledge	to recall, recognize facts, definitions and observation	tell, repeat, recite, name, label, identify, describe, arrange, reproduce, who? what? where? can you recall...? can you list ...?	What does the word mean?
Comprehension	to demonstrate an understanding of subject matter	translate, reword, explain, transform, retell, restate, locate, indicate, summarize, outline, expand, annotate	What's the main idea of the paragraph?
Application	to solve the problems, and use learned material in new and concrete situations	demonstrate, illustrate, employ, apply, what is...used for? what would happen if...?	What if the story happens in today's world?
Analysis	to look at something as a whole and then break down into its component parts	diagram, plan, deduce, classify, uncover, contrast, compare, distinguish, what is the function/motive/ conclusion of...?	What's the purpose for the writer to use a metaphor here?
Synthesis	to develop or create something original based on what the students know or have experienced	compose, combine, estimate, compile, design, invent, how can you improve...? how else would you...? what would you have done in this situation?	What would you do if you were the boy Harry?
Evaluation	to make reasonable value judgments and defend those judgments with rational argument	value, rate, criticize, dispute, decide, select, judge, verify, accept, reject, comment, which do you think is more ...? what's the best and why?	Do you think the arguments are well supported?

In response to the research questions, we coded all the simple questions and classified them into six categories contingent on the context of each question and the way of answering it. Then frequencies and percentages of the questions in different categories were calculated. Based on that, the percentages of categorized lower-order and higher-order questions were aggregated. With respect to the composite questions, their cognitive developmental modes were depicted. Comparisons and contrasts were made across three textbooks to see possible proportional differences in their questioning design. To facilitate the analysis of results, percentages were tabulated and represented by pie and bar graphs to visualize the proportions of lower- and higher-order questions in each textbook.

4. RESULTS AND DISCUSSION

4.1. Cognitive Distribution of the Simple Questions and their Differences Across Three EFL Textbooks

Simple questions include the originally simple ones and those constituting the composite questions, totaling 1025. As shown in Figure 1, when examined as a whole, simple questions of the three textbooks are distributed in all of the six categories. *Knowledge* questions occupy the highest percentage (N = 552, 54%), followed with *comprehension* (N = 152, 15%), *analysis* (N = 116, 11%), *evaluation* (N = 114, 11%), and *synthesis* (N = 81, 8%) questions, while *application* ones merely account for 1% (N = 10). Following our classification of cognitive skills, the cumulative percentage of higher-order questions (31%), i.e., the summation of percentages for *application*, *analysis*, *synthesis* and *evaluation* questions, is much lower than that of the lower-order ones, i.e., *knowledge* and *comprehension* questions (69%).

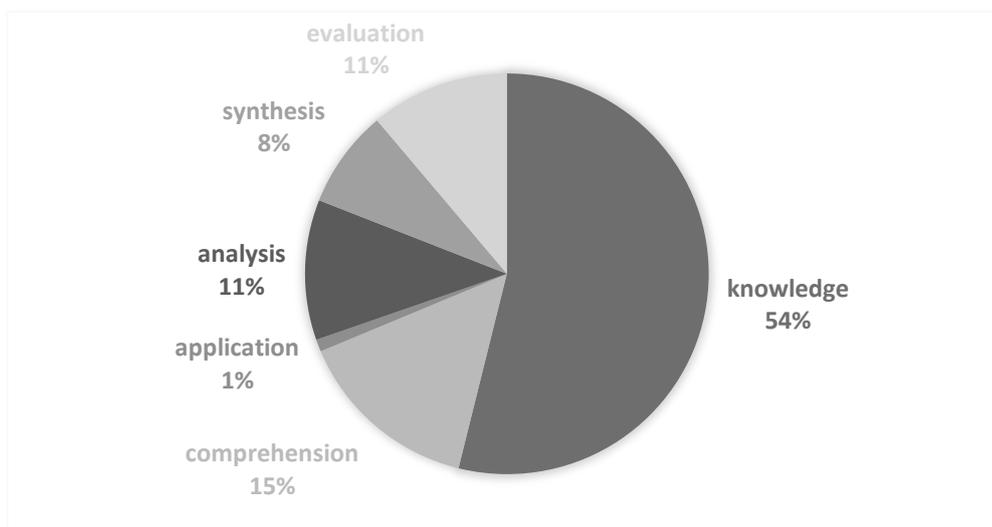


Figure-1. Percentages of the Categorized Simple Questions as a Whole

After unveiling the distribution of all the simple questions, we turn to specific textbooks and check their differences. As shown in Table 3, the percentages for each category of question within each textbook are quite different. In *English Through Culture*, 79.8% of the questions belong to *knowledge*. *Evaluation* questions account for 6.7%, followed by questions of *synthesis* (5%), *analysis* (4.6%), and then *comprehension* (3.5%). *Application* questions are the least asked, which take up 0.4%. The majority of questions in *English Through Culture* are related to *knowledge*. Likewise, most questions in *Contemporary College English* are also *knowledge* (56.3%). *Comprehension* questions are the second most, accounting for 17.4%, followed by *analysis* and *evaluation* questions both with 9.9%. *Synthesis* questions account for 6.3% and the least frequently asked questions are *application* ones occupying a percentage of 0.2%. In *Think English*, *knowledge* questions rank first accounting for 28.6%. Then *comprehension*, *analysis*, *evaluation*, and *synthesis* questions follow, taking up 21.3%, 18.8%, 16.4% and 12.5% respectively. The number of *application* questions is the smallest (2.4%).

Table-3. Distribution of the Simple Questions in Six Categories within Each Textbook

Cognitive level	Category	English Culture		Through Contemporary English		College		Think English		
		F	%	C%	F	%	C%	F	%	C%
Lower-order	knowledge	225	79.8		233	56.3		94	28.6	
	comprehension	10	3.5	83.3	72	17.4	73.7	70	21.3	49.9
	application	1	0.4		1	0.2		8	2.4	
Higher-order	analysis	13	4.6		41	9.9		62	18.8	
	synthesis	14	5.0	16.7	26	6.3	26.3	41	12.5	50.1
	evaluation	19	6.7		41	9.9		54	16.4	
Total		282	100	100	414	100	100	329	100	100

Notes: F = frequency, % = percentage, C% = cumulative percentage

Whatever the textbook is, *knowledge* questions make up the largest portion among the six categories, which help students understand the text content. Students can easily answer this category of questions from their memory or find the answers directly in the text without much analysis or discussion, e.g., what happened when Mr. Hayes invited Isabela to a cup of coffee? *Comprehension* questions require students to translate, interpret or extrapolate words, phrases or sentences within the text, e.g., what does Annie mean when she says “I am still running, running from that knowledge, that eye, that love from which there is no refuge?” Although the existence of *knowledge* and

comprehension questions is a must, helpful for students to comb through and understand the text, it can not contribute a lot to students' CT growth.

Among the higher-order questions, *analysis* and *evaluation* questions are in relatively higher proportion than *application* and *synthesis* questions. *Analysis* questions require students to relate the parts to the whole and tell the purpose of an author's writing, e.g., what might be Tuite's purpose in describing the sounds of New York City? *Evaluation* questions mean making judgments of right or wrong in accordance with some criteria and expounding the reasons, e.g., do you agree that homeless is not an isolated problem concerning only a small and specific group of people? why or why not? *Synthesis* questions ask students to create something new based on their own experience, e.g., what would be your advice for a Chinese teenager who has recently been enrolled into a high school in New York City and is leaving China very soon for the first time? *Application* questions, as the most infrequently asked questions, invite students to apply the information heard or read to new situations [Seker and Kömür \(2008\)](#) e.g., what would be gained or lost if Gregory wrote the story in the third-person point of view? Compared with their counterparts, the four categories of high-cognitive-level questions demand in-depth processing of the text or go beyond the text per se, asking students to give rational judgments, provide personal advice or solve real-life problems. They pose more challenge for students, accordingly beneficial to students' CT cultivation. Therefore, it is quite necessary for textbook compilers to increase the number of these questions.

Distributional differences across the textbooks are visualized in Figure 2. Three observations can be made from Figure 2 and Table 3. Firstly, whatever the textbook is, it is *knowledge* questions that occupy the highest percentage and *application* questions, the lowest percentage. Although *knowledge* questions are indispensable, their role in promoting CT skills is limited. CT goes beyond recalling factual knowledge and concepts, and prompts individuals to reason and solve problems ([Sobkowiak, 2016](#)).

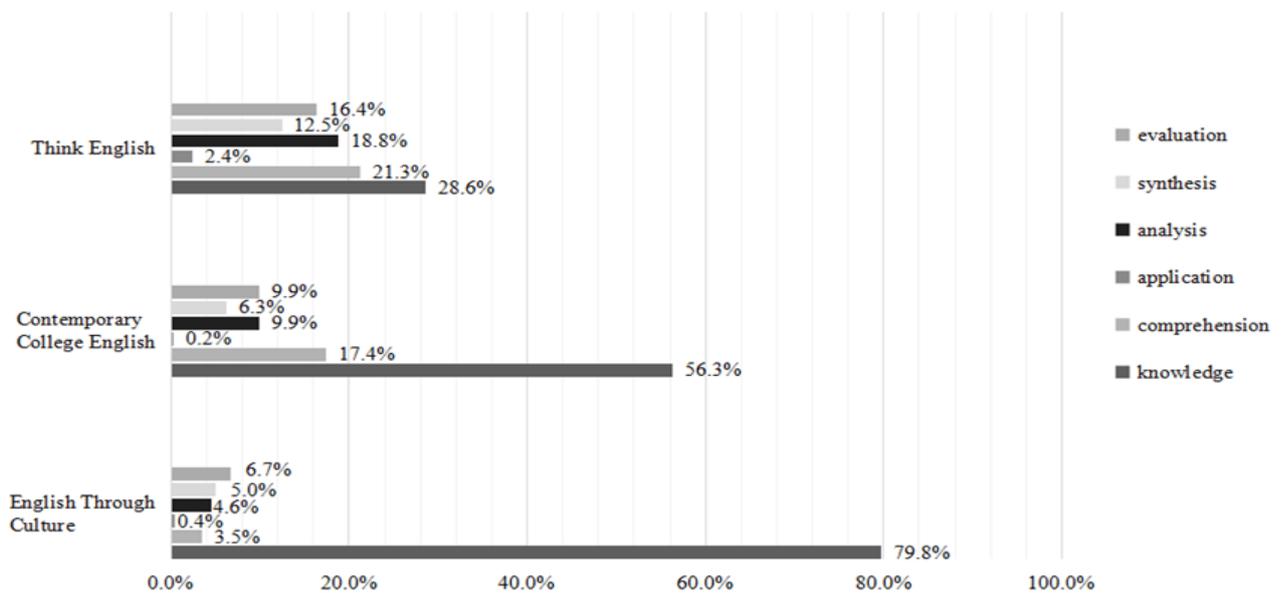


Figure-2. Distributional Differences of Simple Questions across Three Textbooks

Secondly, it is seen that as time passes, the percentages of higher-order questions gradually increase, from 16.7%, 26.3% to 50.1%. The three textbooks are published in different years, with an interval of 5 or 6 years. Textbook compilers are increasingly aware of bringing CT elements into textbooks. In the case of *English Through Culture*, its percentage of lower-order questions is as high as 83.3%. As its title suggests, this textbook is targeted for students' intercultural competence; however, it does not mean CT cultivation should be put aside. Intercultural

competence is essential for successful communication across cultures, and so is CT since the two overlap to some degree (Sobkowiak, 2016). While depicting the target culture or various foreign cultures, it is advisable for culture textbooks to engage students in exploring intercultural encounters and processes, and inspecting how diverse cultures influence their own understanding of reality so as to practise CT.

Thirdly, in *English Through Culture* and *Contemporary College English*, lower-order questions outnumber higher-order ones, but in *Think English*, lower-order questions (49.9%) are slightly fewer than their counterparts (50.1%). The proportions of lower- and higher-order questions in *Think English* are more balanced. As mentioned above, with years of emphasis on practice of English language skills rather than on cultivation of CT skills, English majors have been accused of CT deficiency (Huang, 1998). This accusation calls for bringing CT to classroom teaching of English majors. To echo this call, a team of EFL teachers and researchers at Beijing Foreign Studies University published a series of CT-oriented textbooks entitled *Think English* in 2015 and had it tried out in several universities of China. *Think English* expressly states in its preface that one of the characteristics of this textbook is to provide systematic training of CT skills, as stipulated in the *National Guideline*. Our study indicates that *Think English* really serves the purpose of CT cultivation as its compilers claim.

4.2 Cognitive Development of the Composite Questions and their Differences Across Three EFL Textbooks

In the three textbooks there exist a total of 218 composite questions which include several simple questions raised consecutively or in a sequence. As mentioned before, Yang (2015) took the initiative to analyze the composite questions posed by teachers to English majors in *Intensive Reading* class. She discovered four modes of cognitive development: lateral, upward, downward, and wavy; wavy development further fell into lateral waveform, upward waveform, and downward waveform. Their definitions and examples from the present study are presented as follows.

(1) Lateral development: all the simple questions in the sequence belong to the same category/cognitive level in Bloom's original taxonomy. E.g., "There fathers you see, are becoming—well, how should we put it? Like us." Who are "us"? (*comprehension*) What does this pronoun tell us about the tone in the essay? (*comprehension*)

(2) Upward development: the cognitive level of the latter question is higher than that of the previous question in the sequence. E.g., How does Tuite organize his description? (*analysis*) Do you think the organization is effective? (*evaluation*)

(3) Downward development: the cognitive level of the latter question is lower than that of the previous question in the sequence. E.g., Why do you think that Baron uses the word "infamous" to describe "red pen"? (*analysis*) And what does the phrase "the infamous red pen" refer to? (*comprehension*)

(4) Wavy development: the latter questions have more than one change of cognitive level in the development. According to cognitive level of the last question in the sequence, the wavy development can be classified into three types.

1) Lateral waveform development: the final question is cognitively the same as the initial question. E.g., Do you agree with the Nightingale that "love is a wonderful thing"? (*evaluation*) In what sense is it "wonderful"? (*comprehension*) Do you agree that all wonderful things often seem hard to come by and require great sacrifice? (*evaluation*)

2) Upward waveform development: the final question is cognitively higher than the initial question. E.g., In which paragraph does Tan first mention "all the English I grew up with"? (*knowledge*) In which paragraph does she explicitly lay out all the types of Englishes? (*knowledge*) What are the functions of the paragraphs in between? (*analysis*) Can you find examples from the text to illustrate the different types of Englishes as

described by Tan? (*comprehension*)

3) Downward waveform development: the final question is cognitively lower than the initial question. E.g., How would you compare Ausable and Max as spies? (*analysis*) Is Max stupid? (*evaluation*) Why did he lose? (*analysis*) Could he have done otherwise? (*application*)

Table-4. Distribution of Four Modes of Cognitive Development of Composite Questions in the Textbooks

Developmental Modes	English Through Culture		Contemporary College English		Think English		Total		
	F	%	F	%	F	%	F	%	
Lateral	21	70.0	53	53.5	24	27.0	98	44.9	
Upward	4	13.3	17	17.2	35	39.3	56	25.7	
Downward	5	16.7	14	14.2	13	14.6	32	14.7	
Wavy	Lateral	0	0	3	3.0	1	1.1	4	1.8
	Upward	0	0	4	4.0	14	15.7	18	8.3
	Downward	0	0	8	8.1	2	2.3	10	4.6
Total	30	100	99	100	89	100	218	100	

As shown in Table 4, the composite questions of the lateral mode rank first, taking up nearly 45% of the whole batch of questions. Among the total of 98 composite questions, 61 questions pertain to low-order *knowledge* category (*English Through Culture*: 13; *Contemporary College English*: 41; *Think English*: 7). For example, in the sentence “strange how the habits of his youth clung to him still”, what habits of his youth was he talking about here? why was it strange that the habits were still with him? The questions in upward, downward, and wavy modes come next, accounting for 25.7%, 14.7%, and 14.7% separately.

In *English Through Culture* and *Contemporary College English*, the percentages of lateral questions also rank first. In the former book, there is absence of wavy questions. In *Contemporary College English* and *Think English*, all modes of cognitive development appear including the three types of wavy development. *Think English* differs from the other two in that its upward questions (39.3%), wavy questions (19.1%), and upward waveform questions (15.7%) outnumber their matching types of questions in other textbooks.

Based on data from 18 hours of reading classes to English majors by 3 teachers, Yang (2015) analyzed teachers’ questions by adopting Bloom’s taxonomy. She found that of the different modes of cognitive development in questions, upward questions arranged from easy to difficult encourage students to answer gradually cognitively challenging questions. The wavy questions ask for more complex thinking processes, and comply with higher levels of educational objectives, thus fostering CT skills more effectively than one-way development questions. Among the wavy questions, the upward waveform questions are definitely the most effective in developing CT skills. Judging from its inclusion of the questions in all modes of cognitive development as well as its highest percentages of upward questions, wavy questions and upward waveform questions among the three textbooks, *Think English* is viewed as the best manifestation of CT elements in the design of reading questions.

To summarize, two major findings have emerged from our study. As far as the 1025 simple questions are concerned, the lower-order questions are more prevalent in EFL textbooks used for English majors in Chinese universities, a finding somewhat supportive of those obtained so far in other EFL contexts (e.g., Alul, 2001; Igbaria, 2013; Sulaiman and Abdelrahman, 2014; Olimat, 2015; Zareian et al., 2015; Sobkowiak, 2016; Ulum, 2016). However, the passing time witnesses a gradual increase in compilers’ awareness of incorporating CT cultivation into textbooks, with higher-order questions outnumbering their counterparts in *Think English*. As regards the 218 composite questions, the questions in the lateral mode occupy the largest proportion. *Think English* boasts the highest percentages of upward questions, wavy questions, and upward waveform questions, three types of composite questions most beneficial to CT cultivation. In one word, the most recently published *Think English* is

qualified in fulfilling its stated function of fostering English majors' CT skills in terms of its design of reading comprehension questions. It complies with English majors' CT cultivation as stipulated by the *National Guideline*. To the best of our knowledge, the present study is the first to survey the cognitive development of composite questions in EFL textbooks, thus follow-up studies in this respect are greatly needed to verify the generalizability of our findings concerning composite questions.

5. CONCLUSION

English textbooks encompass questions that come either at the beginning or at the end of each section, lesson or chapter. Unfortunately, most textbook questions, as accumulative research findings in other EFL contexts indicate, emphasize lower-order questions and fail to consider developing higher-level cognitive skills of students. The present study is the first conducted in China to evaluate EFL textbooks in the framework of Bloom's taxonomy. Unlike previous research, it provided an in-depth analysis of reading comprehension questions, covering not only simple questions but also composite questions. Additionally, it analyzed three textbooks compiled in different years to reveal their commonalities and differences in CT manifestation in the questioning design.

Our major findings demonstrate that *Think English* is characterized by more higher-order simple questions and higher percentages of three types of composite questions most beneficial to CT cultivation (i.e., upward questions, wavy questions, and upward waveform questions). It follows that *Think English* as a textbook purposefully designed for the sake of CT satisfactorily fulfills its function of fostering English majors' CT skills as stipulated by the *National Guideline*. Findings from this study shed light on the paramount importance of enhancing textbook compilers' awareness so that CT elements can make their way into reading questions and other aspects of EFL textbooks.

Based on our findings, some implications are presented for future textbook compilation. A textbook should not only be compatible with the current curriculum, but also possess a characteristic of cognitive development and CT cultivation. To fulfill the educational objective of cultivating CT skills of English majors, textbook compilers and publishing houses need to work together on developing CT-relevant EFL textbooks. Symposiums and workshops can be set up on a routine basis for them to raise the awareness of incorporating CT into newly developed textbooks and discuss how to design textbook questions by accentuating higher-order questions as well as upward and wavy composite questions based on Bloom's taxonomy or other educational frameworks. Beyond that, to echo the educational call for transferring CT skills to EFL classrooms of English majors, university teachers ought to reflect upon which textbooks to select by critically viewing their inclusive questions. Generally, teachers have a variety of textbooks approved by the MoE and published by main publishing houses for each grade and proficiency level. Instead of following the recommendations by publishing houses or by other teachers, they should use the cognitive levels of textbook questions as a basic criterion to evaluate whether the textbooks are cognitively appropriate for their students.

This study collected and analyzed the reading comprehension questions from three EFL textbooks. Further studies are advised to take more representative English textbooks, especially those published recently, as research materials for a more general conclusion. A series of textbooks can also be analyzed to see whether their volumes cultivate CT systematically. Besides, further studies may consider administering questionnaires or arranging interviews to elicit teachers' or students' opinions of surveyed textbooks in relation to CT manifestation. Users' experience and suggestions can serve as a basis on which to improve textbook compilation.

REFERENCES

- Alul, F.M., 2001. Analyzing English textbook questions for the elementary eighth grade in Palestine based on Bloom's taxonomy of educational goals at its cognitive domain. Master's Thesis, An-Najah National University, Palestine.
- Assaly, I.R. and O.M. Smadi, 2015. Using Bloom's taxonomy to evaluate the cognitive levels of master class textbook's questions. *English Language Teaching*, 8(5): 100-110. Available at: <https://doi.org/10.5539/elt.v8n5p100>.
- Bloom, B.S., M.D. Englehart, E.J. Furst, W.H. Hill and D.R. Krathwohl, 1956. *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain*. New York: Longman.
- China State Council, 2010. China's national plan for medium and long-term program for education reform and development (2010-2020). Available from http://www.gov.cn/jrzq/2010-07/29/content_1667143.htm.
- Dong, L., 2012. A textbook-based study of critical thinking—A case study of contemporary college English. *Journal of Changzhi University*, 29(1): 100-103.
- Dumteeb, N., 2009. Teachers questioning techniques and students' critical thinking skills: English language classroom in the Thai context. PhD Thesis, Oklahoma State University.
- Facione, N.C., P.A. Facione and C.A. Sánchez, 1994. Critical thinking disposition as a measure of competent clinical judgment: The development of the California critical thinking disposition inventory. *Journal of Nursing Education*, 33(8): 345-350.
- Freahat, N.M. and O.M. Smadi, 2014. Lower-order and higher-order reading questions in secondary and university level EFL textbooks in Jordan. *Theory and Practice in Language Studies*, 4(9): 1804-1814. Available at: <https://doi.org/10.4304/tpls.4.9.1804-1813>.
- Huang, Y., 1998. On the critical thinking deficiency. *Foreign Languages and Their Teaching*(7): 1.
- Igbaria, A.K., 2013. A content analysis of the WH-questions in the EFL textbook of horizons. *International Education Studies*, 6(7): 200-224. Available at: <https://doi.org/10.5539/ies.v6n7p200>.
- Krathwohl, D.R., 2002. A revision of Bloom's taxonomy: An overview. *Theory into Practice*, 41(4): 212-218. Available at: https://doi.org/10.1207/s15430421tip4104_2.
- Liu, H., 2013. A literature review on college English teaching materials study in the past 20 years. *Computer-Assisted Foreign Language Education*(2): 66-71.
- Olimat, M., 2015. Analyzing action pack textbooks' questions according to revised Bloom taxonomy. *Journal of Education and Practice*, 6(28): 152-159.
- Renaud, R.D. and H.G. Murray, 2007. The validity of higher-order questions as a process indicator of educational quality. *Research in Higher Education*, 48(3): 319-351. Available at: <https://doi.org/10.1007/s11162-006-9028-1>.
- Richmond, J.E.D., 2007. Bringing critical thinking to the education of developing country professionals. *International Education Journal*, 8(1): 1-29.
- Seker, H. and S. Kömür, 2008. The relationship between critical thinking skills and in-class questioning behaviours of English language teaching students. *European Journal of Teacher Education*, 31(4): 389-402. Available at: <https://doi.org/10.1080/02619760802420784>.
- Sobkowiak, P., 2016. Critical thinking in the intercultural context: Investigating EFL textbooks. *Studies in Second Language Learning and Teaching*, 6(4): 697-716. Available at: <https://doi.org/10.14746/ssllt.2016.6.4.7>.
- Sulaiman, M. and H.B. Abdelrahman, 2014. An analysis of the tenth grade English language textbooks questions in Jordan based on the revised edition of Bloom's taxonomy. *Journal of Education and Practice*, 5(18): 139-151.
- Tarman, B. and B. Kuran, 2015. Examination of the cognitive level of questions in social studies textbooks and the views of teachers based on Bloom taxonomy. *Educational Sciences: Theory and Practice*, 15(1): 213-222. Available at: <https://doi.org/10.12738/estp.2015.1.2625>.

- Ulum, Ö.G., 2016. A descriptive content analysis of the extent of Bloom's taxonomy in the reading comprehension questions of the course book Q: Skills for success 4 reading and writing. *The Qualitative Report*, 21(9): 1674-1683.
- Xu, J., Q. Zhu and Y. M., 2015. Critical thinking in an English textbook in Germany and its implications for textbook compilation for English majors in China. *Foreign Language Education*, 36(6): 44-48.
- Yang, L., 2015. The cognitive features of reading classroom questioning and critical thinking development. *Foreign Languages in China*, 12(2): 68-79.
- Yang, Y. and J. Ren, 2016. Visualized analysis and reflection of the critical thinking research in China's foreign language education field. *Foreign Language World*(3): 50-56.
- Yun, D.H., 2010. *The ideal EFL textbook for critical thinking*. Germany: VDM Verlag.
- Zareian, G., M. Davoudi, Z. Heshmatifar and J. Rahimi, 2015. An evaluation of questions in two ESP course books based on Bloom's new taxonomy of cognitive learning domain. *International Journal of Education and Research*, 3(8): 313-326.

Online Science Publishing is not responsible or answerable for any loss, damage or liability, etc. caused in relation to/arising out of the use of the content. Any queries should be directed to the corresponding author of the article.