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Cognitive Levels of Activities of the English Language Textbook *Sunrise 12* According to Bloom's Revised Taxonomy

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Abstract
This study is an attempt to analyze and categorize the lower- and higher-order thinking activitiesincluded in*Sunrise12* EFL textbook in the light of Bloom's Revised Taxonomy. The study also attempted to calculate the percentages and frequencies these activities to find out the extent to which their distribution throughout*Sunrise12* textbookis equitable. The findings showed that the total distribution of lower- and higher-order thinking activities, as well as the cognitive domain in both types of thinking is imbalanced. Activities requiring lower-order thinking were more frequent than those requiring higher-order thinking. The former occurred 311 times representing 67.8% of the total number of the employed 459 activities, whereas the latter occurred 148 times representing 32.2%. As a result, it was found that the *Sunrise 12* EFL textbook materials emphasize the use of lower-orderthinking skills more than the higher ones. The frequencies and percentages of lower-order thinking skills were as follows: Remembering 118, 25.7%, Understanding 156, 34%, and Applying 37, 8.1%. On the other hand, the frequencies and percentages of higher-order thinking skills were as follows:Analyzing 58, 12.6%; Evaluating 64, 13.9%; and Creating 26, 5.7%. Consequently, the findings indicated that unbalanced distribution among the cognitive levels encompassing both lower- and higher-order thinking skills lead to inequitable participation in both lower- and higher-order thinking activities.
Key words: Bloom's Revised Taxonomy,Higher-orderthinking,Lower -orderthinking,*Sunrise12*.

1.Introduction

Adaptability, critical thinking, problem solving, and creative reasoning are advanced cognitive abilities that individuals need to achieve in today's technologically complex and fast-paced world (Erman et al., 2021; Risner et al., 2000). The main aim of global educational curricula is to emphasize the cultivation of higher-order thinking (HOT). It is critical to ensure that students have attained skill in lower-order thinking (LOT) in that it is a prerequisite for engaging in higher-order thinking (HOT). Bloom's Revised Taxonomy (BRT) is a prominent theoretical framework frequently used in the field of education to investigate the advancement and categorization of cognitive abilities. The taxonomy categorizes human cognitive domains into six hierarchical levels: Remembering, Understanding, Applying, Analysis, Evaluation, and Creating (Barut & Wijaya, 2021). According to Assaly and Smadi (2015), Bloom's Taxonomy requires a balanced allocation of cognitive levels. In addition, Tikhonova and Kudinova (2015) and Anggraeni and Suharyadi (2013) recommend distributing LOT and HOT equally.

Educational researchers mostly assert that cognition is the primary objective of teaching process. Curriculum materials must include exercises and questions that promote critical thinking among students (Mertler, 2003; Zohrabi, et al., 2012a). Furthermore, educators depend on curriculum for planning, assessment, and instruction. Consequently, instructional materials substantially impact the experiences of both educators and students (Risner et al., 2000). Zohrabi et al. (2012b) assert that, despite the influence of current technologies, textbooks will surely retain a vital function in language learning.

Consequently, it can be argued that examining and assessing the activities within curriculum materials is an effective method to ascertain the level of cognitive engagement included in the EFL textbook *Sunrise 12*. Sunrise textbooks require examination from several perspectives as feedback because they are the primary textbooksutilized by schools in the Kurdistan Region of Iraq. So, an analysis of the textbook is necessary and worth investigating in terms of the cognitive categories listed in BRT. According to the researchers' knowledge, *Sunrise* textbooks have been barely examined within the framework of Bloom's revised cognitive skills taxonomy. Consequently, the researchers believe that this study is necessary in that BRT is regarded as a standard in educational learning. According to Anderson et al. (2001, p. 19), educational standards are "mandated objectives that someone, usually a group such as a professional association or statewide committee, thinks are important." They also assert that their taxonomy includes standard educational objectives (ibid.). Bloom's Revised Taxonomy(BRT) is approved priority position in

all educational systems (Sadighi et al., 2018). In light of the insufficient research on this subject in *Sunrise 12* EFL textbook, the researchers opted to conduct the current investigation to assess the *Sunrise 12* textbook. Zohrabi (2011) asserts that assessing textbooks is essential for identifying their deficiencies in order to improve them.

This study seeks to determine the frequencies and percentages of LOT and HOT activities according to BRT to assess their distribution balance. It also seeks to investigate and find out the frequencies and percentages of the cognitive levels encompassed in LOT and HOT to evaluate their distribution.

This study is significant based on Wagner's view (2008, p.21) who asserts that students need to acquire seven essential skills: "critical thinking and problem solving, collaboration and leadership, effective oral and written communication, accessing and analyzing information, curiosity, and imagination." Since educators heavily rely on textbooks as the primary instructional resource, it is necessary to examine these materials to determine the extent to which higher- orderthinking skills are fostered (Risner et al., 2000). A textbook significantly influences the perceptions of teachers and students regarding educational materials (Okeeffe, 2013). Wagner (2008) asserts that without HOT students will be unable to develop reasoning, creativity, problem-solving abilities, or advanced cognitive processes necessary for being productive and innovative individuals. Consequently, the selection and preparation of textbooks that align with the characteristics and requirements of the learners is essential. Decision-makers, curriculum designers, and educators will collectively benefit from the examination and assessment of textbooks (ibid).

2.Literature Review

2.1 Bloom's Taxonomy and Bloom's Revised Taxonomy

Bloom's Taxonomy (1956) is a model that categorizes cognitive processes into six levels of complexity arranged from least to greatest cognitive demand: knowledge, comprehension, application, analysis, synthesis, and evaluation. The first three layers of this framework are to lower- order thinking(LOT), which are essential for forming a foundation for deeper comprehension. The final three concur with higher- order thinking (HOT) (Hopper, 2009, quoted in Freahat& Smadi, 2014; Forehand, 2005). The taxonomy aims to establish a codification system enabling educators to formulate learning objectives within a hierarchical structure. It is a substantial source and performs a considerable influence on educational processes. Years following to its publication, it remains an invaluable reference for assessing assessment, curriculum, and pedagogy. It is applicable in all contexts, across all subjects, and for every educational level (Marzano & Kendall, 2007).

The increased emphasis on advanced thinking processes in the 1980s required a modification of the taxonomy. As a result,the six classifications in Bloom's original taxonomy have been modified from nouns to verbs in BRT. The modification took place because thinking is an active process, and cognition covers thinking. Consequently, BRT favored verbs, because Anderson and Krathwohl believe thatverbs are more appropriate for the act of thinking (Hanna, 2007). Moreover, the categories' names were changed to verb forms to correspond with their application in objects (Marzano & Kendall, 2007).

Similarly, the Knowledge category, the lowest level of the original Taxonomy, was updated and renamed as 'Remember'. Following that, Comprehension and Synthesis were renamed to 'Understand' and 'Create' (Forehand, 2005). Furthermore, the order of the top two levels were fundamentally modified from the original Taxonomy to the revised Taxonomy; specifically, Evaluation was repositioned from the highest level to one level below, while Synthesis was elevated from the second highest level to the top as Create (Schultz, 2005). The justification for this modification is the belief that creative thinking reflects a more advanced cognitive process than critical thinking. Criticality is not essential for creativity; rather, critical thought is often required for the advancement of creative actions. According to BRT, the Evaluate cognitive category is less complex than the Create cognitive category (Hanna, 2007).

In sum, one can urge for reordering the final two level:putting evaluation prior to creation. This is due to the fact that evaluation is somewhat simpler than creation, resulting in a greater percentage of individuals possessing critical skills than those with creative talents across all domains. Evaluation is generally conducted independently, whereas creation frequently necessitates some type of support, such as financial resources. Evaluation can be performed theoretically, while creation has to be done both theoretically and practically. Consequently, judgement is less complex than invention.

The previously mentioned changes are presented in Figure 1, which shows the structure of both Bloom's original Taxonomy and the revised one.

Blooms' original Taxonomy → Blooms' Revised Taxonomy(BRT)

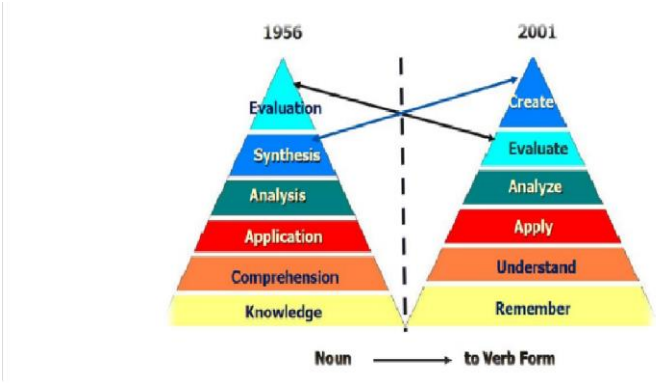

Figure 1. Blooms' original and revised Taxonomies cited from DarwazehandBranch (2015,p.221).

2.2 Levels of Thinking

According to (Tureková, 2021; Hayikaleng, 2016; Tikhonova &Kudinova, 2015;Moore & Stanley, 2010;Churches, 2008) thinking levels in BRT are divided into two levels. They are arranged from simple to most complex one. LOT skills include Remembering,Understanding,and Applying and HOT skillsinvolve Analysing, Evaluating, and Creating.Both thinking levels arepresented in Figure 2.

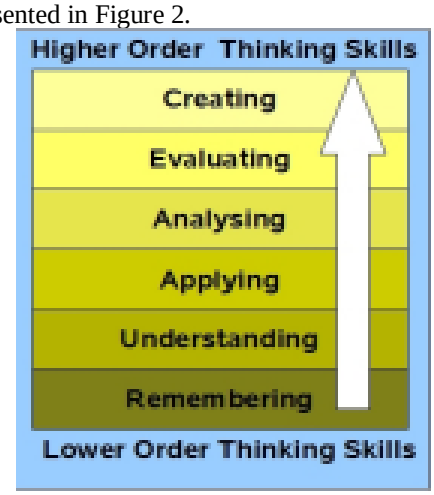

Figure 2. Lower and higher order thinking skills cited from Churches(2008,p.3)

2.2.1 Lower- Order Thinking (LOT)

LOT refers to a reproductive behaviour wherein an individual only recalls and reproduces previously acquired knowledge (Mitana et al., 2018). LOT in BRT encompasses the first three cognitive categories: Remembering, Understanding, and Applying (Hayikaleng et al., 2016; Tikhonova &Kudinova, 2015). Remembering constitutes the fundamental level of cognitive processing wherein a learner is required to recall or recover previously acquired information. The second level of cognition is Understanding, when the learner is expected to participate in tasks such as interpretation, exemplification, classification, summarisation, inference, comparison, or explanation. The Applying level necessitates that the learner implement the acquired information in practice (Mitana et al., 2018).

There has been a considerable emphasis on HOT recently. The primary purpose generally involves enabling students to develop their HOT. The advancement of HOT is acknowledged as essential for cultivating logical and critical thinking skills necessary for managing diverse facets of everyday life. HOT increases students' problem-solving abilities, reinforces their confidence in the learning process, and stimulates their academic achievement. They expertly handle complex, unconventional difficulties as well (Barut & Wijaya, 2021; Qasrawi &BeniAnbelrahman, 2020; Rahman & Manaf, 2017).

Scholars agree upon the idea that Bloom's Taxonomy was designed to indicate that proficiency in lower-order cognitive processes is essential before engaging in higher-order cognitive activities (Mitana et al., 2018). Consequently, it is believed that one cannot assess the level of thinking without being informed of, understanding,

and capable of applying the relevant information (Barut & Wijaya, 2021). Researchers emphasize the importance of LOT in relation to objective learning. They contend that LOT constitutes an essential foundation for the advancement of HOT and is crucial in establishing a strong foundation for the implementation of HOT (Krathwohl, 2002; Kamarulzaman et al., 2017; Mitana et al., 2018)

Presseisen (2001, cited in Tikhonova &Kudinova, 2015, p. 13), distinguishes the transition from LOT to HOT in these words: "simple to more complex operations, from observable to abstract dimensions, and from an emphasis on working with known materials toward an emphasis on creating or inventing new, previously unknown approaches or materials."

Muhayimana et al. (2022) and Assaly and Smadi (2015) assert that the cognitive levels in Bloom's Taxonomy must be allocated in a balanced manner. Anggraeni and Suharyadi (2013) support the unbiased distribution of LOT and HOT. Tikhonova and Kudinova (2015) call for the integration of sophisticated cognitive processes. Sophisticated cognition involves the equitable integration of both LOT and HOT. Sophisticated mental procedures enable advancement and transformation from LOT to HOT.

2.2.2Higher-OrderThinking (HOT)

Resnick (1987, as cited in Mitana et al. 2018) defines HOT as an individual's ability to get beyond conventional understanding of a subject or issue and produce novel insights, interpretations, representations, analyses, relationships, and conclusions. King (2002) introduces an additional ability, the monitoring of thought, i.e., the ability to assess yourself, to the previously identified abilities. Brookhart (2010) categorizes HOT into three competencies: Knowledge transmission, inventive thinking, and problem-solving.

Bloom (1956) recognizes certain tasks commonly utilized in HOT such as problem-solving, reasoning, critical thinking, evaluation, and conclusion drawing. Recently, there has been an increasing focus on HOT in educational curriculum in several nations (Yusoff & Seman, 2018). Consequently, the instructional objective has been revised to enable students to engage in critical thinking, analysis, and making logical decision (Brookhart, 2010).

HOT necessitates advanced cognitive processing, beyond a mere memorization of data and their exact recall. Research on cognitive skills suggests that promoting students' higher-order thinking during the learning process promotes their self-awareness of cognitive processes and improves academic achievement and cognitive growth (Thomas & Thorne, 2009; Perkins et al., 1993). Dewey (1933) contends that thinking is not an innate activity; it requires stimulation throughproblems and enquiries.

Thomas and Thorne (2009) identify three stages that might be employed in education to stimulate and enhance students' HOT.

1. Concepts and Conceptual Connections: A concept is a notion concerning the collection of interconnected ideas—a cognitive representation of a set of facts or ideas that are either directly or indirectly linked. Students should be instructed to comprehend concepts such as facilitating the organisation and classification of their thoughts. For instance, sports encompass activities such as football, basketball, tennis, and boxing. After learners acquire a new concept, it is essential for them to practice integrating it with what they already know.
2. Metaphors and analogies are methods for explaining abstract, unfamiliar, or novel phenomena by illustrating how the abstract or new phenomena possesses characteristics akin to or parallels a familiar concept or notion. Metaphors and analogies can prompt an individual to generate novel image and diverse interpretations of the issue.
3. Inference: The process of deriving a conclusion based on presented evidence. It implies inferring a conclusion from a collection of data or circumstances.

However, HOT is regarded as a significant factor in our future existence. The educational process must align with global modifications, technological progress, and employer requirements. Companies are dismissing low-skilled staff. There is a general agreement that all over time, an increasing percentage of jobs require individuals with higher-order thinking skills, in addition to other competencies (Rimini &Spiezia, 2016). Research indicates that employees engaged in routine jobs will be displaced by digital technology in the future, but at the same time, there will be an increasing demand for non-routine employees' skills (Van Reenen, 2011).

Consequently, depending on the previous clarification,all six cognitive levels, as well as both LOT and HOT, need to participate in the educational programme of learning in a balanced way. Since the equitable engagement across cognitive categories facilitates the growth of pupils' thinking regularly.

2.3Review of Related Studies

Research on English as a Foreign Language (EFL) in diverse contexts has examined the activities in English textbooks utilizing either the original or revised Bloom's Taxonomy.

Riazi and Mosalnejad (2010) conducted a study analyzing the categories of learning objectives included in Iranian senior high school and pre-university English language textbooks employing Bloom's Taxonomy. The results demonstrated that in all grades, lower-order cognitive skills were more prevalent than higher-order skills.

Igbaria (2013) analysed the Horizons textbook designed for 9th grade students learning English. The study was to investigate the degree of variance or frequency of WH-questions across the six levels of the cognitive domain in the Horizons textbook. The results revealed that out of 381 questions, 244 emphasised lower-order cognitive skills, while only 137 stressed higher-order thinking skills. The Understanding level reached a peak frequency of 113, whilst the Evaluation level recorded a minimum frequency of 9.

Bani Abdelrahman (2014) carried out a study to assess the types and levels of questions in the 10th-grade English language textbook in Jordan. The analysis attempted to determine the percentage of distributing questions among the six cognitive levels of BRT. The results revealed that the majority of the questions related to the first two levels were distributed as follows: Remembering and Understanding 55.11%, Applying 16.18%, and the remaining three levels: Analysing, Evaluating, and Creating 28.71%. The results demonstrated that the mass range is assigned to the lower-order questions in the textbook.

Gargari (2018) performed a study analysing the activities in the Iranian senior high school textbook Vision 1, based on the cognitive domain of BRT. The study aimed to examine the types and levels of questions in the 10th grade English textbook. The objective was to determine the levels of cognition present in the enquiries of senior high school English students and their workbooks. The research findings revealed that most questions were to lower-order cognitive skills, whereas only one question addressed higher-order cognitive skills.

Sari and Sakhiyya (2020) conducted an analysis of the English course book titled Symphony 1 to assess the extent of higher- order thinking skills employed in the reading activities. The results revealed that 63% of the items were categorised as lower- order thinking skills, whereas 37% were categorised as higher order thinking skills. Lower order thinking skills seem to be the central emphasis of the work.

3. Methodology

3.1 Materials

*Sunrise 12*EFL textbook (student's book and activity book) of 12$^{th\ grade}$ in Kurdistan region ofIraqis used as the material to be analysed using BRT. They consist of four parts: the student's book, the activity book, the teacher's book, and the CD. The student's book (SB) consists of eight units, a literary reader that consists of eight episodes and six role-plays. The activity book (AB) consists of eight units and a set of activities that correspond to each episode of the literary reader. The teacher's book (TB) includes concise and easy-to-use lesson plans for each lesson in *Sunrise 12*. It offers options for extension work and different exercises, as well as ideas for how to begin lessons for the teachers. It includes the solutions for all activities in both the SB and the AB. Finally, the CD includes all recorded listening subjects and pronunciation exercises. The textbooks used in this study and the number of activities are presented in Table 1.

Table 1. The averages of activities in SB and AB used in the study

Title of the textbooks	Number of activities	Grade	Publication Year	Publisher
Sunrise 12 (SB)	240	12	2011	Ministry of Education
Sunrise 12 (AB)	219	12	2011	Ministry of Education

3.2Design of the Study

The design adopted in this research is qualitative content analysis.It is definedas "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p.1278). Leading qualitative researchers like Howard Becker and Martyn Hammersley call for the incorporation of numerical data in qualitative research, and this is what Becker referred to as "quasi-statistics": simple counts of things to make statements such as "some," "usually," and "most" more precise (Maxswell, 2010).

Ary et al. (2019, p. 14) define content analysis as "a research method applied to written or visual materials to analyse characteristics of the material." Textbook analysis is a substantial process that conveys the strong and weak points of activities, as well as demonstrating to what extent they participate in developing students' thinking. The analysis serves as a device to guide curriculum designers on whether activities should be kept, changed, or improved (Assaly&Igbaria ,2014). Besides, According to Vitouladit (2014, p.280), content analysis has several advantages, such as: Content analysis can be applied to examine any written document, as well as pictures, videos,and situations,widely used and understood.It is inexpensive, and can be easily repeated if problemsarise.It does

notnecessarily require contact with people.Of all the research methods,contentanalysis scores highest withregard to ease of replication.
Usually, the materials can be madeavailablefor others to use.
Content analysis is used to describe, elaborate on, and classify the data within the framework of BRT. All parts of the English textbook *Sunrise 12* (SB&AB) are used. The researcherstry to analyse and classify all the activities included in EFL textbook *Sunrise12* according BRT cognitive levels. The activities might include wh-questions, yes/no questions, multiple-choice questions, completing the sentences or charts, statement questions, and request questions as well as the roleplays.

3.3 Research Questions

The study attempts to answer the questions below:

1. How are the activities in *Sunrise12* EFL textbookdivided between lower-order and higher-order thinking?
2. Is there a balanced distribution of lower- and higher-order thinking activitiesin *Sunrise12* EFL textbook?
3. How are lower-order thinking skills (Remembering, Understanding, and Analysing) distributed in*Sunrise 12* EFL textbook?

How are higher-order thinking skills (Analysing, Evaluating, and Creating) distributed in *Sunrise 12* EFL textbook?

3.4Data Analysis Procedures

Designing a research instrument is a preliminary practical step for conducting a study. The research instrument is an essential element of investigation;it functions as the input. The quality and appropriateness of research input immediately influence the quality and validity of research output, encompassing the findings and conclusions(Kumar, 2011). Therefore, choosing the correct instrument is crucial. Numerous academics globally employ a modification of Bloom's Taxonomy of Educational Objectives in the cognitive dimension. Educational researchers support the adoption of Bloom's Taxonomy as a standard framework for educational processes, as it offers educators guidance in formulating curricula, instructional strategies, and assessments that promote higher-order thinking, deep comprehension, and critical inquiry among students (Cullinane,2010;Chandio et al., 2016;Sadighi et al., 2018). Thus, a thorough examination of all *Sunris*e 12 activities is necessary to assess their integration of Bloom's Taxonomy. To the best of the researchers' knowledge, no study in Kurdistan Region-Iraq has tackled Sunrise textbooks activities based on Bloom's taxonomy. Consequently, it can be argued that this instrument is both appropriate and necessary for the purposes of this study.
Firstly, a coding scheme is used to codify, classify, and analyse the content of the senior secondary stage *Sunrise 12* based on BRT cognitive levels (i.e., Remembering, Understanding, Applying, Analysing, Evaluating, and Creating). See appendices (A & B).
Secondly, a modified form of Anderson et al's (2001) coding scheme is adopted in this studyfor answering its research questions. Onlythe cognitive dimension is used to analyse the activities. The coding scheme is used to show the results of all the learning objectives in *Sunrise 12* (SB & AB) in the form ofa table that includes the six cognitive categories ordered from simple to more complex ones. The categories consist of: Remembering, Understanding, Applying, Analysing, Evaluating, and Creating.
Thirdly, the selected data consist of all the activities in*Sunrise 12*. They are analysed, codified and classifiedin the light of the definitions and clue verbs of each cognitive category in BRT. The data also includeTB and instructional verbs or questioning stems for each activity in SB and AB. Finally, the textbooks are codified, and the frequencies and percentages of various learning objectives are computed and displayed.

3.5Categories of Analysis

To analyse the activities of *Sunrise 12*, this study adopts the six cognitive categories outlined in BRT as well as their definitions. In addition, there are some key words that guide the process of analysing the activities in the correct way. These six cognitive categories, their definitions, and the clue words are presented in Tables 2and3.

Table 2. The six cognitive categories along with their definitions and examples

Cognitive Categories	**Definitions &Examples**
A. Remember	Retrieve knowledge from long -term memory (e.g., Recognize the dates of important events in U.S. history)
B. Understand	Construct meaning from instructional messages, including oral, written, and graphic communication. (e.g., Give examples of various artistic painting styles)
C. Apply	Carry out or use a procedure in a given situation. (e.g., Divide one whole number by another whole number, both with multiple digits)
D. Analyze	Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose. (e.g., Determine the point of view of the author of an essay in terms of his or her political perspective)
E. Evaluate	Make judgments based on criteria and standards. (e.g., Judge which of two methods is the best way to solve a given problem)
F.Create	Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure. (e.g., Plan a research paper on a given historical topic)

Cited from Anderson et al., (2001, p.67-68).

Table 3. The six cognitive categories and their key words

Cognitive Categories	**Key Words**
A. Remember	Choose• Define• Describe • Find • Label • List • Match • Name • Recall • Locate • Select • Show • Spell • Tell • Identify •What •When •Where •Which •Who
B. Understand	Classify • Compare • Contrast • Demonstrate • Define • Describe • Explain • Illustrate • Infer• Interpret • Outline • Relate • Rephrase • Exemplify • Understand •Rewrite • Summarize • Translate
C. Apply	Apply •Experiment with• Interview • Make use of • Present • Solve • Utilize • Carrying out •Organize •Practice
D. Analyze	Analyze • Assume • Categorize • Classify • Compare • Conclusion• Contrast • Discover • Distinguish • Divide • Examine• Function• Infer• Inspect • List• Motive •Relationships• Simplify • Survey• Take part in • Test for
E.Evaluate	Agree • Assess • Choose• Compare • Conclude• Criteria • Criticize• Decide• Deduct • Defend •Determine • Disprove • Estimate • Evaluate• Explain • Influence • Interpret • Judge • Justify • Mark• Measure • Opinion• Perceive • Prioritize • Prove • Recommend • Select• Support • Value
F.Create	•Adapt • Build •Change •Combine• Collect •Compose • Construct •Create •Design •Develop • Discuss •Elaborate •Formulate •Imagine •Improve •Invent •Make up •Maximize •Minimize • Modify •Originate • Plan •Generate • Write •Revise •Reorganize

Cited from Krathwohl, (2002); Munzenmaier and Rubin(2013);Stanny(2016).

3.6Validity

Throughout educational community, Bloom's Taxonomy is widely regarded as a method of classifying and organising information (Assaly&Smadi,2015), and "determining the congruence of educational objectives, activities, and assessments in a unit" (Krathwohl 2002, p. 212). Its validitywas verified in many studies such as,(Riazi &Mosalaejad, 2010;Razmjoo&Kazempourfard, 2012;Ighbaria, 2013; Assaly& Smadi,2015). Accordingly, the categories of analysis, being directly derived from BRT, are considered valid.

To further validate the categories of analysis, their concepts were first defined accurately, depending on the BRT definitions and their key words. Three doctors from different universities namely (Prof.Dr. Ayad Hammed Mahmood, Prof. Dr. Fatimah Rashid Hassan, and Dr. Rasool Mohammed Kheder) examined the displayed categories. There was agreement among them about these categories and definitions. They also concluded that the instrument seemed appropriate for the study's purpose.

3.7 Coding Reliability

To ensure the inter-rater reliability of the adopted coding system, three independent raters (who have a master degree in TEFL) were informedthe studyaims, and the data analysis methodology. They were given examples from identical studies, and were shown an explanation of the coding process. The ratersindependently coded a sample of about 33% of the data, with a resulting agreement. In cases where disagreements arose, they were resolved by discussion. The three raters and the researcher negotiated any differences and made appropriate changes in the coding scheme. This was considered sufficient evidence that the coding scheme was highly objective and that the researcher could independently code the remaining data. The outcomes are presented in Tables4-5.

Table 4.Kruskal Wallis test among analysers for both textbooks

	SB	AB
Chi-Square	0.007	0.008
Df	3	3
Asymp. Sig.	0.9998	0.9997

Table 4. shows the test statistics of the Kruskal Wallis Test among analyser's evaluation for both textbooks, both SB and AB.Overall, there was no statistically significant difference between the results of the four analysers.

To test the level of consistency through persons, the findings of evaluating the activities of SB and AB in *Sunrise12* done by the researcher and three analysers were examined. The results shown in Table 5indicate the level of consistency between the results of the researcher and each analyser.

Table 5. Coefficient correlation among the researcher and the threeanalysers: Person reliability

Book	Raters	Number of items	Points of agreement	Points of difference	Correlation coefficient
SB	Researchers	80	76	4	0.95
	1st rater	80			
AB	Researchers	72	66	6	0.92
	1st rater	72			
SB	Researchers	80	74	6	0.93
	2nd rater	80			
AB	Researchers	72	66	6	0.92
	2nd rater	72			
SB	Researchers	80	74	6	0.93
	3rdrater	80			
AB	Researchers	72	66	6	0.92
	3rd rater	72			

The results in Table 6 show the level of consistency between the results of the researchers and each rater. Based on the table, there is a high correlation between the researchersand the three raters, which enables the researchers to continue and process the data collected.

4. Findings and Discussion

The questions are restated below:

1. How are the activities in *Sunrise12* EFL textbook divided between lower-order and higher-order thinking?

2. Is there a balanced distribution of lower- and higher-order thinking activitiesin *Sunrise12* EFL textbook?
3. How are lower-order thinking skills (Remembering, Understanding, and Analysing) distributed in *Sunrise 12* EFL textbook?
4. How are higher-order thinking skills (Analysing, Evaluating, and Creating) distributed in *Sunrise 12* EFL textbook?

To answer the research questions, the frequencies and percentages of distributing lower and higher- order thinking activities over each part of the SB and AB in *Sunrise 12*was calculated. Tables6and7 show the frequencies of LOT and HOT related cognitive categories.

Table 6. Frequency and percentages of LOT) and HOT in *SB and AB of Sunrise 12*

	Students' book (SB)				Activity book(AB)			Total		
	Cognitive categories codes	F.	%	Expected N.	F.	%	Expected N.	F.	%	Expected N.
LOT	Remembering	68	28.3	40	50	22.8	36.5	118	25.7	76.5
	Understanding	73	30.4	40	83	37.9	36.5	156	34	76.5
	Applying	18	7.5	40	19	8.7	36.5	37	8.1	76.5
HOT	Analyzing	20	8.3	40	38	17.4	36.5	58	12.6	76.5
	Evaluating	47	19.6	40	17	7.8	36.5	64	13.9	76.5
	Creating	14	5.8	40	12	5.5	36.5	26	5.7	76.5
	Total	240	100	240	219	100	219	459	100	459

Table 6 probes thefirst and second research questions, while Table 7 shows the frequencies, percentages, and Std. Residuals for LOT and HOT in SB and AB. Based on these results, it can be concluded that SB includes a higher percentage of LOT, i.e., 66.3%, compared with the HOT 33.8%, although none of the Std. Residual are higher than ±1.96. The AB also includes a higher percentage of LOT, i.e., 69.4%, while the percentage of HOT in AB is 30.6 %. None of the Std. Residuals are higher than ±1.96; that is to say, the observed frequencies were not beyond what was expected. Figure 3 shows the percentages discussed above.

Table 7. Frequencies, percentages and Std. Residuals for lower- and -higher order thinking by Books

		Thinking		Total
		Lower Order	Higher Order	
Students' Book	N	159	81	240
	%	66.3%	33.8%	100.0%
	Std. Residual	-.3	.4	
Activity Book	N	152	67	219
	%	69.4%	30.6%	100.0%
	Std. Residual	.3	-.4	
Total	N	311	148	459
	%	67.8%	32.2%	100.0%

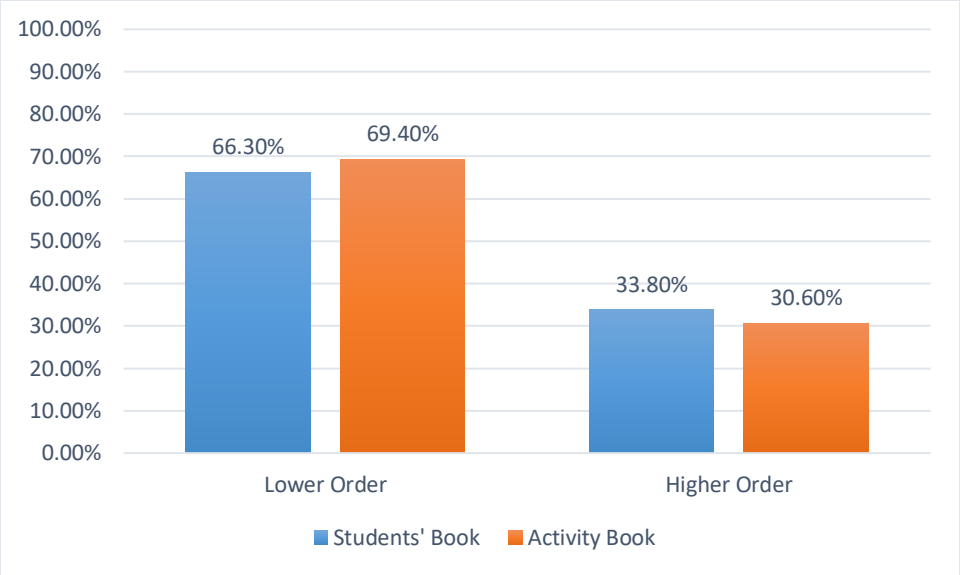

Figure 3 Percentages for lower- and higher-order thinking by books

As for question one, Table 7, shows that HOT activities occur only 148 times in *Sunrise 12* representing 32.2 % of the total number of 459 employed activities. So, only 32.2 % of the activities encourage students to participate in HOT. While LOT activities dominate the textbook. It occurs 311 times representing 67.8%.

Concerning the second research question, Table 7 and Figure 3 show that the total frequencies and percentages of LOT in *Sunrise 12* are about twice as HOT. So, they are not represented proportionately, i.e., their proportions are unbalanced.This is considered a shortcoming because they should have represented equally. (See 2.2.1).

The results indicate that LOT activities are most frequent in this textbook. On the other hand, HOT activities are fortunately not excluded, but they are not given adequate attention. Many other studies point to the same pattern: EFL textbooks and assessment techniques at all levels, from elementary to university, rely heavily on lower-order cognitive processes (Muhayimana et al.,2022; Gargari, 2018; Wu&Pei, 2018; Abdelrahman,2014; Assaly&Igbaria, 2014; Freeahat& Smadi, 2014; Assaly&Smadi,2015; Igbaria, 2013; Riazi &Mosalnejad, 2010).

Regarding the third and fourth research questions, the distribution of the included LOT cognitive categories is not balanced. In both SB and AB, mostof the frequencies are given to Remembering and Understanding cognitive categories, with frequencies of 118 and 156, respectively, whereas Applying cognitive category has the least frequency in both books SB and AB, with a frequency of 37.This is considered a weak point because Applying cognitive level is a sufficient and needed cognitive category; some scholars even believe that it refers to HOT and that it is a required level for HOT. According to McDavitt (1993, p. 20 cited in Keshta & Seif, 2013, p. 51), "higher order skills include analysis, synthesis, and evaluation and require mastery of previous levels, such as applying routine rules to familiar or novel problems." Moreover, according to Munzenmaier and Rubin (2013), an excessive emphasis on memorization and comprehension in learning objectives might lead to students who possess knowledge but struggle to apply it in practical contexts.

The inclusion of HOT cognitive levels in both SB and AB is not adequate. Their total frequencies are 148, as shown in Table 6. The most frequent ones are Evaluating and Analysing levels. The former receives 64 frequencies, while the latter receives 58. Whereas Creation is the most significant level, it has only 26 frequencies. So, the most common frequency in LOT is Understanding, whereas in HOT it is Evaluating. Applying and Creating represent the least frequent occurrences, respectively. This result concords with the study of Sari and Sakhiyya (2020).

However, this inadequate distribution of the six cognitive categories is again counted as negative feedback for decision-makers and curriculum designers because it is necessary to includeall six cognitive levels equally.Turn back to2.2.1.

Overall, researchers believe that although the range of HOT activities is insufficient, their presence is considered positive feedback.According to Chen (2016), the use of HOT is critical for individuals to effectively participate and succeed in the constantly changing global work market. Furthermore, various nations recognize the development of HOT among students as an essential element of educational curricula and a valued objective in education to foster independent and proactive thinking. Furthermore, the significance of HOT is obvious in second language (L2) education as it aligns with the primary objective of English-language acquisition, which is to enhance proficiency in

the four language skills: listening, speaking, reading, and writing. The application of cognitive processes like reasoning, evaluating, and problem-solving enables students to engage in critical communication and express their perspectives.

Additionally, it can be argued that including LOT activities in school instruction is not problematic. Both types of activities are necessary, as mentioned above.LOT activities can facilitate the learning of factual knowledge and establish a foundation for achieving HOT thinking. On the other hand, HOT activities serve as effective instruments for enhancing critical thinking and fostering other cognitive skills such as analysing, judging, creating plans, problem solving, and decision-making.

However, problem arises when HOT activities occur less frequently than LOT activities. In other words, there is no balance between their frequency of use. Conversely, the frequency of HOT and LOT should be equivalent. Similarly, the learners' stage is not taken into account. In fact, decision-makers, curriculum designers, and teachers should be aware of this influential situation. That is, the use of HOT activities should have a positive relationship with the students' grades. In other words, they have to go in parallel. As the students grow, we must use more HOT activities, and vice versa for lower-order activities.

At this stage, students often fall within the age range of 18 to 20 years old; therefore, they bear responsibility for their speech and conduct in accordance with religious and legal principles. Spontaneously, this stage serves as the initial step in preparing pupils for university, where the academic content becomes more demanding and challenging. With insufficient training in demanding HOT activities during their high school years, students will not only struggle to keep up with their peers, but they will also encounter difficulties in their undergraduate or graduate studies, as well as in their personal and professional endeavours, because employers have a lot of demands and conditions during this period. Thus, the students have to be practiced and armed with all high skills to be able to take their place in this life. According to Ross, (2018); Assalyand Smadi (2015); Donna and Kathrine, (2013), in a rapid advancement of digital and challenging world, getting information and recalling it alone is not enough to create the kind of people that societies require to respond to economic, social, and technological changes, the education needs to transition from traditional classroom-based information acquisition to equipping learners with HOT.

The researchers' viewpointsare supported by several researchers, namelyAssaly and Smadi (2015),who suggest equal participating of the six cognitive levels. Anggraeni andSuharyadi(2013), state that the optimal allocation of LOT and HOT activities is a balanced division. Tikhonova andKudinova (2015) confirmtheir view; and they suggest that harmonious or balanced integration cognitive processes facilitate the progression and transition from LOT to HOT. Depending on Muhayimana et al., (2022), if the six cognitive domains are not balanced, there may be a negative influence on instructional quality and student learning.

Depending on the findings,LOT activities dominate the activities included in SB and AB. Based on the researchers' view this happened due to the following factors:

1. In *Sunrise 12* from both SB and AB, the integrated skills activities are 192. Out of this rate, 134 activities relate to LOT, while just 58 activities relate to HOT, see Appendices A and B. The obvious shortage is within the distribution because the rate of HOT activities is so low compared to LOT activities. It should have been the number of HOT activities higher because the four skills (reading, writing, speaking, and listening) are an excellent field for developing the students' cognitive abilities, particularly reading skill.According toSari and Sakhiyya (2020),lifelong learning can be promoted through reading, as pupils have the opportunity to acquire knowledge from a wide range of materials.

2. The literary reader, which consists of eight episodes in AB, includes 45 activities. There are only 16 activities that belong to HOT, whereas 29 are associated with LOTS, see Appendix B. So, again, there is a clear deficiency in the division of the literary reader's activities. It should have been the number of HOT activities higher than LOT activities because this section is an incredible item whereby the students HOT can be developed. In this section, concept mapping was not used, which is impact instrument in teaching reading. Scholars like Liu et al. (2010); Soleimani and Nabizadeh (2012); Trang, (2017), recommend using concept mapping. They state that concept mapping enhances students' critical thinking and reading comprehension capacity.

3.There are 48 lower-order demand thinking and 9 higher-order thinking out of 57 activities that relate to vocabulary items, see Appendix B. The most frequent cognitive categories are remembering and understanding. As it is clear, they include LOT, which in turn makes LOTactivities more than HOT activities. However, it could be taught in a way that coversmore HOT by using the concept maps tool, which is an impressive way of teaching vocabulary. Unfortunately, it is hardly used. According to Lui (2016), concept maps have a significant role in learning in general, especially vocabulary learning. It is a useful technique for fostering meaningful learning across a wide range of ages and subject areas(Kinchin,2001); Chang et al., (2001). According to Liu et al., (2010); Liu (2011), concept mapping can increase a learner's level of awareness. In this vein, Cañas et al., (2017) state that concept map

is a tool that has been suggested as a means to cultivate and practice higher-order thinking abilities. It also enhances learning, especially meaningful learning.
4. There are also other tools, like analogies and inferences, that were rarely used in *Sunrise 12*, but utilizing them increases the range of HOT activities. Return to 2.2.2, points two and three.

5. Conclusions and Recommendations

5.1Conclusions

Based on the findings of the study, it can be concluded that:
1.*Sunrise 12* EFL textbooks employed in Kurdistan Region-Iraq have a dominant emphasis on LOT activities. This leads to an inability to provide adequate HOT activities at this stage.
2.The main objective of *Sunrise 12* EFL textbook seems to be the development of LOT skills, especially Remembering and Understanding, which get the most attention. The majority of LOT activities show that the major activitieswere created to assist pupils to obtain factual information, whereas the minor activities are designed to teach them to think critically and creatively. In brief, attention should be given to employing both LOT and HOT activities in a balanced manner in classroom interactions, the contents of textbooks, and examinations' questions, because each has its own benefit in schooling processes. A balanced combination of LOT and HOT activities will facilitate comprehensive educational objectives, equip learners with knowledge, and improve their abilities to think critically, creatively, and solve problems that they encounter in academic matters and in their daily lives. So, curriculum designers should not neglect either HOT or LOTactivities.
3. Concept mapping is hardly used in spite of its influential impact on practicing and developing HOT skills.
4. In spite of unsatisfactory numbers of HOT activities, they are not distributed well among the included cognitive categories: Analysing, Evaluating, and Creating. Moreover, these activities frequently receive little attention in the classroom due to two primary reasons: First, these activities mainly relate to writing skills, or they need interaction among the students, which require a lot of time. Second, the national exam, which is the final examination, employs the multiple-choice technique 100%. These two factors sometimes make teachers skip these activities. The rate of HOT activities is not as high as LOT; it should be taken into account that their numbers are not so low; they are 32%. It is important to acknowledge that their presence is not negligible. If properly treated, they will make an impressive impact. Unfortunately, most of the HOT activities receive insufficient attention. For example, there is a section in SB entitled Role-play that includes six activities, all of which relate to HOT, but they are not studied in class. In other words, they are totally neglected. Additionally, there are 11 activities in SB entitled 'Think About.' The majority of these activities pertain to evaluation and creation, which encompasses HOT. Only one activity pertains to the application process, which is a crucial and necessary prerequisite category for HOT. They are also totally ignored. Moreover, there are 12 activities in SB and AB entitled 'Unit Task.' Most of them associate with HOT, but they are often not studied, i.e., they are skipped.
HOT activities constitute one-third of all activities. If their number is increased, students' HOT can be developed. Students will be capable of generating and applying their acquired knowledge to novel situations. They will also be able to analyze the subject matter or events, evaluate surrounding troubles, and generate solutions. In other words, students will not just be receivers and consumers, but rather transformers and producers.

5.2 Recommendations

In the light of study findings, the following recommendations can be put forward:
1. It is necessary for educators to assess any textbook prior to its utilization. The textbook should align with the students' competency, needs and the program objectives. It must include all the six cognitive categories in a balanced way.
2. *Sunrise 12* textbook can serve as a significant tool, but it cannot function alone. The educator shouldadd supplementary HOTactivities. They must be adequately prepared to guide the textbook content to align with their objectives rather than the reverse.
3. English textbooks writersare advised to incorporate reading exercises with diverse cognitive demands particularly HOT questions to stimulate students' critical thinking and engagementand prepare them for tasks at any cognitive.
4.Adding and using concept maps, which is an impressive tool especially for teaching vocabulary and literary reading.
5. Every reading text has to be followed by some questions that require the students to solve, make predictions, or find alternative solutions for an issue derived from the reading text. The issue must combine the text with real life.

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