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Applying the Bloom's Revised Taxonomy Model for Identifying the Higher and Lower order Thinking Activities in EFL Textbooks

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Abstract

The present descriptive content analysis study aimed to analyse the activities of the *Sunrise12* EFL textbooks based on Bloom's Revised Taxonomy and quantify and classify the lower and higher order thinking activities. It also tried to determine the frequencies and percentages of these activities in the six levels of the cognitive domain including lower and higher- order thinking skills according to this model to assess the proportionate distribution of these activities within the textbooks. The results revealed an unbalanced distribution of the total lower and higher-order thinking activities in *Sunrise 12*, as well as the cognitive domains in both lower and higher-order thinking activities. The number of lower-order thinking activities was higher than that of higher-order thinking activities. Out of 459 activities, the frequencies and percentages of the former were 311 and 67.8, while the frequencies and percentages of the latter were 148 and 32.2. Therefore, *Sunrise 12* EFL textbooks placed more emphasis on the lower-order thinking activities. Also, the frequencies and percentages of the first three cognitive levels, i.e., Remembering, Understanding, and Applying which refer to the lower-order thinking skills, were 118,25.7%, 156,34%, and 37,8.1%, respectively. The second three cognitive levels, including Analysing, Evaluating, and Creating which belong to the higher-order thinking skills, were 58, 12,6%, 64, 13.9%, and 26, 5.7%, respectively. Consequently, it was found out that there is unequitable distribution even among the included cognitive levels in each lower and higher order thinking activities.

Key words: Bloom's Revised Taxonomy, Higher order thinking, Lower order thinking, *Sunrise12*.

1.Introduction

Learning is the result of thinking (Ritchhart & Perkins, 2008). According to several studies, living in the twenty-first century and the digital age necessitates higher order thinking such as

critical thinking, problem-solving, and creative thinking (Erman et al., 2021). The primary objective of numerous educational curricula worldwide is to prioritize the development of Higher Order Thinking (HOT). The primary objective is typically for students to attain HOT. Simultaneously it is crucial to ensure that pupils have already acquired proficiency in lower thinking (LOT), because they serve as a requirement for engaging in HOT. Bloom's Revised Taxonomy (BRT) is a prominent theoretical framework frequently employed in the field of education to elucidate the development and categorization of cognitive abilities. The taxonomy categorises human cognitive domains into six hierarchical levels: Remembering, Understanding, Applying, Analysis, Evaluation, and Creating. The initial three levels are commonly referred to LOT, while the later three levels are classified as HOT (Barut & Wijaya, 2021). According to Assaly and Smadi (2015), the cognitive levels in Bloom's Taxonomy have to be distributed in a balanced way. Besides, Tikhonova and Kudinova (2015), Anggraeni and Suharyadi (2013) suggest the equitable distribution of LOT and HOT.

“A rapidly changing, technologically advanced world necessitates that students develop the ability to make adaptations, think creatively and critically, and solve complex problems” (Risner et al., 2000, p. 4). Researchers in education mostly state that thinking is the major goal of the instructional process. So, curriculum materials should contain activities and questions that enhance and lead students to think (Mertler, 2003; Zohrabi, et al., 2012a). Besides, teachers rely on the curriculum for planning, assessing, and instruction. Accordingly, curriculum materials have a significant influence on both teachers and students’ practices (Risner et al., 2000). Regarding the role of textbooks, Zohrabi et al., (2012b) claim that regardless of the impact of modern technology, textbooks will undeniably maintain a vital role in the language teaching and learning process.

Therefore, studying and analysing the activities used in curriculum materials is the best way to discover the degree of thinking included in the educational process in the EFL textbooks *Sunrise 12*. They need to be studied from different perspective as feedback because *Sunrise* textbooks are the primary curriculum used in 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. Based on the researchers’ knowledge, *Sunrise* textbooks have barely been investigated within Bloom's revised cognitive skills taxonomy yet. Thus, the researchers think this study is needed

because BRT is considered standard educational learning. According to Anderson and Krathwohl (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 add that their taxonomy includes standard educational objectives (Ibid.). BRT has priority attribution in any educational system (Sadighi et al., 2018). Due to the lack of research on this kind of topic in *Sunrise 12* EFL textbooks, the researchers preferred to conduct this study to assess the Sunrise12 textbooks. According to Zohrabi (2011) assessing textbooks is crucial to identify their shortcomings as well as improve them.

This study aims to find the frequency and percentage of LOTS and HOTS activities based on BRT to see whether they are distributed in a balanced way. It also aims to analyse and determine the frequencies and percentages of the included cognitive levels of the LOTS and HOTS to see how they are divided.

The significance of this study can be confirmed based on the statement by Wagner (2008, p.21) who states that students "need to master seven survival skills: critical thinking and problem solving, collaboration and leadership, effective oral and written communication, accessing and analyzing information, curiosity, and imagination." Since teachers depend deeply on textbooks as the main source of instruction, they must be analysed to find out whether or not HOTS are promoted (Risner et al., 2000). A textbook has a substantial role in shaping teachers' and students' views towards materials (Okeeffe, 2013). Wagner (2008) states that without HOTS, which are essential in all elements of life, pupils will not be able to acquire the ability of reasoning, creating, solving issues, or higher mental processes that are needed to become fully effective and creative persons. Therefore, selecting and preparing textbooks in a way that matches the features and needs of the learners is valuable. Decision-makers, curriculum designers, and teachers together will benefit from the analysis and evaluation of the textbook and the various kinds of activities it contains (Ibid).

2.Literature Review

2.1 Bloom Taxonomy and Bloom's Revised Taxonomy

Bloom's Taxonomy (1956) is a model of classifying thinking into six cognitive levels of complexity. They are organised from most minimal to highest demand: knowledge,

comprehension, application, analysis, synthesis, and evaluation. The initial three levels of this framework relate to LOT that are fundamental in establishing the framework for more profound understanding. The last three ones agree with HOT (Hopper, 2009, cited in Freahat &Smadi, 2014; Forehand, 2005). The purpose of the taxonomy is to set up a codification system through which teachers could design learning objectives within a hierarchical framework. It is a significant source and has an influential effect on educational processes. Many years after its publication, it is still a standard source for evaluating testing, curriculum, and teaching. It can be used in every setting, with all subject matter, and with every grade (Marzano & Kendall, 2007). They add that the increased emphasis on higher-level thinking in the 1980s led to the necessity of revising the taxonomy. Anderson & Krathwohl (2001) employed a framework to modify the taxonomy. The category names were modified to verb forms in order to align with their usage in objectives (Ibid).

The original Bloom's six significant classifications have been changed from nouns to verbs in BRT because cognition is thinking and thinking is an active procedure. Anderson et al. prefer verbs because they think that verbs are more suitable for the action of thinking (Hanna, 2007). Also, the Knowledge category, which is the bottommost level of the original Taxonomy, was renamed and became ‘Remember’. Then, Comprehension and Synthesis were retitled to ‘Understand’ and 'Create' (Forehand, 2005). In addition, the position of the top two levels has been fundamentally changed from the original Taxonomy to the revised Taxonomy, that is, (Evaluation delivered from the top to Evaluate in one level beneath the top and Synthesis transported from second top to the top as Create. (Schultz, 2005). The reason behind this change is that they think that creative thinking is a more sophisticated cognitive process than critical thinking. In other words, being critical is not a requirement for being creative, but critical thought is frequently needed for the development of creative work. That is, according to BRT the Evaluate cognitive category is easier than the Create cognitive category (Hanna, 2007). The researchers advocate repositioning the last two stages, namely, placing evaluation before creation. This is because evaluating is comparatively easier than creating, which is why the number of individuals with critical skills exceeds the number of people with creative skills in all areas. Since evaluation is typically done independently, creation often requires some form of

assistance, such as financial backing. The previously mentioned changes are presented in Figure 1, which shows the structure of both the original Bloom's Taxonomy and BRT.

Blooms' Taxonomy ⟶ Blooms' Revised Taxonomy (BRT)

Figure 1. Blooms' Taxonomy and Blooms' Revised Taxonomy cited from (Darwazeh & Branch,2015: p.221).

According to (Hayikaleng, 2016; Tikhonova & Kudinova, 2015; Churches, 2008) thinking levels in BRT are also divided into two levels. They are arranged from simple to most complex one. LOTS include Remembering, Understanding, and Applying and HOTS involve Analysing, Evaluating, and Creating. Both thinking levels are presented in figure 2.

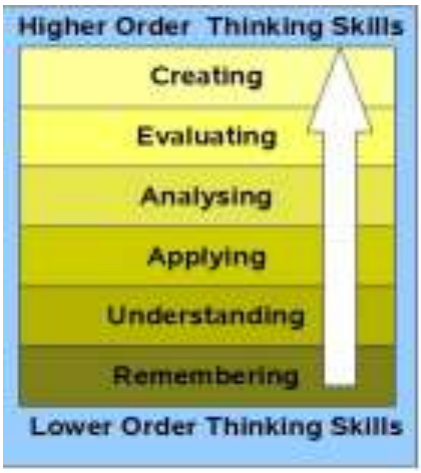

Figure 2. Lower order thinking and higher order thinking, cited from Churches (2008, p.3)

2.1.1 Higher Order Thinking (HOT)

According to Resnick (1987, as cited in Mitana et al. 2018), the term HOT implies a person's capacity to go beyond the surface level of a topic or problem and generate new insights, meanings, representations, analyses, establish connections, and formulate conclusions. In fact, the concept of HOT has been variously defined by numerous psychologists and educators. Despite the various differences, the general agreement among scholars is that the skills included within HOT primarily involve these component skills "analyzing arguments, making inferences by using inductive or deductive reasoning, judging or evaluating, and making decisions or solving problems" (Lai,2011, p.41-42). King (2002) adds another skill, monitoring thinking, to those previous skills. Brookhart (2010) divides HOT into three abilities: transfer knowledge, critical thinking, and problem solving.

According to Smith and Szymanski (2013), there is a correlation between HOT and the appearance of constructive behaviour, in which individuals are capable of utilising their evaluative, imaginative, and creative abilities. Bloom (1956) has identified several tasks that are frequently employed in HOT, including problem-solving, reasoning, critical thinking, evaluation, and drawing conclusions. However, in recent times, there has been a growing emphasis on HOT within educational curricula across numerous countries (Yusoff & Seman, 2018). As a result, the objective of instruction updated to equip students with the ability to think critically, analyse, and make valid decisions (Brookhart, 2010).

HOT requires thinking at a high level, that is, a level of thinking higher than just memorising facts and remembering them in exact form. They entail innovating with the truths, gaining a deep understanding, classifying, supposing, applying, and combining current knowledge with other facts and ideas to create new things. Research on cognitive skills indicate that facilitating students' HOT in the learning process helps to make them more aware of their own thinking and also fosters their learning performance and cognitive growth (Thomas & Thorne, 2009; Perkins et al., 1993). Dewey (1933) argues that thinking is not a spontaneous process, but rather it needs to be stimulated by issues and questions

Thomas and Thorne (2009) mention three stages below that can be used in schooling to activate and advance students' higher-level thinking.

1.Concepts and Concept Linking: A concept is an idea about a group of related ideas—a mental representation of a group of facts or ideas that are directly or indirectly associated. Learners ought to be taught to figure out concepts, because concepts help learners arrange and classify their thinking. For example, football, basketball, tennis, boxing, etc. all revolve around the idea of sports. Once learners are taught a new idea, it is necessary for them to practice combining the new idea with the previous one, which is already known.

2.Metaphors and analogies: are approaches to clarifying the nonconcrete, unfamiliar, or new by showing how the nonconcrete or new phenomenon shares features with or compares to a familiar thought or idea. Metaphors and analogies may make an individual produce a new picture and different representations of the subject.

3.Inference: Means drawing a conclusion from presenting evidence. It means deriving a conclusion from a set of facts or situations.

However, HOT is considered an influential thing in our future lives. The education process must go in parallel with global changes, technological advances, and employers' demands. Companies are leaving low-skilled employees. There is a clear agreement that as time passes, a greater proportion of jobs call for workers with HOT, along with other skills (Rimini & Spiezia, 2016). Studies have shown that workers who perform routine tasks are being replaced by digital

technologies in the future, and simultaneously, there will be a rising demand for non-routine workers (Van Reenen, 2011).

2.1.2 Lower Order Thinking (LOT)

LOT is a term used to describe a type of reproductive behaviour in which an individual just recalls and reproduces information that they have previously learned (Mitana et al., 2018). Depending on BRT, LOT involves the first three cognitive categories, namely Remembering, Understanding, and Applying (Hayikaleng et al., 2016; Tikhonova & Kudinova, 2015). Remembering is the most basic level of mental processing at which a learner is asked to recall or retrieve previously acquired knowledge. The second level of cognition is Understanding, in which the learner is anticipated to engage in activities such as interpretation, exemplification, classification, summarization, inference, comparison, or explanation. The Applying level requires the learner to put the information they have gained into practice (Mitana et al., 2018).

Recently, there has been a significant focus on HOT. The primary objective typically entails pupils attaining HOT. The development of HOT is widely recognised as crucial in fostering logical and critical thinking abilities that are essential for navigating various aspects of daily existence. HOT enhances students' capacity for problem-solving, increase their confidence in the learning process, and contribute to their academic success when they are faced with complex, non-routine problems (Barut & Wijaya, 2021; Qasrawi & Beni Andelrahman, 2020; Rahman & Manaf, 2017).

However, scholars agree that Blooms Taxonomy was created in a way that makes it clear that mastering cognitive processes at a lower level is needed before doing higher-level cognitive activities (Mitana et al., 2018). Therefore, it is thought that one cannot apply evaluating thinking level without being aware of, comprehending, and able to apply the relevant data (Barut & Wijaya, 2021). Researchers have emphasised the significance of LOT in the context of objective learning. They assert that LOT serves as the fundamental basis for the development of HOT and plays a crucial role in building a firm foundation for the application of HOT (Krathwohl, 2002; Kamarulzaman et al., 2017). Mitana et al. (2018) place more emphasis on the LOT and factual knowledge because they believe that HOT depends on LOT.

According to Muhayimana et al., (2022); Assaly and Smadi (2015), the cognitive levels in Bloom's Taxonomy have to be distributed in a balanced way. Anggraeni and Suharyadi (2013) recommend the unbiassed distribution of LOT and HOT. Tikhonova and Kudinova (2015) also suggest incorporating sophisticated thinking. Sophisticated thinking entails the harmonious or balanced integration of both LOT and HOT. Sophisticated cognitive processes facilitate the progression and transition from LOT to HOT. In other words, balanced participation among the cognitive categories eases students thinking development.

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.”

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.

2.2 Review of Related Studies

A number of studies, in English Foreign Language (EFL) in various settings, have been carried out about analysing the activities of English textbooks using Blooms’ Taxonomy, original or revised.

Riazi and Mosalnejad (2010) showed in their study that they investigated the types of learning objectives represented in Iranian senior high school and pre-university English language textbooks using Bloom's Taxonomy of learning objectives. The results showed that in all grades, lower-order cognitive skills were more prevalent than higher-order ones.

Igbaria (2013) analysed the *Horizons* textbook for 9th grade students studying English. The study tried to answer this question: To what extent are the WH-questions in the six levels of the cognitive domain varied or frequent in the textbook of Horizons? The results showed that out of 381 questions, 244 concentrated on lower-order cognitive skills, while only 137 emphasised the

three higher-order thinking skills. The comprehension level was taken at the maximum frequency 113, while the evaluation level was taken at the minimum frequency 9.

Abdelrahman (2014), this study aimed at analysing the types and levels of questions offered in the 10th English language textbooks in Jordan. The purpose of the analysis was to determine the percentage of the distribution of the questions over the six cognitive levels of Bloom's Revised Taxonomy. The results revealed the following: most of the questions referred to the first two levels: remembering and understanding 55.11%, 16.18% for applying, and 28.71% for the other three levels: analysing, evaluating, and creating. The results revealed that the mass range is given to the lower-level questions in the two investigated textbooks.

Gargari (2018) conducted a study in which she analysed the activities in the Iranian senior high school textbook *Vision 1* based on the cognitive domain in Bloom's Revised Taxonomy. The study attempted to investigate the types and levels of questions available in the 10th grade English textbook. It wanted to answer this question: What levels of thinking occurred in the questions of senior high school English students and workbooks? The findings of the research indicated that the majority of the questions referred to lower-order cognitive questions, while just one question referred to higher-order cognitive levels.

Sari and Sakhiyya (2020) performed an analysis of the English Course Book named *Symphony 1* to determine the degree to which HOT are utilized in the reading exercises. The findings indicated that 63% of the items were classified as LOT, whereas 37% of the items were classified as HOT. It seemed that LOT was the primary focus in the book.

3. Methodology

3.1 Materials

EFL textbooks *Sunrise 12* (student's book and activity book) of $12^{th\ grade}$ in the Kurdistan region of Iraq is used as the material to be analysed using BRT cognitive levels. 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 consists of eight episodes and six roleplays. 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 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 contains the answers for every activity in the SB as well as the AB. Lastly, the CD contains all the recorded listening materials and pronunciation activities. The textbooks used in this study and the number of activities is presented in Table 1.

Table 1. The average activities of the student book and activity book used in the study

Title of the textbooks	Number of activities	Grade	Publication Year	Publisher
Sunrise 12 (student book)	240	12	2011	Ministry of education
Sunrise 12 (activity book)	219	12	2011	Ministry of education

3.2 Design of the Study

The design adopted in this study is qualitative content analysis. It has been defined as "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 have called 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 problems arise. It does not necessarily require contact with people. Of all the research methods, content analysis scores highest with regard to ease of replication. Usually, the materials can be made available for 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 researchers try to analyse and classify all the activities included in EFL textbooks *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 distributed in terms of belonging to higher order thinking skills versus lower order thinking in EFL textbooks *Sunrise12*?

2. Are the lower and higher- order thinking activities distributed proportionately in EFL textbooks *Sunrise12*?

3. How are the activities of lower- order thinking in the EFL textbooks *Sunrise 12* distributed?

4.How are the activities of higher- order thinking in the EFL textbooks *Sunrise 12* distributed?

3.4 Data Analysis Procedures

Developing a research instrument is the initial practical action for carrying out a study. The research instrument is a crucial component of the study as it serves as the input. The quality and suitability of your input directly determine the quality and validity of your output, which includes the findings and conclusions (Kumar, 2011). So, selecting the appropriate instrument is significant. A revision of Bloom's Taxonomy of Educational Objectives within the cognitive dimension is used by many different researchers around the world, but based on the researchers' knowledge, this is the first one in the Kurdistan Region of Iraq within *Sunrise* textbooks. So, the researchers find that this instrument is an appropriate needed instrument for the purpose of this study. Firstly, a coding scheme is used by the researcher 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) as shown in the appendices (A and B).

Secondly, a coding scheme is used that was designed and developed by Anderson et al., (2001), which is taken as a dependable model for this study. It is also used by many other researchers to analyse and evaluate English textbooks. However, for the purpose of the study, in terms of answering its research questions, the coding scheme is modified. As a result, just a cognitive dimension is used to analyse all the activities. The coding scheme is used to show the results of all the learning objectives including the Sunrise 12 (SB & AB) in the Kurdistan region of Iraq, which is a table that includes all the six cognitive categories ordered from simple ones to more complex ones. The categories consist of: Remembering, Understanding, Applying, Analysing, Evaluating, and Creating.

Thirdly, the data for this study, which are all the activities that include *Sunrise 12*, are analysed to codify and classify them depending on the definitions and clue verbs of each cognitive category in BRT as well as the Teacher Book and instructional verbs or questioning stems for each activity from the SB and AB. Lastly, the textbooks are codified, and the frequencies and percentages of occurrence of different learning objectives are calculated and presented.

3.5 Categories of Analysis

This study depends on six cognitive categories and their definitions, which include the Taxonomy Table, to analyse all the activities of Sunrise 12. In addition, there are some key words that guide the researcher to analyse the activities in the correct way. All these six cognitive categories, their definitions, and the clue words are presented in Tables 2. & 3.

Table 2. The six cognitive categories and 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 • Describe• 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• Delete •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).

3.6 Validity

Bloom's Taxonomy is widely regarded throughout the educational community as a method of classifying and organising information (Assaly &Smadi,2015). As well as “determining the congruence of educational objectives, activities, and assessments in a unit" (Krathwohl 2002, p. 212)., it was also used and determined to be valid 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, were considered valid.

To further validate the categories of analysis, their concepts were first defined accurately, depending on the BRT definitions and their key words. A group of three experts then 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 Reliability of the Coding

Inter-rater reliability was examined for coding the data. This step was taken to ensure high reliability in the process of data coding and categorization. To determine the inter-rater reliability, three independent raters (who have a master degree in TEFL) were informed about the study, its objectives, and the data analysis procedure, reviewed examples from similar studies, and received a demonstration on the coding procedure. They independently coded the data. These raters 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. This was considered sufficient evidence that the coding was highly objective and that the researcher could independently code the remaining data. The results are shown in the Tables 4-5.

Table 4. Kruskal Wallis Test among analyzers 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 analyzer’s evaluation for both textbooks, both SB and AB, overall, there is no statistically significant difference between the result of the four analyzers.

To test the level of consistency through persons, the findings of the analysis of the activities evaluation of SB and AB in EFL textbooks ‘Sunrise12’ done by one researcher and three analyzers were examined. The result shown in Table 6 shows the level of consistency between the results of the researcher and each analyzer.

Table 5. Coefficient correlation Among Researcher and all the three analyzers: Reliability through persons

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
	3rd rater	80			
AB	Researchers	72	66	6	0.92
	3rd rater	72			

The results in Table 6 above 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 researchers and all three raters, which enables the researchers to continue and process the data collected.

4. Findings and Discussion

The questions are restated below

Q1. How are the textbook activities distributed in terms of belonging to higher order thinking skills versus lower order thinking skills in EFL textbooks *Sunrise12*?

Q2. Are the higher and the lower thinking activities distributed proportionately in EFL textbooks *Sunrise12*?

Q3. How are the activities of LOT in the EFL textbooks ‘Sunrise 12’ distributed?

Q4. How are the activities of HOT in the EFL textbooks 'Sunrise 12' distributed?

To answer these questions, the researchers discriminated the distributed frequencies of lower- and higher- order thinking activities over each part of the SB and AB in 'Sunrise 12' and accumulated their frequencies and percentages. The researchers tabulated Tables 6 & 7, which show the LOT and HOT related cognitive categories frequencies.

Table 6. Frequency and percentages per taxonomy level of lower order thinking (LOT) and higher order thinking (HOT) in Sunrise 12 of SB and AB

		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

Before exploring the research questions, it should be noted that LOT involve the first three levels of the BRT, which are remembering, understanding, and applying. HOT include the second three levels, namely analyzing, evaluating, and creating (Moore & Stanley, 2010; Tureková, 2021). Thus, Table 6 can be represented as Table 7 with new labels to probe the first and second research questions. Table 7 shows the frequencies, percentages, and Std. Residuals for LOTS and HOTS in SB and AB. Based on these results, it can be concluded that the students' book included a higher percentage of LOT, i.e., 66.3%, compared with the HOTS 33.8%, although none of the Std. Residual were higher than ±1.96. The AB also included a higher percentage of LOTS, i.e., 69.4%, while the percentage of HOTS in AB was 30.6 percent. None of the Std. Residuals were

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 Skills by Books

		Thinking Skills		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%

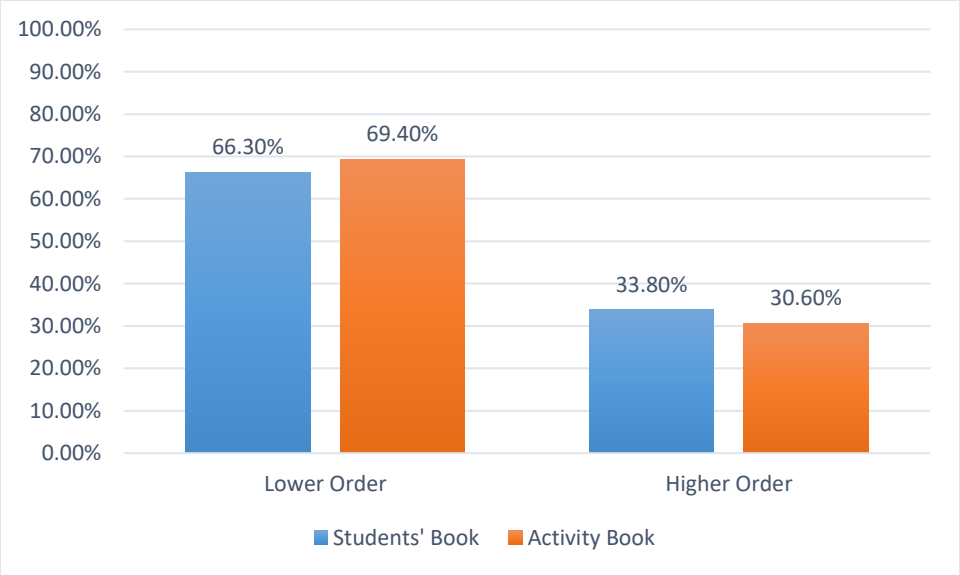

Figure 3 Percentages for Lower and Higher Order Thinking by Books

The result of question one, Table 7, shows that just 148 frequencies and 32.2 percent in 'Sunrise 12' are devoted to HOT out of 459 activities. So, only 32.2 percent of activities encourage

students to participate in HOT. While LOT activities dominate their total frequencies and percentages are 311 and 67.8.

Concerning the second question, depending on Table 7 and Figure 3 the total frequencies and percentages of LOT in Sunrise 12 are about twice as HOT. So, they are not participated proportionately, i.e., their proportions are unbalanced. This is considered a shortcoming because they should have participated equally, turn back to P. 8, second paragraph.

The results indicate that LOT activities are most frequent in this textbook. On the other hand, fortunately, HOT activities are not excluded, but they are not given adequate attention. In addition, to this study, 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 questions, the distribution of the included LOT cognitive categories is not balanced. In both books SB and AB, most of 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; even some scholars 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 books 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 are 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. Turn back to P. 8. Therefore, it is important to include all six cognitive levels equally.

Overall, researchers believe that although the range of HOT activities is insufficient, their presence is considered positive feedback. According to Chen (2017), 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, we believe that including LOT activities in school instruction is not problematic. Both types of activities are necessary, as mentioned above. Lower-order activities can enhance the acquisition of factual knowledge and the foundations for attaining HOT. On the other hand, HOTS activities are effective tools for stimulating thinking and developing other cognitive skills such as analysing, judging, creating plans, problem solving, and decision-making.

However, when HOT activities occur less frequently than LOT activities, the problem arises. In other words, there is no balance between their frequency of use. Conversely, the frequency of HOT and LOT should have been equivalent. Similarly, the learners' stage is not taken into account. In fact, decision-makers, curriculum designers, and teachers have to 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 endeavors, 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); Assaly and 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' viewpoints are supported by several researchers, namely Assaly and Smadi (2015), who suggest equal participating of the six cognitive levels. Anggraeni and Suharyadi (2013), state that the optimal allocation of LOT and HOT activities is a balanced division. Tikhonova and Kudinova (2015) confirm their 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 &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 to Sari 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 LOT activities more than HOT activities. However, it could be taught in a way that covers more 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 HOTS activities. Return to p. 7, points two and three.

5. Conclusion

1.It can be concluded that the EFL textbooks Sunrise 12 in the Kurdistan region of 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 the textbook is the development of LOT skills, especially remembering and understanding, which get the most attention. The majority of LOT activities show that the major activities are designed to help students acquire factual knowledge, 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 mixture of LOT and HOT activities would lead to broad educational goals, as well as equipping learners with knowledge and improving their abilities to think and solve problems that they encounter in academic matters and in their daily lives. So, curriculum designers should not neglect either HOT or LOT activities.

3. Concept mapping is hardly used in spite of its influential impact on practicing and developing HOT skills.

4.Some HOT activities are available. Despite their unsatisfactory numbers, they are not distributed well among the included cognitive categories: analyzing, 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, which require a lot of time. Second, the national exam, which is the final examination, is also 100% multiple choice. These two factors sometimes lead to teachers skipping 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. They will be impressive if they are treated properly. Unfortunately, most of the HOT activities are not given adequate attention. For example, there is a section in SB entitled Roleplay 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 activities in SB entitled 'Think about'; they are 11. Most of them relate to these most significant cognitive categories: evaluating and creating, which include HOT, and one activity refers to applying the cognitive category, which is also important and a 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 not studied, i.e., they are skipped.

However, HOT activities are about a third of all activities. If they are not ignored as well as their number is increased, the students' HOT can be developed, and a generation will be produced with the ability to transfer their knowledge to benefit from it in a new situation, analyze the subject matter or events, evaluate around troubles, and generate solutions. In other words, furnishing a generation will not just be receivers and consumers, but rather transformers and producers.

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