



## **On the Representation of Bloom's Revised Taxonomy in TOEFL iBT and IELTS Academic**

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### **Abstract**

The main objective of this qualitative-quantitative content analysis study was to compare IELTS Academic and TOEFL iBT four modules in terms of the cognition and knowledge dimensions of Revised Bloom's taxonomy. To this end, two authentic tests including all major modules of Speaking, listening, reading, and writing in each domain, namely iBT TOEFL and IELTS Academic exams were analyzed qualitatively and quantitatively. These tests were randomly selected from the collection of authentic tests available in trustworthy resources. The contents of these tests were codified using a coding scheme developed by Razmjoo and Kazempourfard (2012). In this coding scheme, English alphabets and numbers were assigned to levels of cognition and knowledge, respectively. The results indicated that in general TOEFL iBT codes are more inclined toward the higher orders of thinking and knowledge and the codes are not noticeably divergent; while, the majority of the codes in the IELTS Academic test are skewed toward the lower codes of the BRT. This shows the higher stance of the TOEFL iBT test concerning the higher orders of thinking and knowledge in the BRT. A significant difference was also found between the TOEFL iBT and IELTS Academic tests concerning the highest and the lowest levels of BRT.

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## **Introduction**

### **Background**

Bloom's Revised Taxonomy which is the revision of Bloom's Taxonomy (1956) by Anderson and Krathwohl in 2001 has been used in some testing and evaluating materials in different subject matters and different types of tests, either state-wide, nation-wide, or classroom assessments. However, studies on large-scale ESL (English as a Second Language) tests such as IELTS, International English Language Testing System, and TOEFL, Test of English as a Foreign Language, using such taxonomy is scant. According to Uysal (2010) such international tests play an important part in many people's lives as they are often intended for making critical decisions about test-takers such as admission to universities. TOEFL as a major test of English language proficiency developed for decision-making about admissions to English-medium universities and colleges in countries such as North America, plays a consequential and vital part for students from basically non-English countries pursuing their academic studies in countries like the United States and Canada (Cumming, Kantor, Baba, Erdosy, Eouanzoui, & James, 2005). Preparation for IELTS as another high-stakes test comes to dominate all educational and learning activities. Consequently, changes in the content, format, or application of this test exert influence on classroom instruction and students' academic achievement (Chapman & Snyder, 2000, p. 457). This kind of impact of testing on the educational system and the products of learning is referred to as "washback" (Wall, 2000 and Hughes, 1989). Bloom's Revised Taxonomy (Anderson et al., 2001) has affixed the knowledge dimension to the cognitive aspect, which formed the intersection and as a result various distributions of knowledge and cognitive categories in order to support the design of learning strategies and facilitating learning assessment (Nkhoma & Lam, 2016). Also, Fiegel (2013) benefitted from Bloom's Revised Taxonomy for developing learning outcomes connected to the design of lesson plans and assignments. That is why in recent years, there has been growing interest in the analysis of such standardized tests in terms of the cognitive and knowledge learning objectives. This necessitates the assessment procedures of these large-scale tests on a regular basis to set the seal on professional standards such as meeting the higher levels of cognition and knowledge and to contribute to its further development. However, when in these tests the content has a high degree of interactivity among different cognitive and knowledge elements and as a result the test-takers have to process a couple of tasks simultaneously; for example, doing listening and summary completion at the same time, the high cognitive load will be imposed on the test-takers' cognitive architecture. According to Ginns and Leppink (2019), the cognitive load denotes the load placed on the working memory as a result of multiple cognitive processes, such as comprehension, schema construction and automation, also problem solving. When working memory is overloaded through dealing with the demands of such processes, learning becomes impaired. That is why according to Baghaei, Bagheri, and Yamini (2020), IELTS and TOEFL trainers should seek ways to help offset the representation and distribution of the lower and higher-order learning levels of the tasks in these globally recognized tests. Still and all, the proper use of the higher-order questions makes test-takers to be more involved in the process of deeper thinking. Consequently, well-thought analysis of learning objectives in terms of the IELTS and TOEFL test contents will provide test developers with a solid evidence of the cognitive levels of learning tasks and skills (Baghaei et al., 2019).

### The Statement of the Problem

To this aim, the purpose of the present study was to evaluate all the tasks in four major skills of reading, listening, writing, and speaking in two highly recognized tests, namely TOEFL iBT, the Internet-based version and the ones pertinent to IELTS, the academic module which are both intended to assess the English language proficiency of non-native English speakers. This analysis was done in light of Bloom's Revised Taxonomy (BRT) as a principle framework. The reason behind this is that among all the existing taxonomies and models for both tests and course book evaluation, namely, Vygotskian, Piagetian, and Situated Learning Theories (Anderson & Krathwohl, 2001), Bloom's Revised Taxonomy provides a more comprehensive and effective means to assess the learning material to pursue the goal of today's education systems which according to Razmjoo and Kazempourfard (2012) is developing learner's thinking capability. As Hanna (2007) states the new version of this taxonomy provides a common language for educators to design and align their curricula in terms of cognitive learning objectives.

### Analytical framework

This study did a content analysis of the two international exams, namely TOEFL iBT and IELTS academic module in light of Bloom's Revised Taxonomy (2001). Taxonomies of the cognitive domain and the knowledge dimensions have been shown in the following table, table 1 by Anderson and Krathwohl (2001).

**Table 1.** *The Original Taxonomy by Anderson and Krathwohl (2001)*

<i>Lower order thinking skills</i>	<i>→ Higher order thinking skills</i>					
<i>Concrete knowledge</i>	<b>A. Remember</b>	<b>B. Understand</b>	<b>C. Apply</b>	<b>D. Analyze</b>	<b>E. Evaluate</b>	<b>F. Create</b>
<b>Factual</b>	List	Summarize	Classify	Order	Rank	Combine
<b>Conceptual</b>	Describe	Interpret	Experiment	Explain	Assess	Plan
<b>Procedural</b>	Tabulate	Predict	Calculate	Differentiate	Conclude	Compose
<b>Metacognitive</b>	Appropriate Use	Execute	Construct	Achieve	Action	Actualize
<i>Abstract Knowledge.</i>						

### Why Bloom's Revised Taxonomy?

Adams (2015) mentioned that the taxonomy is useful in two important ways. First, the taxonomy promotes the educators' thinking of learning objectives to notice what the learner can do as a result of instruction. Second, employing Bloom's Revised Taxonomy emphasizes the need to set learning objectives that require higher levels of cognitive skills resulting in deeper learning and facilitating the transfer of knowledge and skills to a greater variety of tasks and contexts. According to Adams (2015), the most important use of Bloom's Revised Taxonomy for the teachers is to encourage higher-order thought in their learners and to gain an insight into the perception of varying levels of cognition and delve into assessing learning on these levels. This taxonomy also contributes to adjusting the content and assessment items to the educator's defined objectives.

## Literature Review

The present section is a brief chronological review of the studies conducted on course book and test evaluation in light of Bloom's Taxonomy and Bloom's Revised Taxonomy.

There are quite an appreciable number of studies which have drawn on Bloom's Taxonomy and Bloom's Revised Taxonomy to analyze the content of the textbooks all around the world. These studies have been conducted for a variety of disciplines all bearing some implications for the policy makers, material developers, test-takers, teachers, and learners to design, adopt and teach more efficacious materials. Examples of such studies for which the purpose was to determine the level of thinking processes predominate in the textbooks and tests in line with these taxonomies are: Baghaei, Bagheri, and Yamini (2020); Mizbani, Salehi, and Tabatabaei (2020); Amaliyah (2018); Aghaei and Mirzaei Rad (2018); Zareian, Parsaei, Alemokhtar and Rahimi (2017); Tangsakul, Kijpooonphol, Linh, and Kimura (2017); NamazianDoost and HayaviMehr (2017); Ebadi and Mozafari (2016); Sahragard and Zahed Alavi (2016); Sadeghi and Mahdipour (2015); Zamani and Rezvani (2015); Thompson and O'Loughlin (2015); Assaly and Igbaria (2014); In Askaripour (2014); Igbaria (2013); Su and Osisek (2011); Gordani (2010); Khorsand (2009); and Amin (2004). The most pertinent studies concerning the TOEFL and IELTS tests are presented below:

In a recent study done by Baghaei, Bagheri, and Yamini (2020), 12 Academic IELTS listening and reading tests and 12 TOEFL iBT listening and reading tests were analyzed both qualitatively and quantitatively. The authors codified the contents using a coding scheme developed by the researchers themselves. The Fisher-Freeman-Halton For the listening and Monte Carlo tests for the reading tests were applied to do content analysis in terms of representation of learning objectives. Results unveiled the dominance of the levels of Understanding and Remembering Factual Knowledge in the IELTS listening test items, while the analysis of TOEFL iBT listening test items indicated that Understanding, Analyzing, and Remembering Factual Knowledge were the most prominent planes. In general, lower-order thinking skills were more prominently spotted in both listening and reading tests in IELTS than in those in TOEFL. A Chi-square test was also run in order to compare the IELTS and TOEFL listening and reading tests regarding the frequency of lower and higher-order thinking skills. The results indicated that there was a significant difference between IELTS and TOEFL reading tests concerning the learning objectives.

In another study, NamazianDoost and HayaviMehr (2017) found the cognitive levels of reading comprehension questions in simulated tests of IELTS and Iranian high-school English text books in light of Anderson, et.al's (2001) taxonomy. The findings indicated that in both Iranian high school English text books and IELTS tests, there is a significant tendency to low-order questions such as remembering, understanding, applying. No significant difference was found between high school text books and IELTS reading comprehension questions in terms of their tendency to low level questions; however, this inclination was found to be more in high school books. The potential underlying reasons were the limitations imposed by the question types, culture independency of tests, the marketability, the willingness of universities to accept fee-paying international students, and the effect of target objectives on test objectives.

As the number of studies unveils, Bloom's Taxonomy and its revised version have been used in a wide range of studies in different disciplines; however, there is a paucity of research concerning the use of such taxonomies in the field of English Language Teaching particularly in tests and assessment procedures, those empirically focusing on high-stakes tests such as TOEFL and IELTS.

### Objectives and Research Questions

As such, the present study intended to seek the most prominent planes of Bloom's Revised Taxonomy (BRT) in two standardized tests of TOEFL iBT and IELTS academic module to see which of these two globally recognized exams meets the distribution of the highest levels of thinking and knowledge. In order to do that, a full authentic test administered from 2019 to 2020 was randomly selected from the reliable and available sources in each discipline and then these authentic tests were codified and interpreted according to the BRT. Accordingly, the following research questions are raised:

1. Which distributions of the learning levels of Bloom's Revised Taxonomy will be much more prominent in both the TOEFL iBT and IELTS academic module?
2. Is there any difference between the TOEFL iBT and IELTS academic module in terms of the distribution of highest and the lowest learning levels of BRT?

### Significance of the Study

To raise the overall standard of education, it is crucial that both test developers and test-takers think and operate at higher levels of cognition and knowledge (NamazianDoost and HayaviMehr, 2017). According to them, what and how the examinees perform on the standardized tests on an international scale can be contingent on what they think they will be assessed on. Properly designed tests which are highly recognized internationally and draw on the representation of higher learning levels of thinking and knowledge can help to provide feedbacks to EFL learners and test-takers to make progress and for test developers to direct their assessments toward higher-order skills. This is what Salmani-Nodoushan (2020) calls "Just in Time" (JIT) learning (i.e., learning through trying) or as he says "learning through 'hands-on experience'" (P. 259).

This becomes even more noteworthy as Hashemi and Daneshfar (2018) found that the standardized tests such as IELTS should embark on a more significant body of research to improve test validity as various pieces of research on the predictive validity of IELTS have not found a correlation between IELTS scores and students' academic performance. However, the BRT will help the test developers and test-takers gain better insight into which questions might meet the higher-orders of thinking and knowledge and as a result as Pishghadam and Shams (2013) assert the rating criteria of various modules can be revised through adopting higher levels of tasks and questions in terms of both receptive and productive skills in standardized tests. The impact of testing on education is even more influential when it comes to high-stakes tests like IELTS (Chapman & Snyder, 2000, p. 457). Therefore, the studies like this one can be constructive and efficacious in assisting not only the educators but also the test developers in their approach and outlooks to devise and evaluate need-based tests, the ones that can have generally contributions to education and particularly to the students' academic achievements and thereby the results can enhance the construct validity.



## Method

### Research Design

This study mainly has adopted content or document analysis as a subcategory of qualitative research to find the representation and distribution of the most prominent levels of cognition and knowledge in the TOEFL iBT and IELTS academic version. In line with what Ary, Jacobs, Razavieh and Serensen (2006) have asserted a content analysis as the most predominant data collection strategy in qualitative research would be an appropriate research design as content analysis of records and documents is an unobtrusive approach to qualitative research (p.443).

### Materials

#### Materials

For this study revolves around a content analysis, the materials are two authentic tests including all major modules of speaking, listening, reading, and writing in each domain, namely iBT TOEFL and IELTS Academic module. These tests were randomly selected from the pool of authentic tests administered from 2019 to 2020 available in trustworthy resources.

### Data collection and analysis procedures

The study has made use of a general trend used in the coding scheme which was designed and developed by Razmjoo and Kazempourfard (2012) to codify, classify, and analyze the content of these two standardized tests. However, for the purpose of the study, in terms of codes, all the possible combinations were put into consideration. That is why the coding scheme was modified. In this scheme, the cognitive dimension consists of six levels from the simple recall or recognition of facts, as the lowest level, through increasingly more complex and abstract mental levels of evaluation and creation. The categories are labeled: A) Remember B) Understand C) Apply D) Analyze E) Evaluate and F) Create. Moreover, the knowledge dimension consists of four types of knowledge: 1) Factual knowledge 2) Conceptual knowledge 3) Procedural knowledge and 4) Metacognitive knowledge. Consequently, twenty-four learning objectives represented in codes will be used in this study. Moreover, the full description of the objectives in each cell regarding orders of cognition and understanding is presented in table 2.

**Table 2.** Coding Scheme Based on Bloom's Revised Taxonomy

The Knowledge Dimension		The Cognitive Process Dimension					
		A. Remember	B. Understand	C. Apply	D. Analyze	E. Evaluate	F. Create
1.	Factual Knowledge	A1	B1	C1	D1	E1	F1
2.	Conceptual knowledge	A2	B2	C2	D2	E2	F2
3.	Procedural Knowledge	A3	B3	C3	D3	E3	F3
4.	Metacognitive Knowledge	A4	B4	C4	D4	E4	F4

*Retrieved and revised from Razmjoo and Kazempourfard (2012, p.181)*

Using the above coding scheme, all the test components and the related questions in each skill for a randomly selected test in these two tests were coded in terms of cognitive and knowledge dimensions. In the following section the process of codification and the justification behind assigning each code for the related task is presented.

### **Codification of the TOEFL iBT test**

In order to do codification of a TOEFL iBT test, a full test in this field was randomly selected from the top-seller book, namely "The Cambridge Preparation for the TOEFL Test", the fourth edition and the test was codified and interpreted according to the BRT. In this section, the codification of all tasks in the TOEFL iBT test is done individually for each section of the test according to the coding scheme developed from the BRT. After explicating the process of codification for each module in this test, the information concerning the principal objectives, assigned codes, and their frequencies are presented in separate tables for each section. The point worth mentioning in this codification is that higher codes assigned entail the lower levels as well both in terms of cognition and knowledge. In fact, the higher levels of cognition and knowledge necessitate deeper and greater extent of cognitive processing and this can only be attained once the lower-order cognitive and knowledge skills have been mastered.

#### ***The Reading Section***

In this section, different tasks in the reading section of the TOEFL iBT test are codified in terms of the coding scheme developed for the BRT taxonomy. The codes in this section are stated and elaborated from the lowest orders of thinking skills and the most concrete levels of knowledge to the highest levels of cognition and the most abstract knowledge. The first code is A1 which represents Remembering the Factual Knowledge. In analyzing the reading tasks in the TOEFL iBT, two types of the questions were assigned code A1, namely the MC vocabulary questions and the MC reference questions both with one correct answer. The justification behind is that the vocabulary questions require the examinees recall the terminology which is a part of factual knowledge. In this type of question, they have to make use of their knowledge of vocabulary to see which choice best fits the meaning of the given word in the question. In the MC reference questions, the same code i.e., A1 is assigned as the examinees have to recognize the specific details defined as the factual knowledge. In this question, the participant should locate the references within the passage. Locating and recognizing fall into the category of Remembering and references are within the domain of knowledge of specific details and elements. At this lowest level of cognition dimension yet a more abstract level of knowledge i.e., the conceptual knowledge, Summary questions are observed. These questions require listing the summaries in the form of the structures and categories or the concepts in particular tables. In this process, again the participants are supposed to do listing which is an action verb for defining the lowest order of cognition. That is why the code A2 is assigned to such questions. At a more abstract level of knowledge which is the procedural knowledge, MC Insertion questions reside; however, they still are located in the lowest order of thinking i.e., Remembering. The reason is that such questions involve recognition of an appropriate place of a sentence concerning the preceding and following sentences within the passage. Therefore, the code A3 is assigned as this code represents recognition of a proper place in chain of events. Although most of the questions in the reading section of the TOEFL iBT are coded as the lowest planes of cognition, there are two other

questions which fall into a higher category on the cognition process. The first one is the MC Comprehension Questions with one correct answer. In such questions the examinees are required to understand or interpret the knowledge of specific details and elements in the reading passage. In the Bloom's Revised taxonomy Understanding is one level higher than Remembering and entails some action verbs such as interpreting, inferring, explaining, etc. this question basically taps into the participants' knowledge of the specific information within the reading passages. That is why code B1 has been assigned. The last question type in this section is the Category Chart which necessitates classification of specific details in some charts. According to the BRT, classifying the pieces of information falls into B1 cell i.e., Understanding the Factual knowledge. In essence, this question requires the participants to drag and drop some items from a pool of answer choices (five to seven) into already two assigned categories. They may not use all of the answer choices in answering such questions. The knowledge involved is one pertinent to some specific details and elements. The data on the codification of different tasks in the reading section of the TOEFL iBT is depicted in the table 3.

**Table 3. Codification of Reading Section in TOEFL iBT**

Sections	Tasks	Subtasks	Objectives	Codes
TOEFL iBT Reading	MC with one correct answer	MC Vocabulary	Recall factual	A1
		MC Reference	Recognize factual	A1
		MC Comprehension	Interpret factual	B1
	Insertion	X	Recognize procedural	A3
	Summary	X	List conceptual	A2
	Category Chart	X	Classify factual	B1

Furthermore, in table 3 the types of codes and their frequencies regarding the type of task are given. In the reading section of TOEFL iBT, there are four main tasks for one of which that is MC question with one correct answer there are three sub tasks. Therefore, there are totally six types of tasks. The frequency of codes A1 and B2 are both two and the frequency for A2 and A3 is one per code. X in the table signifies the absence of codes in the taxonomy such as A4, B2, B3, and B4.

### ***The Listening Section***

In this section, different tasks in the listening section of the TOEFL iBT test are codified with regard to the coding scheme developed for the BRT. As the main objective in this part of the exam is measuring the ability of the examinees to understand the spoken English, the B cell in the cognitive process dimension sparkles as the dominant cognitive process. The first and second types of questions are MC listening tasks; one with one correct answer and one with two or sometimes more correct answers. Both of them are assigned the code B1 which is Remembering the Factual knowledge as they require the testee to infer the related details and elements. The number of correct answers does not interfere with the essence of the task and the type of code determined. The third type of the task which is Chart basically asks the examinees to classify the some details and complete a chart and click in the correct box for each category. One of the key action verbs classified under the Understanding cell in the cognition dimension is Classification and the type of knowledge required is Factual specific



details which should be classified under specific categories. That is why again the code B1 is given to such a question which represents Understanding the Factual knowledge. The information concerning the tasks and related codes is presented in table 4.

**Table 4.** *Codification of Listening Section in TOEFL iBT*

Section	Tasks	Objectives	Codes
TOEFL iBT	MC with one correct answer	Inferring factual	B1
	MC with two or more correct answers	Inferring factual	B1
Listening	Chart	Classifying factual	B1

Moreover, in table 4 the types of codes and their frequencies for each type of task is presented. In the listening section of TOEFL iBT, there are three basic tasks. The frequency of the code B1 is one per task and the total number of B1s is three in terms of the type of the task not the number of questions in each task in a typical test. X in the table illustrates the absence of codes in the related column in the taxonomy such as B2, B3, and B4.

### *The Speaking Section*

In the speaking module on the TOEFL iBT test, there are two principle tasks, namely independent and integrated tasks. The codes in this section are stated and elaborated from the lowest orders of thinking and knowledge to the highest levels of cognition and the most abstract knowledge. The lowest level of cognition and knowledge here belongs to a campus situation topic task which is the subcategory of the Integrated Reading- Listening- Speaking task. The code assigned is B1 which signifies summarization of the factual knowledge. In this type of task after reading a passage which puts forward an issue attributed to the campus, the test taker listens to a conversation between two people talking about the topic. Through the use of information from both the reading passage and the conversation, the test taker has to summarize the speakers' viewpoints and opinions on the issue within the context of the reading passage. According to the BRT, Summarizing is a key action verb which has been classified under the category of Understanding. This task requires a deep understanding of the whole context to make the story short. Another code B1 assigned belongs to an Integrated Listening-Speaking task called an Academic Course Topic. In this task, the test taker must listen to a classroom lecture about an academic topic and then summarizes the lecture and explains how the examples and details are related to that topic. The code B1 is appropriated as this task taps into the ability of the examinees to understand and summarize the factual knowledge of specific details on a topic. On a more sophisticated level of the BRT in this section code C3 is allocated to an Integrated Reading- Listening- Speaking task called an Academic Topic Task. Here, the examinees have to read a passage on a general academic topic. Then, they should listen to a classroom lecture which presents some specific information and examples which elaborate on the reading text. Subsequently, they are asked to combine and state important information from both sources. The reason for assigning such a code is that the objective is to integrate the information from both sources. Basically in this task, the integration of procedural knowledge from both sources and how these two sources might be related and how something such as a behavior might develop is of question. Here in this task, Code C3 signifies the application and combination of information from different sources to shed light on the development, change,

and the process of becoming. The next higher code belongs to D1 which is assigned to the Integrated Listening- Speaking task which is named as a Campus Situation Topic in which the test takers must listen to dialogue about a student's problem and two possible solutions to that problem. The examinees should use the information from the conversation to indicate they have understood the problem. Moreover, they should give their opinions on how to solve such a problem and state which solutions they prefer and why. This task requires the test takers to perform at a higher level of cognition that is to Analyze the whole situation, state their preference and the justifications behind that choice regarding some pieces of information including some specific details on a problem and some solutions. Code D1 specifies Analyzing the Factual knowledge.

The last and highest level in the speaking section of the TOEFL iBT test belongs to the code D2 which designates higher level of knowledge and is attributed to the first Independent task called a Personal Preference Task. In this task, examinees hear the speaking task which is in the form of a statement or question about a familiar topic, at the same time see it on the screen, and after the allocated time they should start speaking. This task requires the test takers to state and support a personal choice from a special category like activities, events, important people and places. As the nature of this task necessitates the analysis of the statement regarding some special categories and attributing some qualities, code D2 which entails Analyzing the Conceptual knowledge is assigned. Another task with the same nature is called a Personal Choice task which again belongs to the Independents tasks. The Personal Choice task requires the examinee to make and support an option between two contrasting actions or behaviors. Here, the testees must analyze the whole context and differentiate and compare between two contrasting categories of methods and activities. In fact, Analyzing the conceptual knowledge, knowledge of classifications and categories is meant which is represented in code D2. The data concerning the tasks and related codes in the speaking section of the TOEFL iBT is presented in table 5.

**Table 5. Codification of Speaking Section in TOEFL iBT**

Section	Tasks	Sub-tasks	Subsub-tasks	Objectives	Codes
<b>TOEFL iBT  Speaking</b>	Independent	A personal preference	X	Analyzing conceptual	D2
		A personal choice	X	Analyzing conceptual	D2
	Integrated	Read-Listen-Speak	A campus situation topic	Summarize factual	B1
			An academic topic	Integrate procedural	C3
		Listen- Speak	A campus situation topic	Analyze factual	D1
			An academic course topic	Summarize factual	B1

In the speaking section of TOEFL iBT, there are two basic tasks, namely independent and integrated tasks. They are both assigned code D2. Therefore, the frequency of this code is 2. The integrated tasks are divided into two tasks, namely Read-Listen-Speak and Listen- Speak tasks and each of them is divided into two other tasks. In this category of integrated tasks there

are three codes (B1, C3, and D1). The frequency of code B1 is two and for the other two codes the frequency is one.

### *Writing Section*

In the writing section of the TOEFL iBT test, there are mainly two types of tasks, namely Independent and Integrated tasks. In the integrated tasks, although the test takers should have the ability to combine what they have learned from the assigned reading passage, the ultimate goal for them is to summarize the points made in the lecture and explain how these points cast doubt on the points made in the reading. That is why code B1 which represents Understanding and the related action verbs such as summarizing and explaining on one hand and on the other hand denotes the Factual knowledge of specific details has been considered for this type task. Lastly but most importantly are the independent writing tasks of the TOEFL iBT tests. In such tasks the principal objective is to express and support the points of view and compose an essay; either state, explain and support an opinion or state, explain and support a preference. The major concern here is to develop an argument which requires the highest level of cognition that is Creation represented by the code F. Creation is manifested in code F in the BRT which entails action verbs such as planning, generation or producing. Here, according to McKinley (2015), the use of critical argument and writer's identity will lead to understanding the test takers' academic writing abilities as writers use different ways and forms of developing an argument. This necessitates the test taker's reading widely beforehand and supporting their writing with evidence and is exactly where knowledge is constructed or created. However, the type knowledge used is basically Factual, since the testee has to create or develop some argument not some classifications or a method or even an approach. The knowledge here in this task is the knowledge of specific details. That is why code F1, the highest code in this test, is assigned to the independent writing tasks in the TOEFL iBT test. The information related to the tasks and attributed codes in the writing section of the TOEFL iBT is presented in table 6.

**Table 6.** *Codification of Writing Section in TOEFL iBT*

Section	Tasks	Objective	Codes
TOEFL iBT	Independent	Create factual	F1
Writing	Integrated	Summarize & compare factual	B1

Moreover, the following table 6 depicts the code and related frequency per task in the writing section of the TOEFL iBT test. As it can be observed, the frequency for the code B1 and F1 is one each.

### *Codification of the IELTS Academic Test*

In order to do codification of an IELTS test, a full test in the field of IELTS Academic was randomly selected from the top-seller book, namely "Cambridge IELTS 10: authentic examination papers from Cambridge", the fourth edition. In the first step, the test was codified and then interpreted according to the BRT. In this section, the codification of all tasks in the IELTS Academic test is done individually for each module of the test according to the coding scheme developed from the BRT. After explaining the process of codification for each module in this test, the information on its major objectives, assigned codes, and their frequencies are depicted in separate tables for each task. In this process of codification like the one done on the TOEFL iBT test, higher codes also entail the lower levels with regard to the cognition and

knowledge dimensions. Therefore, when a high code is assigned it is presumed that the candidate has already attained at least some if not all the other lower codes. Another point is that the codes in the following sections are stated and elaborated from the lowest orders of thinking skills and the most concrete levels of knowledge to the highest levels of cognition and the most abstract knowledge.

### ***Listening Section***

In this section, different tasks in the Listening Section of the IELTS Academic test are codified in terms of the coding scheme developed from the BRT taxonomy. The listening section consists of four recordings of native English speakers with ten questions each. There can be a variety of question types observed in this part all of which mostly of the same essence (e.g., matching, diagram/plan/map labelling, form/note/flow-chart/summary completion, etc.). The first type of the task in this section is a conversation usually between two speakers on social needs set in an everyday social context (e.g., a conversation about travel arrangements). There are two types of tasks entailed by this part, one in the form of a sentence and phrase completion and the other one in the form of table completion. In either case, the task requires the examinee to remember some specific details and concrete facts and assesses the skill of listening for details and if an examinee can understand information given in a conversation on an everyday topic, for example different types of hotel or guest house accommodation. The task focus is on the main points which a listener would naturally listen in this type of situation and on the ability of the candidate to spot the key information in the listening text. That is why the code A1 which of the lowest level of cognition and knowledge is assigned. This code presents Remembering the Factual Knowledge. In this type of task the candidate has to remain concentrated to fill the blanks using typically one word or a number (the number of words may vary). Test takers have to follow this word limit for each task otherwise they are penalized.

The second recording is basically a monologue again on the social needs. The sample examined includes a multiple choice question and sentence completion. In multiple choice tasks, there is a question followed by five possible options marked by English letters such as A, B, C, etc. Candidates are asked to choose two correct answers. Sometimes, test takers are given more than one question with three possible answers and required to choose only one. Therefore, examinees should read the guideline carefully to check how many answers are required. The examinee is required to identify or recognize and remember specific points in the listening. That is why code A1 is assigned. In the second part of this section which belongs to a monologue sentence completion is observed. Again in this task, the candidates are asked to fill a gap in each sentence using information from the recording. A word limit is of concern. The test takers are expected to identify the key information in a listening text. Therefore, Code A1 is given to this task which indicates Remembering the Factual Knowledge. The second type of task in the second recording is sentence completion in which test takers have to identify and recall missing words from the recordings played once and they are not expected to change the words relating to factual details from the recording in any way. That is why code A1 is selected for this type of task.

In the third recording, again there are two subsections the lower of which in terms of thinking process and knowledge dimension is sentence completion in which the candidates are expected to read a set of sentences summarizing key information from the recording or from

one part of it and they should fill in the gap in each given sentence using concrete facts and specific details from the listening. That is why code A1 is assigned. The second part is MC comprehension questions in which there are some questions followed by three possible answers each and examinees have to select one correct answer - A, B or C. The candidates are required to have a detailed understanding of specific points and details or an overall comprehension of the main ideas of the recording. This necessitates a higher level of cognition to be involved and that is Understanding and interpreting the Factual Knowledge. That is why code B1 is assigned to this task.

The fourth and last recording is summary completion in which candidates are required to read a set of sentences which is the summary of key points from all the listening text. This type of task is more than the ability to identify the key information in the recording. Examinees must also understand functional relationships such as cause and effect and this requires them to perform at a higher level of cognition that is Understanding. Therefore, code B1 is given to this task as the objective is to understand some specific details and elements. Again like other completion tasks, testees should follow word limit otherwise they are penalized. Table 7 summarizes the tasks in this module and the related codes.

**Table 7.** *Codification of Listening Section in IELTS Academic*

Sections	Tasks	Subtasks	Objectives	Codes
<b>IELTS Listening</b>	Conversation on social needs	Sentence completion	Remember factual	A1
		Table completion	Remember factual	A1
	Monologue on social needs	MC with two correct answers	Recognize factual	A1
		MC		
	Conversation In educational context	Sentence completion	Remember factual	A1
		MC comprehension	Infer factual	B1
	Monologue In educational context	Sentence completion	Remember factual	A1
		Summary completion	Summarize factual	B1

Furthermore, in table 7 the types of codes and their frequencies regarding the type of task is given. In the listening module of IELTS, there are four main sections and their subtasks. As the data in the table indicates the frequency for code A1 is five and for code B1 is two. Therefore, the dominant code assigned in the listening module of the IELTS test is A1 which is the lowest code denoting Remembering the Factual Knowledge.

### **Reading Section**

The Reading Section of IELTS Academic consists of three long passages ranging from the descriptive, narrative and factual texts to the discursive, argumentative and analytical ones and totally 40 questions developed to test reading skills. Main sources for such passages are magazines, books, journals, and newspapers. They are intended for people entering university and undergraduate or postgraduate courses or looking for professional registration. A variety of question types are used in this module. The topics are of general interest and recognizably appropriate for academic contexts. In this section like the other modules, the order of exercises



is based on the order of codes from the lowest and most concrete to the highest and most abstract.

The second task following the first passage is categorized as Short-answer questions. The questions in this task are usually linked to factual information about details in the passage. This type of task is most likely to be used with a passage containing a lot of factual information and details. Test takers must write their answers in words or numbers used from the passage on the answer sheet. In this type of task word limit is important. Short-answer questions assess the candidates' ability to locate, recognize and recall precise and detailed information in the reading passage. That is why code A1 is appropriated to this task.

The third type of task used for the passage in the sample is Table Completion. Test takers are given a table with some of its cells empty or partially empty and they are asked to complete it with information drawn from the passage. The point is that the answers do not necessarily occur in the same order as in the reading passage. Since this task type often is concerned with precise factual information, it is often used with descriptive texts. This task assesses the test takers' ability to recall details and/or the key ideas of some sections of the text. Here in this type of question, test takers need to be aware of word forms which best fit into an intended gap (e.g., whether a noun should be used, or a verb, etc.). Therefore, the code given to this task is A1 as it taps into the examinees' ability to Remember the Factual Knowledge.

Following the second academic reading passage in IELTS, there is a repeated task called 'True-False-Not Given questions' in this section and as the types of tasks are the focus of this study, the repeated questions for each module are not considered for codification.

The third reading passage is followed by MC comprehension questions. Here in this test and in this module, test takers are required to choose the best answer from four options (A, B, C or D). In other tests, they are expected to select two answers from five alternatives (A, B, C, D or E), or even three answers from seven alternatives (A, B, C, D, E, F or G). After choosing the appropriate answers, examinees have to write them on their answer sheets. This type of task in the reading module tests detailed understanding and inference of specific points. As a result code B1 is assigned which represents Understanding the Factual Knowledge.

The second task following the third reading passage is called Matching Sentence Endings. In this task, the first half of a sentence based on the reading passage is given and the examinees must choose the best ending to complete it from a list of possible alternatives and have to write the appropriate letter as the answer on their answer sheets. This type of task puts the questions in the same order as the information in the passage. Therefore, the candidates can find the answer to the first question before the answer to the second question in the passage, and so on. This task evaluates the examinees' ability to understand the specific details and information. That is why code B1 is given to this type of task.

As the order of codes from the lowest to the highest is of concern, in this part the second reading text in the sample which begins with a type of task called Matching Headings is mentioned. In this task, there is a list of headings, mostly indicated by lower-case Roman numerals such as i, ii, iii, etc. A heading denotes the main idea of the paragraph or a section of the text. It is expected that the candidates be able to match the headings to their correct

paragraphs or sections which are identified with English alphabets. Usually an example is included like in the test investigated for this study in which one paragraph has already been matched with a heading. Test takers are required to write the appropriate Roman numerals in the given boxes on the answer sheets. All the paragraphs or sections are not always given in such tasks. The point is that there are more headings than there are paragraphs or sections. Therefore, some headings are not used. This task type is used with texts that contain paragraphs or sections with clearly defined themes. This type of task assesses the test takers' ability to identify and understand the main idea or theme in the paragraphs or sections and classify them under the appropriate paragraph or section. Unlike other types of matching which deal with the specific and detailed information, Matching Heading tests the knowledge of key ideas, themes and classifications. For this reason, code B2 is chosen which shows Understanding the Conceptual knowledge.

The third task used after the third reading text in the IELTS Academic test is called Yes-No-Not Given questions. There is a number of statements for which the candidates must ask themselves whether such statements with the views or claims of the writer and they are asked to write 'YES', 'NO' or 'NOT GIVEN' in the appropriate boxes on their answer sheets. Understanding the differences and differentiating between 'no' and 'not given' is significant in such tasks. 'No' indicates that the author's views or claims explicitly disagree with the statement. This means that the writer's views or claims contradicts the one given in the statement and 'not given' means that the views expressed or claims made by the author are neither confirmed nor contradicted. Students need to understand any prior knowledge not stated in the passage should not interfere with their decisions to choose the proper answer. Test takers' ability to recognize, understand opinions or ideas, analyze the specific details of the text, and finally differentiate between the statements and claims or views in the passage which is often of a discursive or argumentative nature is assessed by this type of task. Consequently, code D1 which is categorized as high in terms of cognitive processes and low regarding the knowledge is assigned. Code D1 denotes Analyzing the Factual Knowledge.

Likewise, the first passage in the sample examined and codified included True-False-Not Given questions which are of the same essence as Yes-No-Not Given questions. This task provides a number of statements and asks the examinees to analyze if these statements agree with the information given in the reading passage. Testees are then required to write 'TRUE', 'FALSE' OR 'NOT GIVEN' in the boxes on their answer sheets. How well the candidates differentiate between 'false' and 'not given' is of utmost importance here. 'False' shows that the reading text states the opposite of the statement in question and 'not given' means that the statement is neither approved nor contradicted by the information in the reading passage. Another point is that any knowledge brought by the test takers from outside the passage or their world knowledge should NOT affect their answers. This task requires the test takers to identify, recognize particular points of information conveyed in the text, have a good sense of discretion and differentiate between 'true', 'false' and 'not given' statements. This passage is used with more factual texts. Code D1 is assigned to this task which represents Analysis of Factual Knowledge. Table 8 summarizes the above-mentioned information on Academic Reading tasks of IELTS, their codes and objectives.

**Table 8.** *Codification of Reading Section in IELTS Academic*

Sections	Tasks	Objectives	Codes
	True-False-Not Given	Analyze factual	D1
	Short-answer Q	Remember factual	A1
	Table completion	Remember factual	A1
	Matching heading	Classify conceptual	B2
	MC comprehension	Infer factual	B1
	Matching sentence endings	Classify factual	B1
	Yes-No-Not Given	Analyze factual	D1

Table 8 presents the types of codes assigned to different tasks in the Academic Reading Passages of IELTS and their frequencies. There are seven main types of tasks in this section and the frequency for the codes A1, B1 and D1 is two each. The frequency for code B2 is only one. The lowest code is A1 and the highest code is D1. The other codes in the coding scheme are absent.

### **Writing Section**

The Writing Section of the IELTS test, the Academic Module, consists of two types of writing tasks. The topics in these two tasks are of general interest and intended for candidates wanting pursuing undergraduate or post-graduate studies or professional registration in English speaking countries. In the first writing task, there are variations in the type of questions. The candidates may be presented with visual information such as a table, graph, diagram or chart and required to describe and explain how something works, describe the stages of a process or an object or event. In the question investigated in this study, the test takers are required to summarize the information in two pie charts by selecting and reporting the main features and make comparisons where relevant. In this task, the examinees describe, summarize or explain the information in their own words. This task is meant to find about the candidates' ability to spot the most important and pertinent data or trends in a visual representation, and their ability to provide a well-organized overview of the information like here in this sample giving a summary of the conceptual knowledge or the knowledge of classifications, categories, models and structures through using an accurate language in an academic style. For these reasons, code B2 is assigned to this category of question as summarization and comparison are among the key components of Understanding in the BRT.

Following this question, in the second task which contributes twice as much to the writing band score, the candidates are asked to write an essay in response to an argument, a point of view, or a problem. Responses must be in a formal style. Clearness, Relevant, well-organized argument, sufficient evidence or examples and an accurate language are of utmost importance in task 2. Since this task requires candidates to formulate, plan and develop a position in relation to a given prompt which is either in the form of a question or statement, code F1 has been considered which signifies generating and Creating the Factual Knowledge about facts, specific details and even lived experiences of the examinees. The candidate has to use different ways and forms of developing an argument not some classifications or a method of inquiry. That is why code F1, the highest code in this test, is assigned to the independent writing task in the

IELTS Academic test. The information related to the tasks and attributed codes in the writing section of the IELTS Academic test is presented in table 9.

**Table 9.** *Codification of Writing Section in IELTS Academic*

Sections	Tasks	Subtasks	Objectives	Codes
IELTS	Diagram, graph, table or chart	X	Summarize, Describe & Compare	B2
	Writing		conceptual	
Academic Writing	Independent Writing Task	X	Create factual	F1

Moreover, the following table 9 depicts the code and related frequency per task in the writing section of the IELTS Academic test. As it can be observed, the frequency for the code B2 and F1 is one each. The other codes are absent.

### *Speaking Section*

The Speaking Section of the IELTS Academic Test encompasses three types of speaking tasks. In this section like the other modules, the order of exercises is based on the order of codes from the lowest and most concrete to the highest and most abstract.

In the first task, the candidates, in an overall interview with the examiner, are asked general questions about themselves and a range of familiar topics such as family, home, studies, and interests. This module sheds light on the ability to communicate opinions and information around everyday subjects and common experiences. In this task the candidates are required to respond to the questions for which the answers are of factual knowledge. That is why code A1, Remembering the Factual Knowledge, has been selected for this task. In fact, this responding is entangled with remembering some personal information in the form of an introduction which entails code A1 in the BRT codification scheme.

The second task in the Speaking Module, the test takers are given a task card about a specific topic. This card comprises some points to be covered by the candidates in their talk and gives clues and instructs the examinees to explain one aspect of the topic. One minute is allotted to preparation stage during which the test takers are given a pencil and paper to make some notes. The candidates are asked to talk for 1 to 2 minutes and after they are stopped and have to answer to one or two questions on the same topic. This requires them to talk at length on a given topic, understand the prompts, points and questions, explain, exemplify, and draw on their lived experiences and factual information to complete a long turn. That is the Code B1 has been assigned to this task which basically is categorized under Understanding the factual knowledge.

The third task in the IELTS Academic test requires the test giver and the test taker discuss issues pertinent to the topic in task 2 in greater depth and in a more general and abstract way. This task wants the candidate to have the ability of analysis the question posed in order to respond, exemplify, and explain about the topic. In essence, analysis in the BRT taxonomy presupposes lower orders of cognition i.e., Remembering, Understanding and Applying. This section calls for the ability to remember, speculate, analyze, and express the factual knowledge and information. Therefore, code D1 has been designated which represents Analyzing the

Factual Knowledge. The data concerning the tasks and related codes in the speaking section of the IELTS Academic test is presented in table 10.

**Table 10.** *Codification of Listening Section in IELTS Academic*

Sections	Tasks	Subtasks	Objectives	Codes
<b>IELTS</b>	Familiar topics	X	Remember factual	A1
	Task card with prompts	X	Explain & Exemplify factual	B1
<b>Speaking</b>	Discuss more abstract issues	X	Analyze factual	D1

Table 10 presents the types of codes assigned to different tasks in the Speaking Section of the IELTS Academic test and their frequencies. There are three main types of tasks in this section and the frequency for the codes A1, B1 and D1 is one each. The lowest code is A1 and the highest code is D1. The other codes in the coding scheme are absent.

### *Reliability of the coding scheme*

In order to ensure the intra-rater reliability, all the codified questions were again recoded after the period of two and a half weeks. The degree of the consistency between the two sets of the codes has been calculated as 97% through the Pearson correlation.

### **Results and Discussions**

Table 11 indicates the number of sections included in all four modules of Listening, Reading, Writing and Speaking in each test, namely TOEFL iBT and IELTS, the Academic version. As the table shows the number of the sections in the former and latter tests is 19 and 17, respectively. Although the number of sections in the TOEFL iBT test is more than in the Academic IELTS test, this difference is not noticeably high.

**Table 11.** *Number of Sections in TOEFL iBT and IELTS Academic Tests*

Code	Statistics		
<b>TOEFL iBT</b>	N	Valid	17
		Missing	0
<b>IELTS Academic</b>	N	Valid	19
		Missing	0

### *TOEFL iBT Test*

Table 12 depicts total number of codes (number of tasks) belong to each module. Reading and Speaking modules enjoy the highest portion (35.3%) of tasks and hence codes. Listening and Writing sections have the shares of 17.6% and 11.8%, respectively. The total number of tasks in the TOEFL iBT test is 17.

**Table 12:** *Total Number of Codes in Each Module in TOEFL iBT Test*

Exam Type	Module		Frequency	Percent
<b>TOEFL iBT</b>	<b>Listening</b>		3	17.6
	<b>Reading</b>		6	35.3
	<b>Writing</b>		2	11.8
	<b>Speaking</b>		6	35.3
	<b>Total</b>		17	100.0



As table 13 displays in general in the TOEFL iBT test code B1 (Understand the Factual Knowledge) has the highest frequency of 8 (47.1%). Code B1 is one of the lowest codes in the BRT which represents the second low level in the Cognitive Dimension and the lowest level in the Knowledge Dimension. Code B1 is followed by the codes A1 (Remember the Factual Knowledge) and D2 (Analyze the Conceptual Knowledge) both with the frequency of 2 (11.8%). The other assigned codes in order from the lowest to the highest levels are A2 (Remember the Conceptual Knowledge), A3 (Remember the Procedural Knowledge), C3 (Apply the Procedural Knowledge), D1 (Analyze the Factual Knowledge), and F1 (Create the Factual Knowledge) with the frequency of 1 (5.9%) each. The other 16 codes are grossly absent in this test.

**Table 13.** *Frequency and Percentage of Codes in TOEFL iBT Test*

Exam Type	Code	
	Frequency	Percent
TOEFL iBT	A1	2
	A2	1
	A3	1
	B1	8
	C3	1
	D1	1
	D2	2
	F1	1
	Total	17
		100.0

The table 13 shows code B1 enjoys the highest frequency which is considerably prominent. The frequency of code B1 is 8 (47.1%) and the highest portion belongs to the Listening section of the TOEFL iBT in which all the question types, namely MC questions with one correct answer, MC questions with two or more correct answers and Charts are observed. Reading and Speaking modules each has two types of questions which are codified as B1. In Reading section, MC Comprehension questions and Category Charts and in Speaking module, Campus Situation Topic questions and Academic Course Topic questions which both are categorized under the Integrated Speaking section are assigned code B1. Integrated Writing in Writing Module is also given code B1. In the TOEFL iBT test, the other two codes, namely A1 and D2 with the frequency of 2 (11.8%) belong to the Reading (MC Vocabulary and MC Reference questions) and Speaking (Independent Personal Preference and Personal Choice questions) modules, respectively. Codes A2, A3, C3, D1, and F1 have the frequency of 1 (5.9%) each. Codes A2 and A3 belong to the Reading module, Summary and Insertion questions, respectively. Codes C3 and D1 are assigned to two integrated Speaking sections, namely Academic Topic question (Read-Listen-Speak task) and Campus Situation topic question (Listen- Speak task). The last code (D1) which is the highest in terms of cognition dimension and the most concrete with regard to Knowledge dimension is given to Independent Writing section in the TOEFL iBT test.

### ***IELTS Academic Test***

The following table (table 14) indicates total number of codes (number of tasks) owned by each module. Listening and Reading modules possess the highest share (36.8%) of tasks and hence

codes. Speaking and Writing sections have the 3(15.8%) and 2 (10.5%) tasks or codes, respectively. The total number of tasks in the IELTS Academic test is 19.

**Table 14. Total Number of Codes in Each Module in IELTS Academic Test**

Exam Type	Module	Frequency	Percent
IELTS Academic	Listening	7	36.8
	Reading	7	36.8
	Writing	2	10.5
	Speaking	3	15.8
	Total	19	100.0

Table 15 presents the codes observed in the Academic IELTS test. Globally, in this test, the highest frequency which is 8 (42.1%) belongs to the lowest code in the BRT which is code A1 (Remember the Factual Knowledge) which is followed by code B1 with the frequency of 5 (26.3%). Codes D1 (Analyze the Factual Knowledge), B2 (Understand the Conceptual Knowledge), and F1 (Create the Factual Knowledge) have the frequencies of 3, 2 and 1, respectively.

**Table 15. Frequency and Percentage of Codes in TOEFL iBT Test**

Exam Type	Code	Frequency	Percent
IELTS Academic	A1	8	42.1
	B1	5	26.3
	B2	2	10.5
	D1	3	15.8
	F1	1	5.3
	Total	19	100.0

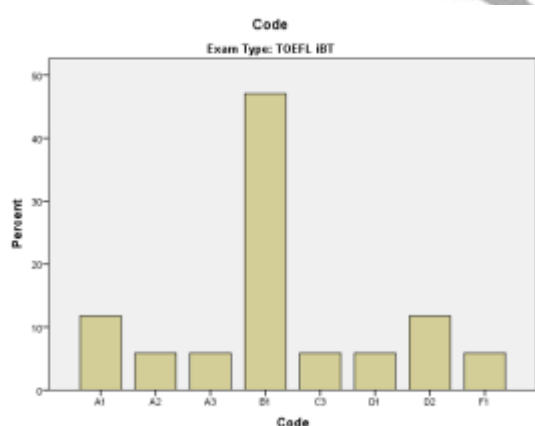
In terms of the IELTS Academic test, table 6 shows code A1 enjoys the highest frequency which is considerably prominent.

Code A1 which is the lowest quality code in the BRT is predominantly detected in the Listening module in the IELTS Academic test. Two major tasks, namely Conversation on Social Needs and Monologue on Social Needs and all their subtasks in this section are given this code. Moreover, the Sentence Completion in another major task called Conversation in Educational Context is assigned code A1. In Academic Reading module, Short- Answer and Table Completion questions are given the same code. This is the case for IELTS Speaking module on Familiar Topics as well. The next frequently observed code is B1. Listening and Academic Reading sections have the same share of code B1. In terms of the Listening module, MC Comprehension questions related to Conversations in Educational tasks and Summary completion in Monologues in Educational contexts are assigned code B. Considering the Academic Reading module, MC Comprehension questions and Matching Sentence Endings are detected to deserve the same code. Furthermore, Speaking module in its second major task which is Task Cards with Prompts is given code B1. The next frequent code is D1 which is assigned to True-False-Not Given and Yes-No-Not Given tasks in the Academic Reading section and the third major task in the Speaking module which is around discussion of more abstract issues. Code B2 comes next. This code with the frequency of 2 is observed in the

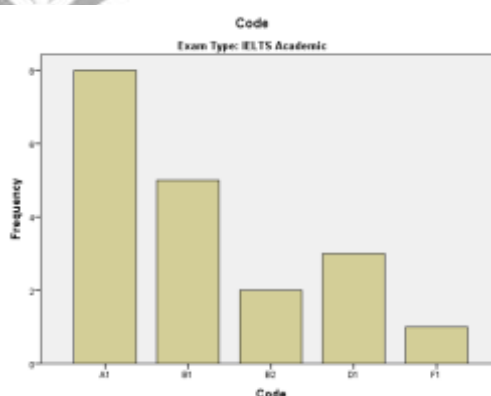
Matching Heading tasks in the Academic Reading module and in the first task of the Academic Writing section which is around Diagram, Graph, Table or Chart Writing. The last but not the least quality code is code F1. This code enjoys the highest level of cognition in the BRT while has the most concrete form of knowledge in this taxonomy. This code is allotted to the Independent Academic Writing Task.

### *Comparison and Contrast between the TOEFL iBT and IELTS Academic Tests*

There is a point worth considering from the statistical viewpoint that as there are different number of tasks in TOEFL iBT and IELTS Academic Tests and the proportion of tasks and subtasks allotted to each module differs from one test to the other one and while the percentages and frequencies of either group are calculated in accordance with the number of the tasks and their subtasks in that intended group, hence they cannot be reliable enough to be deployed as dependable criteria for comparing the two groups of the tests. Therefore, the percentages for each group have been shown in separate charts rather in a clustered bar. According to the figures 1 and 2, there are number of codes shared by the two tests, namely codes A1, B1, D1, and F1. Code A1 is shared by the Reading, code B1 by both Listening and Reading, code D1 by Speaking and code F1 by Writing modules. Predominantly the knowledge types shared by these two global tests are Factual and Conceptual shown by 1 and 2 in the BRT codification table, respectively.



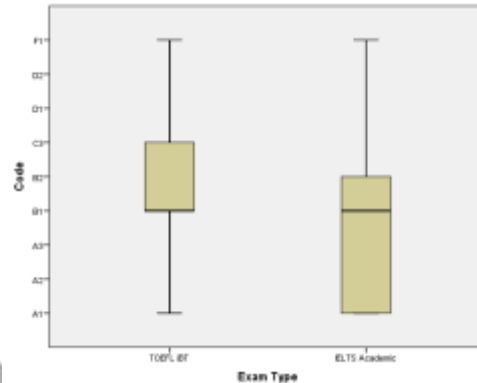
**Figure 1.** Percentage of Codes in TOEFL iBT



**Figure 1.** Percentage of Codes in IELTS Academic

From the point of contrast, according to the above charts, in the TOEFL iBT test code B1 predominates over the other codes while in the IELTS Academic test, code A1 overweighs. From the point of variation, the TOEFL iBT test enjoys more diversity for all levels (both low and high) of thinking and knowledge than the IELTS Academic test. According to figure 1, although there are fewer number of tasks, the total number of codes in the TOEFL iBT test (8 codes) is more than the total number of codes in the IELTS Academic test (5 codes in Figure 2). The reason can be the Reading and Speaking modules in the TOEFL iBT test bearing more variation in codes (4 different codes in each module). However, in the IELTS Academic test, the only module with four codes is Academic Reading module. In the TOEFL iBT test, Reading and Speaking modules and in the IELTS Academic test, Academic and Listening modules possess more shares of the codes. Writing module in both tests has the fewest number of codes. In the following Boxplot (Figure 3), as the interquartile range box representing the middle 50% of the data shows, the majority of the codes in the TOEFL iBT test are radically skewed

positively (right-skewed) toward the higher orders of thinking and knowledge and the codes are not considerably divergent; however, most of the codes in the IELTS Academic test are negatively skewed (left-skewed) toward the lower codes and the length of the box is indicative of more divergence among the codes.



**Figure 3.** Comparing TOEFL iBT and IELTS Academic

Consequently, according to the above Boxplot, in order to answer the first research question which is looking for more prominent levels of the Bloom's Revised Taxonomy in each test, it can be said that there are two different trajectories through which one can answer the question; one from the frequency point of view and the other from the variation stance. The tasks in the TOEFL iBT test enjoy higher orders of thinking and knowledge than in the IELTS Academic test. Moreover, although the numbers of tasks are fewer in the TOEFL iBT test, the types of codes are more varied, but more convergent in nature than in the IELTS Academic test. The most frequent code in the TOEFL iBT test is B1 while the most repeated code in the IELTS Academic test is A1. The lowest code (minimum) and the highest code (maximum) in both tests are A1 and F1, respectively. Moreover, it is worth considering that there are a number of codes grossly absent in both tests. These codes are A4 (Remember the Metacognitive Knowledge), B3 (Understand the Procedural Knowledge), B4 (Understand the Metacognitive Knowledge), C1 (Apply the Factual Knowledge), C2 (Apply the Conceptual Knowledge), C4 (Apply the Metacognitive Knowledge), D3 (Analyze the Procedural Knowledge), D4 (Analyze the Metacognitive Knowledge), E1 (Evaluate the Factual Knowledge), E2 (Evaluate the Conceptual Knowledge), E3 (Evaluate the Procedural Knowledge), E4, F2 (Create the Conceptual Knowledge), F3 (Create the Procedural Knowledge), and F4 (Create the Metacognitive Knowledge). Most of these codes are from the higher orders of cognition and knowledge.

### *The results of Chi Square*

Now this question might be raised whether the types of the differences between the TOEFL iBT test and IELTS Academic test are statistically meaningful. In order to answer the second question of the research i.e., whether there is any difference between the TOEFL iBT test and IELTS Academic test in terms of the distribution of highest and the lowest learning levels of BRT, a chi-Square Test ( $\chi^2$ ) has been run. As table 16 displays, since the *p-value* is calculated as  $P - value = 0.022 < 0.05$ , the result of this chi-Square test is statistically significant which shows that there is statistically meaningful difference between the TOEFL iBT and IELTS Academic tests in terms of the highest and the lowest levels of BRT.

**Table 16.** *Chi-Square Test to Find Difference between the TOEFL iBT and IELTS Academic Tests Regarding Distribution of Highest and the Lowest Learning Levels of BRT*

	Chi-Square Tests		
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	39.816 <sup>a</sup>	24	.022*
Likelihood Ratio	34.536	24	.076
Linear-by-Linear Association	8.487	1	.004
N of Valid Cases	36		

### Discussion and Conclusion

In this study, the most prominent levels of Bloom's Revised Taxonomy (BRT) in two standardized tests of TOEFL iBT and IELTS academic module were studied. The first objective was to investigate which of these internationally recognized exams meets the distribution of the highest levels of thinking and knowledge in such taxonomy. Accordingly two questions are raised. The first one is to find which distributions of the learning levels of Bloom's Revised Taxonomy are much more prominent in both the TOEFL iBT and IELTS academic module. The results have led to provide answers for the first question posed in this paper are as following.

In terms of the TOEFL iBT test, Reading and Speaking modules bear the highest portion of tasks and codes. Listening and Writing section come next. What was observed was that code B1 (one of the lowest codes in the BRT) has the highest frequency among all other codes detected. Code B1 is followed by the codes A1 and D2 both with the same frequency. Codes A2, A3, C3, D1, and F1 (one of the highest levels) have the lowest shares. 16 codes are flagrantly absent in this test. Reading, Listening and Speaking modules represent larger shares of the cognition levels A, B, and D, respectively. The most concrete knowledge which is Factual is observed to be the most prominent level in all four modules in the TOEFL iBT test.

With regard to the IELTS Academic test, the highest frequency pertains to the lowest code in the BRT i.e., code A1 followed by code B1. Codes D1, B2, and F1 share lower proportion. 19 codes are observed to be grossly absent in this test. Listening and Academic Reading modules bear larger shares of the Cognitive levels A and B, respectively. The Factual Knowledge (the most concrete knowledge) is seen to be the most dominant level in all four sections in the IELTS Academic test.

From a statistical standpoint, it is worth noting that the number of tasks in the TOEFL iBT and IELTS Academic Tests differs. The proportion of tasks and subtasks assigned to each module varies from test to test. The two tests share a number of codes, including A1, B1, D1, and F1. Code A1 is shared by the Reading module, code B1 by both the Listening and Reading modules, code D1 by the Speaking module, and code F1 by the Writing module. Therefore, Reading and Listening sections require lower cognitive load while Speaking and Writing modules necessitate higher loads of cognition. Basically, Factual and Conceptual types of knowledge enjoy the centrality in these two international tests. Code B1 overtakes the other codes in the TOEFL iBT test, while code A1 leads the other codes in the IELTS Academic test. Consequently, TOEFL iBT test meets a higher cognitive level in the BRT.



In terms of variations in codes, the TOEFL iBT test has met more diversity of codes in all levels including low and high planes of thinking and knowledge than the IELTS Academic test has. In spite of fewer numbers of tasks, the total number of codes in the TOEFL iBT test is more than in the IELTS Academic test. The Reading and Speaking modules in the TOEFL iBT test represent more variation in codes. Besides, most of the tasks in the TOEFL iBT test are piled above the code B1, whereas in the IELTS Academic test, this accumulation has been lowered to code A1. This is also demonstrated through a Boxplot which indicted radically skewed TOEFL iBT codes toward the higher orders of thinking and knowledge and the codes which are not noticeably divergent; on the other hand, majority of the codes in the IELTS Academic test are shown to be negatively skewed toward the lower codes of the BRT. This can well be indicative of the higher stance of the TOEFL iBT test concerning the higher orders of thinking and more abstract knowledge in the BRT. This is in line with the work of Baghaei, Bagheri, and Yamini (2020) comparing these two global test although their study included only the listening and reading modules. They found that in general, lower-order thinking skills prevailed in both listening and reading sections in IELTS test than in in TOEFL iBT test. Moreover, the study done by NamazianDoost and HayaviMehr (2017) is in agreement. They found IELTS reading comprehension questions are more catered to low levels in light of Anderson, et.al's (2001) taxonomy.

With regard to the second research question raised which seeks whether there is any statistically meaningful difference between the TOEFL iBT and IELTS academic module in terms of the distribution of highest and the lowest learning levels of BRT, the result of the chi-Square test is representative of a statistically meaningful difference between the TOEFL iBT and IELTS Academic tests regarding the highest and the lowest levels of BRT. This is in accordance with the result of the chi-Square test done by Baghaei, Bagheri, and Yamini (2020). They found significant difference between IELTS and TOEFL reading sections in terms of the learning objectives in the BRT.

### **Implications**

The findings of the present study hold some significant pedagogical implications for TOEFL and IELTS test-item developers and teachers. Considering the differences between these two highly recognized global tests in terms of the cognitive and knowledge levels in the BRT taxonomy, instructors and test developers in these two fields can put such differences into consideration and modify their instructional approaches accordingly. In fact, getting a better picture of the cognitive and knowledge domains and learning objectives assessed in IELTS and TOEFL modules is of value to assessment practitioners and test-item writers as it assists them in finding potential pathways to reconstruct high-stakes tests and devise high-quality items that take into consideration higher cognitive and knowledge levels. IELTS Academic module and TOEFL iBT candidates can also benefit from the results as they can compare the IELTS and TOEFL different modules considering test difficulty. The reason is that this study provides them with a frame of reference.

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