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Bloom's Revised Taxonomy: An Approach to the Content Analysis of the ESP Medical and Paramedical Textbooks

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Abstract

Objective: This research aimed to conduct a content analysis of medical and paramedical textbooks at Shiraz University of Medical Sciences, focusing on Bloom's Revised Taxonomy (2001). The study sought to determine which taxonomy levels are more prominent in both types of textbooks and whether there are any differences between the two disciplines regarding thinking skills and knowledge levels. Method: The textbooks were coded using a coding scheme for which the reliability was assessed through intra-coder reliability. After data analysis, we calculated the frequencies and percentages of different thinking levels and knowledge. **Results:** The findings revealed that medical textbooks emphasize lower levels of thinking and knowledge although there is some variation in the learning objectives of the taxonomy. On the other hand, paramedical textbooks prioritize higher knowledge and thinking, albeit with less diversity. The Chi-Square test confirmed a statistically significant difference between the types of exercises in the two groups of textbooks. **Discussion:** Medical textbooks exhibited a broader coverage but less depth in terms of thinking skills and knowledge, while paramedical textbooks demonstrated the opposite pattern. **Finally:** the study provides implications for teachers and material developers to consider.

Keywords: *Revised Bloom's Taxonomy; Medical ESP Textbooks; Paramedical ESP Textbooks; Content Analysis; Codification*

Introduction

Any textbook should have its content thoroughly examined, especially those that are devoted to teaching English for Specific Purposes (ESP) in any setting, but especially in an EFL setting where English instruction is limited to language courses. Researchers such as O'Neils (1982), Sheldon (1988), Huchinson and Torres (1994), Cunningsworth (1995), and Haycroft (1998) support the primary role of need-based textbooks in executive education decisions where there is significant investment and growth in the areas of politics, finance, and even professional development. Like the other effective approaches to teaching languages, ESP bases all decisions about method and content on the unique needs and motivations of the learner (Hutchinson & Waters, 1987; Strevens, 1988). According

to Lorenzo (2005), adult learners of English for specific job-related tasks and professional communication typically enroll in ESP programs. These adults usually have some prior English language proficiency. This is especially important in the medical sciences, where students' proficiency in English is essential for their future success in the workplace, social settings, and even the economy. In a study by Moslehi and Kafipour (2023), it was observed that medical students academically outperform their paramedical peers in language proficiency. Consequently, a stronger basis for a far more sensible and advantageous approach to an ESP theory is laid by examining the material found in ESP textbooks.

In this study, we aimed to assess the effectiveness of ESP medical coursebooks for doctrate (medicine and dentistry) and undergraduate paramedical (nursing and operation room) students. To achieve this goal, the study utilized Bloom's Revised Taxonomy (2001) as a model for evaluating the course material. According to Razmjoo and Kazempourfard (2012), to develop our learners' thinking, Bloom's Revised Taxonomy is a thorough and efficacious method used to assess the learning material compard to any other taxonomy or model currently in use for coursebook evaluation (Anderson and Krathwohl, 2001).

Theoretical Framework

In this study, we performed a content analysis on the course materials in light of Bloom's Revised Taxonomy revised by Anderson and Krathwihl (2001); their taxonomy shown in Table 1 (Anderson, and Krathwohl, 2001).

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

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

Review of Literature

Numerous studies have examined the content of textbooks worldwide using Bloom's Taxonomy and Bloom's Revised Taxonomy. These studies, which span a number of disciplines, all have implications

for how better materials should be created, adopted, and taught by educators, legislators, and learners. In the following section, a review of the related literature on studies conducted on ESP textbooks covering diverse subjects using Bloom's Revised Taxonomy is presented as a guideline to classify the materials.

In a recent study, Mizbani et al. (2023) evaluated the senior high school English curriculum in Iran, using Vision 2, to assess the students' listening, speaking, reading, and writing skills. The assessment was based on Bloom's updated cognitive domain model. In actuality, the study was carried out to ascertain the cognitive levels in Bloom's Revised framework with reference to the four language skills tasks in this textbook. Additionally, it used questionnaires created by the researcher to look into how teachers and students felt about these kinds of activities. First, using the codifications in Bloom's revised version as a guide, the researcher located, tabulated, and classified the activities in the textbooks. Subsequently, the percentages and frequencies of the codes were determined. A researcher-made questionnaire was distributed among 130 textbook users; they consisted of 30 teachers, and 100 male and female high school students selected using convenient sampling. Throughout the class sessions, they were requested to provide anonymous answers to questionnaires. Manual analysis was done on the data gathered from the questionnaires. The results showed that the identified codes were mostly placed in lower-level categories of Bloom's taxonomy, suggesting that the activities were not helpful for the students who were actively engaged in the higher stages of the thought process. Furthermore, a regular pattern was not observed in the obtained codes, and the Chi-square test result indicated that there was no statistically significant relationship between the two groups of low-level and high-level codes. Regarding questionnaire answers, the activities—especially the speaking and listening exercises—did not seem to have a significant impact on the students' in-depth understanding. Therefore, it was confirmed that there was a need for assignments that would push students to think at higher levels—namely, analyzing, evaluating, and creating knowledge. In a compatible study, the questions (1) "How are Bloom's taxonomy levels represented in English textbooks?" and (2): How are reading comprehension questions calculated for each level of Bloom's taxonomy?" were investigated by Stevani and Tarigan's research (2022). Using a qualitative approach and content analysis, the findings demonstrated how different kinds of reading comprehension questions could encourage students to think critically about achieving the curriculum for English. A significant portion of the questions (26 percent) were centered around comprehension, followed by knowledge/remember, application, synthesis, analysis, evaluation, and creation levels (17 percent, 16 percent, 11 percent, and 3 percent, respectively). It was suggested that English teachers should categorize their learning objectives and instructional objectives using Bloom's taxonomy. Another similar research paper in an EFL context by Ulum (2022) made some suggestions for examining how much of the Revised Bloom's taxonomy is used in the reading comprehension questions of an EFL reading textbook. As a result, two research questions were posed to ascertain the current state of cognitive skills as listed in the revised taxonomy, with the first question focusing on assessing the lower level and thenthe higher level. Descriptive content analysis was used to examine the EFL reading textbook. According to the study findings, the examined textbook lacked the higher-order cognitive skills that the revised taxonomy highlighted. As a result, relevant presumptions have been supplied to suggest how the updated Bloom's taxonomy should be incorporated into reading textbooks that are currently being written or will soon be written to evaluate the students' reading abilities.

In a study, Stevani and Tarigan (2022) contributed to the representation of Bloom's taxonomy levels in English textbooks and computed reading comprehension questions in each level of Bloom's taxonomy. The results of a content analysis qualitative approach demonstrated that the kinds of reading comprehension questions could encourage students' critical thinking about learning objectives in the English curriculum. A significant portion of the questions (26 percent) were centered around comprehension, followed by knowledge/remember, application, synthesis, analysis, evaluation, and creation levels (17 percent, 16 percent, and 3 percent, respectively). This study outcome was in the same line with those of Khodabandeh and Mombini's (2018) investigation on the impact of question classification training on the cognitive level of the questions. Their results indicated that the cognitive level of questions used by English teachers is strongly impacted by training in Bloom's taxonomy.

Another study by Abalkheel (2021) investigated reading comprehension questions in English language textbooks used by Forestry Vocational School, specifically focusing on the high and low order of thinking. According to the results, the majority of these questions concentrated on knowledge (58 percent), comprehension (15 percent), application (45 percent), analysis (6%), synthesis (12 percent), and evaluation (45 percent). In a similar study, Divsar (2020) conducted a study analyzing the undergraduate and graduate English Translation curricula in Iran's higher education system, known as Sarfasl, using Bloom's Revised Taxonomy (BRT) as a framework. The study aimed to assess the extent to which the levels of BRT were integrated into the curricula. Content analysis was conducted to examine the frequency and proportion of objectives related to knowledge and cognitive dimensions. The findings indicated that both curricula prioritized lower-order thinking skills (remember, understand, and apply) over higher-order ones (analyze, evaluate, and create) overall. 'Understand' was identified as the most prevalent objective in terms of the knowledge domain in both curricula, particularly focusing on conceptual knowledge. The study also noted a lack of emphasis on metacognitive-related categories, highlighting the importance of integrating these elements into curriculum design for educational quality assurance. Likewise, Sadighi et al. (2018) conducted a similar study to determine whether the pre-university teaching materials (English 1 and 2) used by the teachers to instruct their students in Shiraz, Iran, adhered to Bloom's hierarchy. Similarly, the researchers tried to determine whether the annual University Entrance Exams used to select applicants for admission to Iranian universities, were in line with this taxonomy. Lastly, to determine whether there was a statistical significance in the differences between the two dichotomies (lower and higher) in the textbook. To accomplish these aims, we used Bloom's Revised Taxonomy to assess both the textbook's content and the test results of general and English majors. Descriptive statistics and a Chi-square test were used to analyze the data, and the results indicated that the content of the English book did not correspond with Bloom's thinking skills order. The hierarchy moves up to higher order—analyzing, evaluating, and creating—from lower order—remembering, understanding, and applying. Likewise, no congruency with Bloom's hierarchy was found in the content analysis of university entrance exams.

Parsaei, Alemokhtar, and Rahimi (2017) looked into the learning goals in ESP books for IUMS medical, dental, and pharmacology students. In this library research, learning objectives found in ESP books for students studying pharmacology, medicine, and dentistry at IUMS were examined using Bloom's taxonomy. The frequency of use of every learning level was ascertained. The results were presented using descriptive statistics. Only 8 percent, 23 percent, and 14 percent of the activities that followed each lesson in the ESP books were designed to enhance learning at higher cognitive levels. The activities in these ESP textbooks following each lesson tended to be more geared toward lower cognitive levels.Throughout the books, there was an imbalance in how various learning levels were applied. Ebadi and Mozafari's (2016) study examined how two series of textbooks for teaching Persian to Speakers of Other Languages (TPSOL) to adults and children incorporated Bloom's Revised Taxonomy (BRT) revised by Anderson. To achieve this, they used a coding system to analyze the textbook material. Based on the learning objectives of the two series and the various volumes of the Young Learners' Series, the results indicated statistically significant differences. Nonetheless, the study did not find any appreciable distinctions in the emphasis placed on higher-order and lower-order thinking skills between the two series or between the volumes of the adult learners' series. Overall, the results showed that the most prevalent levels in these books were lower-order skills which were compatible with the previous study. Because the content of the examined textbooks did not align with BRT, the results suggested that they would not help students develop their critical thinking skills. Rashidi and Raghnezhad (2014) also analyzed the Persian language textbooks (referred to as "Basic Courses" and "Capital of Iran") written for non-native speakers using Bloom's Revised Taxonomy. The findings indicated that both textbooks gave more weight to lower-level cognitive skills than to higher-level ones. Additionally, the textbooks contained more exercises focusing on creativity and composition (which require higher-order cognitive skills) than on application (which requires lower-order cognitive skills). Additionally, the taxonomy's comprehension exercises—which are lower-level cognitive skills—were used far more frequently than its other higher-level skills. As to the significance of the taxonomy in a medical context, Su and Osisek

(2011) strongly emphasized the nurses' capacity to enhance patient care outcomes through knowledge enhancement. For this to happen, students must apply what they have learned to real-world situations. The authors showcased that to achieve this objective, instructional designs that integrate subject matter and cognitive processes associated with its application are necessary. The Bloom's Revised Taxonomy offers a structure for fulfilling this educational requirement. As a result, the authors demonstrate how the Revised Bloom's Taxonomy relates to continuing education and provided evidence for using the taxonomy to organize a lesson that emphasizes knowledge transfer.

As the literature unveils, there is a paucity and dearth of research in the content analysis of the materials devised in the medical and paramedical disciplines. However, as the previous studies revealed, the use of taxonomies like Bloom's has got its paramount importance because it builds the students' knowledge in these areas by supporting their cognitive capacities, enabling them to put their potential into practice in the fields of research.

Therefore, the goal of the current study was to identify the most prominent planes of Bloom's Revised Taxonomy in the course materials for medical and paramedical students at Shiraz University of Medical Sciences to determine which specialized materials meet the highest learning objectives of all the textbooks used by these students. The faculty members of the English Department at the same university have created and are teaching these textbooks following the needs analysis of the students in the aforementioned fields. In light of this, the following research inquiries are posed:

1. Which levels of the Bloom's Revised Taxonomy are much more prominent in both medical and paramedical course books?
2. Is there any difference between medical or paramedical textbooks in terms of the highest and the lowest levels of BRT?

Significance of the Study

ESP is an English language teaching method designed to meet the specific needs of learners (Strevens, 1988). Research indicates that the number of universities offering ESP courses is increasing to cater to the diverse requirements of students across various disciplines (Javid, 2015). It is crucial to carefully select, analyze, and create materials that align with the needs and characteristics of ESP students; this highlights the importance of the present study. These types of studies are beneficial in aiding teachers, material developers, future authors, and ESP administrators in developing and evaluating course books tailored to meet the English language learning needs, especially in the medical and paramedical fields where future professionals, such as physicians, dentists, nurses, and midwives, play a critical role in the health and wellbeing of individuals. Therefore, further research on course books in these areas is necessary to emphasize the significance of English language learning for students in medical sciences to enhance their knowledge and effectiveness in their roles

Method

Research Design

Content analysis, a subset of qualitative research, is the primary method used in this study to identify the critical cognitive and knowledge levels found in medical and paramedical textbooks. Congruent with the claims made by Ary, Jacobs, Razavieh, and Serensen (2006), the content analysis would be a suitable research design as the primary method of data collection in qualitative research because it is a non-intrusive approach to collecting data from records and documents.

Materials

The materials in this study are two books, namely, "English for the Students of Medicine" and "English for the Students of Dentistry" and two books from paramedical disciplines, namely "English for the Students of Nursing" and "English for the Students of Operation Room" all composed by the faculty members of English Department at Shiraz University of Medical Sciences and published by the Shiraz University of Medical Sciences Publications.

- Jafari, S. M., Khojasteh, L., Moslehi, Sh., & Shokrpour, N. *English for the Students of Dentistry*. Shiraz University of Medical Sciences Publications, 2016.
- Fazelli, F., Khojasteh, L. Mahboudi, A. & Shokrpour, N. *English for the students of Medicine*. Shiraz University of Medical Sciences Publications, 2021.
- Mahboudi, A. Moslehi, Sh. & Shokrpour, N. *English for the students of Operation Room*. Shiraz University of Medical Sciences Publications, 2021.
- Kashefian Naeini, S., Khojasteh, L., Mahboudi, A., Shahsavar, Z., & Shokrpour, N. *English for the students of Nursing*. Shiraz University of Medical Sciences Publications, 2023.

Every unit in all four books is divided into primarily two parts, adhering to a common mainstream pattern. Before the main reading section, there are a few warm-up questions in the first section. Following this reading passage, there are some multiple-choice comprehension questions and some true/false questions. A second reading passage that is similar to the first one is included in the second section along with some true/false questions and comprehension tests. The next set of questions is multiple-choice vocabulary. In addition, there are word form exercises and vocabulary matching activities, which are followed by cloze tests.

Additionally, every book —aside from the Operation Room course book— has a separate section devoted to testing medical terminology and specialized affixes that are frequently used by subject-matter experts. This section can be found at the end of the book—Medicine and Operation Room—or following each unit—Nursing and Dentistry. However, the sequence and nature of the exercises in each of these four coursebooks may differ to differing degrees. Specialized instructional videos taken from YouTube to supplement all of the books can also be assigned as self-study, contingent on the time constraints of the instructors, or used in the classroom to help students in that discipline become better listeners. Because the videos might not be shown in every class, the authors chose not to include this section in the evaluation.

Data Collection and Analysis

The content of the course books has been coded, categorized, and analyzed using a coding scheme that Razmjoo and Kazempourfard (2012) developed. The authors have approved and reported the coding scheme's intracoder and intercoder reliability as 97.2 and 97.9, respectively. The plan is displayed in Table 2. The six levels of the cognitive dimension range from the lowest, the simple recall or recognition of facts, to higher, more abstract and sophisticated mental levels of evaluation and creation. The categories are labeled: A) Recall, B) Gain, Knowledge, C) Utilize, D) Examine, E) Assess, and F) Produce. Furthermore, according to Razmjoo and Kazempourfard (2012), four different kinds of knowledge make up the knowledge dimension: 1) Factual knowledge; 2) Conceptual knowledge;3) Procedural knowledge; and 4) Metacognitive knowledge.

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

Following the learning objectives, all the exercises and activities of the three units that are mostly representative of the other units in terms of their length, sequence, and degree of difficulty were coded using the above coding scheme. The frequency and percentage of the distribution of various levels of Bloom's Revised Taxonomy were also assessed. The medical and paramedical course books were compared using the six levels of Bloom's Revised Taxonomy using a Chi-square test to see if there is a significant pattern in the occurrence of different levels of cognitive skills in the four textbooks.

Coding a Sample of the Textbooks

A sample of the exercises, primarily found in all textbooks, is presented here to help explain the process of codification to fully explain the worth of the content of the four books and illustrate the steps. Prereading questions are included in the first set of questions that can be seen in these books to help set the stage and warm up the students to read the entire selection. Most of the variations occurred in this section because the authors attempted to use various strategies to draw on the student's prior knowledge. Examples of questions with this type of assignment are: "What is hemostasis?" and "What is another name for another red blood cell antigen?" Additionally, post-reading questions such as matching questions were coded as A1 (remember the factual knowledge) because the students were only expected to recall the factual meaning of the terminologies. Additional post-reading true/false questions, such as "How does biology differ from physics and chemistry," or pre-reading questions requiring students to distinguish between pertinent and irrelevant information were coded as D2 (analyze and differentiate the conceptual knowledge). E4 questions are the reading comprehension ones that ask students to evaluate their cognitive knowledge and comprehension and form an opinion based on the assigned reading selections, sometimes even requiring them to conclude.

For the vocabulary questions in the form of multiple questions, where students have to choose the most appropriate word, mainly technical words, the code D1 (analysis of factual knowledge) was assigned. Code C2 (applying conceptual knowledge) was used for the word family questions that required students to apply their conceptual knowledge of the inflectional categories by filling in the blanks. For the fill-in-the-blank exercises, E2 was chosen as the code that captures this level because students want to use their discretion to determine the conceptual knowledge of the lexicon and grammatical categories based on the internal organization or structure of the given text. All the above exercises are considered as core to all textbooks examined in the study. However, the diversity observed in the medical textbooks, dentistry and especially medicine, in terms of purposes and, therefore, codes was greater than the other two paramedical books. The exercises include, for example, labeling some images with the corresponding terminologies and writing the functions of various living tissues and organs next to this term in the form of some classifications (Code: B2, understanding and classifying conceptual knowledge) or some practical questions in the form of anamnesis in which the students should create and put together a condition for the anamnesis, which can then also be played (Code: F2, creating the concept.

Reliability of Coding Scheme

As to intra-rater reliability, all the codified exercises were recorded after two and a half weeks. We used the Pearson correlation to determine the degree of consistency between the two sets of codes; it was found to be 97% using.

Results and Discussion

Table 3. Frequencies and percentages of the codes in medical and paramedical textbooks

	Frequency	Percent
Para-medical book	75	38.5
Medical book	120	61.5
Total	195	100.0

The frequencies and percentages of the exercises found in medical and paramedical textbooks are shown in Table 3. 38.5% of the total number of exercises were found in paramedical textbooks, whereas the majority of the exercises examined—61.55 percent— were found in medical course books.

As Figures 1 and 2 show, in this total sample of the textbooks, A1 (remember the factual knowledge) has the highest frequency of 34 (17.44%). E4 (evaluate the metacognitive knowledge) and D2 (analyze the conceptual knowledge) come next, each with 25 (12.82%) and 24 (12.82%), respectively. Some codes like A4 (remember the metacognitive knowledge), C4 (Apply the metacognitive knowledge), D4 (analyze the metacognitive knowledge), F1(generate factual knowledge), F4 (create the metacognitive knowledge, the highest level of thinking and knowledge) were grossly absent in the research sample and the exercises assigned as F3 (create procedural knowledge), E3 (evaluate procedural knowledge), E1(evaluate factual knowledge), D3 (analyze procedural knowledge), and B4 (understand metacognitive knowledge) were present with the lowest frequencies among all the others in both medical and paramedical textbooks. The information concerning the frequencies and percentages of the codes is shown in Figures 2 and 3 in both textbooks.

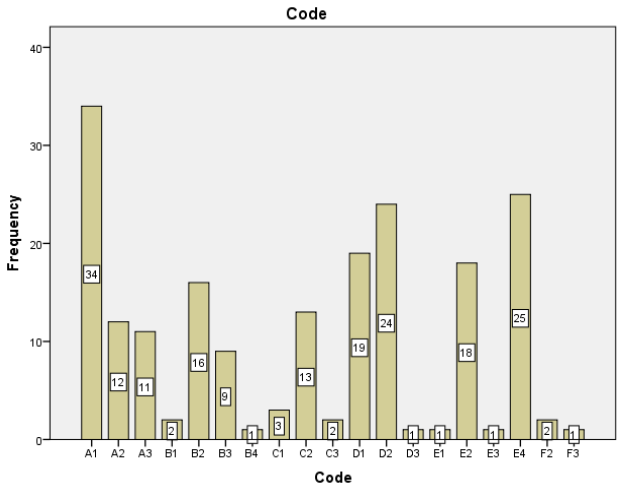

Figure 1. Frequencies of the codes in medical and paramedical textbooks Percentages of the codes

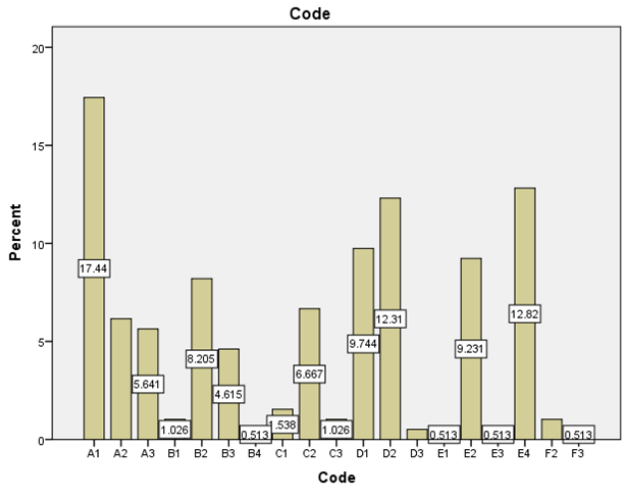

Figure 2. in medical and paramedical textbooks

Table 4. Frequencies and percentages in the medical course books

	Frequency	Percent	Cumulative Percent
A1	22	18.3	18.3
A2	10	8.3	26.7
A3	10	8.3	35.0
B1	2	1.7	36.7
B2	9	7.5	44.2
B3	8	6.7	50.8
B4	1	.8	51.7
C1	3	2.5	54.2
C2	7	5.8	60.0
C3	2	1.7	61.7
D1	8	6.7	68.3
D2	10	8.3	76.7
D3	1	.8	77.5
E1	1	.8	78.3
E2	11	9.2	87.5
E3	1	.8	88.3
E4	11	9.2	97.5
F2	2	1.7	99.2
F3	1	.8	100.0
Total	120	100.0	

Table 5. Frequencies and percentages in the paramedical course books

	Frequency	Percent	Cumulative Percent
A1	12	16.0	16.0
A2	2	2.7	18.7
A3	1	1.3	20.0
B2	7	9.3	29.3
B3	1	1.3	30.7
C2	6	8.0	38.7
D1	11	14.7	53.3
D2	14	18.7	72.0
E2	7	9.3	81.3
E4	14	18.7	100.0
Total	75	100.0	

Tables 4 and 5 show that most of the exercises in medical course books accumulate before the code C1 (apply the factual knowledge). In contrast, the paramedical textbooks raise this level to code D1 (select the factual knowledge), which is higher than C1. This can be observed by comparing the columns appropriated to the cumulative percentages of the medical and paramedical groups. While the differences are not very great, it is clearly shown that the paramedical textbooks capture higher orders of thinking and more abstract knowledge. (Figure 3)

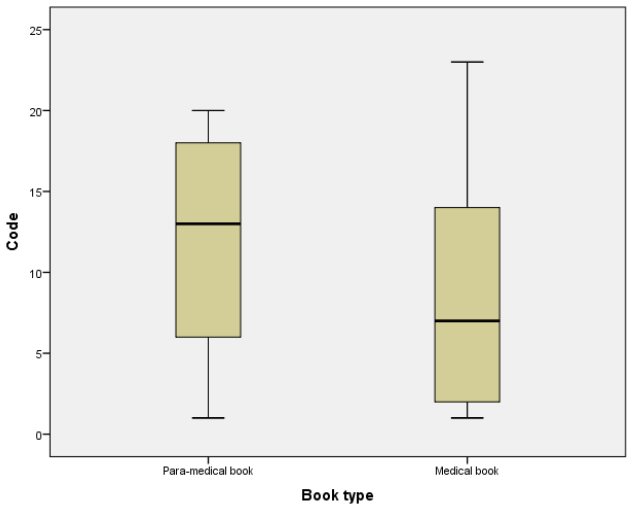

Figure 3. A Box plot

As the box plot above shows, while most of the exercises in medical textbooks fall into the lower levels of thinking and more concrete knowledge according to Bloom's revised taxonomy - the code A1 (think factual knowledge) is more prominent - the variations of the higher orders of the thinking and abstract knowledge are more strongly represented in these textbooks. In these books, there are codes of higher levels of thought and abstract knowledge albeit at lower frequencies, which are completely absent in the paramedical books. However, it is important to mention that the code F4 (creating metacognitive knowledge), which represents the highest level of thinking and knowledge, is not used in any of the groups.

This is evident by the section above the center line of the box dedicated to medical course books. The examples of these higher-order codes of thought and abstract knowledge, which are completely absent in the paramedical textbooks but manifest with low frequency in the medical ones, are F3 (generate the procedural knowledge) with the frequency of (1), F2 (create conceptual knowledge) (2), E3 (evaluate procedural knowledge) (1), E1 (evaluate factual knowledge) (1), and D3 (analyze procedural knowledge) (1); concerning the lower levels of thinking Ad Knowledge other codes exist such as C3 (apply procedural knowledge) (2), C1 (apply factual knowledge) (3), B4 (understand metacognitive knowledge) (1) and finally B1 (understand factual knowledge) (2). As shown, the coding levels in medical textbooks are different. However, this is not the case with paramedical textbooks, as the boxplot above shows. The entire rectangular box shown for paramedical books is predominantly positioned higher up in the diagram towards higher orders of thought and more abstract knowledge, while the variation in these codes is lower.

As mentioned earlier, some higher-level codes in medical textbooks are missing in paramedical textbooks. Of course, one reason may be that the number of exercises in these books is less compared to those in medical textbooks, as shown in the pie chart above. Another possibility lies in the nature of the exercises in the paramedical textbooks, which capture a higher level of thought and knowledge while having less variation in the codes. Therefore, as to the first research question, which seeks more prominent levels of Bloom's Revised Taxonomy in each group of course books, we found that there were two different trajectories through which one can answer the question: one from the perspective of frequencies and one from the side of diversity captured through the exercises. In terms of frequency, A1 (Remember factual knowledge) has the highest frequency in medical books with a frequency of 22, which is in a large gap with E2 (Assessment of conceptual knowledge) and E4 (Assessment of metacognitive knowledge) where both have the frequency 11. The prominence of lower levels of the taxonomy is reported in the work of several researchers such as Mizbani et al. (2023), Sadighi et al. (2018), and Divsar (2020).

In paramedical textbooks, D2 (analysis of conceptual knowledge) and E4 (assessment of metacognitive knowledge) with a frequency of 14 are preferred after code A1 with a frequency of 12 with the highest frequencies. However, from the perspective of variation, medical books show greater diversity for all levels of thought and knowledge (both low and high) but shallow indeed. This diversity could be due to the nature of reading selection in majors such as medicine and dentistry, as these texts contain richer materials consistent with the nature of these master's fields of study. Such diversity was reported in the studies conducted by Stevani and Tarigan (2022), Abalkheel (2021), and Khodabandeh and Mombini's (2018) who did the content analysis of English language textbooks, albeit not in a medical context, using taxonomy. Nevertheless, in the paramedical textbooks examined (operating room and nursing), nine codes are completely missing from both the low and high levels of the taxonomy. This lack of consistency in the frequencies of the thinking and knowledge levels in the taxonomy in these two groups of textbooks is indicative of a lack of consistency in learning objectives, as Zareian, Parsaei, Alemokhtar, and Rahimi (2017) reported in the analysis of the results of their study “SAMT” ESP books in the fields of medicine, dentistry, and pharmacology.

However, in this study, it has been pointed out that the differences observed in the medical textbooks at different levels are due to the nature of the texts, and this has contributed to the richness of these books since students are required to achieve a variety of orders of thought and knowledge. Nevertheless, Parsaei et al. (2017) concluded that the lowest level (A1) of taxonomy predominates in these books. While paramedical textbooks have two of the predominant higher thinking levels (D2 and E4), they do not have nine codes at different levels throughout the taxonomy. Since according to a study by Moslehi and Kafipour (2023) paramedical students usually fall behind their medical peers in language proficiency, , it makes sense to include a variety of exercises, mainly from the lower areas of thought, and more concrete knowledge. It is noteworthy that the lowest level of the taxonomy (A1) still predominates among the other lower orders and levels. In comparative studies such as the one done by Ebadi and Mozafari (2016), the study did not make any clear distinctions in the emphasis put on the higher-order and lower-order thinking skills between the two series of textbooks or between the volumes of the adult learners' series which were under investigation.

The other important point is the apparent absence of the F4 code as the highest order of thought and most abstract knowledge of metacognition. According to Razmjoo and Kazempourfard (2012), at this level the learner should ask himself a specific question. An example may be the creation of a learning portfolio, which is not normally a goal and is evident in these course books. This may be the reason why there is no instance of this code in these course books. Now the question might be raised as to whether one can generally say that the nature of the exercises in these two groups of books, namely the medical and the paramedical, differ.

As to the second question of the research, i.e. to determine whether there is a difference between medical and paramedical textbooks in terms of the highest and lowest BRT values, a chi-square test (χ^2) was used. As shown in Table 6, the *p-value* was as $P - value = 0.049 < 0.05$, so the result of this chi-square test is statistically significant, showing that a statistically significant difference exists between medical or paramedical textbooks in terms of the highest and the lowest levels of BRT.

Table 6. Pearson Chi-Square

Chi-Square Tests			
	Value	df	P-value
Pearson Chi-Square	28.956[a]	18	.049*
Likelihood Ratio	35.212	18	.009
Linear-by-Linear Association	5.946	1	.015
N of Valid Cases	195		

Conclusions

In this study, two main types of ESP books developed in the English Department of Shiraz Medical University were codified in light of Bloom's revised taxonomy. The findings helped to answer the two questions posed in this paper, namely:

1. Which levels of Bloom's Revised Taxonomy are much more prominent in both the medical and paramedical course books?

It has been shown that the most dominant code of taxonomy in medical textbooks is A1 with a frequency of 22 and these textbooks generally reach a lower level of thought and knowledge although low diversity is evident at the different levels of the taxonomy. In the case of paramedical textbooks, codes D2 and E4 (frequency: 14) predominate, with a small gap to A1 (frequency: 12). The results show that

overall these books are preferred by people with higher levels of knowledge and thinking although the diversity is less pronounced. The final code, F4, is noticeably absent in both groups.

2. Is there any difference between medical or paramedical textbooks in terms of the highest and the lowest levels of BRT?

The chi-square test performed shows a statistically significant difference between the exercise types in these two book groups. This difference in the quantitative part of this research must be justified qualitatively since the p-value here is the sign of the difference in terms of lower or higher levels achieved by each textbook group, not in terms of the observed diversity in the types of exercises and their tasks goals behind them. However, it appears that there is some sort of inconsistency between the two groups in terms of diversity, which can be well represented in the boxplot above.

The results show that there is some incompatibility between the medical and paramedical textbooks in terms of the quantity, frequency, and variety of exercises as well as the percentages of thinking and knowledge levels. These two groups of ESP course books have different amounts of exercises. Thus, it makes sense to increase the variety or breadth of the exercises in the paramedical course books and the depth of the tasks in the medical course books to achieve a certain level of equilibrium in our educational system. According to Moslehi and Kafipour (2022), such differences, induced by the discipline, can facilitate the advancement of English for specific purposes, particularly within academic curricula across the domains, thereby enabling novice learners in EFL contexts, such as Iran, where exposure to the English language is constrained, to attain heightened awareness. To obtain additional insights into the issue, future research can focus on the practical implications of the findings, what actually occurs in the classrooms, whether higher-order exercises are completed in their entirety, and even ask university lecturers to reflect on their ideas and experiences.

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