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An Investigation into the Logic Textbooks Written in Accordance with the 2009 Logic Curriculum

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Abstract

Textbooks have attained an essential position with the student-centered approach. Accordingly, curricula are developed based largely on constructivist approach. Since textbooks are prepared in accordance with the curriculum, they are therefore constructivist approach-oriented. As a result, textbooks are the reflection of the curriculum. The mistakes in textbooks can directly affect learning in a negative manner. Additionally, the visuals, reading texts, preparation and evaluation questions in textbooks should be on a par with the outcomes in the curriculum in regard to level and structure. In this study, three of the textbooks written in accordance with the 2009 logic course curriculum were examined in terms of physical features, distribution by units, their congruence to the curriculum, language and expression, scientific content, print-typesetting-orthography, reading texts, preparation and evaluation questions, and bibliography. From this aspect, this study is qualitative. Document review method was adopted in this study. It was discovered that the evaluation questions in the textbooks framed to measure the outcomes were under the outcome levels. To exemplify, the questions taxonomically at the evaluation level were found to be corresponding to the knowledge and comprehension levels, it was further explored that most errors were detected in the elements of print-typesetting-orthography.

Keywords: Textbooks, Logic, Curriculum, Logic instruction, Scientific content, Preparation questions, Evaluation questions.

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Contents

1. Introduction

Teaching activities aim at effective student learning. Textbooks, in this sense, are extremely important. The preparation questions, activities, unit evaluation questions and examples play a vital role in effective teaching.

By taking into account the problems from practice in program development, the research results are used which will provide changes in the direction of research, development and student behaviors. For this reason, the identification of drawbacks in logic textbooks written in accordance with the curricula and thus making observations and suggestions are extremely significant. This can also provide assistance with the writing of new textbooks and development of new curricula (Duman, 2014).

Textbooks are primary instruments that facilitate education/training activities and enable the regular and systematic implementation of education and training. Textbooks also serve as a bridge in conveying the fundamental values aimed to be acquired by students (Duman, 2014).

Textbooks are complementary materials for the achievement of learning objectives. They are resources of learning experiences for both teachers and students. In addition, they contribute to students' cognitive, affective, and psychomotor skills (Duman, 2014).

1.1. Purpose of the Study

The education of philosophy group comprises disciplines of philosophy, sociology, and logic. These disciplines address questions about the existence, knowledge, and value of human and universe (Dombayci and Kiziltan, 2017).

The purpose of logic course is to raise individuals who can transfer true thinking methods into daily life. It further aims to raise individuals who can think independently by noticing contradictions, provide solutions to the encountered problems, and ground their ideas (Bicer, 2013).

The main purpose of the study is to examine the logic textbooks written by Elci, Karaveliogullari and Topakkaya developed in accordance with the 2009 logic course curriculum. From this perspective, the textbooks were examined to find out whether they are congruent to the criteria determined from physical, contextual, scientific, etc. aspects.

1.2. Significance of the Study

The errors in textbooks might result in wrong or inadequate learning to a certain extent. Textbook examinations are therefore salient. The workshops organized by the Ministry of Education to identify the errors in textbooks and the studies of error correction support this view hence increase the importance of scholarly work. For these reasons, it is significant to examine the logic textbooks prepared in accordance with the current logic course curriculum for high schools from several aspects (contextual, scientific, language and expression, etc.).

1.3. Limitations

This research deals with the textbooks by Elci, Karaveliogullari and Topakkaya; therefore is limited to three textbooks.

2. Method

Within the framework of survey model, a review of literature about the subject was conducted in this research. From this aspect, this is a descriptive research. By scrutinizing the examined logic textbooks pursuant to various criteria, evaluations were made.

According to Sonmez and Alacapinar (2017) it is important in qualitative research to evaluate the documents according to the structure of the culture and the meanings attributed to it.

The document review used in the study includes analysis of written materials with information on the concept or concepts targeted to be investigated (Yildirim and Simsek, 2016).

The materials to be used as data in document review are closely related to the research problem. For example, the documents to be used as data in a study related to education are textbooks, program (curriculum) instructions, intramural and extramural correspondence, course and unit plans, and etc. resources (Yildirim and Simsek, 2016).

In this study, logic course curriculum and logic textbooks are included. The research is based on document review with this aspect.

3. Findings and Remarks

3.1. 2009 Logic Course Curriculum

The program includes the general objectives of the Turkish National Education. The vision of the program is explained as educating individuals who can transfer true thinking to daily life, think coherently, perceive contradictions, think independently, produce solutions to the problems they face and can base their thoughts on. (MEB, 2009).

Provided two hours a week, the logic course curriculum was prepared by planning seventy-two hours course time in an academic year.

Logic course curriculum includes general objectives, units, outcomes and examples of activities. The general objectives of the logic course are explained as follows (MEB, 2009):

The students who complete the logic course will be able to;

1) reach the knowledge that logic is related to reasoning which is a form of thinking,
2) recognize their own ways of thinking,
3) transfer ways of true thinking to daily life,
4) have the ability to be consistent when thinking,
5) control the consistency of thoughts,
6) express everyday language with logic language,
7) use the language correctly and carefully when transferring their opinions,
8) develop awareness against conflicting thoughts,

9) justify the accuracy of information,
10) develop characteristics of being systematic and careful.

3.2. The Imprints of Logic Textbooks Written in accordance with the 2009 Logic Course Curriculum

Table-1. The imprints of logic textbooks written in accordance with the 2009 logic course curriculum

Title Page	Author	Edition-Volume	Publishing Date	Publishing House	Date of Acceptance	Issue	Dimension
Logic 160 Textbook for Secondary Schools	Elci	-	2017	Cem	2014	106	19,5x27,5
Logic 159 Textbook	Karaveliogullari	-	2013	Semih	2012	46	19,5x27,5
Logic 160 Textbook	Topakkaya	2nd Ed.	2012	MEB	2010	237	19,5x27,5

Source: Elci (2017), Karaveliogullari (2013) and Topakkaya (2012)

According to the criteria set by the Ministry (of Education), high school logic textbooks should be in the range of 8-10. A form corresponds to 16 pages. Considering that the authors are allowed to have the front pages of the book in half form, in this context, the logic textbook can be up to 168 pages. It is seen that the criteria determined in this respect are observed in the books reviewed. In addition, the dimensions of the books are in accordance with the determined criteria.

3.3. Unit Distributions of the Logic Textbooks Written in accordance with 2009 the Logic Course Curriculum

In accordance with the 2009 Logic Course Curriculum, the logic course is structured under four units.

Table-2. The Units and Durations of the Logic Course Curriculum

Number of Unit Outcomes	Title of Unit	The Percentage of Unit in the Program	Course Distribution/Hour	Number of in the Program
Unit I	Introduction to Logic	%20	14 hr	7 outcomes
Unit II	Classic Logic	%30	22 hr	19 outcomes
Unit III	Logic and Language	%20	14 hr	7 outcomes
Unit IV	Symbolic Logic	%30	22 hr	20 outcomes
Total		%100	72 hr	53 outcomes

Source: MEB (2009).

The units that should be included in the textbooks and the percentage ratios to be allocated to these units are given in the logic course curriculum. Therefore, the ratio of units in books should be compared with the ratios in the program. Whether the units are sufficiently placed in the books or there is any excessive or missing parts can thus be determined (Duman, 2014).

3.3.1. Unit Title: Introduction to Logic

The percentile determined by the Ministry is: 20%

Table-3. The Number of Pages and Percentages for Introduction to Logic Unit in the Logic Textbooks

Author Percentile	Edition	Dimension	Total Page Number	Calculated Total Calculated Page Number	Page Number Allocated for the Unit	Percentile in the Total Page
Elci 18,57	2017	19,5x27,5	160	140	26	16,25
Karaveliogullari 17,60	2013	19,5x27,5	160	142	25	15,62
Topakkaya 20,42	2012	19,5x27,5	160	142	29	18,12

Source: Elci (2017), Karaveliogullari (2013) and Topakkaya (2012)

When the data obtained are analyzed, the logic textbooks by Elci and Karaveliogullari are found to be closer to each other in both the percentage of the total page and the percentages calculated. However, the logic book by Topakkaya varies between 2% and 3%. When the percentile determined by the Ministry is taken into consideration, it has been determined that the books other than the Topakkaya book are in accordance with the percentile.

3.3.2. Unit Title: Classic Logic

The percentile determined by the Ministry is: 30%

Table-4. The Number of Pages and Percentages for Classic Logic Unit in the Logic Textbooks

Author Percentile	Edition	Dimension	Total Page Number	Calculated Total Calculated Page Number	Page Number Allocated for the Unit	Percentile in the Total Page
Elci 30	2017	19,5x27,5	160	140	42	26,25
Karaveliogullari 28,87	2013	19,5x27,5	160	142	41	25,62
Topakkaya 28,16	2012	19,5x27,5	160	142	40	25

Source: Elci (2017), Karaveliogullari (2013) and Topakkaya (2012)

When the percentages of the classic logic unit on the total page are examined, it is observed that the rates of each of the three books are close to each other. Besides, when the percentages calculated are examined, it is observed that classic logic is given a 1% - 0.50% emphasis in Elci's logic textbook. However, all three books are compatible with the percentile of the Ministry.

3.3.3. Unit Title: Logic and Language

The percentile determined by the Ministry is: 20%

Table-5. The Number of Pages and Percentages for Logic and Language Unit in the Logic Textbooks

Author Percentile	Edition	Dimension	Total Page Number	Calculated Total Calculated Page Number	Page Number Allocated for the Unit	Percentile in the Total Page
Elci 18,57	2017	19,5x27,5	160	140	26	16,25
Karaveliogullari 18,30	2013	19,5x27,5	160	142	26	16,25
Topakkaya 20,42	2012	19,5x27,5	160	142	29	18,12

Source: Elci (2017), Karaveliogullari (2013) and Topakkaya (2012)

When the calculated percentile results and the percentile results on the total page are examined, it is seen that the logic textbooks by Elci and Karaveliogullari are closer to each other. In addition, the book by Topakkaya was found to be 2% higher in both measurements. Considering the percentile determined by the Ministry, the book by Topakkaya includes 0.42% more of this unit while the other two books do not exceed the determined percentile.

3.3.4. Unit Title: Symbolic Logic

The percentile determined by the Ministry is: 30%

Table-6. The Number of Pages and Percentages for Symbolic Logic Unit in the Logic Textbooks

Author Percentile	Edition	Dimension	Total Page Number	Calculated Total Calculated Page Number	Page Number Allocated for the Unit	Percentile in the Total Page
Elci 32,85	2017	19,5x27,5	160	140	46	28,75
Karaveliogullari 35,21	2013	19,5x27,5	160	142	50	31,25
Topakkaya 30,98	2012	19,5x27,5	160	142	44	27,50

Source: Elci (2017), Karaveliogullari (2013) and Topakkaya (2012)

When the total page percentiles of the "Symbolic Logic" unit are examined, it can be seen that the books by Elci and Topakkaya are close to each other while Karaveliogullari's book exceeds the determined percentile by 3-4%. On the other hand, when the percentages calculated are examined, it is seen that the rate of excess is observed in the logic textbook of Karaveliogullari. In addition, when the books are analyzed according to the percentile of the Ministry, it is seen that the percentile calculated in all three books is more than the specified percentile.

According to Duman and Arslan (2017) when the unit and course duration distributions in the curriculum are examined, the units are not distributed equally within the curriculum such that 14 hours are allocated for seven outcomes in the "Introduction to Logic" unit while 22 hours are allocated for 20 outcomes in the "Symbolic Logic" unit which should have more practice activities. This disproportion is also reflected on the textbooks.

3.4. The Congruence of the Logic Textbooks to the 2009 Logic Course Curriculum

The following topics should be included according to the 2009 Logic Course Curriculum (MEB, 2009):

The first unit is Introduction to Logic. In this unit, what is accurate thinking, basic concepts, principles of reasoning, areas of application of logic, logic and practical life, logic and technique, logic and science, logic and philosophy are included. The second unit, Classic Logic, includes concept and terms, whatness-reality-identity, intenseion-extension, types of concepts, five universals, concepts' relationship to one another, description, what is proposition, types of propositions, what is inference, direct inference, counterfactual inference, conversion, indirect inference, what is comparison, rules of comparison, logical necessity and probability in comparison, and types of comparison. The third unit, Logic and Language, encompasses different functions of language, information transfer and language, factors that hinder information transfer, polysemy, uncertainty, factual and verbal arguments, comprehension and identification. The fourth unit, Symbolic Logic, covers introduction to logic, propositional logic, proposition and its structure, simple and compound propositions, propositional connectives, inference, symbolization, interpretation, truth table, analytic table (tree method), consistency-validity-equivalence, logic of quantization (predicate logic), symbolization, basic concepts, basic rules, multi-valued logic, three-valued logic, and fuzzy logic.

The logic textbooks by Elci and Karaveliogullari encompass all the headings in the curriculum. The logic textbook by Topakkaya cover such subheadings as identity, non-contradiction, the impossibility of the third state and the principle of sufficient reason under the heading of "the Principles of the Mind" in the first unit. Additionally, the second unit covers the heading of "Aristoteles and Logic" which is not included in the curriculum. Also, the fourth unit covers the headings such as consistency, validity, and equivalence. Apart from these differences, the contents of the book are in align with those determined in the curriculum.

3.5. Language and Expression in the Logic Textbooks Written in accordance with the 2009 Logic Course Curriculum

All three books can be claimed to be appropriate for students' levels in terms of language and expression such that in Elci (2017) book the equivalents of some words used in the same sense were written in brackets such as akil yurutme (comparison), tumevarim (enduction), tumdengelim (deduction), benzesim (analogy). The dates of birth and death of individuals are provided within brackets next to them such as Gottfried Leibnitz (Laypniz) (1646-1716), with the pronunciation of foreign names transcribed in the native language such as Sophocles (Sofokles) and Jan Lukasiewicz (Yan Lukasiyeviç).

In Karaveliogullari (2013) book, the equivalents of some words used in the same sense were written in brackets such as akil yurutme (inference), onerme (axiom). The dates of birth and death of individuals are provided within brackets. Also, the pronunciation of foreign names transcribed in the native language such as Mevlana (1207-1273), Porphyrios (Porfiryus, M.S. 233-304).

In Topakkaya (2012) book, the meanings of some words are given in brackets. Additionally, the pronunciation of foreign names transcribed in the native language are provided for some names while it is not for others. Also, the dates of birth and death of individuals are not given such as Bacon (Beykın), Descartes (Dekart), and De Morgan (Dö Morgın). In addition, examples for certain concepts along with descriptions are provided in brackets such as sense (color, smell.etc.), emotion (love, romance, etc.), and superior genus (a genus without any other above it). The meanings of some words are provided within brackets such as "Principia mathematica" (matematigin prensipleri).

3.6. The Scientific Content of the Logic Textbooks Written in Accordance with the 2009 Logic Course Curriculum

3.6.1. Elci (2017)

"Reasoning is the result of at least two propositions (p. 18)." This is misinformation because for reasoning there must be a proposition in the form of proving (premise) and a result in the form of proved (conclusion), not at least two propositions. Therefore, reasoning requires at least two propositions. However, it would be enough to have one of them as a premise and the other as a conclusion. For instance, there exists reasoning between "All people are smart" and "Therefore, some people are smart" (Ozlem, 1991).

"Tumdengelim (Deduction): Starting from a general principle, it is a kind of reasoning that necessarily enters into objects and events (p. 27)." The term deduction is not a full equivalent of the phrase tumdengelim. That is, deduction is not a reasoning that goes from one element to the next, from a general principle to individual events.

In the inference of "All A's are B's", "All B's are C's", "Therefore; all A's are C's", there is a relationship between from the whole to the whole not from the whole to the part (Ozlem, 1991). Therefore, the definition provided in the book is deficient.

The proposition of "Ali knows how to read" is symbolized with a capital P in the practice part on page 115 in the book. However, capitalized letters should be used for the propositions in symbolic logic.

At the very bottom of page 116 in the book, the expression "(p ∧ q) → (p ∧ q) ∴ r" given in a rectangular box is not the symbolized version of the verbal inference. The verbalization of the given inference is wrong. The correct form should be "(p ∧ q) → r, (p ∧ q) ∴ r".

In the last example of the topic "the control of propositional validity" on page 123 in the book, it was asked whether the proposition "(p ∧ q) ∨ (p ↔ q)" is valid. However, the validity of the proposition "(p ∧ q) ∨ (p → q)" was controlled in the table. Also, the third line of the proposition "(p → q)" given in the table should have received "D" value while it was analyzed using "Y". This causes a scientific error.

On page 124 in the book, the statement that "In order for an inference to be valid, the premise and the conclusion must take at least the value 'D' together in at least one line." in the topic "The Control of Inference Validity" is false because inference validity in the truth function table is possible in the same line if there is no case where the premise D is the conclusion Y. So an inference can be valid even if all of the premises are wrong.

On page 127 in the book, the expression whose analysis was given as "~~q" in the analytical table at the bottom should have been "~~p".

On page 128 in the book, the expression that should have been given as "~ (p ∨ ~q)" in the second step in the analytical table was given as "~ (p ∨ q)" and thus a fallacious analysis.

On page 133 in the book, there are significant scientific errors in the example provided within the topic of "The Control of Propositional Validity". In the "~[(p → q) ∧ (p ∧ ~q)]" proposition, the "∧" connective in the middle converts into "∨" when the negation connective out of the brackets is dispersed within. At the same time, the premises take "~" connective before. The negation connective was not brought before the first premise but before the "p" proposition of the first premise in the analytical table in the book. This is a scientific error. An analysis was also made before the negation connective which should be before the second premise was given, which also points out a scientific error. The "(~p → q)" expression should replace "~ (p → q)"and the "(p ∧ ~q)" expression should replace"~ (p ∧ ~q)".

On page 135 of the book, the question is wrong because the "-" expression was given instead of the propositional connective that should have been between the first premise of the question in the upper right of the second question.

Symbolization in quantification was misrepresented on page 138 in the book. It was stated that the proposition that "All beings are mortal" was symbolized by "∀xFx" while the proposition that "Some people are students" was symbolized by "∃xFx". However, the first symbolic form of the proposition should have been as "∀x(Fx→Öx), with the second as "∃x(Fx∧Öx)" because the equivalent of the proposition given in the book could be "Everybody is mortal" and "Some are mortal" in daily life. That is, subject terms are also symbolized in propositions if any and to differentiate between the subject and predicate terms, "→" connective is placed in between in the "∀" quantifier while it was "∧" connective "∃" quantifier. If there are no subject terms, these expressions are not written in symbolization. Bearing this in mind, the expressions in the examples at the end of the page provided for the topic

to be understood well were also symbolized wrongly. The symbolization of the four proposed forms of the so-called Aristotle Frame, as well as information on the false symbolization and how it should be true, confirms the symbolized form.

∃x (Fa → Fb) given as the symbolic equivalent to the proposition that "Some people are hardworking" given in the fourth question in the practice part on page 139 in the book also supports and justifies the aforementioned argument. This shows us the lack of internal consistency in lectures in the book.

3.6.2. Karaveliogullari (2013)

"Reasoning is the result of at least two propositions (p. 15)." This is false information because for reasoning there must be a proposition in the form of proving (premise) and a result in the form of proved (conclusion), not at least two propositions.

On page 126 in the book, whether the (p → q), (pVq) ∴ q inference is valid was tested with table. In the testing, the third line received "D" in place of "Y" in the testing of the [(p → q)Λ(pVq)] →p expression.

While lecturing on the symbols used in the quantification logic on page 138 in the book, "A" was used instead of "∀" as a symbol for universal quantification. Similarly, "E" was used instead of "∃" as a symbol for particle quantification. These expressions create scientific errors.

3.6.3. Topakkaya (2012)

"Tumdengelim (Deduction): A method of reasoning in the form of from the general to the particular or from the whole to the part. Example: All developed communities have a high level of education. Japan is a developed community. Therefore, the level of education in Japan is also high."(p. 29). The term deduction falls short of satisfying the meaning of the term tumdengelim such that deduction is not an execution that goes from the whole to the part, reaching only the individual events from a general principle. It also signifies the transition from the whole to the whole. That's why, the description in the book is fallacious.

The symbol for "if and only" was displayed as "→" while lecturing the symbols used in propositional connectives on page 115 in the book. However, "if and only" proposition is expressed by "↔". This false illustration creates a scientific error. The "if and only" proposition on page 117 is again displayed by "→" symbol, creating a scientific error. Similar errors were committed on pages 121 and 124.

The expression that "He had worked if and only become rich" was symbolized wrongly as p→q on page116. The correct form of the expression should have been p↔q.

In the testing of the equivalences of "~ (pΛq), (~p V~q)" propositions through a truth table on page 118, the expression in the third line was shown as "~q" in place of "~p".

3.7. Printing-Typesetting-Orthography in the Logic Textbooks Written in Accordance with the 2009 Logic Course Curriculum

One of the questions in the preparation questions section on page 16 of Elci's logic textbook lacks a question mark. On page 42, the expression which should have been written as "Aristoteles logic" was written as "Aristoteles Logic". On the same page, the word "Aristotelesci" was misspelled as "Aristotelestci". On page 44, the word "beslemeye" was misspelled as "beslemeye". On page 48, the word "eksiltili" was misspelled as eksiktili". On page 56, "bir seyin" was misspelled as "bir seyi". On page 57, the initial letter in the word "ornegin" at the beginning of a sentence was written with a capitalized letter. On page 68, there was no space left between the phrase "karsit onerme". On page 77, "nelik kavramini" was misspelled as "nelik kavrami". On the same page, the fourth question was not finalized with a question mark. On page 123, "onermelerin gecerliliginin denetlenmesi" was misspelled as "onermelerin geçerliliginin denetlenme". On page 138, "filozoftur" was misspelt as "filozftur". On page 156, while citing a reference, the word "kitabevi" was written as "kitavevi". On the same page, "Cücen" was misspelled as "Cücen".

In Karaveliogullari's logic textbook, "Dunya'nin" was misspelled as "Dunyanin" on page 14. On page 29, the word "ucak" was misspelled as "ucuk". On page 74, the initial letter of the word "Gunes" was capitalized. On page 157, "Cücen" was misspelled as "Cücen" in the references.

In Topakkaya's textbook, the word "bildirme" was misspelled as "bildirisme" on page 82.

3.8. Preparation Questions in the Logic Textbooks Written in Accordance with the 2009 Logic Course Curriculum

Preparation questions should arouse interest about students' immediate vicinity and daily lives. They should arouse students' interests and willingness to learn the subject. In addition, they should be congruent to student's knowledge and skills. They should further encourage observations, experiments, examinations, and investigations suitable to students' levels (Duman, 2014).

3.8.1. Elci (2017)

Prior to all lectures in all units of the book, preparation questions are provided. There are five preparation questions in the first unit titled Introduction to Logic, with eight preparation questions in the second unit Classic Logic, four in the third unit Logic and Language, and ten in the fourth unit Symbolic Logic.

When these questions are examined, it can be seen that students are expected to possess knowledge by providing tips despite the lack of lectures. Although inferences are not lectured on page 63, the first preparation question asks students make inferences about universal, universal negative, and partial negative propositions with the proposition that "Some animals are reptiles". The second preparation question asks students to replace the underlined words in the given propositions and make new ones. These questions are supposed to be practical. Therefore, such questions should be used to support what students have learned after the lectures. Since they are not preparatory for the topic in nature, such questions should not be included in the preparation questions section. On page 115, the preparation questions are not preparatory but practical in nature since they are provided before

the lecture. Such questions should be excluded in the preparation questions section since they cannot be answered by students as they do not know about the topic. These questions may therefore cause students to develop prejudice towards the topic.

3.8.2. Karaveliogullari (2013)

The preparation questions in this book are given under the name of "Let's Prepare". In the first unit, Introduction to Logic, there are five preparation questions, with eight in the second unit Classic Logic, three in the third unit Logic and Language, and 11 in the fourth unit Symbolic Logic.

On page 61 in the book, students are asked to write the negative, universal and universal negative of the proposition that "Some people are students" without being taught the topic "Inferences". It is wrong to have such questions as a preparation without lectures since these questions are practical in nature. On page 66, are as well practical in nature. The third and fourth preparation questions on page 94 include questions like "Which of the above would you agree in a discussion? Why? Should we be looking at phenomena or just using our logic in the arguments above? Explain." However, there is no statement given above such that there are statements supposed to refer to when answering the first and second. The questions on page 107 are also for practical purposes.

3.8.3. Topakkaya (2012)

The preparation questions in this book are given under the name of "Let's Prepare". In Introduction to Logic unit, there are eight preparation questions, with 14 in Classic Logic unit, five in Logic and Language unit, and 11 in Symbolic Logic unit.

While formulating the preparation questions, visuals, tables, and caricatures are utilized. Some questions are prepared based on these tables, visuals and caricatures. The preparation questions include yes-no questions along with those that require knowledge and comprehension. Students are asked to present and discuss some of the preliminary preparations in the class, which might possibly be to arouse students' interests towards the course. However, being many in number, these questions might cause troubles in the course of lectures along with the fact that they are not utilized all the time because of unfavorable class hours. On the other hand, not all preparation questions suffice in terms of their association with daily life, arousing interests towards the topic, and acquiring preliminary knowledge.

In Symbolic Logic unit, some of the preparation questions require students to apply about the topic without being taught the topic. This might lead to problems since students have not yet learned the topic. Students might sweat since they have no previous knowledge. In this case, they might develop prejudice towards the topic and think they will never understand the topic or make it. Therefore, such exercises should be provided following the lecture so that students who have learnt the topic can reinforce what they have learnt by doing these exercises.

3.9. Evaluation Questions in the Logic Textbooks Written in Accordance with the 2009 Logic Course Curriculum

The evaluation questions in the textbooks reinforce the learnt topics and help identify the unlearnt topics. Therefore, the conscious, purposeful, and planned formulation of evaluation questions is important (Duman, 2014).

Evaluation questions are a means to demonstrate to what extent the outcomes are acquired by students. In this regard, the questions should be parallel with the outcomes.

The outcomes in the logic curriculum and the evaluation questions in the textbooks should be in harmony. It was stated that assessment should aim evaluating students' high level skills. However, the outcomes in the higher cognitive knowledge level were scarcely included. This indicates that the assessment objectives do not befit the outcomes in the 2009 logic course curriculum (Duman and Arslan, 2017).

The outcomes in Introduction to Logic unit in logic course curriculum are in analysis and evaluation categories. The outcomes in Classic Logic unit belong to the comprehension, analysis, and evaluation categories while those in Logic and Language unit are in comprehension, analysis, and evaluation levels. The unit titled Symbolic Logic includes outcomes at the comprehension, analysis, and evaluation levels.

3.9.1. Elci (2017)

In Introduction to Logic unit, there are five open-ended, ten true/false, and six multiple choice questions. The open-ended question bases were in the form of "state the difference", "affect in a positive way, why", briefly write", "what, explain", and "exemplify". "State the difference" is at the analysis level while the other are at the knowledge and comprehension levels. The true/false questions consist of questions at the knowledge level. The open-ended question bases are in the form of "to which it is an example", "which one is wrong", "which one should be brought", "to which does it congrue" and "which identity principle does it exemplify" and are mostly at comprehension level.

The question bases in the first unit of the book Introduction to Logic are in the form of "what is it", "describe", and "explain". Such question bases do not befit the questions at the evaluation level in the outcomes.

The Classic Logic unit has five open-ended, ten true/false, and six multiple choice questions. The open-ended question bases are in the form of "exemplify", "briefly write", "how many relations are there, exemplify", and "what does it mean, what are its conditions, write". The questions are often at the comprehension level. The true/false questions consist of questions at the knowledge level. The multiple choice question bases are "which of these", "what kind of proposition is it", "which one should be brought", "which of these should be included in the fish term intention", and "which option is listed in the correct order".

When the questions in the book are examined, it can be seen that they are mostly at the comprehension level. This does not match the curriculum.

In Logic and Language unit, there are five open-ended, ten true/false, and six multiple choice questions. The open-ended question bases are "provide an example", "write the preventive factors", "what does it mean, explain and exemplify", and "describe". The questions are at the knowledge and comprehension levels. In true/false questions, ten propositions are provided. From this aspect, the questions are at the comprehension level. The multiple choice question bases are "to which does it relate", "which uncertainty does it exemplify", "which does it exemplify",

"which of these", "which", and "which one should be brought" Therefore, the questions are at the knowledge and comprehension levels.

When the questions in the book are examined, it can be seen that they do not befit the curriculum since there are questions at the knowledge and comprehension levels.

In Symbolic Logic unit, five open-ended, ten true/false and six multiple choice questions are included. The question bases are "what", "why, explain", "what does it mean, exemplify", write the negation and double negation propositions", "by describing, state these constants" These questions along with true/false ones are at the levels of knowledge and comprehension. The multiple choice question bases are "which of these", "what is it called", "on which does it depend", "in which is it included", "which", and "which should be brought", all of which are at knowledge and comprehension levels.

The questions are generally at the application level. On the other hand, it can be seen that there are questions at the knowledge and comprehension levels other than application level when the questions are examined.

3.9.2. Karaveliogullari (2013)

In Introduction to Logic unit, there are eight multiple choice, eight gap-filling, and seven open-ended questions whose bases are "which are not", "which is wrong", "which has it", "which is it", and "which cannot be inferred" The open-ended question bases are "exemplify", "explain", and "what is it" The multiple choice questions along with open-ended and gap-filling are at knowledge and comprehension levels.

The Introduction to Logic unit includes questions at the knowledge and comprehension levels, which does not befit the curriculum.

The Classic Logic unit includes 11 multiple choice, nine gap-filling, and four open-ended questions. The multiple choice question bases are "which", "how", "which is not", "which contradicts", "which one is not followed" while the open-ended question bases are "find", "state" and "describe" and are at knowledge and comprehension levels.

When the questions are examined, it can be seen that there does not exist questions at the analysis and evaluation levels and therefore does not befit the curriculum.

In Logic and Language unit, there are seven multiple choice, eight gap-filling, and seven open-ended questions. The multiple choice question bases are "which is not", "which is more preferred", "which" while the open-ended question bases are "explain with examples", and "what does it mean", "explain its reasons" and are at the knowledge and comprehension levels. In addition, there are questions at the evaluation level with bases including "explain by comparison", "discuss", "comment" and "state".

The questions in the book consist of knowledge, comprehension and evaluation categories. For this reason, it does not completely befit the curriculum.

In Symbolic Logic unit, there are eight multiple choice, 11 gap-filling, and seven open-ended questions. The multiple-choice question bases are "which are", "In which is it included", "which is not equivalent", "which cannot be qualified", and "on which does it depend". The open-ended question bases are "state", "exemplify", "what is, state", "which conditions are necessary, state", and "which propositional connectives is it used, state" and are at the comprehension level.

The expressions that should complete the gaps in fill-in the-gaps questions are given in a mixed order. When the questions are examined, it can be seen that there are questions at both application and comprehension levels.

3.9.3. Topakkaya (2012)

In Introduction to Logic unit, there are six gap-filling, six multiple choice, five true/false, and four open-ended questions. Additionally, five extra open-ended questions are also included with a prompt. The expressions/phrases that should complete the gaps are not provided in the gap-filling questions. The multiple choice question bases are "what is it called", "which one is it", "which fails to befit", and "which does not belong" and are at the knowledge level. The true/false questions are at the knowledge and comprehension levels. The first open-ended question base is in the form of "state the difference" and is a question at the analysis level while the third question base is in the form of "compare" and is a question at the evaluation level. The other open-ended question bases are "state" and "what is" and are at the knowledge levels. The questions with prompts are in the form of "is it appropriate, why", "demonstrate", and "state" and are mostly at the knowledge and comprehension levels.

There are questions at the evaluation level in the evaluation questions in the book. Additionally, there are questions at the knowledge and comprehension levels.

In Classic Logic unit, there are five multiple choice, six true/false, five gap-filling, and five open-ended questions. The multiple choice question bases are "which" and "which of these are related" and are at the knowledge level. The true/false questions consist of six propositions and are at the knowledge and comprehension levels. The gap-filling questions are missing the expressions that should complete the gaps and are at the comprehension level. The open-ended question bases are "explain the difference", "what does it imply, write", "what kind of relationship is there, state", "what is the nature of relationship" and "write an example of comparison" and are at the comprehension level.

The evaluation questions comprise questions at the comprehension level. For this reason, they do not match with the curriculum.

In Logic and Language unit, there are five multiple choice, seven true/false, five gap-filling, and four open-ended questions. The multiple choice bases are "which is not" and "which is" and are at the comprehension level. The true/false questions are at the knowledge level. The concepts that should complete the gaps are not given. The gap-filling questions are at the knowledge and comprehension levels. The first open-ended question base is "write the difference in approach" and is a question at the analysis level. The fourth question base is "evaluate the role" and is a question at the evaluation level. The other question bases are "what is, write" and are at the knowledge level.

When the questions are examined, it can be observed that they are evaluation questions at the analysis level. Additionally, there are questions at the knowledge, comprehension, and evaluation levels.

In Symbolic Logic unit, there are six multiple choice, three practice, seven true/false, five gap-filling, and four open-ended questions. The multiple choice question bases are "what" and "which" and are at the knowledge level. The three practice questions deal with the consistency and validity of propositions and their testing through the table. These questions help reinforce the topic learnt. The true/false questions are the knowledge and comprehension level. In this unit, the concepts that should complete the gaps in gap-filling questions are scrambled. The gap-filling questions are as well at the knowledge level. The open-ended question bases are "which, how, state", "why, state", "write the negation proposition", and "symbolize" and are at the comprehension level.

When the evaluation questions in the book are examined, it can be observed that they are at the comprehension and application levels.

4. Findings and Discussion

Logic course aims to provide students with skills such as critical thinking and multi-dimensional thinking. Curriculum and textbooks are prepared in order to achieve these objectives.

The textbooks prepared in line with the outcomes in the curriculums are the first source in the learning process of the students. Activities in the textbooks, preparation questions, and evaluation questions are extremely important in learning the subject. Therefore, missing or inaccurate information in textbooks, printing errors, etc. directly affect students' learning.

Scientific errors in the textbooks may cause students to misunderstand subjects. This has a dangerous side. As a result of incorrect learning, students can solve the logic questions incorrectly they encounter in the university entrance exam. This situation may cause the students not to reach their goals and even cause trauma. It is also difficult to change wrong learning because the first learning is more permanent in mind. In fact, it is difficult to predict, in this respect, whether students are aware of what they have learned wrong or when they will realize it.

Textbooks have an important place in every kind of school system due to the bridge they assume between teacher and student. Curriculum, textbook, school building, equipment of classrooms, learning environment and the supporting staff in this environment are the second elements that determine the quality of auxiliary materials and environmental education. Among these, the task loaded on textbooks, in case of teacher absence, is to direct students' studies by informing them (Altun *et al.*, 2004).

Gülersoy (2013) stated that there is a serious preliminary phase in the preparation of an ideal textbook. In addition, a large bibliographic survey, contact with relevant people and institutions and the execution of this process by competent people are needed.

The deficiencies and incorrect information in textbooks directly affect learning in a negative way. Therefore, the preparation of the textbooks should be carried out with a very careful study. In this research, three books prepared according to the 2009 logic course curriculum are discussed. These books are examined in various aspects such as physical characteristics, suitability to curriculum and scientific content. The data obtained as a result of the examination are mentioned.

The most important elements of the curriculum are objectives, outcomes and content. These elements are consistent with each other in a qualified curriculum. In the most general sense, objectives, outcomes and content must be integrated with each other in the curriculum (Durakoglu, 2017).

In the textbooks, errors such as misspellings in language and expression, and printing errors negatively affect students. This is even more important in logic textbooks. In particular, the incorrect or incomplete writing of the symbols in the symbolic logic unit directly affects the student's learning.

The preparation questions in textbooks should consist of questions that prepare students for the topic such that they should be formulated in a manner that they can reveal students' background information about the topic. At the same time, reading texts and caricatures should also be directly related to the topic. Thus, more effective student learning can be achieved.

One of the important sections in the textbooks is the evaluation questions at the end of the unit. It is extremely important that these questions are related to the outcomes in the curriculum. In fact, it is appropriate for questions to be at the same level as taxonomic gains. In this context, it was noted that the books examined were unsuitable questions in terms of the level of outcomes in the evaluation problems which is against assessment because it is not appropriate to ask a question in the knowledge or comprehension level to measure whether an outcome in the evaluation level has been achieved.

5. Suggestions

1. Scientific errors in textbooks should be corrected and thus prevent any wrong learning.
2. It should first be teachers who should be aware of the scientific errors in textbooks and correct them while lecturing. From this aspect, teachers are assumed important responsibilities.
3. The number of examples should be increased in order to increase the comprehensibility of the subject and to provide consolidation of the subject in "Symbolic Logic" units.
4. The fact that textbooks contain this many errors, despite its review by the author, publishing house, and the commission formed by the Board of Education and Discipline, is thought-provoking in how healthily these procedures function. Therefore, all these procedures should be revised more, writers and publishing houses should be more careful, and commissions of book reviews should be more sensitive to this issue.
5. The field competences and work performances of those who partake in commissions of book review should be revised considering the scientific and printing-typesetting-language errors.
6. In this sense, to what extent the individuals in the commissions of book reviews work harmoniously and cooperatively should be checked.
7. The textbooks written by those who work as teachers in administrative positions in the Ministry should not be included in the evaluation process since it is not an ethical approach.
8. Special publishing houses should know the areas of expertise of the people who will print a textbook and make sure that they are sufficient or not and then make them write a textbook.
9. Textbooks should be reviewed on the basis of constructivist approach in terms of preparation questions.

10. If there are significant errors in the textbooks accepted for reading by the Ministry, these textbooks should be withdrawn regardless of the duration of the book. Once the errors in the books have been corrected, they must be approved again because students may experience great problems in the university entrance exams in this regard.
11. In order to write the textbooks at the desired levels with minimum errors, the curriculum should be made more clear and understandable, and in this sense, clear statements should be given in the curriculum.
12. Textbook writing regulations should be turned into clear, understandable and detailed texts because if the people reading the articles in the regulations differ from each other, then the unity in the textbooks may be disrupted.

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