# A Qualitative Evaluation of Instructors' Exam Questions at a Primary Education Department in terms of Certain Variables

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**Abstract**
The purpose of this qualitative research study is to analyze instructors' exam questions at a Primary Education Department in terms of the exam's period, the comprehensibility of the instructions, cognitive level, and the appropriateness to the critical thinking. This qualitative study is based on document analysis method. 100 randomly selected exam papers and 1665 questions asked in these exams are analyzed by three experts in the field. The results conclude that the exam questions are generally at knowledge level in terms of cognitive domain and they are not appropriate to critical thinking.

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## Introduction

The use of critical thinking skills is vital for people to fully participate in democratic processes of their communities. Therefore, educating people to have critical thinking abilities with the intellectual tools and capacities is a target to be reached for democratic societies. It is possible to reach the objective by educating children as critical thinkers at early ages. Duckwort (1964, p.172) states that education systems have two goals. The first one is to educate individuals who have the capacity of generating new ideas rather than repeating the previous works of researchers and scientists. The second one is to educate individuals with critical thinking capacities in place of individuals who accept everything without questioning.

Teaching the ability of critical thinking to primary school children is robustly associated with the intellectual tools and critical thinking capacities of their primary school teachers. Consequently, it is important that education of primary school teachers should focus on critical thinking skills with all dimensions. One of these dimensions is the appropriateness of the questions given to prospective primary school teachers in the midterm and final exams.

## Critical Thinking

Şahbat (2002, p.14 cited in İpşiroğlu 1998) expresses that students accustomed to rote learning and conveying information are shocked when they are asked to comment on a written work, poem, etc., with their own words. Since they do not know how to think on a given topic and they do not grasp the importance and requirement of this process, they quickly transform this into a simple buying and selling process and find someone who thinks for themselves. This can be explained as the unfamiliarity of our culture to the critical thinking.

Historically, critical thinking can be traced back as far as Socrates, and has developed through the centuries, via the writings and teachings of such renowned scholars as Aquinas, Aristotales, Marx, members of the Frankfurt School, etc. Scientists such as Robert Boyle and Sir Isaac Newton developed and used critical processes of thought that challenged the accepted views of the world and demanded a rigorous framework based on carefully gathered evidence and sound reasoning. The contribution of twentieth century educational philosophers such as Dewey, Wittgenstein and Piaget has been to highlight the importance of education in fostering critical thinking abilities, in order to challenge prejudice, over-generalization, misconceptions, self-deception, rigidity and narrowness (Hargreaves & Grenfell, 2003).

The 1990 Delphi Report on critical thinking, endorsed by an expert panel from a variety of disciplines, defined critical thinking as "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, on contextual considerations upon which that judgment in based…" (Facione, 1990, p. 3). According to Angelo (1995, p.6) most formal definitions characterize critical thinking as the intentional application of rational, higher order thinking skills, such as analysis, synthesis, problem recognition and problem solving, inference and evaluation.

In the mid-1990s, a large sample of California faculty members affirmed the importance of critical thinking as an educational outcome. Eighty-nine percent of the faculty said critical thinking was a "primary objective" of their teaching-but only %19 could give a clear explanation of the concept. While %78 of these faculty said that students "lacked

standards" to assess their own thinking, only %8 could name or describe any of these standards (Paul, Elder, & Bartell, 1997).

Critical thinking can be defined as a complex activity and it is not true to expect a single method of instruction will prove sufficient utility for developing each of its components parts. Whatever methodology is used, it is unquestionable the effect of the questions organized in fostering the critical thinking abilities.

## Questions and Their Classification

Questioning is accepted as a methodology which triggers thinking. Thinking occurs when people have question marks in their minds. People need questions in order to use one's life (Özden, 1999, p.106). Gürses et al. (2005, p.363) affirm that questioning is the most essential step for the activity of thinking. Questioning can be admitted as a tactic that activates thinking. In any environment in which the action of thinking happens, learning occurs in its real meaning. As Hussain mentions (2003 cited in Ellis, 1993 and Foster, 1983) in the realm of teaching and learning, questions have been cited as not only the most often used, but also the single most important strategy used by instructors. The researches ground on classroom implementation throughout the 20$^{th}$ century consistently document that the presentation and memorization methods are foremost in these classrooms (Onosko, 1988, p.1). Research over the last sixty years has shown that, of teachers' questions, the predominating ones are those that are concerned with simple data and recall of facts already learned which fall under lower order questions (Hussain, 2003).

Questions can and have been used for a wide variety of educational purposes: reviewing previously read or studied material; diagnosing student abilities, preferences, and attitudes; stimulating critical thinking; managing student behavior; probing student thought process; stirring creative thinking; personalizing the curriculum; motivating students; and assessing student knowledge (Sadker, 2003). Teachers use questions for these reasons at different stages of education. When the questions given in the exams are considered, "assessing student knowledge", "probing student thought process", "stimulating critical thinking" can be listed as primary goals.

Akbulut (1999, p.16-17) asserts that teachers can learn which questions can be asked at the beginning of the lesson, at the practice stage of the lesson and at the wrap up stage of the lesson by knowing the classification of the questions rather than gaining this knowledge with the experience throughout years. Besides, the questions should also be sorted in order to address the students into appropriate thoughts. The categorization of the questions causes the teachers to gain experience in developing new teaching materials and exposing the students' previous knowledge (Hadder, 1970, p.93). Although the initial efforts on the categorization of the questions are mostly accepted in the field, some researchers criticize these categorizations in some ways and try to form new categorizations in the following years. Cognitive domain is the primarily discussed realm and new categorizations are added to this area. Yüksel (2007, p. 480) indicates that the primary extensive efforts were commenced in 1948 on the gradual categorization of the objectives. A group of researchers working at the higher education institutions in the USA gathers in Boston with the purpose of forming a categorization that can be accepted by everyone. Even though the basic aim is to form a categorization of all fields, only the cognitive domain is classified within this period (Bloom, 1956). The process that starts as the categorization of the objectives changes into the categorization of the questions.

Yüksel (2007) states that alternative categorizations based on Bloom's Taxonomy (1956) aims to formulate the Bloom's Taxonomy as truer and accurate. Some of the alternative categorizations propound against Bloom's Taxonomy are listed as follows: Categorization of Gerlach and Sullivan, Categorization of De Block, Categorization of Tuckman, Categorization of Williams, Categorization of Hannah and Michaelis, Categorization of Gagné and Briggs, Categorization of Stahl and Murphy, Categorization of Romizowski, Categorization of Quellmalz and Categorization of Haladayna.

## Bloom's Taxonomy

Bloom Taxonomy is the most common approach employed in categorization of the question levels and educational objectives. Bloom Taxonomy consists of six levels that are hierarchically aligned from low cognitive skills to high cognitive skills. These levels are Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.

Bloom's *Knowledge* level requires an answer that demonstrates simple recall of facts. Questions at this level could ask students to answer who and what and to describe, state, and list. *Comprehension* requires an answer that demonstrates an understanding of the information. Questions at this level might ask students to summarize, explain, paraphrase, compare, and contrast. *Application* requires an answer that demonstrates an ability to use information, concepts and theories in new situations. Questions at this level may ask students to apply, construct, solve, discover, and show. *Analysis* requires an answer that demonstrates an ability to see patterns and classify information, concepts, and theories into component parts. Questions at this level could ask students to examine, classify, categorize, differentiate, and analyze. *Synthesis* requires an answer that demonstrates an ability to relate knowledge from several areas to create new or original work. Questions at this level might ask students to combine, construct, create, role-play, and suppose. Finally, *Evaluation* requires an answer that demonstrates ability to judge evidence based on reasoned argument. Questions at this level may ask students to assess, criticize, recommend, predict, and evaluate (Duron, Limbach & Waugh, 2006, p.160). Although the Bloom Taxonomy is primarily developed for the classification of educational objectives, it has been widely used in many researches for the analysis of the questions asked by the teachers in oral and written exams and the questions in course books as well.

## Bloom's Taxonomy and Critical Thinking

Critical thinking has been an important issue in education for many years. After the 1948 Convention of the American Psychological Association, Benjamin Bloom took the lead in developing "the goals of the educational process," including knowledge, comprehension, application, analysis, synthesis, and evaluation. Critical thinking in education has been hotly debated since then (Schneider, 2002). Bloom's taxonomy does not explicitly define critical thinking. Rather, it includes six knowledge levels that constitute the construct of critical thinking (Aviles, 2000, p.4). Bloom (1956, p.46-47) acknowledged critical thinking as a broad aim of education and stated that such broad aims are helpful in suggesting general policy and direction for curriculum development.

The theory of critical thinking began primarily with the works of Bloom (1956), who identified six levels within the cognitive domain, each of which related to a different level of cognitive ability. *Knowledge* focused on remembering and reciting information. *Comprehension* focused on relating and organizing previously learned information.

*Application* focused on applying information according to a rule or principle in a specific situation. *Analysis* was defined as critical thinking focused on parts and their functionality in the whole. *Synthesis* was defined as critical thinking focused on putting parts together to form a new and original whole. *Evaluation* was defined as critical thinking focused upon valuing and making judgments based upon information (Duron, Limbach & Waugh, 2006, p.160). MacPherson and Mansfield (2008) affirm that critical thinking is inherent in Bloom's Taxonomy. In addition, they assert that top three levels of Bloom's Taxonomy (analysis, synthesis, and evaluation) are associated with critical thinking. Blank-Libra (1997, p.17 cited in Gall 1984) provides evidence to support the notion that higher-level questions will provoke higher-level responses from students. The same principle, of course, applies to lower-level questions. Bloom (1988) says that his graduate students have done a series of studies that have supported the same idea.

The research studies conducted on the analysis of the questions in Turkey largely focused on exam question used in various courses and questions figured in the course books at primary schools and secondary schools or questions asked in national exams (Çepni & Azar, 1998; Çepni, Keleş & Ayvacı, 1999; Gelen, 1999; Çepni, Ayvacı & Keleş, 2001; Koray & Yaman, 2002; Tekin & Ayas, 2002; Akpınar, 2003; Çepni, 2003; Çepni, Özsevgenç & Gökdere, 2003; Karamustafaoğlu et al., 2003; Mutlu, Uşak & Aydoğdu, 2003; Sağır, 2003; Güler, Özek & Yaprak, 2004; Azar, 2005; Eş, 2005; Gürses et al., 2005; Karaman, 2005; Köğce, 2005; Yaşar, 2005; Akpınar & Ergin, 2006; Baysen, 2006; Dindar & Demir, 2006; Özmen & Karamustafaoğlu, 2006; Özgür, 2007; Erman, 2008; Köğce & Baki, 2009). It is striking that document analysis is employed as a research methodology in most of these studies, and observations, interviews and questionnaires are applied in some other studies as well. It is necessary to indicate that there are scarcely any research analyzing exam questions at the University level and even no research is found about the questions given at the primary teacher training departments within the related literature. Related studies conclude that most of the analyzed questions only concentrate on levels such as knowledge, comprehension, and implementation that do not require high levels of thinking and few almost no questions are asked appropriate to the critical thinking skills demanding analysis, synthesis, and evaluation levels.

## Method

In this qualitative study, document analysis method was employed. In this method, any part of a selected text or document was analyzed and the features of the text transformed into numerical data in order to utilize any statistical operation.

### *Research Group*

The exams given to the prospective primary school teachers at an Education Faculty was the main data source. 100 randomly selected exam papers and 1665 questions asked in those exams were used as the sample of this study.

### *Data Collection Tools*

The features of the Bloom Taxonomy's cognitive levels were primarily designated by reviewing the related literature to determine the cognitive levels of the questions given to the prospective primary school teachers and their appropriateness to the critical thinking. Thus the criteria for the evaluation of the questions were formed.

1665 question obtained from 100 randomly selected exam papers were analyzed by a research team involving the researchers and two experts in the field. The criteria formed for the purpose of the study and the cognitive level of the questions including the knowledge, comprehension, application, analysis, synthesis, evaluation levels and appropriateness to critical thinking were used. The questions' appropriateness to critical thinking was examined in regard to the first and last three levels of the Bloom Taxonomy. The obtained data was tabulated into frequency and percentage distribution by using the SPSS program.

## Findings

The study year of the course which the exam questions were analyzed, are showed in Table 1.

**Table 1**
*The Study Year of the Course Which the Exam Questions were Analyzed.*

| The year of the course | f | % |
|---|---|---|
| First Year Course | 35 | 35,0 |
| Second Year Course | 34 | 34,0 |
| Third Year Course | 16 | 16,0 |
| Fourth Year Course | 15 | 15,0 |
| Total | 100 | 100,0 |

As it is demonstrated in table 1, 69 % of the analyzed exams questions belonged to the courses of the first and second year. The exam questions of the third and fourth year courses constitute 31 % of the total sample. The occurrence time of the exams, are showed in Table 2.

**Table 2**
*The Occurrence Time of the Exams*

| The occurrence time of the exams | *f* | % |
|---|---|---|
| **Mid-term exam** | 49 | 49,0 |
| Final exam | 51 | 51,0 |
| Total | 100 | 100,0 |

When the table 2 is examined, it can be observed that 51 % of the analyzed exams are final exams and 49 % of them are Mid-Term exams. Length of the exams, are showed in Table 3.

**Table 3**
*Length of the Exams*

| Length of the exams | *f* | % |
|---|---|---|
| 0-20 min. | 10 | 10,0 |
| 21-40 min. | 50 | 50,0 |
| 41-60 min. | 39 | 39,0 |
| 61 min and over | 1 | 1,0 |
| Total | 100 | 100,0 |

Table 3 demonstrates that 50 % of the analyzed exams take place in 21-40 minutes, 39% of them are limited with 41-60 minutes. It is remarkable that 0-20 minute the exams have only 10 % distribution in the overall sample and the longest exams in terms of their implementation time have just 1 % in the distribution. It is clear that 89 % of the exams of the prospective primary school teachers are held in 21-60 minutes. The comprehensibility level of the exams' instructions, are showed in Table 4.

**Table 4**
*The Comprehensibility Level of the Exams' Instructions*

| Clearness of the instructions | f | % |
|---|---|---|
| Totally Clear | 76 | 76,0 |
| Poor | 24 | 24,0 |
| Total | 100 | 100,0 |

Table 4 represents that the 76 % of the instructions are totally clear and comprehensible whereas 24 % of them are poor and difficult to understand. The comprehensibility of the exam instructions that is one of the basic requirements for the implementation easiness is fundamental in improving the students' success in the given exam. Therefore, it is a noteworthy result that approximately one fourth of the exam instructions are vague and problematic in terms of their comprehensibility. The cognitive level of the analyzed exam questions, are showed in Table 5.

**Table 5**
*The Cognitive Level of the Analyzed Exam Questions*

| Cognitive Level | f | % |
|---|---|---|
| Knowledge | 965 | 58,0 |
| Comprehension | 237 | 14,2 |
| Application | 248 | 14,9 |
| Analysis | 137 | 8,2 |
| Synthesis | 48 | 2,9 |
| Evaluation | 30 | 1,8 |
| Total | 1665 | 100,0 |

The analysis in table 5 presents that the exam questions are mostly at the knowledge level with a 58 % regarding the Bloom's Taxonomy cognitive levels. It is an appealing outcome that more than half of the questions given to the prospective primary school teachers are at knowledge level. The questions at comprehension and application level have both 14 % in overall distribution. The questions at the analysis level have higher proportion than the questions at synthesis and evaluation level with an 8.2 percentage. The total distribution of the question at synthesis level and evaluation level is less than 5 % of the whole distribution. The distribution of the questions at evaluation level, which is considered as the top stage among these hierarchical levels with a 1.8 percentage, awakes the question of how the prospective primary school teachers are educated. Furthermore, the results of the present study match up with the outcomes of the previous studies in the literature.

It is necessary to ask high cognitive level questions to enable prospective student teachers to think in a multifaceted way. Therefore, they can avoid the tendency of superficial thinking that they get used to by answering cognitive level questions. It is obvious that assessment of students' success is one of the most important tasks of the teachers or instructors. The exams including questions with a high level thinking skills can be used as well as an assessment tool and a teaching material. The appropriateness level of the analyzed questions to critical thinking, are showed in Table 6.

**Table 6**
*The Appropriateness Level of the Analyzed Questions to Critical Thinking*

| Appropriateness to Critical Thinking | f | % |
|---|---|---|
| Inappropriate to Critical Thinking (Knowledge – Comprehension – Application) | 1450 | 87,1 |
| Appropriate to Critical Thinking (Analysis – Synthesis – Evaluation) | 215 | 12,9 |
| Total | 1665 | 100,0 |

Table 6 illustrates that the proposition of the questions supporting the Knowledge level, Comprehension level and Application level is 87, 1 % in the overall distribution. The distribution of questions requiring high level thinking at analysis level, synthesis level and evaluation level form 12,9 % of the all questions.

Of course, only considering the questions given at the exams as the primary source of education of prospective teachers as critical thinkers would be a mistake. However, exams in which the students perform their intake as an outcome offer unique opportunities for understanding of the development of critical thinking. Gürses et al. (2005, p.366) asserts that preparation and evaluation of the questions involving analysis, synthesis and evaluation levels which are effective in improving the high level thinking skills is more difficult than preparing questions partaking at the Knowledge, Comprehension and application level. This can be an explanation of not preparing these kinds of questions or the critical thinking skills can be underestimated in the given courses.

## Conclusions and Recommendations

There is no doubt that critical thinking skill is a treasure that every individual should have in order to overcome the dilemmas of globalization and information society. Therefore, the educating students with the resourses and strayegies of critical thinking starting from primary school level is essential for the development of true participatory democracy. Primary school teachers who are good at using critical thinking skills and have the knowledge of methodologies in conveying these skills to their students play an important role in this democratization process.

The questions given in the exams by the instructors reflect the objectives, goals, outputs and the methodologies that the instructors apply in their teaching. The results of this study have strong similarities with the other studies conducted in Turkey about the appropriateness of questions in regard to the levels of critical thinking. Both the teachers in primary and secondary schools and the university instructors tend to check whether the students memorize the decontextualized information by using semester exams and they do not force the student enough to critically analyze, synthesize and evaluate what they have learnt because of the low cognitive level questions in the exams. It should not be forgotten that prospective teachers have the tendency of using the same teaching methodologies and same kind of questions that they encounter during their university education, when they become classroom teachers.

It is not surprising to discover that the evaluation of the students' learning with low cognitive level questions in primary and secondary schools as well as in higher education institutions is a common assessment strategy. Once prospective teachers graduate from their programs without attaining high-level cognitive questions during their education, they do not prefer to assess their students' progress with high-level cognitive questions as a teacher.

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