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Examination of question types used by elementary school teachers in the process of teaching and learning

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Abstract

This study was carried out on 156 elementary school teachers working in 20 elementary schools in 5 different districts of Istanbul. A total of 492 class hours were observed and the questions asked by teachers during these class hours were recorded on essay type observation forms. Percentages, frequency distributions and weighted mean values were calculated for the data obtained. The teachers were observed to ask a total of 4,467 questions, which were classified as open-ended and one-answer. The results showed that 85.60% of all the questions asked by the teachers were one-answer, while only the remaining 14.40% were open-ended. It was also found that teachers asked an average of 9.08 questions in one class hour in all courses.

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1. Introduction

Asking questions is one of the most common activities used by teachers in classrooms. By asking questions, teachers fulfil many different tasks such as testing student competencies in certain areas or encouraging them to think. Questioning is also important in starting and maintaining interaction within the classroom. It is through teacher questions that students get an opportunity to express their feelings and thoughts, be motivated to learn, participate actively in the lessons, solve problems, learn through interacting with each other, and reflect on certain issues. The best way to understand whether students have understood the contents of a course is to assess their answers to questions. In order to do these by asking questions, the questions need to be accurate, appropriate and effective. Therefore it is the responsibility of teachers to know how to ask questions and how to use them in educational contexts. Instructional contexts are based on communication, which would be difficult to assess without accurate and appropriate questions (Sonmez, 2002). Teachers should therefore make sure that their questions are clear, intelligible and to-the-point. Additionally, it is important that the questions are not beyond students' level, they do not give away the answer, cannot be answered by guessing, require mental activity on the students' part, cannot be answered by simply "yes" or "no", and motivate students to learn (Fidan, 1985; Kucukahmet, 2002; Sonmez, 2002).

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Teacher questions can be classified in many different ways. Sonmez (2002) divides them into four major categories according to their level of objective, type of response, instructional method used and the way they are directed.

- Question types according to level of objective reflect the levels of Bloom’s cognitive domain taxonomy: knowledge, comprehension, application, analysis, synthesis and evaluation (Sonmez, 2002; Montague, 1987).
- Classifying questions according to type of response is one of the most important and basic systems. Here, questions are categorized as open-ended or multiple response and one-answer or single response.
- Question types according to the instructional method are leading (opening) questions, follow-up (complementary) questions, unplanned questions and rhetorical questions.
- Question types according to the way they are directed are whole group questions and individual questions.

Chaffee (1988) classifies questions as information, interpretation, analysis, synthesis, evaluation and application questions. In the present study, teacher questions were classified according to type of response into open-ended and one-answer. These two types of questions have different effects on the development of thinking skills in students. One-answer questions require a single and pre-specified answer and only test information level behavior according to Bloom’s taxonomy. Therefore, these questions do not contribute much to the development of thinking skills. Open-ended questions, on the other hand, are questions where the answer may change from one individual to another, and they therefore do not have a single pre-specified answer. These questions tap students’ higher-order thinking skills, such as interpretation, analysis, application and inference. As can be seen, the type of question that a teacher uses has an important effect on students’ thinking skills. By asking open-ended questions, teachers can encourage students to think critically, creatively or reflectively. Making students to enter into such thought processes is essential for their mental development. The present study aimed to classify teacher questions and establish whether the questions that teachers asked were conducive to developing students’ thinking skills. To this end, the questions used by teachers were recorded unchanged in essay type observation forms and then classified one by one as either single or multiple response.

2. Method

As the study aimed to identify the number and type of questions asked by teachers during their lessons, it adopted the survey model.

2.1. Study Group

Participants were 156 teachers (34 from each of the 1st, 2nd, and 3rd grades; 27 from each of the 4th and 5th grades) working at 20 elementary schools in the Kadikoy, Uskudar, Umraniye, Atasehir and Sultangazi provinces of Istanbul.

2.2. Data Collection Instruments

The data collection instrument used in the study was essay type observation form.

3. Results (Findings)

Table 1. Distribution of Observed Lessons by Grade Level

Classes	Life Studies	Turkish	Mathematics	Science and Technology	Social Studies	The total Number of Courses
1. classes	32	32	32			96
2. classes	32	32	32			96
3. classes	32	32	32			96
4. classes		26	26	25	25	102
5. classes		26	26	25	25	102
Total	96	148	148	50	50	492

Table 1 shows that the breakdown of the 492 observed class hours was as follows: 96 hours of Life Studies, 148 hours of Turkish, 148 hours of Mathematics, 50 hours of Science and Technology, and 50 hours of Social Studies.

Table 2. Number of Questions in Different Courses

Classes	Life Studies Number of Question	Turkish Number of Question	Mathematic Number of Question	Science and Technology Number of Question	Social Studies Number of Question	Total	%
1. classes	294	206	341			841	18.82
2. classes	328	267	318			913	20.43
3. classes	342	272	334			948	21.22
4. classes		249	239	194	217	899	20.12
5. classes		214	258	203	191	866	19.38
Total	964	1208	1490	397	408	4467	100.00

As presented in Table 2, of the total number of 4,467 questions, Life Studies teachers asked 964, Turkish teachers asked 1,208, Mathematics teachers asked 1,490, Science and Technology teachers asked 397, and Social Studies teachers asked 408.

Table 3. Mean Number of Questions per Class Hour and Class in the Life Studies Course

Classes	Number of Courses	A number of Questions	Average	Overall Average
1. classes	32	294	9.18	
2. classes	32	328	10.25	10.04
3. classes	32	342	10.68	
Total	96	964		

It can be seen from Table 3 that Life Studies teachers asked 964 questions in the 96 observed class hours in grades 1, 2 and 3. In the Life Studies course, the highest number of questions was asked in grade 3, while the lowest number of questions was asked in grade 2. An average of 10.04 questions was asked per class hour in this course.

Table 4. Question Types Used in Life Studies Courses

Classes	Number of One-Answer Questions	%	Number of Open-Ended Questions	%	A Number of Questions Total
1. classes	239	81.29	58	19.72	294
2. classes	283	86.29	45	13.71	328
3. classes	276	80.70	66	19.30	342
Total	798	82.78	166	17.22	964

It is shown in Table 4 that, of the 964 questions asked in the Life Studies course, 798 were one-answer (single response) and 166 were open-ended (multiple response). According to this, 82.78% of the questions asked by Life Studies teachers were one-answer questions, and only the remaining 17.22% were open-ended. As can be seen, the majority of the questions were single response.

Table 5. Mean Number of Questions per Class Hour and Class in the Turkish Course

Classes	Number of Courses	A number of Questions	Average	Overall Average
1. classes	32	206	6.43	
2. classes	32	267	8.34	
3. classes	32	272	8.50	8.16
4. classes	26	249	9.57	
5. classes	26	214	8.23	
Total	148	1208		

As shown in Table 5, a total of 1,208 questions were asked by teachers in the 148 observed Turkish classes in grades 1, 2, 3, 4 and 5. In the Turkish course, the highest number of questions was asked in grade 3, and the lowest number in grade 1. An average of 8.16 questions was asked per class hour in this course.

Table 6. Question Types Used in Turkish Courses

Classes	Number of One-Answer Questions	%	Number of Open-Ended Questions	%	A Number of Questions Total
1. classes	192	93.20	14	6.80	206
2. classes	211	79.02	56	20.98	267
3. classes	219	80.51	53	19.49	272
4. classes	184	73.90	65	26.10	249
5. classes	176	82.25	38	17.75	214
Total	982	81.30	226	18.70	1208

Table 6 shows that, of the 1,208 questions asked in the Turkish course, 982 were one-answer and 226 were open-ended (multiple response). This means that 81.30% of the questions asked in the Turkish course were one-answer questions, while only 18.70% were open-ended. Thus, the majority of the questions asked were single response.

Table 7. Mean Number of Questions per Class Hour and Class in the Mathematics Course

Classes	Number of Courses	A number of Questions	Average	Overall Average
1. classes	32	341	10.65	10.06
2. classes	32	318	9.93	
3. classes	32	334	10.43	
4. classes	26	239	9.19	
5. classes	26	258	9.92	
Total	148	1490		

According to Table 7, a total of 1,490 questions were asked by teachers in the 148 observed Mathematics classes in grades 1, 2, 3, 4 and 5. In this course, the highest number of questions was asked in grade 1, and the lowest number in grade 5. An average of 10.06 questions was asked per class hour in the mathematics course.

Table 8. Question Types Used in Mathematics Courses

Classes	Number of One-Answer Questions	%	Number of Open-Ended Questions	%	A Number of Questions Total
1. classes	313	91.78	28	8.22	341
2. classes	298	93.71	20	6.29	318
3. classes	329	98.50	5	1.50	334
4. classes	223	93.30	16	6.70	239
5. classes	237	91.86	21	8.14	258
Total	1400	93.96	90	6.04	1490

Table 8 shows that, of the 1,490 questions asked in the Mathematics course, 1,400 were one-answer (single response) and 90 were open-ended (multiple response). It can be seen here that 93.96% of the questions asked in the Mathematics course were one-answer questions, while only 6.04% were open-ended. Thus, the majority of the questions asked were single response.

Table 9. Mean Number of Questions per Class Hour and Class in the Science and Technology Course

Classes	Number of Courses	A number of Questions	Average	Overall Average
4. classes	25	194	7.76	7.94
5. classes	25	203	8.12	
Total	50	397		

Table 9 reveals that 397 questions were asked in the 50 hours of observed Science and Technology classes in grades 4 and 5. More questions were asked in the 5th grade Science and Technology course than the 4th grade course. An average of 7.94 questions was asked per class hour in the Science and Technology course.

Table 10. Question Types Used in Science and Technology Courses

Classes	Number of One-Answer Questions	%	Number of Open-Ended Questions	%	A Number of Questions Total
4. classes	182	93.81	12	6.19	194
5. classes	189	93.10	14	6.90	203
Total	371	93.45	26	6.55	397

It is presented in Table 10 that 371 out of the total of 397 questions asked in the Science and Technology courses were one-answer questions (single response) and the remaining 26 were open-ended (multiple response). According to this, 93.45% of the questions asked in the Science and Technology course were one-answer questions, while only 6.55% were open-ended. The majority were single response questions.

Table 11. Mean Number of Questions per Class Hour and Class in the Social Studies Course

Classes	Number of Courses	A number of Questions	Average	Overall Average
4. classes	25	217	8.68	
5. classes	25	191	7.64	8.16
Total	50	408		

Table 11 shows that 408 questions were asked in the 50 hours of observed Social Studies courses in grades 4 and 5. More questions were asked in the 4th grade Social Studies course than the 5th grade course. An average of 8.16 questions was asked per class hour in this course.

Table 12. Question Types Used in Social Studies Courses

Classes	Number of One-Answer Questions	%	Number of Open-Ended Questions	%	A Number of Questions Total
4. classes	141	64.98	76	35.02	217
5. courses	132	69.11	59	30.89	191
Total	273	66.91	135	33.09	408

As presented in Table 12, of the 408 questions asked in the Social Studies course, 273 were one-answer and 135 were open-ended (multiple response). According to this, 66.91% of the questions asked in the Social Studies course were one-answer questions, and the remaining 33.09% were open-ended questions. Similar to other courses, the majority of the questions asked in the Social Studies course were also single response(one-answer). However, when compared with other courses, the highest number of open-ended questions was used in the Social Studies course.

Table 13. General Distribution of the Number and Type of Questions Asked by Teachers

Courses	Number of One-Answer Questions	%	Number of Open-Ended Questions	%	A Number of Questions Total
Life Studies	798		166		964
Turkish	982		226		1208
Mathematics	1400		90		1490
Science and Technology	371		26		397
Social Studies	273		135		408
Total	3824	85.60	643	14.40	4467

According to Table 13, of the 4,467 questions asked by teachers in 492 class hours, 3,824 were closed and 643 were open-ended. This shows that 85.60% of the questions were one-answer and only 14.40% were open-ended. At the same time, an average of 9.08 questions was asked per class hour in all courses.

4. Discussion

As the results revealed that most of the questions asked by teachers were one-answer, it may be concluded that teachers cannot contribute significantly to the development of students' thinking skills via their questions. According to Savage (1998), one of the best ways of developing critical thinking skills in students is to use

questioning in their classes. These questions should have more than one answer because one-answer questions with only one answer cannot contribute to critical thinking skills. Such questions which have a single answer are based on memorization and should only be used for revision. Seen through this perspective, the results of this study have revealed that teacher questions fail to develop critical thinking skills in students. Schiever (1990) refers to single response questions as “narrowing questions” and states that approximately 80% of teacher questions fall within this category. The results of the present study corroborate Schiever’s (1990) findings. Open-ended questions, which can be answered in more than one way, develop students’ higher-order thinking skills and ensure permanent learning. Schiever (1990) claims that students can retain 70 to 85% of the answers they give to open-ended questions. Teachers should then use open-ended questions to ensure permanent learning as well. In order to ask questions that develop thinking skills, teachers should receive in-service training and attend workshops about questioning techniques.

5. Conclusion and Recommendation

The results showed that:

- The questions used by elementary teachers in their classes were mostly one-answer questions,
- The highest number of questions was asked in Mathematics and Life Studies courses, while the lowest number was asked in the Science and Technology course.
- An average of 9 questions was asked by teachers in each class hour.

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