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An analysis of teachers' questioning strategies

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Questioning has been utilized as a critical assessment tool for centuries. It has been thought that there is a relationship between asking good questions and effective teaching. In order to analyze teachers' questioning strategies from various aspects, this study was conducted during the 2014-2015 academic year with 170 primary school teachers working in the schools located in the center of Gaziantep Province in Turkey. Data were collected through a semi-structured questionnaire prepared by the researchers, and were examined via content analysis. Explanatory mixed method design was used to analyze the research problem. The findings of this study revealed that: (1) Teachers asked divergent questions to draw attention and interest (2) Teachers have misunderstanding of divergent and convergent questions (3) Teachers mostly ask questions to entire class than individual (4) Teachers asked most frequently questions aimed at uncovering operational knowledge and least frequently questions whose goal was to uncover metacognitive knowledge (5) Teachers generally used probing questions, prolonged waiting time and did not ask vague questions (6) Teachers did not use questions as a punishment tool. This study revealed that asking good questions must be considered more important in pre-service education and teachers must be supported with in-service trainings to be more effective in asking questions.

Key words: Questioning strategies, teacher education, quality instruction.

INTRODUCTION

Questions are stimulants which activate students' cognitive skills and they have functioned as a primary educational tool for centuries (Aydemir and Çiftçi, 2008). Teaching with questions began with Socrates and has maintained its importance and validity until today. Using this method, Socrates had asked questions to his students, and responded to each question with other questions instead of giving direct information or responses (Filiz, 2009).

The famous scientist Einstein emphasizes the importance of asking questions when he states that "the most important thing is to not stop asking questions" (Sternheimer, 2014). Considering the founders of leading technology companies such as Facebook, Amazon and Google as individuals who ask eligible questions, the importance of questioning can be revealed (Berger, 2014). These individuals, capable of utilizing questions critically, have contributed to discoveries in new technologies in today's competitive environment. The ability to ask eligible questions will become much more important in the future. Entrepreneurs in the U.S.'s Silicon Valley have asserted that "questions are new answers," and the critical use of questioning is crucial in the field of education, as well (Berger, 2014).

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Interrogation contributes especially to effective teaching. After analyzing over 100 studies in a meta-analytical method, Marzano et al. (2001) included “clues, questions, and preparation” among their nine effective teaching strategies. In fact, asking questions is one of the most important aspects of teaching, and can be highly effective when used appropriately. Motivating students and ensuring their active participation (Gall, 1984; Cotton, 1988), leading students to think (Costa, 2001) and develop their own problem solving skills (Hu, 2015); storing knowledge (Dos and Demir, 2013); improving academic achievement as well as developing meta-cognitive thinking (Tanner, 2012); and enabling students to form critical thinking skills (Cotton, 1988) are some of the benefits of asking questions to students. Teachers ensuring the effectiveness of themselves and their classes positively affect the preparation and homework habits of students (Hu, 2015). In addition to improving students’ critical thinking skills, high-level questioning stimulates students’ active participation and facilitates learning (Redfield and Rousseau, 1981). Furthermore, asking questions triggers and interrelates students’ prior knowledge with new information and assists them in reconstructing knowledge (Penick et al., 1996).

It is important to realize that the earlier-mentioned benefits of asking questions depend on the teachers’ ability to use this method effectively. Depending on personal characteristics, teachers’ questioning methods may also vary. Teachers’ questioning goals, the level of their questions, question types, use of probing questions, waiting time for follow-up questions, to whom they direct their questions (individual, group, whole class, etc.), and their reactions after asking questions demonstrate this variance in strategy.

One dimension of teachers’ questioning strategies involves motive. The awareness of the aim and results of asking questions seems to be important. Therefore the aim of this study was to analyze the questioning strategies of the teachers. The analysis of teachers’ questioning strategies is considered important because it is believed to reveal much information about asking questions. This is a unique study in terms of proffering a detailed analysis of teachers’ questioning strategies. This study will enable the determination of whether teachers have sufficient and efficient information about questioning strategies. In this respect, the realization of training teachers on questioning strategies and focusing on this issue in both education faculties and in-service teacher education programs will be helpful. The overall goal of this study is to analyze the classroom teachers’ questioning strategies. To do this we developed these sub-questions:

1. What is the aim of the teachers for asking questions?
2. To whom teachers ask their questions?
3. In which Bloom Taxonomy level teachers ask their questions?
4. What is the average wait time for teachers?
5. Are the teacher’s aware of using questioning strategies?

LITERATURE REVIEW

The questions teachers ask can be classified according to the Revised Bloom Taxonomy in Cognitive Field as ‘remembering, understanding, applying, analyzing, evaluating and creating (synthesizing)’. Remembering, understanding and applying steps are considered lower level, while analyzing, evaluating and creating steps are considered higher-level. Teachers are expected to ask higher-level questions for higher-level learning. However, most studies indicate that teachers generally ask lower-level questions (Barker and Hapkiewicz, 2001; Aydemir and Çiftçi, 2008; Özcan and Akcan, 2010; Tanık and Saraçoğlu, 2011; Özdemir and Dikici, 2012).

Inability in higher-level questioning is not a new or unique problem to Turkey. According to a study conducted by Stevens (1912), two-thirds of the questions posed by teachers were found to be merely on remembering (Barker, 1974). In his study, Gall (1970) found that 80% of teachers’ questions aimed at remembering, and only 20% made students to think. Today, teachers generally ask simple questions intended for remembering and revising (Akyol et al., 2013; Güler et al., 2012; Aslan, 2011; Tanık and Saraçoğlu, 2011; Ateş, 2011; Ayvacı and Türkdoğan, 2010; Aydemir and Çiftçi, 2008).

There are two main classifications of questioning based on student response. Generally, questions with a single correct answer, short, and intended to recall acquired information are called *convergent questions*. These questions are also referred to as closed-ended questions as students are not expected to contribute to an original idea. For example, after teaching about animals that change color, the teacher then ask “Which animals are chatoyant?”; this question is a convergent question. On the other hand, questions which students answer by analysis, synthesis, or evaluation using their related knowledge of a question, a problem or a situation are referred to as *divergent questions*.

Divergent questions are open-ended questions and may have multiple answers. For example, “What kinds of problems chatoyant animals might face if they lost this characteristic?” is a divergent question. For such a question, students are supposed to know the chatoyant animals and their characteristics, know about their wild-life conditions and contribute original opinions. When and in what cases should convergent and divergent questions be asked? According to McComas and Abraham (2005), if you want your students to recall and remember certain knowledge, ask them low-level convergent questions (Bloom Taxonomy); however, if you want to see if students understand and be able to transfer knowledge,

then ask them divergent questions. Similarly, they indicated that low-level divergent questions should be asked to see if students can make inferences, find the causes and effects of an issue, and make generalizations; on the other hand, to make them speculate, make evaluations, and think creatively, they should be asked high-level divergent questions.

An important aspect of teacher questioning is wait time, a period of time during which the teacher and other students wait silently so that the student to whom the question was addressed answers the question. Mary Bud Rowe was the first, in 1972, to reveal the relationship between wait time and student achievement. According to studies, teachers tend to wait about 0.7-1.4 seconds after they ask a question to a student (McComas and Abraham, 2005). The studies further suggest that teachers give less waiting time to students whom they consider to be low-level (Cotton, 1988). The ideal time for low-level questions was found to be 3 s. A lower or higher waiting time leads to unsuccessful student responses (Cotton, 1988). The most appropriate waiting time was determined by Rowe (1986). According to her, it is best to wait for 3 to 5 s. This duration ensures students' success, helps them keep the topic in mind, raises the quality and length of their responses, provides more students the opportunity to answer, and encourages them to ask more questions (Cotton, 1988).

Although asking questions is important, its effectiveness depends on how intentionally teachers choose their questions to accomplish certain goals (Strother, 1989). If the purpose of a question is not pre-determined, it might result in chaos, disorder and eventually the inability to learn. The appropriateness of a question depends on the extent to which pre-determined goals are achieved (Crespo, 2002). For instance, convergent questions are most appropriate for a teacher who is performing inductive teaching. A language teacher may ask convergent questions to reveal students' vocabulary and spelling knowledge or to motivate them. Divergent questions are mostly used for responses with application, analysis and synthesis levels. In order to use this, it requires a good preparation process, as well (Epstein, 2003).

Asking appropriate questions and developing questioning skills is a process that might take weeks (even months); thus, this process should be performed systematically (Streifer, 2001). There are many studies on the questioning strategies of teachers. However, the reasons why teachers cannot ask eligible questions have hardly been investigated. Research indicates that most studies are based on the classification of teacher's written and oral questions through observation and/or other data collection tools (Filippone, 1998; Baykul, 1989; Çepni and Azar, 1998; Çepni, Ayvacı and Keleş, 2001; Ayvacı and Türkdoğan, 2010). There are also studies which analyze the questions according to Bloom Taxonomy (Stano, 1981: cited in Filippone, 1998). There are further experimental studies on training to develop teachers' questioning skills (Aslan, 2011). Some other studies have tried to classify the questions of High School Placement Tests (SBS exams) according to PISA proficiency scale (İskenderoğlu et al., 2013). Dalak (2015) analyzed a national exam questions called TEOG for entering high school in relation with Bloom Taxonomy. As can be understood from the literature, the studies are mostly in the form of analysis of oral and written questions used by teachers during exams, the success of questioning trainings, and the classification of questions in national examinations in terms of certain criteria. It can clearly be seen that teachers' questioning techniques have not been analyzed with a holistic approach. This study tried to reveal the holistic view about teachers' questioning skills. Therefore it is very important to understand the reasons why teachers cannot use effective questions in their classes. The questions of this study created with the help of a frame published in Borich (2014) effective teaching methods book.

METHODOLOGY

In this section sample, data collection, procedure and data analysis were presented.

Sample and data collection

This is a mixed method design study that attempts to identify teachers' strategies for asking questions in the classroom using a combination of quantitative and qualitative data. In mixed methods research, investigators use both quantitative and qualitative data because they work to provide the best understanding of a research problem (Creswell, 2003).

In this study, the aim of using mixed method design is to find out the quantity of using some questioning strategies as well as the reason for using these strategies. Thus the researchers can compare the quantitative and qualitative data to understand the phenomenon. The data were collected through semi-structured questionnaire prepared by the researchers. The questionnaire includes 10 quantitative and 10 qualitative questions such as "What kind of questions do you use? 1-Divergent, 2-Convergent" and it follows a qualitative question "Why?" By asking why quesitons we collected qualitative data to understand the consistency of the data as well as comparison of the questioning strategies. So this study used triangulation design of mixed method, because qualitative and quantitative methods are given equal priority and all data are collected simultaneously (Fraenkel et al., 2012).

The study was conducted on 170 classroom teachers who work in primary schools in the District of Şahinbey, Gaziantep. Homogeneous sampling method was used in this study. Homogeneous sampling, one in which all of the members possess a certain trait or characteristic (e.g., a group of high school students all judged to possess exceptional artistic talent). The data about participants are shown in Table 1.

There is a balanced distribution in terms of gender in the research (53 female, 47 male). The majority of teachers are under graduates (%87), while others have master's degrees (%13). The distribution of the group was balanced in terms of experience (about %20, each group). In this sense, the representability of all groups in the study is high in terms of gender and seniority.

Table 1. Data for study groups.

Characteristics	Type	f	%
Gender	Female	89	53.3
	Male	78	46.7
Graduation	Undergraduate	146	87.4
	Graduate	21	12.6
Experience	1-5	29	17.4
	6-10	37	22.2
	11-15	38	22.8
	16-20	34	20.4
	20 or more	29	17.4

The questionnaire used in the study consisted of open- and closed-ended questions, and it was developed by the researchers based on the objectives of the study. Prepared as a draft, the questionnaire was first analyzed by three education experts in terms of scope and nature, necessary corrections were made and then it was applied to 10 teachers as a pilot study. The pilot questionnaire was finalized after the necessary adjustments were applied to the survey again. We changed some of the questions in terms of its grammar and understanding.

The questionnaire consists of 10 items to determine teachers' questioning strategies. It contained open- and closed-ended questions regarding the reasons why teachers use questions as well as their use of convergent-divergent and probing questions. Sample questions from the questionnaire are presented in Table 2.

In the questioning strategies questionnaire, teachers' questions were diversified with probing questions and they were allowed spaces to make explanations. They were also allowed to choose more than one option on the questionnaire. The developed inquiry was applied to the determined sample group by the researchers.

Procedure and analysis of the data

The quantitative data regarding closed-ended questions on the questionnaire were analyzed on SPSS. Frequency and percentage calculations were made in the analysis of this data. Content analysis was applied to the responses to open-ended questions. Content analysis involves drawing conclusions from the current context of data (Krippendorf, 2004). In this sense, codes and themes were formed by deriving inferences from teachers' thoughts about the questions they asked in the classroom. Two researchers separately encoded data obtained and the coding reliability between them was found to be over 80%. Within the study, the responses submitted to other sets of questions by those who answered a specific set were also revealed by cross-tabulation analysis. The reason for making such tabulation was an attempt to draw a pattern besides revealing the consistency of teacher responses to the questions addressed to them. Results were presented firstly on quantitative data and then qualitative data explained the reasons why teachers scored higher in some questions. Also cross-table analyses were performed to explain the nature of asking questions in the classroom.

FINDINGS

The analysis of data obtained is submitted below:

Findings regarding teachers' aims in asking questions

The initial purpose of the study was to determine the reasons for which teachers ask questions. The results obtained are presented in Table 3.

The findings of Table 3 indicate that teachers mostly ask questions "to draw interest and attention" (26.3%) and subsequently "to promote higher-level thinking" (14.8%) as well as "to allow the expression of feelings" (14.1%). It can also be seen that teachers rarely use questions "to manage students" (4.8%). One participant stated the reason for asking questions *"I ask questions to draw the calssroom attention and make students actively participate to the discussions".* One of the participant emphasized "*I ask questions to promote higher–order thinking*".

Findings regarding teachers' use of convergent and divergent questions in their courses

The study secondly investigated the amounts and reasons why teachers used convergent and divergent questions. The obtained data is provided in Table 4.

Table 4 demonstrates that teachers mostly used divergent questions (67%; f=120). The use of convergent questions was found to be 33% (f=57). Convergent question types were mostly used by teachers to reinforce and summarize topics as well as to motivate the students. On the other hand, divergent questions were used in order to encourage students to think, make judgments, and draw inferences and to develop multi-dimensional thinking, imagination and different perspectives. Regarding teacher motivation for utilizing convergent and divergent questions, two basic problems can be observed. First of all, the teachers confuse convergent and divergent question types; secondly, they believe that students' levels are so low that they will be unable to answer divergent questions. For example one teacher stated *"I use divergent question type to get the*

Table 2. Sample questions from questionnaire

Which of these target audiences do you generally direct your questions toward?
a) the individual **b)** a certain group **c)** the whole class because…….
Which of the following do you do after you ask questions in your classes?
a) I expect the students to give only the response I expect to get. **b)** I use probing questions to get the right answer when the students cannot provide the correct answer. **c)** I provide the correct answer after I ask a question. **d)** Other……
For what reasons do you mostly use questions in your classes? Tick at most three options below.
a) To draw students interest and attention (What would you first realize if you went to the moon?)

Table 3. The frequencies and percentages for teachers' aims in asking questions.

Aims for asking questions	**f**	**%**
To draw interest and attention	126	26.3
To promote higher-level thinking	71	14.8
To allow the expression of feelings	68	14.1
To remind certain facts and information	65	13.5
To construct and redirect learning	65	13.5
To diagnose and control	61	12.7
To manage	23	4.8
Total	**479**	**100**

Table 4. The analysis of frequency and percentage values regarding teachers' use of convergent and divergent questions and their purposes for asking these questions.

Convergent Questions F=57; 33%	**Divergent Questions F= 120; 67%**
1. Appropriate to the level of students	1. Promoting students to develop high-level skills of thinking, and making judgments
2. Remembering and making comparisons	2. Initiating learning
3. Making comparisons with concrete examples	3. Ensuring the use of cognitive processes
4. Summarizing the topic	4. Developing students' thoughts and feelings
5. Not to bore students with detail	5. Promoting students to active thinking
6. Ensuring easy learning	6. Ensuring that students do reflective and creative thinking
7. Reinforcing the topic	7. Making comparisons and determining the level of knowledge
8. Revealing similarities and differences	8. Encouraging the students to do research and learn
9. Increasing the self-confidence of students (by asking easy and known questions)	9. Determining if they are using information or not
10. Directing students to multi-dimensional thinking	10. Determining if certain concepts are understood
11. Revealing student creativity	11. Activating their prior knowledge
12. Deriving genuine ideas from students	12. Ensuring that students can express themselves
13. Encouraging students to think rather than memorization	

Table 5. The frequencies and percentages of target audience in teacher questions.

Target audience	f	%	Purpose of the question
Whole class	154	87.1	Ensuring the participation of the whole class, Ensuring that the whole class hear and think about the question, Initiating whole-class learning, Allowing emergence of different ideas, Drawing interest, Determining the level of the class,
Individual	16	9.0	Unable to get a response from a particular group or class, Differences in developmental characteristics, Higher participation of some students.
Certain group	7	3.9	Showing the weak students who the teachers believe not to understand the lesson that they can do and motivate them, Providing a better understanding of the rest of the class by asking the student group who know well
Total	**177**	**100**	

answer directly, not indirect". This means students do not need to think different focus. Another teacher stated "*I use convergent questions to think differently and make a research*". As we can see teachers have no idea what type of questions they are using for different purposes. The teachers have misconceptions about the kinds of mental processes to which convergent and divergent questions might lead to. It can be said that they use convergent questions with divergent questions in mind and vice versa.

Findings about the target audience of teacher questions

The findings regarding the target audience of teacher questions are presented in Table 5. The table indicates that teachers mostly ask questions to the class (87.1%; f=154) and subsequently to individuals (9%; f=16) and to certain groups (3.9%; f=7). It can be understood that teachers ask questions to the entire class for such reasons as ensuring the participation of all students in a class, identifying the extent to which learning is initiated by a class, and drawing attention. One participant stated "*I ask the whole class question because I want them to be active* in classroom discussions".

Findings regarding teacher questions in terms of cognitive processes in revised Bloom Taxonomy

The findings about types of teachers' questions used in terms of cognitive processes in revised Bloom Taxonomy and dimensions of knowledge are presented in Table 6.

According to Table 6, teachers mostly use the question types in level groups on Bloom Taxonomy; 21.1% in terms of application and subsequently 19.9% in terms of evaluation, 18.1% in terms of analysis, 16.5% in terms of remembering, 15.7% in terms of understanding and lastly, 8.5% in creating dimensions. The findings indicate that teachers mainly use operational knowledge (39.2%) and subsequently cognitive knowledge (25.2%), factual knowledge (19.2%) and metacognitive knowledge (16.2%).

Findings concerning the use of probe questions

Research findings regarding the teachers use of probe questions in their courses are given in Table 7. The majority of teachers stated that they used probe questions (94.6%). These are questions that measure the comprehensive subject knowledge of students their response. In this sense, the use of these questions is important for teaching in the classroom. When asked why they used probe questions, teachers indicated that they used such questions respectively from most frequently to the least to reconstruct knowledge, to express answers using alternative wording, and to elicit new information. Teachers also reported that they used these questions to increase their preparedness.

Waiting time

The findings on teachers' waiting time following a question they addressed to students are given in Table 8.

It can be seen that teachers wait mostly for 9 to 12 and

Table 6. The findings related to the questions asked in terms of Bloom's Taxonomy.

Cognitive process of Bloom Taxonomy	f	%
Applying	102	21.1
Evaluating	96	19.9
Analysis	87	18.1
remembering	80	16.5
Understanding	76	15.7
Synthesizing	41	8.5
Total	482	99.8
Dimension of knowledge	f	%
Operational knowledge	118	39.2
Conceptual knowledge	76	25.2
Factual knowledge	58	19.2
Metacognitive knowledge	49	16.2
Total	301	100

Table 7. The frequencies and percentages regarding teachers' use of probing questions.

Yes (F=158. 94.6%)	**No (**F=9; 5.4%)
Reconstructing (f=67. 38.7%)	
Repeating the answer in other words (f=52. 30.1%)	
Seeking for new information (F=51. 29.4%)	
Others (F=3. 1.7%)	

Table 8. Frequencies and Percentages for teachers' wait time after questions addressed to students.

Wait time	f	%	Reason
9-12 s	53	31.7	Individual differences
13-15 s	53	31.7	Giving an opportunity to think
6-8 s	44	26.3	Concentrating on an opinion
3-5 s	17	10.1	Overcoming anxiety Getting to the right answer
Total	**167**	**99.8**	

13 to 15 s (31.7%); following this, they wait for 6 to 8 s (26.3%) and 3 to 5 s (10.1%). Teachers made the following statements pertaining to why they gave a long wait for a response after asking questions: students are given a long time primarily due to individual differences among them, and they are also given time as an opportunity to think, as a space to concentrate on what they would like to say, as a period to recall their prior knowledge, and as a phase to overcome their anxiety and get the correct answer.

The teachers provided the following reasons for why they give a short period of waiting time: the belief that 3 to 5 s would be enough for a student who already knows, the abundance of subjects in comparison with the short length of lessons, the importance of the first belief that comes to mind, and that waiting would not stimulate favorable results.

Findings regarding complex, ambiguous and erroneous questions

Research findings regarding complex, ambiguous and erroneous questions by teachers are presented in Table

Table 9. Frequencies and percentages regarding complex, ambiguous and erroneous questions the teachers asked.

Erroneous questions	f	%
I never ask	62	32.2
Double Questions	51	26.5
Complicated Questions	40	20.8
Ambiguous Questions	39	20.3
Total	192	99.8

Table 10. Frequencies and percentages regarding teachers' reactions after questions they ask.

Reactions	f	%
If the correct answer is not given, I help students find the right answer with probing questions	148	83.6
After asking the question, I give the right answer myself	10	5.6
Other	10	5.6
I want my students to give only the right answer I expect	9	5.0
Total	177	99.8

Table 11. Frequencies and percentages concerning the use of questions as a means of punishment by teachers.

As a means of punishment	f	%
No	121	72.5
Yes	46	27.5
Total	167	100

9.

The findings in Table 9 indicate that 32.2% of the teachers never ask erroneous questions, 26.5% ask double questions, 20.8% ask complicated questions and 20.3% ask ambiguous questions. Complex, ambiguous and double questions make it difficult for students to understand, thus doing more harm than good. It is important that teachers claimed they do not use such questions.

Findings regarding the reactions given by teachers after questions

The findings concerning the reactions given by the teachers after they ask questions are presented in Table 10.

According to Table 10, 83.6% of teachers attempt to elicit the correct answer by posing probe questions when they do not receive an answer, and following this, 5.6% of the teachers answer the question themselves or find another way when there is no response, and 5.0% seek only the answer in their mind.

Findings regarding use of questions as a means of punishment

Research findings on the use of questions as a means of punishment are presented in Table 11.

According to Table 11, 72.5% of teachers do not ask questions to punish their students. The teachers who use questions as a punishment tool stated that they generally ask questions to the students who do not voluntarily participate, to punish those who do not fulfill their homework responsibilities, and to warn those who become distracted during the lesson and do something else during the class. On the other hand, the teachers who do not use questions as a means of punishment believe that questions might have an adverse effect on students, harm their self-confidence, alienate them from class, and limit independent thinking.

Findings regarding the correlation between questioning levels, types of questions and waiting time

In this research question, teachers' questioning levels, the type of questions based on Revised Bloom Taxonomy and waiting time were compared. For those who stated that they use divergent questions, the areas of Bloom Taxonomy on which they mostly focused are important because according to this taxonomy, such questions require analysis, synthesis and evaluation level questions. For this reason, the levels of these questions

were presented with cross-tabulation (Figure 1).

The questions at the “remembering” stage are mostly used for divergent question types. The waiting time for divergent and convergent questions is 13 to15 s at most. On the other hand, the questions at the “understanding” stage are mostly divergent ones. While the waiting time posed for divergent questions at the understanding level is 9 to 12 s at most, the maximum time for convergent questions at the same level is 13 to 15 s.

Regarding the “application” level, the most frequently used question types are divergent questions. Although the preferred waiting time for divergent questions is 9 to12 s, for convergent questions it is 13 to 15 s. At the analyzing stage, divergent questions are the most commonly addressed and the appropriate waiting time for these questions is 9 to 12 s, the same as that for convergent questions.

Divergent questions are most frequently favored at the evaluation stage. While the waiting time posed for divergent questions is 9 to 12 s, the period of time ideally accepted for convergent questions is 13 to 15 s at this stage. Finally, divergent questions are the most commonly used question types at the creating stage and the appropriate waiting time for them is 13 to 15 s, as for convergent questions.

Findings regarding purpose of questions, type of questions, and the target audience

In this research question, the reasons of teacher questions, the types of questions they asked and their target audiences were compared (Figure 2).

In order to attract students’ interest and attention, divergent questions are the most commonly used. Divergent questions are posed to attract interest and attention while convergent questions are mostly addressed to the entire class and minimally to specific groups.

To check and control students’ learning, mostly divergent types of questions are used. These questions are mostly posed to the class as a whole and at a minimum level to the groups. The convergent questions posed to check and control students’ learning are also posed most frequently to the entire class and least frequently to specific groups. Divergent questions are further used to remind students of certain facts and knowledge; similar to convergent questions, most of these questions are addressed to the entire class. Another use of divergent questions is to manage the class and most of them, as with convergent ones, are directed to the entire class.

Encouraging high-level thinking processes generally requires divergent questions and these questions are mostly asked to the class as a whole. However, convergent questions are always posed to the entire class. Furthermore, to construct and re-direct learning, generally divergent questions are used and almost all of these divergent questions are addressed to the class. Finally, in order to express emotions, divergent questions are used and generally these types of questions are asked to the class. The divergent question types are also generally directed to the class.

DISCUSSION AND CONCLUSION

In this study, the teachers proved to be asking questions mostly in order to attract students’ interest and attention. From the cross-tabulation analysis, it was revealed that divergent questions were frequently used by addressing the entire class. Furthermore, to assist students in remembering specific facts and knowledge, the teachers also use divergent questions and generally posed these questions to the class. The findings from cross analysis demonstrated that teachers make use of convergent questions mostly to attract students and minimally to manage the class. On the other hand, divergent questions were posed mostly in order for students to recall certain facts and knowledge while minimally used to manage the class. Teachers were found to ask convergent questions to a great extent (Korinek, 1987; Filippone, 1998; Mutlu et al., 2003; Ülger, 2003; Güfta and Zorbaz, 2008; Aydemir and Çiftçi, 2008). Both divergent and convergent questions can be used to attract students’ interest and attention, but it might be more reasonable to use convergent questions which can easily be prepared to direct students’ attention toward a specific point. While convergent questions are posed to remind students of certain facts and information, divergent questions are used to induce higher-level thinking.

In this sense, it can be claimed that teachers have misconceptions about convergent and divergent questions. Wrong questions for wrong aims might lead to wrong results. In addition, teachers’ statements that they ask questions mostly to attract students’ interest and attention might provide information about how the lesson is taught. Convergent questions should be used mostly to make students do critical and creative thinking for problem solving.

The teachers stated that they mostly used divergent questions to improve students’ higher-level thinking skills such as consideration and reasoning, to perform learning, and to improve active learning, creative thinking, emotions and thoughts. Although all these mentioned indicate correct uses, teachers further stated that they use divergent questions to determine whether students comprehend certain concepts, to activate their prior knowledge and to ensure that students express themselves. However, using convergent questions for the previously-mentioned purposes is easier and more reasonable.

The teachers also indicated that they asked convergent

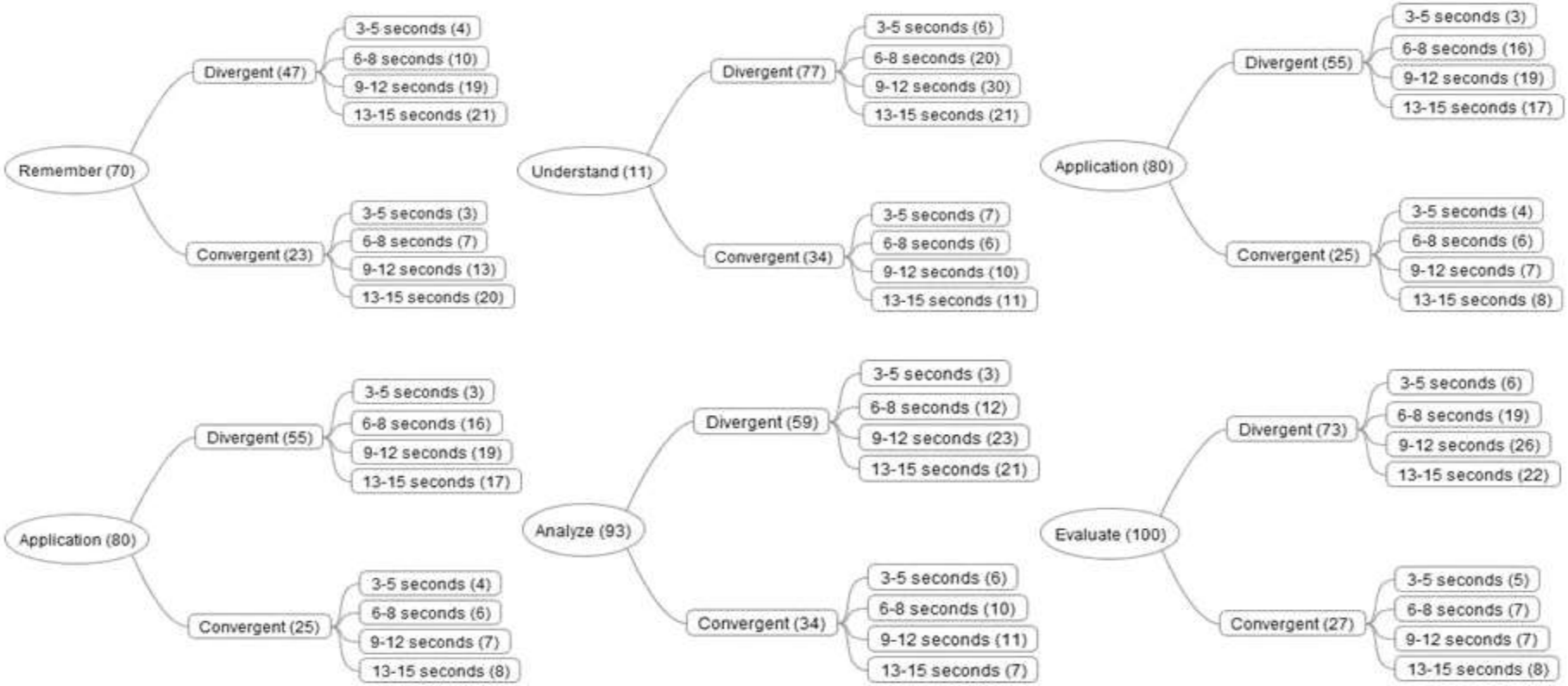

Figure 1. Cross analysis based on Bloom's Taxonomy.

questions to register whether students were able to think creatively, to reveal an original idea, and to encourage students for multi-dimensional thinking, as can be seen from the cross-analysis diagram in Figure 1. Teachers more frequently use divergent questions at remembering and understanding stages, where convergent questions are expected to be more appropriate. There are also teachers who stated that they used convergent questions at evaluation and creating stages. In this sense, as it would be difficult to fulfill these skills with convergent questions and it would be unreasonable to use divergent questions for low-level thinking skills, it can be said that teachers have misconceptions about convergent and divergent question types, and the types of questions to be asked depend on specific purposes.

Teachers reported that they prefer to address their questions to the whole class audience. They stated that their purpose in doing so was to ensure the participation of whole class, to stimulate student thinking and to determine class level. Only a few of these teachers stated that they addressed questions to individuals or groups in the class. According to cross-analysis, individuals were mostly addressed divergent questions aimed at diagnosis and control. The most frequent questions directed to groups were divergent questions to attract interest and

attention. On the other hand, the question types directed toward the entire class were found to be divergent questions aimed at reminding students of certain facts and information. Addressing the questions to the whole class may cause active students with high self-confidence to be more dominant in the class and others to be withdrawn from participation. Hence, it is vital for in-class teaching to have a balanced distribution questions addressed to the individuals, groups or entire class.

Asking questions to the whole class in the initial stage, then addressing a certain group and lastly directing questions to the students individually is a more reasonable method in the actualization of teaching (Bezukladnlkov et al., 2013). In this sense, there needs to be a balanced distribution of individual, group and whole-class questions. From the cross-analysis in Figure 2, it can be noticed that only one teacher was observed to have used divergent and convergent questions to perform high-level thinking skills. Under-addressing individual questions might hinder ensuring whether or not actual learning takes place for all of the students.

When the teachers were asked about the stages of their questions according to Bloom Taxonomy, they reported that most of the questions they used were at a stage requiring high-level thinking such as application, evaluation, and analysis stages. However, the review of the literature indicates that teachers mostly ask low-level questions at remembering and understanding stages (Stano, 1981; Korinek, 1987; Ülger, 2003; Barker and Hapkiewicz, 2001; Aydemir and Çiftçi, 2008; Güfta and Zorbaz, 2008; Özcan and Akcan, 2010; Güler, Tanık and Saraçoğlu, 2011; Özdemir and Dikici, 2012).

Teachers' perceptions might be based on a sense that they ask high-level questions; however, as can be seen from experimental studies, these questions remain at a low-level. Although some attribute this inability in asking high-level questions to primary or secondary education (Aydemir and Çiftçi, 2008), others attribute this to professional education from university (Özdemir and Baran, 1999). Still, others attribute this inability to conventional habits of questioning and being questioned (Tanık and Saraçoğlu, 2011). When the teachers are unaware of the cognitive processes that take place in students' minds, the quality of addressed questions as well as the variety is limited; consequently, students' attainment is reduced.

According to research findings, teachers initially pose questions to uncover operational knowledge and subsequently to seek conceptual, factual, and meta-cognitive knowledge. The questions posed demonstrate a balanced distribution. As a significant indicator of higher-level thinking skills, metacognitive awareness and knowledge plays an important role in students' achievement (Bağçeci et al., 2011). Conceptual, factual, and generalization knowledge is an important factor in education as it helps to determine whether newly learned items are exactly acquired, and ensures an effective learning process. Probe questions are also important in an educational context as they reveal whether students possess detailed knowledge on a certain topic. Moreover, 94% of teachers reported that they posed these questions in order to reconstruct a question, to paraphrase a response, and to demand new information. Reconstructing a question is method which contains hints that can help students understand a question more clearly.

Waiting time is one of the most important factors affecting students' correct response. This study has revealed that teachers generally give students a long waiting time. Individual differences among students, anxiety, and allowing time to remember are the main causes of long waiting times. Those who give short waiting times expressed that the lesson time was short, the subject topics were numerous, and that long waiting times would not make any change. From cross-analysis, teachers were found to allot either the same length of waiting time for both convergent and divergent question types or a longer time for convergent questions. This also indicates that teachers do not have favorable awareness of the use of divergent and convergent question types in the class.

Moreover, most of the teachers reported that they waited for 9 to 12 and/or 13 to 15 s after asking questions. However, studies have revealed that teachers wait for about 0.7 to 1.4 s following questions (McComas and Abraham, 2005).

From this study, it can be concluded that teachers are not aware of how long they wait after asking questions. They must be educated about the nature of asking good questions and waiting time and feedback. The relationship between waiting time and students' achievement was first revealed by Mary Bud Rowe in 1972. When students are provided with appropriate waiting time, they respond to questions more successfully. Rowe (1986) discovered that waiting quietly for three seconds has a positive effect on children. Furthermore, waiting for 3 to 5 s after questions has important consequences for students (Harris and Swick, 1985). Such waiting times stimulate students' achievement, retention of subject knowledge; improve the quality and length of responses; increase participation with correct responses; and encourage students to ask more questions (Cotton, 1988). According to Cotton (1988), teachers permit less waiting time for the students they consider to be at low-level.

Teachers stated that they do not pose erroneous, complex and/or ambiguous questions to students. When pre-planned, ambiguous and complicated questions are applied in the classroom, they might ensure enriched student learning and assist students in exploring their thoughts. On the other hand, unstructured, complex and ambiguous questions might distract students from understanding the subject. The study further revealed that two-thirds of teachers do not pose questions as a means of punishment. However, one-third of teachers

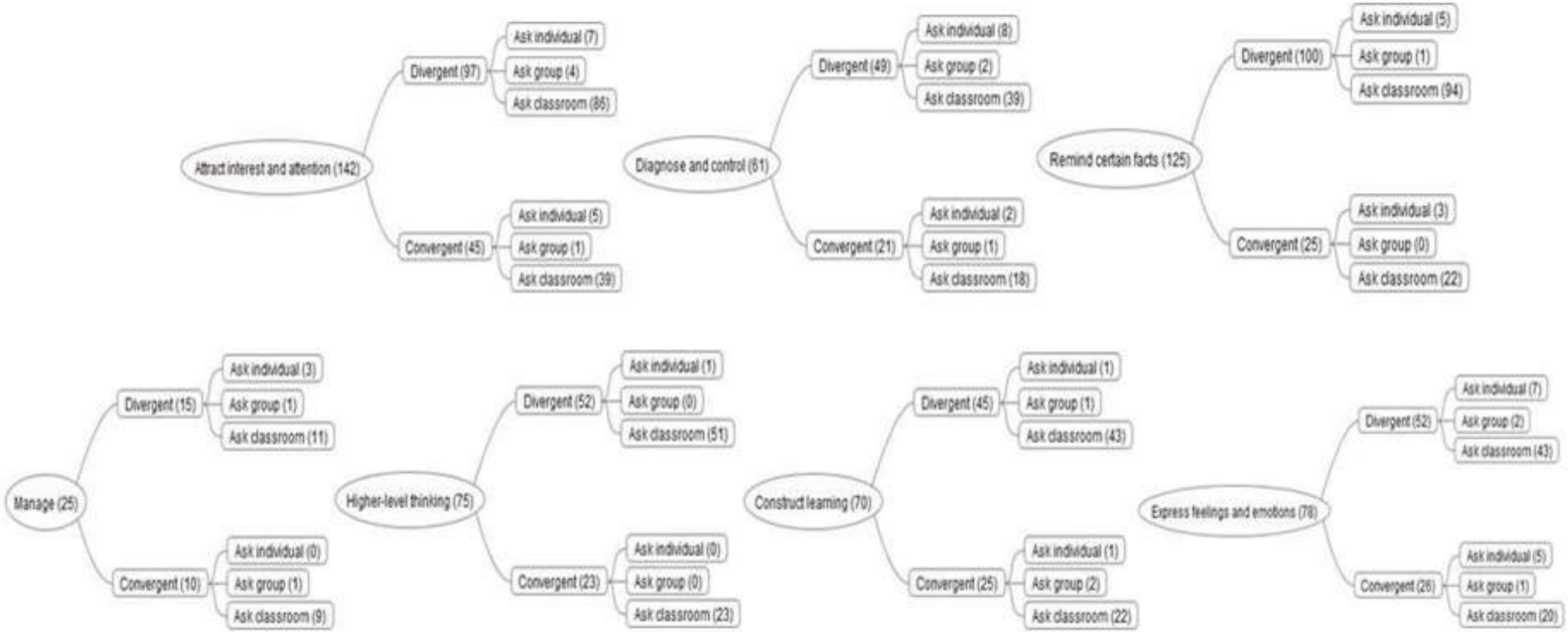

Figure 2. Cross analysis according to purpose of questions.

reported that they used questions as a tool of punishment in order to ensure classroom participation, to punish those who do not fulfill their homework responsibilities, and to warn those who become distracted and do something else during the class. Asking eligible questions is an important skill that requires long training and experience. In 1974, Lewis Lee Barker provided training for pre-service school teachers during his PhD study and obtained favorable results. Moreover, Aslan (2011) asserted that teachers posed more eligible questions after questioning training. Consequently, questioning strategies can be taught.

Eligible questioning skills can be obtained with long training and experience. Thus, such kind of training should be provided to teacher candidates both during pre-service teacher education as an individual subject or course subject and during in-service teacher education. Critical learning theory and constructivist learning theory state the importance of questioning skills (Young, 2009).
Asking good questions could be emphasized more importantly in Teaching Principles and Methods and/or Classroom Management courses to the pre-service teacher candidates. Furthermore, teacher candidates can gain experience by practicing these strategies in their Teaching Practice course. Teachers might acquire new knowledge and skills regarding questioning strategies by attending other teachers' classes.

Further studies containing a detailed analysis of questioning strategies can be conducted using various methods and techniques with different tools in different teaching contexts. Studies involving the analysis of reasons why teachers cannot ask eligible questions have stood out as a shortcoming.

Studies on the teaching of questioning

strategies may hold an important place in the field. In addition, studies devoted to modeling for questioning strategies are considered to occupy an important place in the field.

Conflict of Interests

The authors have not declared any conflicts of interest.

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