

A Study of Lower-order and Higher-order Questions at Secondary Level

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Received: April 21, 2011 Accepted: May 29, 2011 doi:10.5539/ass.v7n9p149

Abstract

In classrooms, questioning is one of the most regularly employed teaching strategies. Questioning is considered by many to be the most important tool that teachers have for helping students build understanding and to encourage students to think about and act upon the material that have structured. Questions are asked to individual pupils, to the whole class, to small groups to arouse curiosity, focus attention, develop an active approach, stimulate pupils, structure the task, diagnose difficulties, communicate expectation, help children reflect, develop thinking skills, help group reflection, provoke discussion and show interest in pupils' ideas. Perhaps few studies have been carried out regarding the levels of classroom questions in Pakistan on this vital aspect of teaching learning process.

The main objective of the study was to explore the levels of questions teachers asked during teaching at secondary level using bloom's taxonomy. It was focused to observe the ratio of lower and higher- order questions. It was an observational study of the descriptive method. The target population comprised all the teachers of Working Folks Grammar School & College Peshawar. Twenty teachers of different subjects teaching at secondary level were randomly selected as sample of the study. Teachers were observed using an observational guide and audio recording were conducted. The researcher focused only the asked questions of the teachers. This study is significant because its findings and conclusions may stimulate teachers to improve their questioning behavior in order to develop and promote higher order thinking abilities.

The result of the study showed that so much time was spent with teachers questioning the students. Most of the questions were low- level cognitive questions. Higher- order questions were also observed however, the ratio of these questions was very low. Total percentage of questions during 445 minutes was 60 percent. The whole number of questions was good but in most of the classes the number of questions was low. Among 267 questions 67 percent were knowledge based, 23 percent were comprehension based, 7 percent were application based, 2 percent were analysis based and 1 percent was synthesis based. However the ratio of evaluation based questions was zero.

Keywords: Questioning, Lower-order, Higher-order, Thinking abilities, Secondary-level

1. Theoretical Framework

The art of asking questions is one of the basic skills of good teaching. Socrates believed that knowledge and awareness were an intrinsic part of each learner. Thus, in exercising the craft of good teaching an educator must reach into the learner's hidden levels of knowing and awareness in order to help the learner reach new levels of thinking (Lindley, 1993).

Questioning is the heart of teaching learning process. Through the art of questioning the teacher can exploit the hidden potentialities of students however this mainly depends upon the types of questions teachers ask (www.highlandschools-virtualib.org.uk).

Teachers spend much time talking with students ---lecturing, giving directions, and asking and answering questions. To ensure understanding and application of knowledge, teachers commonly engaged students in question and answer session. Questions can prompt responses ranging from simple recall of information to abstract processes of applying, synthesizing, and evaluating information (Zepeda, 2009).

Bloom and his colleagues in 1956 developed a continuum for categorizing questions and responses. Bloom's taxonomy includes the following elements, arranged from lowest to highest order: Knowledge: recalling specific facts; Comprehension: describing in one's own words; Application: applying information to produce some result; Analysis: subdividing something to show how it is put together; Synthesis: creating a unique, original product; and Evaluation: making value decisions about issues. The first three levels of this system deal with lower-order thinking skills that are essential in laying the foundation for deeper understanding. The last three employ higher-order thinking skills (Hopper, 2009).

Teachers frequently spend a great deal of classroom time testing students through questions. In fact, observations of teachers at all levels of education reveal that most spend more than 90% of their instructional time testing students through questioning. Most of the questions teachers ask are typically factual questions that rely on short-term memory (www.teachervision.fen.com).

Questions may also be convergent (asking for only one right answer) or divergent (asking for many possible answers). Questions about concrete facts are convergent: who ruled England in 1540? Who wrote Peter Pan? Questions dealing with opinions or hypotheses are divergent: Why did the United States go to war in 1898? What do you think of nuclear power plants? (Woolfolk, 1989).

Quite a bit of space in education textbooks has been devoted to urging teachers to ask both high-level (analysis, synthesis, and evaluation) and divergent questions.

Lower- order cognitive questions embrace chiefly recall, comprehension and application; higher order questions, by contrast, involve analysis, synthesis and evaluation. Lower order questions tend to closed questions (when a known response is sought); higher order questions tend to be open questions (when the type of response is known but the actual response is not, students being free to respond in their own way). Lower order questions are knowledge, comprehension and application based which encourage lower levels of thinking while higher order questions develop in students the ability to critically analyze and evaluate the concepts and ideas. www.oir.uiuc.edu/Did/docs/QUESTION/quest1.htm

It is said that higher level thinking occurs with higher level questions. Teachers play an important role in engaging students in higher order thinking skills by asking higher order questions. A teacher can raise the level of critical thinking and help children in reflective thought by the proper use of questions (Hollingsworth, 1982). Framing questions that are challenging, open-ended and uncluttered with extraneous information supports higher order thinking (Wang & Orig, 2003) and this is why examining teacher's questions is important. Effective teacher makes the students think even when they don't want to (Fisher, 1998).

In the light of the above discussion the overall purpose of the proposed study was to observe lower- order and higher- order questions at secondary level. The objective of the proposed study was to explore lower and higher-order questions and to analyse the level of questions in the light of bloom's taxonomy.

2. Methodology

The study focused on observation of lower order and higher order questions at secondary level. This study was an observational type of the descriptive method. The target population comprised all the teachers of Working Folks Grammar School and College Hayatabad Peshawar. Twenty teachers of different subjects were randomly selected by the researcher as sample of the study. These teachers were informed and asked for permission prior to observation. The observation was more overt as mentioned by Gay (2000) that in overt observation the researcher obtains permission to observe someone. After going through different articles and researches, (Inamullah,2005) the researcher, selected the instrument with certain amendments keeping in view the ground realities for observing the level of questions asked in the classrooms. This instrument "observation guide using bloom's taxonomy" was developed by Zepeda (2008). The selected instrument assisted the researcher to observe the proportion of lower and higher- order questions asked over a specified time.

3. Data collection and analysis

The teachers were reluctant to be observed specially with audio recording but were convinced. After obtaining consent from the participants and ensuring them that their real names would not be used when reporting the findings from this study, data were collected over 24 days in January, 2011. The observation was participant in nature.

During the classroom observations, the teachers' questioning patterns were observed and audio recorded. The observation sheet developed for the study was used for encoding the data. Each teacher was observed in the class for 30 minutes. Twenty teachers (as mentioned in the sample) were observed with audio recording. The cooperation of the teachers was commendable.

Following observations, questions were transcribed from the audio recorder and questions were coded into higher or lower order categories. Procedural questions (e.g., open up your book at page 16 and read it?) and rhetorical questions (e.g., that was tasty, wasn't it?) were not analyzed. The teacher's questions were coded as higher-order if the question called for the student to create new information (information not previously discussed) as mentioned by Renaud and Murray (2007).

After confirming the level of teacher questions, questioning data were recorded onto a questioning chart regarding: question types (higher-order or lower-order); Categories of data from the chart were summed. After each category was calculated, the total number of question types (i.e., higher-order and lower-order) was divided by the number of questions the teacher asked. This information provided a percentage and in graphic form in order to present a holistic view of what types of questions the teacher asked.

4. Discussion

The result of the study showed that lower order questions were mostly asked by the teachers than higher order. The results of the study were in support of early studies estimated that 70 to 80 percent of all questions require the simple recall of facts, while only 20 to 30 percent require the higher-level thought processes of clarifying, expanding, generalizing, and making inferences (Haynes, 1935; Corey, 1940). Recent study in the United States and England indicates that, of every five questions asked, three require data recall, one is managerial, and only one requires higher-level thought processes (Dillon, 1988).

Brown & Wragg (1993) discusses the research study of Stevens (1912) that teachers appeared to ask 400 questions per day, that 65 percent of those questions were concerned with recall of text-book information. Brown & Wragg (1993) also discusses the result study of Gall (1970) who noted that 6 percent of teacher questions required pupils to recall facts in much the same way as that in which they were presented, and only twenty percent required pupils to think beyond the level of recall; the remaining percent involved procedural matters such as classroom management.

Elizabeth Shaunessy (2005) reported that Parker (1989) observed that most classrooms engender factual, convergent thinking questions; divergent thinking is a non-traditional concept and occurs infrequently in most classrooms.

5. Conclusion

In the light of results and discussion the following conclusions were drawn. It was observed that the time devoted to asking questions from students by the teachers, almost every lesson was started with the question. The ratio of questions was different in each class. In 445 minutes duration 267 questions were asked. The total percentage of questions during 445 minutes was 60 percent. In most of the cases the number of questions was low. Majority of the questions were lower order i.e. they were knowledge, comprehension, and application based as these levels are considered as lower order under bloom's hierarchy of cognitive domain.

Higher-order questions consist of analysis; synthesis and evaluation based were seldom asked. Very few questions were asked at the analysis and synthesis level however evaluation based questions were not observed by the researcher during observation of teachers in their respective classes.

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Table 1.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
20 min	13	7	2	4			
%age		54%	15%	31%			

Table 1 indicated that in 20 minutes class duration, the researcher observed 13 questions. 54 % of the questions were knowledge based, 15% were comprehension based and 31% were application based. Thus majority of the questions asked in the class were lower order questions. The total percentage of questions during 20 minutes was 65%.

Table 2.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
30 min	9	9					
%age		100%					

Table 2 indicated that in 30 minutes class duration, the researcher observed 9 questions. 100 % of the questions were knowledge based. All the questions asked in the class were lower order questions. The total percentage of questions during 30 minutes was 30%.

Table 3.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
30 min	19	10	7	1	1		
%age		53%	37%	5%	5%		

Table 3 indicated that in 30 minutes class duration, the researcher observed 19 questions. 53 % of the questions were knowledge based, 37% were comprehension based, 5% were application and 5% were analysis based. Thus majority of the questions asked in the class were lower order questions. Only 5% of the questions were higher order. The total percentage of questions during 30 minutes was 63%.

Table 4.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
25 min	22	17	2	2	1		
%age		77%	9%	9%	5%		

Table 4 indicated that in 25 minutes class duration, the researcher observed 22 questions. 77 % of the questions were knowledge based, 9% were comprehension based, 2% were application and 5% were analysis based. Thus majority of the questions asked in the class were lower order questions. Only 5% of the questions were higher order. The total percentage of questions during 25 minutes was 88%.

Table 5.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
30 min	17	11	3	3			
%age		65%	17.6%	17.6%			

Table 5 indicated that in 30 minutes class duration, the researcher observed 17 questions. 65 % of the questions were knowledge based, 17.6% were comprehension based, and 17.6% were application based. Thus majority of the questions asked in the class were lower order questions. The total percentage of questions during 30 minutes was 57%.

Table 6.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
20 min	9	3	5	1			
%age		33%	56%	11%			

Table 6 indicated that in 20 minutes class duration, the researcher observed 9 questions. 33 % of the questions were knowledge based, 56% were comprehension based, and 11% were application based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 20 minutes was 45%.

Table 7.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
30 min	19	13	6				
%age		68%	32%				

Table 7 indicated that in 30 minutes class duration, the researcher observed 19 questions. 68 % of the questions were knowledge based and 32% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 30 minutes was 63%.

Table 8.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
20 min	7	4	3				
%age		57%	43%				

Table 8 indicated that in 20 minutes class duration, the researcher observed 7 questions. 57 % of the questions were knowledge based and 43% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 20 minutes was 35%.

Table 9.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
25min	26	20	2	3	1		
%age		77%	7%	12%	4%		

Table 9 indicated that in 25 minutes class duration, the researcher observed 26 questions. 77 % of the questions were knowledge based, 7% were comprehension based, 12% were application and 4% were analysis based. Thus majority of the questions asked in the class were lower order questions. Only 4% of the questions were higher order. The total percentage of questions during 25 minutes was 104%.

Table 10.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
15min	10	9	1				
%age		90%	10%				

Table 10 indicated that in 15 minutes class duration, the researcher observed 10 questions. 90 % of the questions were knowledge based and 10% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 15 minutes was 67%.

Table 11.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
15min	10	5	5				
%age		50%	50%				

Table 11 indicated that in 15 minutes class duration, the researcher observed 10 questions. 50 % of the questions were knowledge based and 50% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 15 minutes was 67%.

Table 12.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
25min	11	9	2				
%age		82%	18%				

Table 12 indicated that in 25 minutes class duration, the researcher observed 11 questions. 82 % of the questions were knowledge based and 18% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 25 minutes was 44%.

Table 13.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
15min	9	4	4		1		
%age		44%	44%		12%		

Table 13 indicated that in 15 minutes class duration, the researcher observed 9 questions. 44 % of the questions were knowledge based, 44% were comprehension based and 12% were analysis based. Thus majority of the questions asked in the class were lower order questions. Only 12% of the questions were higher order. The total percentage of questions during 15 minutes was 60%.

Table 14.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
15min	19	11	7		1		
%age		58%	37%		5%		

Table 14 indicated that in 15 minutes class duration, the researcher observed 19 questions. 58 % of the questions were knowledge based, 37% were comprehension based and 5% were analysis based. Thus majority of the questions asked in the class were lower order questions. Only 5% of the questions was higher order. The total percentage of questions during 15 minutes was 60%.

Table 15.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
30min	18	12		4	1	1	
%age		67%		22%	5%	5%	

Table 15 indicated that in 30 minutes class duration, the researcher observed 18 questions. 67 % of the questions were knowledge based, 44% were application based, 1% was analysis based and 5% were synthesis based. Thus majority of the questions asked in the class were lower order questions. Only 10% of the questions were higher order. The total percentage of questions during 30 minutes was 60%.

Table 16.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
10min	10	8	2				
%age		80%	20%				

Table 16 indicated that in 10 minutes class duration, the researcher observed 10 questions. 80 % of the questions were knowledge based and 20% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 10 minutes was 100%.

Table 17.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
20min	12	11	1				
%age		92%	8%				

Table 17 indicated that in 20 minutes class duration, the researcher observed 12 questions. 92 % of the questions were knowledge based and 8% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 20 minutes was 60%.

Table 18.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
30min	11	10	1				
%age		91%	9%				

Table 18 indicated that in 30 minutes class duration, the researcher observed 11 questions. 91 % of the questions were knowledge based and 9% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 30 minutes was 37%.

Table 19.

Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
20min	11	3	8				
%age		27%	73%				

Table 19 indicated that in 20 minutes class duration, the researcher observed 11 questions. 27 % of the questions were knowledge based and 73% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 20 minutes was 55%.

Table 20.

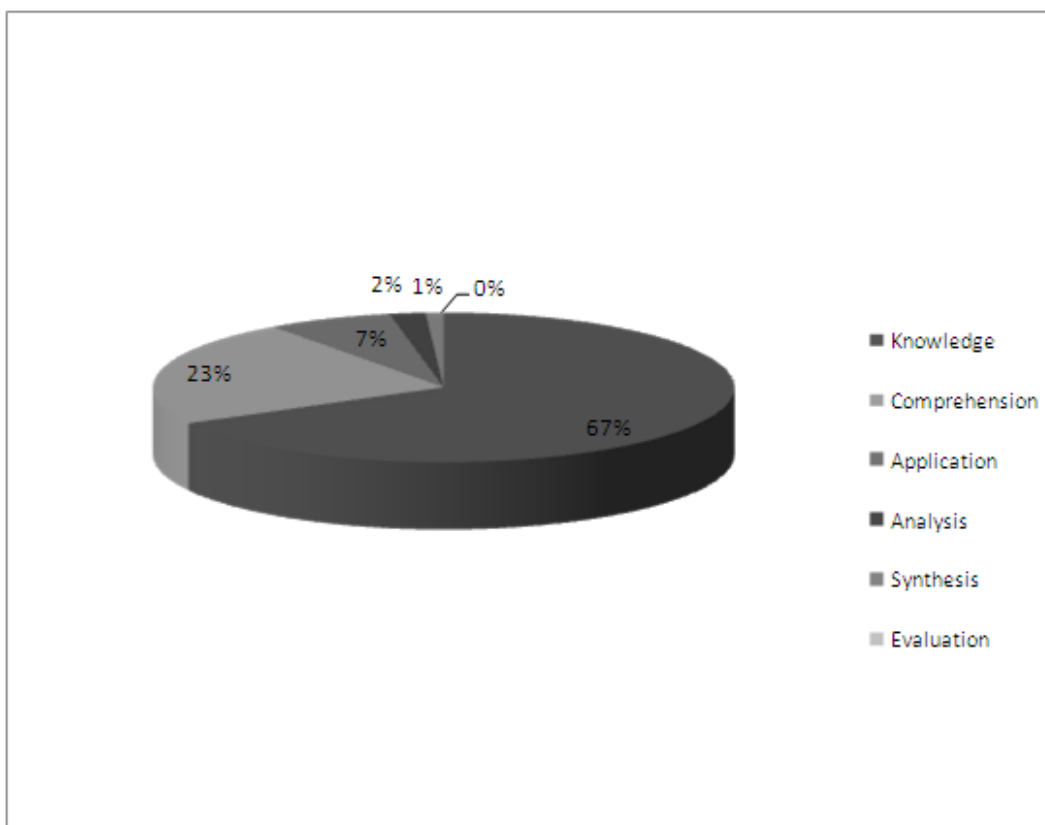
Time	No. of Questions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
20min	5	4	1				
%age		80%	20%				

Table 20 indicated that in 20 minutes class duration, the researcher observed 5 questions. 80 % of the questions were knowledge based and 20% were comprehension based. Thus most of the questions asked in the class were lower order questions. The total percentage of questions during 20 minutes was 25%

Results

Observation	Time	No. of Questions	knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1	20 min	13	7	2	4			
2	30 min	9	9					
3	30 min	19	10	7	1	1		
4	25 min	22	17	2	2	1		
5	30 min	17	11	3	3			
6	20 min	9	3	5	1			
7	30 min	19	13	6				
8	20 min	7	4	3				
9	25 min	26	20	2	3	1		
10	15 min	10	9	1				
11	15 min	10	5	5				
12	25 min	11	9	2				
13	15 min	9	4	4		1		
14	15 min	19	11	7		1		

15	30 min	18	12		4	1	1	
16	10 min	10	8	2				
17	20 min	12	11	1				
18	30 min	11	10	1				
19	20 min	11	3	8				
20	20 min	5	4	1				
Total	445 min	267	180	62	18	6	1	
%age			67%	23%	7%	2%	1%	



The above table indicated that during 20 observations session, the total time of observation was 445 minutes, the number of questions observed were 267. The result of the study revealed that the teachers asked frequent questions during instruction. Total percentage of questions during 445 minutes was 60 percent. The whole number of questions was good but in most of the classes the number of questions was low.

Among 267 questions 67 percent were knowledge based, 23% were comprehension based, 7 percent were application based, 2 percent were analysis based and 1 percent was synthesis based. However evaluation based questions were not observed by the researcher. In the knowledge category most of the questions were related to knowledge of specifics and terminology, theories and structures, and trend and sequences. In the comprehension category most of the questions asked were related to interpretation and extrapolation.