Peer Review of Instructional Practice at Colleges: A Perspective on the Professional Development of Instructors

Solomon Amare*

Abstract: This study set out to investigate the nature and the level of cognitive complexity of questions that teachers ask in the classroom. Primarily informed by the value the concept of a "reflective practitioner", the study involved one instructor of English who volunteered to participate in the research. The instructor's class was recorded, transcribed and analyzed using the observation technique known as "selective verbatim" which was developed by Achenson and Gall (1989) and the Taxonomy of Cognitive Difficulty of Questions developed by Thomas Barret. Analysis of the instructor's questions revealed that he posed a total of 88 questions in an hour. Most of these (71.5%) were lower cognitive questions and only very few of them (3.4%) were real higher cognitive questions - a finding consistent with the research literature. Further analysis made by reflecting on the data secured led to some major observations and feedback. The feedback was intentionally used in the subsequent lessons and a second recording and analysis revealed the improvements in questioning techniques and the influences on the quality of classroom interaction. Finally, implications for practice and in sights with regard to professional development were drawn both from the findings and the experiences of participating in the study.

Background

The most significant and influential educational advancement in the last thirty years or so is the paradigm shift that increasingly views the learner as a major agent of learning. The student-centered curriculum, learning strategies (styles), project-based learning and others are evidences to this shift. The essence of the shift is perhaps that students should take the primary responsibility for their own learning and teachers should create a conducive atmosphere in which the desired learning could take place. In creating that conducive atmosphere, teachers will definitely interact with their students. In these both extensive and intensive classroom interactions one of the

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major and most common teacher functions is asking questions of various kinds for purposes that include enhancing student-involvement and assisting understanding. Research indicates that teachers were observed asking as many as 400 questions and spending any where from 40 to 50 per cent of classroom time asking questions (Sinclair and Coulthard, 1975).

However, it is not enough that teachers just ask questions. They need to make sure that students really understand the essence of their questions. On the need for the clarity of thought in teachers questions Zamel (1981: 141) has the following to say: "If we teachers desire and expect a particular performance, we must make sure that the student knows what we are asking for...". This implies that teachers should know not only what and how to ask but also the level of cognitive difficulty that their questions present to the student. In order for teachers to be aware of their questioning practices and help them improve their questioning techniques and better assist student learning, they need to systematically record and reflect on their own practices and experiences.

Cotton (2002:1) defines a question as ".... any sentence which has an interrogative form or function. In classroom settings, teacher questions are defined as instructional cues or stimuli that convey to students the content elements to be learned and directions for what they are to do and how they are to do it." This definition makes it clear that what is referred to as teacher question is not limited to the grammatical form that ends with a question mark only. A question is rather understood as any utterance or cue that elicits responses or some kind of human interaction.

Many researchers (for example, David and Tinsley (1967); Fillippone (1998)) have asserted the time-tested value of questioning as an instructional strategy. Cotton (2000) indicates that questioning is the second most popular instructional technique next to lecturing.

An analysis of the literature on questioning reveals that teacher questions have the following general purposes: to activate prior knowledge, to check comprehension, concept, homework or seatwork completion, to assess achievement of objectives, to promote critical attitude and thinking, and to review and summarize lessons (Alexander and Judy, 1988; Cotton 2002).

The high prevalence of questioning as the commonest instructional strategy and its perceived influence on student learning have attracted many educational researchers to investigate its form, nature, cognitive difficulty and its relation to student learning. On the role of classroom questioning, Alexander et al. (1994) and Cotton (2002) have reported the following.

- Instruction which includes posing questions during lessons is more effective in producing achievement gains than instruction carried out without questioning students.
- Students perform better on test items previously asked as recitation questions than on items they have not been exposed to before.
- Oral questions posed during classroom recitations are more effective in fostering learning than are written questions.
- Questions which focus student attention on salient elements in the lesson result in better comprehension than questions which do not.

The literature review also reveals two broad categories of teacher questions classified on the basis of their level of cognitive difficulty. Redfield and Rousseau (1981), for example, classify teacher questions as lower order (lower cognitive) and higher-order (higher cognitive) questions. Lower-order/cognitive questions are those, which require students to recall simple facts or information previously taught. Higher-order/ cognitive questions on the other hand are those questions, which require students to formulate, evaluate or synthesize an idea or information and provide a logical response. Researchers have also proved that higher-order cognitive questions result in better

student learning, Marzano, Robert, J. (2001). However, research has revealed that most classroom questions asked by teachers are lower-cognitive questions, Davis, O.L., and Tinsley (1967); Fillipone (1998); Guszak (1967); Mueller (1973).

Research on classroom questioning has also introduced the important concept of what is known as " wait-time." It refers to the time that a teacher allows to elapse after posing a question, Rowe (1974). An investigation of the research literature on wait-time reveals the following major conclusions.

- allowing students more time to respond affects the quality and the cognitive level of their responses, Swift and Gooding (1983).
- increase in wait-time results in increased student-student interaction, Fowler (1975); Honea (1982).
- the average wait time teachers allow after posing a question is one second or less, Cotton (2002).
- increasing wait-time beyond three seconds is positively related to such student outcomes as increases in the length and quality of response and increase in the number of unsolicited response, Cotton (2002).

Questioning and English Language Teaching

In the teaching and learning of English, questioning is not only common but also one of the major and most important occurrences. The most notable and influential study on classroom questioning in English classes is perhaps the one conducted by Long and Sato (1983). In their analysis of teacher questions they identified two major types of questions most commonly asked: display questions and referential questions. The former concerns the kinds of questions to which the teacher or every one else already knows the answer and the latter are questions which require the student to provide answers to which only he/she knows or possesses the answers.

Long and Sato (1983) have also reported that referential questions promote better classroom interaction by increasing both the quantity and quality of student talk and hence contribute to better student learning. They maintain referential questions create an information-gap where there is a real interest and need to interact, negotiate or engage in some kind of interaction on the part of teachers and students. It is argued that the use or inclusion of many referential questions helps to maximize classroom interaction which in turn promotes higher order thinking, sharing of information, knowledge and experiences and increased learner involvement whereby students are gradually encouraged and confidently led to assume more and more responsibility for their own learning.

The Rationale for the Study

The decision to conduct this research is informed by an understanding of the value of three related points about classroom pedagogy: the influence of teacher effectiveness on student learning, instructional strategies that enhance achievement (learning), and the concept of "teachers acting as self investigators of their own instructional practice".

Studies by educators, Good and Brophy (1986); Sandres, Horn (1994), for example, have established that teacher effectiveness enhances the learning and achievement of students in more ways than one and than was originally thought. One of the qualities of an effective teacher is the ability to identify the most appropriate instructional strategies for students and to be able to use them effectively and efficiently in the classroom. Thus, the perceived influence of teachers' use of instructional strategies such as questioning on achievement (learning) is the first basis for this study.

The second rationale for the study concerns the fact that 'questioning' as an instructional strategy has a long history and a strong effect on student achievement (Marzano, 2001). After analyzing the voluminous research literature and theory on instruction, Marzano and his

colleagues identified "questioning" as one of the nine categories of instructional strategies that have strong effect on student achievement (learning). I have, therefore, decided to investigate its practice in our context in order to learn from the feedback that is secured from the empirical data.

The third reason behind this study is the interest and the belief in the value of the concept of "teacher as self-investigator (observer)" or "reflective practitioner" to reflect on higher own practice and alter instructional behavior and also contribute to professional development. Proponents of this view, Richards and Nunan (1990); Wright, (1987); Achensen and Gall (1987) all argue that teachers should systematically investigate their own classroom practices for making decisions about what should be happening, and for changing instructional behaviors when necessary.

The Purpose of the Study

The major purpose of this study is to investigate the nature of a teacher's questions with particular reference to the level of cognitive difficulty or challenge they present to students. The data secured through audio recording will help to make reflections and learn from the experience and improve the use of the specific instructional strategy (in this case 'questioning') in classroom in future. Both the observer and the observed will use the information from the recording called 'Persuasive data' to make inferences and if possible generalizations about the strategy (questioning) and related activities. The observer (researcher) shall present the 'persuasive data' i.e. the transcribed questions of the teacher so that the observed teacher himself may be led to make similar inferences as did the observer about his questioning techniques and behaviors. Persuasive data do not contain value judgments and shall be very specific that possibly focus on, attend to and result in meeting a particular need the teacher identifies as relevant. The study is, therefore, hoped to help us (both the observer and the observed) by providing the opportunity to engage in a valuable activity of looking back at our instructional

practices and take the primary responsibility towards enhancing professional development as teachers.

Methodology

The major purpose of this study was to investigate the nature and the level of cognitive difficulty of a teachers question in an English language class with a view to reflect on the questioning techniques and behaviors of the teacher and learn from the experience and the persuasive data secured through observation.

To collect the data needed for the study, the observation technique known as 'selective verbatim' developed by Achenson and Gall (1989) was used. This method involves having an observer record the classroom-interaction for later analysis. On this occasion a teacher's class was audio-recorded, transcribed and analyzed focusing on the questions he posed during the entire classroom time.

For the analysis of the data, the **Taxonomy of Cognitive Difficulty of Questions** developed by Thomas Barrett and cited in Tollefson, (1989) was employed. The taxonomy was chosen since it is adapted especially for use in English language classes. It helps teachers to reflect on their own questioning behaviors by allowing them to categorize their questions under the five levels of cognitive difficulty, which are arranged according to increasing cognitive complexity.

The five levels of cognitive difficulty in the taxonomy as measured by the level of cognition a question requires from students are: literal comprehension, reorganization, inferential comprehension, evaluation, and appreciation. Each of these levels has subcategories that further elaborate the demands the question in a particular level places on students who are supposed to provide the answer.

The total of 88 questions posed by the teacher in this study were classified according to their level of complexity (cognitive difficulty) and were placed in the five categories of the taxonomy. This

placement helped to identify lower-cognitive versus higher-cognitive questions. Further analysis is made by critically reflecting on extracts (instances) from the transcript using the best available information in the related literature.

The Context and the Lesson

The educational setting considered constitutes an English class taking a second year writing course known as "Sophomore English" in a private university college: Unity University College. The course instructor meets the class twice a week and usually discusses an assignment set in a previous meeting. During the recording of the class for the purpose of this study, the class was mainly discussing with the instructor the answers to questions previously assigned as homework.
The particular lesson on this occasion concerns **"the concept of topic sentence and the development of topic sentences by generating appropriate supporting details".**

At the beginning of the lesson, the instructor briefly revised the topic "the process of writing" as a lead-up work to their specific assignment questions on topic sentences.

The first set of questions required the students to identify the most suitable topic sentence that lends itself to development within a single paragraph of 150 to 200 words from a given pair of related topic sentences designated as A and B. The instructor invited the class and offered them the chance to respond as they raised their hands. The students took turns to provide answers to the assignment questions. The second group of questions on the assignment required the students to write a more specific topic sentence suitable for development in a paragraph of 8-10 sentences based on a broad statement provided. In other words, the students were required to narrow down a broader statement to a topic sentence appropriate for development in a paragraph of the size mentioned above.

After discussing the answers to the two exercises described above, the instructor introduced **"Supporting Details"** as the next topic of discussion and lectured briefly on the relationship between the topic sentence and the supporting details. Following this he dealt with and strategies of generating supporting details. He then gave class work exercise that required the students to sort out jumbled details and place them under two different topic sentences according to how well they support the main ideas raised in the two topic sentences.

The last exercise set as homework was "writing supporting details to topic sentences provided by the instructor." The exercise required the students to write at least three supporting details for each and every one of the five topic sentences provided. Finally, the class discussed the answers to the questions set as classroom seatwork.

The Instructor's Questions

The instructor asked the class a total of 88 questions during the 60-minute lesson. These questions were entirely initiated by the teacher. No question was initiated by either a student or a group of students. The 88 questions were classified on the basis of the categories specified in Thomas Barret's "Taxonomy of Cognitive Difficulty of Questions": a taxonomy specifically developed for use in the classroom. An analysis of the 88 questions resulted in the following classification.

Table 1: Classification of the Questions on the basis of Cognitive Difficulty

Category	Number of questions		Level of Cognitive Complexity aimed at
	Frequency	Percent	
Literal Comprehension	55	62.5	Recall or recognize information explicitly stated
Reorganization	8	9.0	Analyze, synthesize, organize information explicitly stated
Inferential Comprehension	23	25.1	Use information explicitly stated with personal experience to conjecture
Evaluation	2	3.4	Compare and contrast information to form judgments
Appreciation	0	0	Form and articulate emotional and aesthetic responses
Total	88	100	

Discussion of the Results

The following points will be used in discussing the nature, the relative weight and value of the 88 questions posed by the teacher: lower-order (cognitive)Vs higher-order (cognitive) questions, the general purpose of the question posed, wait-time and the source of the answers (teacher Vs student) to the questions asked.

As can be seen from the table 63 of the 88 questions (70.5%) aimed at levels one and two of the taxonomy of cognitive difficulty of questions: literal comprehension and reorganization. These questions required the student to recognize details, recall facts (information) and classify or synthesize information, which were explicitly stated in the text used for the lesson. In particular, the 55 questions in category one (literal comprehension) are, by and large, display questions: questions to which everyone knows the answer. Most of them do not

seem to engage the students in any meaningful thinking since the answers are readily available and explicitly stated in the text.

Example-1

Let's study the following 'extract' where the teacher posed the question that required students simply to look at information explicitly stated in a statement in their course-book.

Teacher: Has there been any specific type of holiday specified in the second sentence? (Although the students gave the answer, the teacher provided it first).

Students: No!

Teacher: Why is basketball interesting? (the answer is explicitly stated in a statement both the teacher and the students are looking at). Students: (did not respond until the teacher expressed his disappointment by saying "Answer, read what is written down" and then read the answer himself)

This finding is consistent with the information in the literature that most classroom questions asked by teachers are lower-order (cognitive), Fillipone (1998); Guszak (1967); Mueller (1973).

However, from purpose perspective, it seems appropriate and justifiable that the questions are posed at the various stages of instruction. The instructor, for example, posed some of the 55 questions at the beginning of the lesson as an attempt to activate their prior knowledge and to check the completion of the homework. This finding is also consistent with the research literature, which established the value of teacher questions posed at various stages of the lesson, Cotton (2002).

Reorganization questions' which required students to classify, outline and in some cases synthesize information provided by the teacher

were 8 of the 88 questions (9%). These groups of questions fall in the second level of the taxonomy and are believed to be less challenging as compared to the other three levels (3-5) in the taxonomy. All of the reorganization questions were posed during the exercise that required the students to sort out jumbled details and place them under two different topic sentences on the basis of how well they relate to each one of them. An analysis of the teacher-student interaction during the questioning appears to show that the students had very little or no difficulty in sorting out the details. This corroborates the idea that the 8 questions in this category were cognitively less challenging as they required the students to read and sort out very simple ideas.

The questions that fall in the third level of the taxonomy: inferential comprehension were found to be 23 of the 88 questions (25.1%). Such questions are believed to require the student to make inferences of various kinds on the basis of information explicitly stated and their own prior knowledge and experiences, Clymer (1968) cited in Tollefson (1989).

Although a considerable number of questions that required students to make sundry inferences were posed, an analysis of the classroom-interaction did not seem to reveal the expected and desired outcome: using English to make different inferences. There seems to be two important reasons for this: the fact that most student responses were very brief, inaudible and the length of wait time allowed to students to reply to most of the questions was short. The first reason presented difficulty in understanding the quality of and the main points in the students responses. However, analysis of the wait-time during the questioning seems to indicate that the students did not really say much. It was discovered that the average wait-time allowed in most cases was less than two seconds. Besides, many questions were unfortunately answered by the teacher himself, who seemed to have denied the students of the opportunity presented by the questions to think critically and understand content better through inferences. Let us examine the following instances in the lesson.

Teacher: What makes it more general? "Interesting" Yeah!
Student: (inaudible) but it seems the student repeated the word 'interesting' after the teacher.

Teacher: "Interesting" has been specified into what? What do we mean by interesting in this case? The first question posed by the teacher "what makes it more general?" could have assisted the students to examine the pair of topic sentences by comparing and contrasting the level of generality of the controlling ideas in them in order to determine which one of the sentences is more general and which one is specific. In that process of identifying the general from the specific students are required to apply their prior knowledge about the controlling ideas explicitly stated in the pair of topic sentences and cognitively worked out which broader or narrower in scope. However, this did not seem to happen as the teacher immediately indicated the controlling idea that makes one of the pairs of topic sentences broader. His next two questions about the further narrowing of the controlling idea in the first general sentence (the word 'interesting') are questions of literal comprehension, which did not require the students more than a simple recognition of details explicitly stated in the next more specific topic sentence of the pair.

The most important variable that has affected the learning opportunity that could have been gained from the challenges presented by the 23 questions in the 'inferential comprehension' level of cognitive difficulty appears to be the very little wait-time allowed. An additional variable could be the fact that multiple questions were asked at a time without letting students know which one to answer first or which one (s) really requires an answer.

This finding is also consistent with the research literature since length of wait-time is found to affect the quality and cognitive level of students' response, Swift and Gooding (1983). The average wait-time the teacher allowed to students (less than two seconds) is also in conformity with the literature which have established the fact that the

average wait-time teachers allow after posing a question is one second or less, Cotton (2002).

Only 2 of the 88 questions (3.4%) fall in the category of 'Evaluation': the fourth level of cognitive difficulty in the taxonomy. This does not seem surprising in view of the research literature which asserts that the large majority of classroom teacher questions are lower-cognitive questions, Guszak (1967); Muller (1973); Fillipone (1998).

The research literature has also established that the use of higher cognitive questions such as 'Evaluation' questions expedite the process of learning, Marzano (2001). Research also suggested that the cognitive complexity of students' responses is affected by the corresponding cognitive complexity of teachers' questions, Wilson (1973) cited in Tollefson (1989). The following extract from the transcript of this study seems to corroborate these findings.

Teacher: Are the supporting details in the following paragraph sufficient and appropriate to support the main idea in the topic sentence?

Student: Not all of them.

Teacher: Which ones for example are inappropriate?

Student: (This is another student who intervened) The third sentence not related to topic sentence. Because, it is another idea.

Teacher: That's it! That is absolutely right! The topic sentence promises to tell us about the physical appearance of the bird, ...er... but this detail talks about when it disappeared ...er... so it is not related to the main idea in our topic sentence.. Ok...that's good. What other sentence or sentences are unrelated to the topic sentence?
Student: (Nominated by teacher) All sentences are not related to the paragraph. It is about history. So topic sentence is not supported and ... (teacher interrupted)

Teacher: That's great; so the supporting details are not only inappropriate but also not sufficient. So we need... In the instance above the teacher posed a question that required students to judge the adequacy and appropriacy of supporting details used to prove the validity of the main idea raised in the topic sentence of the paragraph. As can be seen from the transcript, the level of cognitive difficulty of the question posed (Judgment or evaluation of ideas) affected students' responses in more ways than one. First, the length of their responses increased. Second, it has attracted their attention and raised level of motivation to be engaged in the interaction. Third, it has also increased the syntactic complexity of students' responses as rightly observed by Dillon (1981) and Smith (1978). Finally, it has also revealed that better understanding and hence learning occurred as evidenced by the quality and the correctness of the students' responses.

Summary of Major Observations and Reflections

A closer investigation and analysis of the teacher's questioning behavior and the ensuing classroom interaction seem to lead to the following major observations and reflections.

- The teacher asked very clear questions in most cases and attempted to restate the questions whenever he felt there was a need.
- Most of the questions were either preceded or followed by a lead-up explanation, commentary or a brief revision of points related to the question. This might have helped the students understanding.
- The teacher provided answers to many of his own questions in less than two seconds after they were posed. Instead, he could have allowed longer wait-time to the students, and used questioning techniques such as redirection and probing especially when students failed to respond or provide satisfactory and complete responses. However, in such

instances the teacher was observed offering the answer himself and proceeding to the next question.

- Correct responses were acknowledged and students were praised for getting them right.
- Some students came unprepared without doing the assignment and this seemed to have prevented them from answering the questions.
- The teacher seemed to have previously established an undesirable norm by providing answers to his own questions. Consequently he seemed to let the students think that they were not really expected to answer his questions as he would soon answer them anyway.

Lessons Gained

The observed teacher analyzed his questions and discovered that his questions were simple, narrow and not as challenging as he thought they would be. He was also very surprised to learn that he allowed very little time (less than two seconds) for the students to respond to his questions and the fact that he provided (rather hastily) the answers to many of the questions he posed. He was also amazed by the total number of questions (88) posed. He commented that he believed neither he nor other teachers would ask more than a maximum of 25 questions during any one classroom meeting. Above all, both the observed and the observer (the researcher) decided to use the feedback from the data, to improve their questioning techniques and behaviors in subsequent lessons. In particular, higher-order (cognitive) questions such as 'evaluation' and 'appreciation' questions that are believed to promote better interaction and hence learning and increasing wait-time beyond three seconds were intentionally employed. As a result, the recording of lessons taken in the same class two weeks later revealed that teacher questions were slightly more complex and so were students responses. Besides, the increment of wait-time resulted in more student participation both in giving answers and in initiating either questions or points for discussion.

Other major observations from the second recording include, that teacher questions were more purposeful, the decrease in the occurrence of multiple questions (asking more than one question at a time) and the fact that many of the questions posed relate directly to both the objectives and content of the lesson and the intentions of the teacher. The most interesting observation was perhaps the questioning pattern revealed and its effect on students participation. In the first recording most of the teacher's questions started with a "wh", word (what, who, which etc.) and required only a one-word answer, which in most cases was explicitly stated in the text. Consequently, the large majority of the students were reluctant to respond to these display questions. In contrast, teacher questions in the second recording started with a verb, or the phrase "Do you think...?" This was found to maximize student participation. Many more students from all corners of the classroom raised their hands to answer such questions as opposed to the amount of participation during the first recording.

Implications for Practice and Professional Development

The participation of teachers in such self or collaborative peer observation and reflection of their own instructional practice will have the following implications.

Implications for Professional Development

- Teachers will discover the shortcomings (defects) or strengths in their teaching only when they consciously and systematically reflect on it. Thus, we should not only encourage teachers but also enforce a policy that requires them to conduct such reflections as part of the requirements or standards for their promotion or even retention.
- The experiences from this mini-research leads to an alternative conception of professional development (especially in terms of becoming a better teacher). Teachers should not necessarily join a program of study for further education to develop as

professional teachers. Collaborative peer review of their teaching practice can secure them a more satisfying, tailor-made, lasting and rewarding knowledge and experience that benefits both themselves and their students.

- The participation in this collaborative peer observation taught us that teaching is very complex that takes a long time to master. Although both the observer (researcher) and the observed have over 10 years of teaching experience, a second degree in their field of specialization, and a number of years of teacher training, they both discovered that there are many aspects of their teaching that really need much improvement. Thus, as Achenson (1981) rightly observes teachers need to be aware and recognize that a thorough knowledge of their subject matter or their ability to communicate with colleagues or their research talent or the sound teacher training or education they have had does not necessarily translate into classroom success. They will discover and learn about the quality of their teaching only when they employ systematic self and/or peer investigation to refine (modify) instructional practices.

Implications for Classroom Practice

- Teachers need to ask more referential questions that promote higher-order thinking by probing into a particular aspect of students' statements for critical reflection.
- More time need to be allowed after a question is posed both to increase the quality of the answer and to establish a desirable norm among students regarding answering a question. That is, if a teacher waits for few seconds and answers his/her own questions, the students will learn that the teacher does not really expect an answer. Students are usually happy to let teachers answer all questions, Cashin (1981).

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