

# Cognitive Levels of Questions through Visual Materials in English

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**Abstract:** *This is an experimental study looking into the cognitive levels of questions of freshman teacher education students of the College of Education and AB Political Science students of the College of Arts and Communication in the University of Eastern Philippines elicited from the use of visual materials and traditional lecture in reading activities. It ascertained the cognitive levels and characteristics of questions formulated by the students as reading texts were exposed to them. The level of performance in the pretest and posttest of the experimental and control groups was identified. The difference in the performance in the pretest and posttest of both the experimental and control group was also determined. A total of 91 freshman college students in two intact English 121 classes were chosen as subjects. Each class was split into two using their scores in the English Placement Test conducted before the enrolment. Students with odd scores belonged to the experimental group while those with even numbers to the control group. A quasi-experimental non-equivalent control group design was used to examine the effect of self-questioning activities in English 121 classes. Data were analyzed using frequency counts, percentages, weighted means, and t-tests for correlated and independent samples. The results of the study showed that both groups were of the same level of performance before the conduct of the study. There was no significant difference in the pretest level of performance of the experimental and the control group. The cognitive level of both the experimental and control groups was fair but they used mostly hypothesis and evaluation questions. Most questions formulated by the students were sensible and grammatical. Both groups also had excellent performance in the posttest. Significant differences were observed in the pretest and posttest of the experimental as well as in the pretest and posttest of the control groups. However, no significant difference was found between the two groups: the experimental and the control. The study concluded that the use of visual materials and the traditional lecture were both very effective in eliciting high cognitive levels of questions such as analysis and evaluation questions.*

**Keywords:** cognitive levels, summary questions, analysis questions, hypothesis, evaluation

## 1. Introduction

Most experts emphasized the need of teaching cognitive thinking. As authorities recently suggested that a teacher needs to formulate questions and problems that challenge one's intellectual and resourcefulness in terms of drawing relevant concepts from stored ideas gained from previous reading experiences. The teacher should consider a vast expanse of printed matter that one must intellectually process to be updated on the affairs of the academe, in the community, in the country, and the world. There is really a need to develop reading and thinking skills. S/He should provide reinforcing or challenging experiences that will stimulate creative thinking and application. The students need to be provided with related communicative learning experiences. But one does not necessarily read, read, and read in the thinking lesson. In reading-thinking activities, the lesson can precede to meaningful writing or other activities that foster creativity.

This paper posits that one significant technique in carrying out the reading-thinking task is questioning. Reading experiences throughout the four levels are sustained mostly by questions. Questions have a rich potential in enhancing reading experience and performance. Questions improve reading performance because they focus the reader's attention on what is significant in a text and make a more interactive relationship with a text, resulting in a deeper understanding and appreciation of it. In addition, questions may offer one possible way of tapping the reader's cognitive process.

## 2. Objectives

This study attempted to look into the cognitive level and characteristics of questions generated by the students elicited from using visual materials and traditional lecture in reading activities.

More importantly, it sought to:

- 1) Find out the experimental and control group's level of performance in the pretest;
- 2) Determine if there a significant difference in the pretest result of the experimental and the control group;
- 3) Determine on which of the following cognitive levels of questioning do the reader-generated question fall:
  - a) Summary/definition questions,
  - b) Analysis questions,
  - c) Hypothesis questions, and
  - d) Evaluation questions;
- 4) Find out within which of the following linguistic characteristics of questions do the reader-generated questions fall:
  - a) Incoherent
  - b) Sensible, not grammatical, and
  - c) Sensible and grammatical;
- 5) Determine if there is a significant difference in the posttest result of the experimental and the control groups;
- 6) Ascertain if there is a significant difference in the experimental group's pretest and posttest; and
- 7) Determine if there is a significant difference in the pretest and posttest performance of the control groups.

### 3. Methodology

This study was conducted at the main campus of the University of Eastern Philippines (UEP), the former Catarman National Agricultural School which was converted to a state college, the Samar Institute of Technology, then a university. In 1991 two CHED-supervised institutions – the UEP Laoang and the UEP PRMAC were integrated as extension campuses.

Only two of the ten colleges of the University – the Colleges of Education and the Arts and Communication were included in the study.

The College of Education, the second largest college in UEP offers four (4) teacher education programs – Bachelor in Elementary Education (BEED), Bachelor in Secondary Education (BSED) with a major curriculum, Bachelor in Science in Home Economics (BSHE), and Bachelor in Elementary Education Home Economics combined (BEED-HE).

The College of Arts and Communication is the university college in charge of offering the courses in the first two years of the different curricular programs of the University.

This study made use of a quasi-experimental method since no randomization was done with the student subjects (Best and Khan 1989:128-129). Instead, intact classes schedules of the student subjects.

Specifically, the non-equivalent control group design was applied since the experimental study consisted of two groups: the experimental class and the control class. The design gives pretest and posttest to both groups.

The scoring system for the cognitive level adapted from Thorpe's evaluation questions included the range of cognitive processing from summary or definition questions, to the higher levels like the operation of analysis, hypothesis, and evaluation. Characteristics of questions like incoherent, sensible but ungrammatical, and sensible grammatical were adopted from Miciano's study.

The instruments have been used in several English as Second Language (ESL) countries.

The cognitive levels of questions classified as summary/definition, analysis, hypothesis, and evaluation questions were proposed by Thorpe (1992).

The 12 texts used were published articles from the different columns of the Philippine Daily Inquirer and reading selections from Cryme's et al book "Developing Fluency in English."

The reading selections used in the pretest and posttest questionnaire were taken from Ustunluglu's (2004) proposed activities in his article.

The data gathering began with a Letter of Permission to conduct an experimental study addressed to the Deans of the

Colleges of Education and Arts and Communication in the University of Eastern Philippines main campus.

The student's score in the English Placement test conducted before the enrolment were considered to ensure the same level of English students. This was also used in determining the experimental and control groups of every class. Odd numbers belonged to the experimental classes while the even numbers to the control classes.

Pretest then was given to both experimental and control groups. Before the reading activities, the cognitive level of questions and the characteristics of questions and answers they require (high level or "think type" and low level questions) were discussed by the teacher.

The reading of texts and question-generation were done individually to measure "the individual's construction of knowledge based on the questions generated after a reading text was given to the students.

The pretest and posttest scores were transmuted and interpreted using range. Those is, getting the difference of the highest and lowest scores and divide it by ten to have ten-group distribution.

After each reading activity, the reader-generated questions were described as to what cognitive level they fall, given the corresponding score indicated, tallied and scored based on the indicators given.

To make sure of the accuracy and in-depth analysis of the data, the following statistical techniques and methods were used.

Frequency distribution and percentage were used to ascertain the cognitive level and the characteristics of questions.

To find out the level of performance in the pretest and posttest between the experimental and the control groups, frequency distribution and percentages were again used. The same formula was applied.

To determine the significant difference in the student performance in the pretest and posttest of the experimental and the control group, the arithmetic mean and T-test for correlated samples were used.

To ascertain the significant difference in the pretest and posttest between the experimental and control groups, the t-test for independent samples were used.

### 4. Findings

The findings showed that the majority in the experimental group passed the pretest while the control class failed as gleaned from Table 1. but it was found out to be of no significant difference in the level of performance of the experimental and the control groups. They had the same level of performance in the pretest.

**Table 1**

Pretest Performance Level of Experimental and Control Groups

Level of Performance	Experimental		Control	
	F	P	F	P
Fair (6-11) 11.9	8	16.3	5	
Passed (3-5)	24	49	13	31
Failed (0-2)	17	34.7	24	57.1
<b>Total</b>	<b>49</b>	<b>100</b>	<b>42</b>	<b>100</b>

However, as shown in Table 2, it was found out to be of no significant difference in the level of performance of the experimental and the control groups. They had the same level of performance in the pretest.

**Table 2**

Result of the t-computed value in the Experimental and Control Groups' Pretest

Groups	N	Mean	t-value		
Interpretation			computed	tabular	
Experimental	49	3.4			
Control	42	2.71	1.41	1.960	<b>Not significant</b>

Based on the total number of questions generated by the students, both groups used analysis questions and evaluation questions. Preferred least was the hypothesis and summary/definition questions. This means that the student-subjects in both groups used a higher level of cognitive questions as texts were presented or lectured to them. As they were used to reading different articles, they progressed to the use of evaluation and analysis questions and not just summary/ definition questions. This implies that they really analyze and evaluate the texts, which involves much thinking on their part. As mentioned by Staufer (1975), reading involves thinking or cognitive processes. This also confirmed Bruning's observation that a number of studies had favorable improvements when students are taught to generate their own questions before and after giving reading activities. However, this negates the findings in Miciano's (2004), Gonzales' (1999), Yap's (1999) and Rosin's (2010) studies where the respondents had not really improved. The recall type of questions, a lower order thinking skill considered as low cognitive level, was the one used by the students.

Both groups had the same cognitive level of questions. Hypothesis and evaluation questions were mostly used. They exhibited a fair cognitive level. Wh questions were the questions mostly formulated by the experimental and the control group, with only a few declarative questions.

In linguistic characteristics, most student-generated questions were sensible and grammatical.

No significant difference was found in the posttest performance of the experimental and the control group as presented in Table 3.

**Table 3**

Result of the t-computed value of the Experimental and Control Groups' Posttest

Groups	N	Mean	t-value		
			computed	tabular	
Experimental	49	23.39			
Control	42	23.69	-.303	-1.960	<b>not significant</b>

Testing for difference in the pretest and posttest of the experimental as well as in the pretest and posttest of the control groups, significant differences were found. This is shown in Tables 4 and 5.

**Table 4**

Result of the t-computed value in the Experimental Group's Pretest and Posttest

Groups	Mean	Mean	t-value		
		Diff.	computed	tabular	
Pretest	3.4				
Posttest	23.39	-19.897	-35.32	-1.645	<b>significant</b>

**Table 5**

Result of the t-computed value of the Control Group's Pretest and Posttest

Groups	Mean	Mean	t-value		
		Diff.	computed	tabular	
Pretest	2.71				
Posttest	23.69	-20.976	-33.55	-1.645	<b>significant</b>

Based on the findings, the conclusions are drawn:

As to the cognitive levels of questions, the students both in the experimental and the control groups performed very well. They used higher order questions. Ranked first were the analysis and evaluation questions. It can be traced that they analyzed and evaluated the reading texts given to them. They had become familiar with the use of the why and how questions because the teacher helped them how to process these kinds of questions. They did not just confined themselves to the "who, what, when, and where" questions. They resorted to questions the answers to which can be analyzed and evaluated and from which inferences could be made. Although the majority had good cognitive level, there were still some who needed attention in the way they formulated questions.

There was no significant difference in the posttest of the experimental and the control group. It can therefore be concluded that both the traditional lecture and the use of

visual materials were effective in eliciting higher order cognitive questions if interesting texts were given or discussed with them. It was very visible in the student-subjects' performance. At first, they frequently used summary/definition questions but as they became used to reading different texts, the cognitive level of questions improved to evaluation and hypothesis questions. This is an example of providing the students with a rich environment. If the teacher really wants the students to learn and develop to the fullest, he/she must model and follow-up how they improved and developed. There was also a great motivation in using authentic texts inside the classroom. The teacher played a very important role in influencing what levels of questions were generated by the students. The low proficient students relied on the discussion and explanation of the teacher but this aided much the development of their questioning skills because primarily their problem was in expressing their ideas. They may have good ideas but they had a hard time in using the language.

There was a significant difference in the experimental group's performance in the posttest, implying that the use of visual materials in English classes is effective. It aided the thinking and questioning skills of the students. The majority of students had a very good time interacting with the reading text given to them. Without the intervention of their classmates and their teacher, they spent most of their time in trying to understand and internalize the text.

There was a significant difference in the control group's performance in the posttest. As such it can be construed that the use of the traditional way in English classes is also very effective. Even though they started of the cognitive with no knowledge of the cognitive and linguistic levels of questions, they progressively performed very well. With the aid of the teacher, the texts were internalized and understood by the students and this triggered them to think and generate higher order cognitive questions.

From the findings, conclusions, and implications of this study, a Cognition Plus Theory was proposed. It posits that producing knowledge requires analysis and evaluation-critical skills which are developed and enhanced by a perceptive teacher which is the plus factor. A teacher plays an important role in the development and enhancement of the critical thinking skills of the students. A teacher designs the course objectives well and is prepared to deliver the lesson. S/He thinks of the activities well-suited to the students. Materials are carefully chosen giving priority to the recent news and editorials as to meet their interests and enthusiasm. The use of authentic texts and interesting reading materials are considered for the students to really feel every situation thus triggering them to think critically. The strategies of teaching used by the teacher should meet the level of needs, abilities, interests, and intelligence of the students.

## 5. Recommendations

Based on the findings of the study, the following recommendations are proposed:

1) The teachers themselves should ask higher order cognitive questions such as evaluation and hypothesis

questions so that the students would develop their higher order critical thinking skills.

- 2) Teachers should promote questioning activities in English classes. Allot sufficient time for the students to think and question using higher order questioning skills.
- 3) The use of visual materials should be used often by the teachers in any activities in English teaching.
- 4) A lecture method should be coupled with interesting text or lessons especially to low performing students so that the students can grasp easily the topic and be motivated to learn. On the part of the teachers, s/he can identify at once student/s needs and assess their difficulties in the English subject.
- 5) Researches should be conducted along the development of thinking or questioning skills preferably among both teachers and learners in English, and even in other disciplines. Studies show that there is a need to develop the questioning abilities of the students.

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