British Journal of Education, Society & Behavioural Science
2(2): 184-201, 2012

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Discouraging Transmission Model of Teaching as Telling through Interactive Mode of Questioning

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Author's contribution

JDK designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. JDK read and approved the final manuscript.

Research Article

Received 23rd February 2012
Accepted 19th June 2012
Online Ready 5th July 2012

ABSTRACT

Aim: To investigate extent to which teachers were proficient in questioning during teaching and learning processes in classrooms.
Study Design: Lesson/Class Observation.
Place and Duration of Study: Northern and Southern parts of Akure, capital of Ondo State of Nigeria, between August and December 2011.
Methodology: Twelve teachers (12) selected from 6 secondary schools (3 senior and 3 junior) among social science based teachers, participated in the research. Twelve indices of questioning adapted from authors that span from 1982-2010 formed the major instrument. The instrument was validated and its reliability was ensured before it was finally used. Two other instruments, namely, Form to obtain demographic data from the teachers and Tape Recorder to record each interaction in class, served as supplements. The instruments were used to observe each of the participating teachers by the researcher, to ensure uniformity in recording.
Results: Most of the teachers that were observed passed (5/7) with respect to basic processes of questioning; most of the teachers failed (1/12) with respect to a unique process of interaction; score for questions which facilitate thinking was 2/12; and score for teachers that qualified to be called prolific questioner was 0/12. The results were further

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investigated using Chi-Square (X2) analyses and the corresponding values are 17.640 at .000 levels of significance for teachers that passed; 70.5600 at .000 levels of significance against teachers that failed; 77.440 at .000 levels of significance against teachers that failed; while the last intended investigation could not be executed on the basis that the failure score was extreme (0/12).

Conclusion: The observed teachers passed on convergent rather than on divergent processes of questioning: fact (information) seeking processes of questioning rather than on those requiring options (analytical and creative answers). The teachers were inadequate in critical skills of questioning.

Keywords: Teaching techniques/methods; class interaction; cyclic process in teaching; effective teaching; instruction process/procedure.

1. INTRODUCTION

Effective teaching is obviously vital in education and there are germane issues relating to it including various approaches, techniques, methods, styles, strategies, models; competence of the teacher versus training and teaching media. The statement that man is the most significant matter in space underscores the role of the teacher in effective teaching. The teacher is the entrepreneur that is required to adequately organize all other elements toward ensuring productive teaching and learning in classrooms.

Brookbank and McGill (1998:98) asserted that a mode of teaching that places emphasis on transmission of knowledge and ideas is not conducive to critical reflective learning while Kane (2002) observed that pre-service teacher education programmes continued to prepare teachers in ways that reinforced a transmission model of teaching as telling. In Nigeria, the word 'transmission' is commonly used along a similar one: 'impart'. Suggestion is that many educators in the country are not conscious of the professional implications of these words as portraying teaching as a forceful or mere giving out act.

May Oi and Stimpson (1994) were of the view that teachers are facilitators of learning. Wells (1995:234-5) noted that because views are fluidly varied and yet there is need for compromise in a society, meanings should be co-constructed. Beattie (1995:65) held similar perspective that it seemed safe to predict that we would live in classes, schools, communities, societies and a world where others hold different views, values and beliefs to ours. A phenomenon that these references suggest relating to classes is interaction. Sadker and Sadker (2005:82-83) discussed effective teaching and had a heading as pedagogical cycle or classroom dialogue. Four moves were stated in the cycle namely (1) structure: where the teacher provides information, provides direction, and introduces the topic (2) question: where the teacher asks a question (3) respond: where the student answers the question or attempts to (4) react: where the teacher reacts to the student's answer and provides feedback. Brown (1993) presented classroom dialogue as having seven skills, namely: explaining, listening, questioning, responding to student's comments and answers, providing and giving guidance, assessing and providing feedback and monitoring one's own teaching. In an indirect presentation, Encyclopedia Britannica (1998) observed that each lesson is a complex of smaller teaching – learning – thinking elements. Each lesson consists

of instruction by the teacher and construction by the learner. A basic scene in these references is interaction and a key element embedded in interaction is question.

Among the usages of the word 'question', *three* are relevant in this context and they are stated as follows (1) ask for information or test knowledge of (2) a subject or problem that needs to be discussed, that is, being subject to analysis (3) expression of doubt or uncertainty (Martin and Ross, 2001; Geddes and Grosset, 2003; Woodford and Jackson, 2003; Wehmeier, 2006; Summers, 2007). It seems that in the interaction between a teacher and learners, these three issues are valid.

Some people are noted to be opposed to frequent teacher questions. They include Dillon (1994) reported by Brookfield and Preskill (1999:71-72). The authors remarked that Dillon's position was extreme. Brookbank and McGill (1998:199-200) demonstrated skepticism that questioning may do more harm than good or emit negative signals rather than positive ones. *While it is true that the word 'question' conveys some ideas tilting toward negative, it seems necessary to expose the positive usages in it which apply to education*. Based on perspectives of several authors including the following: Weil and Murphy (1982), King (1991), Perrot (1992:86), Brookfield and Preskill (1999: 68), Biggs (2003: 84), Sadker and Sadker (2005), Shulman (2007), Walberg (2007), Perkins (2007), Olaofe (2008) and Orluwene and Essien (2010), questioning is a core element in class interaction. *In this article*, the three positive usages of the word 'question' namely, asking for information or testing of knowledge, a subject or problem that needs discussion or being subject to analysis and expression of doubt or uncertainty, are implied. The negative connotation of challenge or confrontation is not intended.

1.1 Statement of the Problem

The fore-going provides some clue that questioning is vital in class interaction. However, in spite of its vitality, teachers and researchers in education had not paid adequate attention to questioning as would be observed under literature review. That inadequate attention is neither limited to Nigeria nor Africa. Moreover, it is neither limited to a subject area nor general/effective teaching. Hence the title: discouraging transmission model of teaching as telling through inter-active mode of questioning, for this research.

1.2 Proposed Solution to the Problem

This research would investigate extent to which classroom teachers are proficient in questioning by observing them as they teach learners in classrooms. Recordings of the processes of questioning would be affected; data thus obtained would be analyzed by employing appropriate statistical procedures. Obtained results would be presented, interpreted, discussed, and conclusion would be drawn.

1.3 Literature Review

Brookfield and Preskill (1999) presented seven points on how to maintain momentum of discussion and all of them focus on questions. While six of them, namely (i) questions that ask for more evidence (ii) questions that ask for clarification (iii) linking or extension questions (iv) hypothetical questions (v) cause and effect questions (vi) summary and synthesis questions, could be obvious enough from the twelve skills/indices presented above, the remaining one type namely (vii) open questions is not quite obvious. Although

open questions could come under skill/index eleven, namely, framing questions that require the learner to use high cognitive thought or think at high cognitive levels, Biggs (2003:83) checked that open discussions should be controlled (limited) so that subject matter may remain as the focus. This check earns more credit in a curriculum based system as in Nigeria.

Biggs (2003:84) noted that questions could be of various types but important distinctions were:

(i) Convergent or divergent questions
Convergent questions have correct answers in minds of teachers while divergent questions seek students input.

(ii) High – level or low – level questions
High-level questions centre on high-level verbs such as theorizing, reflecting, hypothesizing, while low-level questions seek factual answers. The issue of high and low levels seems confusing thus far even following Biggs' assertion. Although this paper cannot dwell on the issue, it seems valuable to note that Perrot (1992:48) observed that low-level questions ask the learner to remember particular facts, information previously taught or are of general knowledge, while high-level questions require the learner to change the nature/form/organization of information so as to: compare/contrast, explain/summarize, analyze/synthesize or evaluate. Biggs (2003:57) illustrated deep and surface types of teaching. One activity as he/she put it, required for deep teaching is explanation. The illustration suggests that comprehending main ideas is the beginning of high cognitive level activities. Biggs' illustration does not appear to follow taxonomy of objectives or reasoning levels as portrayed by Bloom and his associates (Bloom, 1956). Notwithstanding, a good number of authors internationally refers to it as fundamental (Yoloye, 1986; Cangelosi, 1990:8; Akande, 2002; Igwe, 2003:71-72; Sadker and Sadker, 2005:87; Tanner and Tanner, 2007:84, 171-176; Shulman, 2007; Perkins, 2007; Walberg, 2007; Pollard et al., 2008). One of these authors (Perkins 2007:281) acknowledged that understanding is one of the most cherished goals in education. If this order is used, explanation is the main activity at comprehension level. Concisely, comprehension would be the beginning of the high cognitive levels so information only, would remain as low cognitive level. The *perspective* is that true comprehension of given information has the potential to apply that information; with comprehension and application combined, a thorough analysis is possible and a good analysis is the factory for synthesis and evaluation, which take care of problem-solving and creation (Kukuru, 2008a). Tersely, high levels questions may not be limited to theorizing, reflecting and hypothesizing, as presented by Biggs (2003:84).

Shulman (2007) stressed that the image of teaching involves the exchange of ideas. The ideas are grasped, probed, and comprehended by a teacher. The teacher's comprehension requires vigorous interaction with the ideas, so also do the students require active interaction with the ideas. Instruction as an activity involves observable performance of the various teaching acts (pedagogy). One crucial act of pedagogy is interacting effectively with students through questions and probes, answers and reactions, and praise and criticism. Walberg (2007) noted that questioning promotes engagement of students and has the potential to encourage deeper thinking and Perkins (2007) submitted that thinking could be made visible by asking appropriate questions.

Critical empirical researches on questioning especially in journal publications appear not abundantly available. One that is at this author's disposal is that of Orluwene and Essien (2010) on efficacy of questioning techniques on creative achievements in Chemistry. The emphasis of that research was on convergent and divergent questioning techniques. It observed that most questions asked by teachers were the convergent type which required right or wrong answers of factual information. In a view, low cognitive levels of students were trained more than their high levels. Orluwene and Essien (2010) referred to Miller (2005) who asserted that divergent questioning is aimed at developing a broad range of students' responses while convergent questioning is set at developing students thinking around a given objective. These authors also referred to Erickson (2007); his perspectives were that divergent questions often require students to analyze, synthesize, or evaluate a knowledge base and consequently predict different outcomes while answers to convergent questions require different levels of cognition such as comprehension and application where the answers make inferences based on personal consciousness or on material read, presented or known.

It would be observed that the references above are more of theory and portray abstract compact situations with respect to questioning. To the class teacher, clearer guide-lines on basic structures of questions would be of greater utility. Accordingly, skills/indices of questioning depicting the general array of questioning require stating and such could be observed through the following authors: Weil and Murphy (1982); King (1991); Perrot (1992:86); Brookfield and Preskill (1999: 68); Biggs (2003: 84); Sadker and Sadker (2005); Shulman (2007); Walberg (2007); Perkins (2007); Olaofe (2008); Orluwene and Essien (2010). Their expressions may be presented as here-under.

A. Basic processes of questioning

1. The teacher using close-ended rather than open-ended questions.
2. Calling on learners by name before asking questions or his/her questions having a patterned order.
3. Waiting for three seconds before intervening, after asking a question.
4. Ensuring that learners can answer, at least 75% of the questions.
5. Primarily asking direct academic questions while avoiding non-academic questions and responses.
6. Minimizing learners' initiated questions rather than answering learners' questions.
7. Primarily using low cognitive levels questions as against high cognitive levels questions.

B. A unique process of questioning

8. Re-directing unanswered questions to other learners normally.

C. Questions that facilitate thinking or high cognitive levels questions

9. Asking probing questions to obtain clarifications/better answers.
10. Framing questions to call for sets of related facts.
11. Framing questions that require the learner to use high cognitive thought: think at high cognitive levels.

D. Over-all assessment of a teacher based on the above eleven skills/indices

12. The teacher: being an active and prolific questioner.

As could be observed, the first group (A) above covers convergent questions, fact finding and low cognitive level questions; the need to consider levels of learners; it also includes

avoiding of non-academic and divergent questions. Finally this group specifies certain principles to follow by the teacher in asking questions. The second group (B) stresses the need to improve inter-action or discussion; other attributes of a competent teacher such as patience, maturity, and clarity consciousness are embedded in this outwardly single question group. The third group (C) incorporates questions requiring deeper understanding especially analysis, synthesis, evaluation including skills of hypothesizing, reflecting, and theorizing. Last group (D) unequivocally suggests that questioning is the main instrument for inter-action in the class between the teacher and his or her learners.

1.4 Scope and Justification for the Study

Orluwene and Esssien (2010) revealed that limited researches had been conducted on questioning. The authors cited Lewis (2002) who stated that it was only in the last decade and a half that considerable attention was directed to questions and their strategies. Thus some twenty five years are now covered by the researches. An issue is that the number of consequently available researches was not stated. Moreover, the number of researches that were empirical among them was not identified. Furthermore, considering observations of educators from various continents of the world such as Kane (2002), McKenzie (2003), Bloom (2007), and utterances in Nigeria with frequent references to 'transmission' and 'impart' as noted above, it seems obvious enough that inter-active mode of teaching through questioning has not been sufficiently imbibed by teachers in many parts of the world.

It should be noted that whereas the research of Orluwene and Essien (2010) dwelt on special sections of questioning (convergent and divergent), this research presents the sections covered by those authors as well as other sections of questioning. In addition, while the research of those authors focused on a subject area: Chemistry, this research hinges on general/effective teaching but used several subjects in the Social Sciences, namely, Social Studies, Christian Religious Knowledge, Economics, Accounts, Government, (and) Geography.

1.5 Purpose of Research

The purpose of this research was to:

1. Determine the degree to which teachers would be efficient relating to basic processes of questioning in class.
2. Ascertain the stretch to which teachers would do well regarding a unique process of interaction in class.
3. Determine to what extent teachers would be proficient with respect to questions that facilitate thinking or high cognitive levels questions.
4. Verify to what extent teachers could be called prolific questioners.

1.6 Research Questions

The following questions guided this research.

1. What is the degree to which teachers would be efficient relating to basic processes of questioning in class?
2. What is the stretch to which teachers would do well regarding a unique process of interaction in class?
3. To what extent would the teachers be proficient with respect to questions that facilitate thinking or high cognitive levels questions?

4. To what extent would the teachers be called prolific questioners?

1.7 Research Hypotheses

Four hypotheses were generated for this research.

1. There will be no significant difference between positive performances of class teachers under basic processes of questioning and negative performances of class teachers under same group of questioning skills.
2. There will be no significant difference between positive performances of class teachers with respect to a unique process of interaction and negative performances of class teachers under same process.
3. There will be no significant difference between positive performances of class teachers in relation to questions that facilitate thinking or high cognitive levels questions and negative performances of class teachers under same group of questioning skills.
4. There will be no significant difference between proportion of class teachers that could be referred to as prolific questioners and the proportion of class teachers that could not be referred to as prolific questioners.

1.8 Significance of the Study

It is overt that there is a dearth of critical/specialized empirical researches on questioning, not only in Africa but also beyond. This research will reduce that dearth by providing some information; reduction of that dearth is the major contribution to knowledge by this research. Tersely, this research would be relevant to classroom teachers and their supervisors, curriculum researchers and other educators generally. Attention would be drawn to the class relationship between teachers and learners (students) on the need to de-emphasizing transmission kind of teaching which had assumed model/institution degree to emphasizing inter-action mode of teaching through questioning; the shift would enhance understanding and deeper thinking.

2. RESEARCH METHODOLOGY

The design of this research was observational: service teachers were watched in classes and recordings were made following defined aspects of class interaction. All public secondary schools teachers in northern and southern parts of Akure, capital of Ondo State of Nigeria, formed the population of this research. Six (6) secondary schools: junior and senior, were randomly selected from the population. Two teachers participated in each school (using non-probability quota sampling technique; Bandele, 2004:91-98) so the total number of teachers observed was twelve (12). For efficiency, in an observational research, limited number of teachers was needed. Moreover, because the researcher's teaching subject is in the social sciences, the required number of teachers had to be selected from social sciences related subjects. These issues/considerations informed the adoption of non-probability sampling technique in order to pick two teachers whose teaching subjects should be in the social sciences related areas. Subjects that the teachers taught at Junior Secondary school level (JSS) were Social Studies and Christian Religious Knowledge (CRK). Subjects that the teachers taught at Senior Secondary School (SSS) were Economics/Accounts and Government/Geography.

Instruments used to obtain data were three:

i. Twelve indices of questioning adapted from Weil and Murphy (1982), Perrot (1992), Brookfield and Preskill (1999:72), Biggs (2003:84), Sadker and Sadker (2005:86-94), Pollard et al. (2008:363-366) and Orluwene and Essien (2010), formed the major instrument for the research. The twelve indices were written on paper and spaces were provided to record frequency of each index. There were other supportive items namely, school of teacher, qualification of teacher, area of specialization of teacher, teaching experience of teacher, subject taught by teacher, class taught by teacher, method/s used by teacher, topic taught by teacher, duration of class observation. The supportive items were written below the twelve indices and space was provided in front of each index to record particulars simultaneously.
ii. Form to obtain demographic data from teachers that were observed.
iii. Tape recorder to record each interaction in class.

A pilot study was carried out by administering the major instrument on 30 (thirty) non-participating teachers in three secondary schools. The scores obtained from the responses were subjected to internal consistency analysis. The coefficient alpha value obtained was 0.76. According to Akinboye (2001), coefficient alpha value obtained from an internal consistency analysis is an index of construct validity. Therefore the 0.76 coefficient alpha value obtained from the scores of the pilot study confirmed the validity of the instrument.

Test-retest method was adopted for reliability by administering the instrument twice on a group of 30 (thirty) teachers with an interval of two weeks. The scores obtained from the two administrations of the instrument were subjected to Pearson's Product Moment Correlation analysis and the reliability coefficient obtained was 0.86. This result shows that the instrument is reliable. The above instruments were used to obtain data by the researcher as follows:

i. A copy of the paper containing the twelve indices of questioning and the supportive items was used for each class/teacher; frequencies of each index of questioning were recorded as they were observed.
ii. A copy of the form for demographic data was handed over to each teacher after he/she ended his/her class, to fill and the form was collected immediately after filling by each teacher.
iii. The tape recorder was put on once a class started, to record the whole class exercise/interaction and was put off at the end of each class.

Observations were carried out by the researcher for the purpose of uniformity in recording. To avoid unnatural dispositions of the teachers and learners, preliminary visits were made to the schools and classes. The visits were aimed at making the researcher familiar to them geared toward removing artificial interactions.

Frequencies, percentages, and Chi-Square (X^2) statistics were used to analyze the data collected because the data did not require more sophisticated analyses or further probing.

3. RESULTS

Results obtained from data collected follow. The initial concern of the researcher was presentation of all the data obtained in the observations of the 12 teachers to enable him have an overview of the work done. All other analyses are upshots of the omnibus analysis. The result of the omnibus analysis is presented on Table 1.

Table 1. Indices of questioning sought for and frequency obtained on each index

Indices of questioning		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Names of schools that participated		Using close-ended rather than open–ended questions	Calling on learners by name before asking questions or his/her questions having a patterned order	Waiting for three seconds before intervening, after asking a question	Ensuring that learners can answer, at least 75% of the questions	Primarily asking direct academic questions while avoiding non-academic questions and responses	Minimizing learners initiated questions rather than answering learners questions	Primarily using low cognitive levels questions as against high cognitive levels questions	Re-directing unanswered questions to other learners normally	Asking probing questions to obtain clarifications/ better answers	Framing questions to call for sets of related facts	Framing questions that require the learner to use high cognitive thought: think at high cognitive levels.	The teacher: being an active and prolific questioner
Specific name of school	**Type of school**	**Frequency (FRY)**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**	**FRY**
	JSS	1	1	0	0	1	0	1	0	0	0	0	0
	JSS	1111	1111	1	0	1	0	1	0	1	0	0	0
AC	SSS	11111	1	0	1	1	1	1	0	1	0	0	0
	SSS	1	1	0	0	1	0	1	0	0	0	0	0
	JSS	11	1	0	0	1	0	1	1	0	0	0	0
	JSS	111	111	0	111	111	0	1	0	0	0	0	0
EHS	SSS	1111	1111	1111	0	1	0	1	0	0	0	0	0
	SSS	111	111	0	0	1	0	1	0	0	0	0	0
	JSS	1111	1111	0	11	11	0	1	0	0	0	0	0
	JSS	11	11	0	11	1	0	1	0	0	0	0	0
AHS	SSS	1111111	1111111	0	1111111	1	0	1	0	0	0	0	0
	SSS	11111	11111	0	11111	1	0	1	0	0	0	0	0
	Totals	12/12	12/12	2/12	6/12	12/12	1/12	12/12	1/12	2/12	0/12	0/12	0/12
Groupings		A							B	C			D

Note: *On Table 1 above, JSS means Junior Secondary School*
SSS means Senior Secondary School; AC means Aquinas College Akure: has both JSS & SSS; EHS means Ejioba High School, Oba Ile, Akure: has both JSS and SSS; AHS means Akure High School, Akure: has both JSS & SSS.
Occurrence at all, of any index is the emphasis in the totals hence frequency is interpreted as one (1) no matter the number of occurrence. Thus occurrence of one (1) is the same as occurrence of seven (1111111).

The A,B,C,D groupings show questions that are: basic, a unique process of questioning, questions which facilitate thinking and over-all assessment based on the preceding groupings, respectively. The groupings are presented on Table 2 for more clarity.

Table 2. Groupings of the twelve questioning indices

A	**1,2,3,4,5,6,7 (1 – 7) = Seven columns**	**Basic processes of questioning (has seven types)**
B	8 = One column	A unique process of questioning which suggests a number of traits of a teacher such as patience, maturity, clarity consciousness, teacher rather than lecturer; discussion among others.
C	9,10,11 (9 – 11) = Three columns	Questions that facilitate thinking or high cognitive levels questions (are three types)
D	12 = One column	Over-all assessment based on indices 1 – 11 to determine whether a teacher is a prolific questioner or not

Note: *1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, (&) 12, here, means corresponding number of each Questioning Index: there are twelve of them. Discussion on the outcome of this research would be done following these groupings.*

3.1 Answering of the Research Questions

The first research question asked: What is the degree to which teachers would be efficient relating to basic processes of questioning in class?

The answer to this question is that most of the teachers observed passed (5/7=71.43%: indices 1, 2, 4, 5, & 7); the teachers failed on indices 3 & 6 (2/7=28.57%).

The second research question asked: What is the stretch to which teachers would do well regarding a unique process of interaction in class?

The answer to this question is that most of the teachers observed: eleven failed (11/12=91.67%); one teacher only passed: (1/12=8.33%) and the frequency of interaction was one (1).

The third research question asked: To what extent would the teachers be proficient with respect to questions that facilitate thinking or high cognitive levels questions?

The answer to this question is failure; only two (2/12) teachers asked questions in one out of the three types of questions that is, probing questions to obtain clarifications or better answers. The other two columns (10 & 11) have 0/12 each = 2/36 = 5.56%.

The fourth research question asked: To what extent would the teachers be called prolific questioners?

The answer to this question is that no one teacher in the sample could be called a prolific questioner (0/12= 0%).

These results are presented on Table 3.

Table 3. Summary results on observations on extent of class teachers' use of questioning indices

Groupings of Questioning Indices	A							B	C			D
Number Representing Each Questioning Index	1	2	3	4	5	6	7	8	9	10	11	12
Over-all Scores on Observations on Each Questioning Index	12/ 12	12/ 12	2/ 12	6/ 12	12/ 12	1/ 12	12/ 12	1/ 12	2/ 12	0/ 12	0/ 12	0/ 12

The results on Table 3 above which were derived through frequencies were further investigated through Chi-Square (X^2) analyses to enable the researcher determine their significance or otherwise. Each of the four research questions which led to each hypothesis with corresponding result is presented on Table. Each corresponding result is on a row: A, B, C, or D and the values of the Chi-Square (X^2) analyses are:

A: 17.640 at .000 levels of significance for teachers that passed with respect to questions on facts/information or convergent ideas.

B: 70.560 at .000 levels of significance depicting teachers that failed in relation to a unique process of questioning: re-directing unanswered questions to other learners which suggest several traits of a teacher such as patience, maturity, clarity consciousness, being a teacher rather than a lecturer.

C: 77.440 at .000 levels of significance portraying teachers that failed regarding thinking or high cognitive levels questions.

D: Incomparable results but obviously implying extreme negative situation that no single teacher among them could be called a prolific questioner.

These analyses are presented on Table 4.

3.2 Testing of Hypotheses

The stated hypotheses are tested here-under; the Chi-Square (X^2) values on Table 4 above are used as bases for the testing.

3.2.1 Hypothesis 1

The hypothesis states that there will be no significant difference between positive performances of the class teachers under basic processes of questioning and negative performances of the class teachers under same group of questioning skills. First row on Table 4 provides values to test this hypothesis: $X^2 = 17.640$ at .000 levels of significance. It expresses that the class teachers with positive performances are significantly more than the class teachers with negative performances under basic processes of questioning. Therefore, hypothesis 1 is rejected.

Table 4. Chi – Square (X^2) comparisons on summary results on extent of class teachers' use of questioning indices

Groupings of the twelve questioning Indices	Proportions of teachers that passed	Percentages of proportion of teachers that passed	Proportions of teachers that failed	Percentages of proportion of teachers that failed	Chi-Square (X^2) Values of comparisons	Degrees of freedom	Table values	Significance levels	Remarks on comparisons
A	5/7	71	2/7	29	17.640	1	3.841	.000	Significant (ST)
B	1/12	8	11/12	92	70.560	1	3.841	.000	ST
C	2/12	6	10/12	94	77.440	1	3.841	.000	ST
D	0	0	12 (12/12)	100	Not Comparable	Not Necessary (NN)	NN	NN	Extreme Negative Significant Situation

3.2.2 Hypothesis 2

The hypothesis states that there will be no significant difference between positive performances of the class teachers with respect to a unique process of interaction and negative performances of the class teachers under same process. Second row on Table 4 provides values to test this hypothesis: X^2 value is 70.560 at .000 levels of significance. It expresses that the class teachers with negative performances are significantly more than the one class teacher with positive performance with respect to the unique process of interaction. Consequently, hypothesis 2 is rejected.

3.2.3 Hypothesis 3

This hypothesis states that there will be no significant difference between positive performances of the class teachers in relation to questions that facilitate thinking or high cognitive levels questions and negative performances of the class teachers under same group of questioning skills. Third row on Table 4 provides values to test this hypothesis: X^2 value is 77.440 at .000 levels of significance. It implies that the class teachers with positive performances in relation to questions that facilitate thinking or high cognitive levels questions are significantly less than the class teachers with negative performances under same group of questioning skills. Accordingly, hypothesis 3 is rejected.

3.2.4 Hypothesis 4

It states that there will be no significant difference between proportion of the class teachers that could be referred to as prolific questioners and proportion of the class teachers that could *not* be referred to as prolific questioners. Last row on Table 4 shows non-comparable values of 0 to 12 with 0 to 100 percentages. The obvious implication is extreme negative significant situation indicating that proportion of the class teachers that could be referred to as prolific questioners is extremely negatively significant compared to the proportion of the class teachers that could not be referred to as prolific questioners. Briefly, no one teacher could be referred to as prolific questioner among the twelve teachers that were observed. By this connotation, hypothesis 4 is rejected.

4. DISCUSSION

The first research question asks degree to which the teachers would be efficient relating to basic processes of questioning in class. Hypothesis 1 was tested on this question and the finding is that class teachers with positive performances were significantly more than class teachers with negative performances under basic processes of questioning. It follows that the teachers were knowledgeable on and used the fundamental processes of questioning in class. However, the pass level might be due to the reason that most questions were on previous knowledge or summative evaluation either of which is basic in class. Moreover, as Orluwene and Essien (2010) observed, this group of questioning is where teachers had concentrated. The group underscores convergent more than divergent questions. It indulges in fact seeking (information) questions more than questions which require several options (analytical and creative answers). This group in a perspective attracts low cognitive actions more than high cognitive patterns of behaviour from students.

On the second question, the degree to which the teachers would do well regarding a unique process of interaction in class, namely, redirecting unanswered questions to other learners normally, hypothesis 2 was tested on this question and the finding is that class teachers with

negative performances were significantly more than the one class teacher with positive performance. It suggests that interaction was limited; patience, maturity, clarity consciousness, discussion, and real teaching, were wanting in the teachers observed. The teachers used lecture method generally. If they generally used lecture method, the problem may be traced to their preparatory days. Kane (2002) had observed that pre-service teacher education programmes continued to prepare teachers in ways that reinforced a transmission model of teaching as telling. This transmission model seems to have been indirectly noted by Bloom (2007) when he showed that over ninety percent of test questions that United States public school students were expected to answer dealt with little more than information. Transmission model of telling dwells on lecture or giving of information since end of term or semester examination questions would be based on previous teacher and learners' interactions. Bloom's observation that questions focused on information suggests that the presentations did not underscore understanding hence the transmission model of teaching as telling; yet, understanding is a major (cherished) goal in education (Perkins 2007). McNergney and McNergney (2007:313) itemized eight points on learning environment. One of them (the sixth: 6) is for teacher to talk less in class so that learners may talk more. Transmission model of teaching as telling is in contrast to this principle. In a similar perspective, Tanner and Tanner (2007:15) asserted that the idea of seeing the learner as active rather than passive had streamed into American educational theory and educators should see it as a responsibility to develop the potential: put the theory into practice (even in the class).

Third question asks: to what extent would the teachers be proficient with respect to questions that facilitate thinking or high cognitive levels questions? Hypothesis 3 was tested on this issue and the finding was that class teachers with positive performances in relation to this group of questioning were significantly less than class teachers with negative performances under same group of questioning skills. There were only two questions on probing or clarification for better answers. The other two indices either on related facts or high cognitive levels were not asked. Consequently, questions were almost wholly limited to low cognitive levels. It portrays shallow teaching and shallow learning for the learners; thinking of learners was not facilitated. Thus it may dwarf the learners thinking abilities. Perrot (1992) observed that questioning facilitates thinking (and thinking is a high cognitive process). The author noted that the kind of question a teacher asks will indicate to the student what kind of thinking that would be required. Bloom (2007) seems to have agreed that students can learn the higher mental processes, if the processes are made more central in the teaching-learning procedure. Shulman (2007) stressed that questioning is vital to understanding of ideas by students and Walberg (2007) observed that questioning has the potential to encouraging deeper thinking, while Perkins (2007) noted that thinking could be made visible by asking appropriate questions.

The last research question is: to what extent could teachers in this research be called 'prolific' questioners? Hypothesis 4 was formulated on this issue. The values, however, could not be statistically compared because they were extreme cases: 0 to 12 which implied 0 percent to 100 percent. Obvious implication is that proportion of class teachers that could be referred to as prolific questioners is extremely negatively significant compared to proportion of class teachers that could not be referred to as prolific questioners. Tersely, no one teacher could be referred to as 'prolific' questioner. Apparently no one teacher really introduced or employed discussion method. Several authors including Brookfield and Preskill (1999:68), Larson (1999), Biggs (2003:83-84), Shulman (2007) and Pollard et al. (2008: 371-377) agreed that employment of discussion method allows the use of questioning because the technique is the key to discussion before listening and responding can occur. All the

twelve teachers observed used lecture method. The practice appears traceable to the teacher preparation programmes that such teachers passed through and seems to have confirmed the observation of Kane (2002) that pre-service teacher education programmes continued to prepare teachers in ways that re-enforced a transmission model of teaching as telling. The finding also supports why many educators commonly use the words 'transmission' and 'impart'. They seem to feel satisfied with lecture method. But McKenzie (2003) declared that construction of a reflective pedagogy of teaching and learning where questioning would be prominent was over-due; Pollard (2008) is a large volume which dwells on reflective teaching. Using the perspective of Archibong (2007) there is the need to effectively communicate content with learners by the teacher; effective questioning skills are essential in this regard as echoed by Orluwene and Essien (2010).

A measure of improving a profession is through preparation/training. While some people may prefer one term to the other, it seems that a blend of both terms would be more useful. Whereas preparation tilts to de-emphasizing hard and fast rules, training inclines to underscoring hard and fast rules. A profession requires a foundation that is solid; consequently certain rules and processes should be fundamentally made rigid enough. In spite of the need for rigidity, realistic innovations should not be ignored and a means to achieving that goal could be to assess issues objectively as they emerge and be liberal on non-fundamentals, which stresses preparation. The National Policy on Education of the Federal Republic of Nigeria states that teacher education programme shall provide teachers with the intellectual background that is adequate for their assignment (FRN 2004:39[71d]). Thus adequate intellectual background is the ultimate standard through preparation/training. Akinbobola (2006) noted that the teacher is the main factor in learning. This point presumes that the teacher is adequately intellectually prepared or trained. Ayeni (2007) underscored the need to sufficiently equip the teacher for his assignment.

5. CONCLUSION

The concern of this article was to determine degree to which class teachers would inter-act with their learners through questioning as opposed to transmission model of teaching as telling. General indices of questioning which were validated and found reliable were recorded and sought for from the teachers that participated under observation. Analyses of obtained data showed that the teachers passed on convergent questions but performed inadequately on divergent questions. The questions that they asked hinged on facts (information) rather than on questions which required options (analytical and creative answers). The teachers performed inadequately in questions on critical skills. They generally did not employ questions on critical skills during presentation of objectives. The few questions that they asked were on introductory step, evaluation process, and swift ones. On the whole, virtually all the teachers observed used lecture method.

6. RECOMMENDATIONS

Based on the outcome of this research, the following recommendations are made geared toward improving inter-action through questioning.

1. Teacher preparation programmes are encouraged to underscore interactive mode of teaching. So, the current teacher training packages may be reviewed to facilitate skills in interaction mode. Besides theoretical preparation, teaching

practice exercise is vital: the formats for writing lesson note/plan by student teachers as well as evaluation formats may require reviews.

2. In stressing the interactive mode of teaching, it should be made obvious enough that questioning is a core in the process. That would prepare student teachers to gradually imbibe questioning culture such that after graduation, the culture may remain.
3. Teaching practice supervisors are encouraged to emphasize the importance of questioning to student teachers during teaching practice, more than ever before.
4. Supervisors from the ministries are equally encouraged to stress this culture to service teachers through timely visits; besides, workshops, seminars and conferences, may be organized for them for this purpose.
5. This study may be replicated in other ecologies of Ondo State or Nigeria and beyond for comparative information advantage.
6. Although observation research limits the number of participants and subjects such as teachers and classes due to obvious reasons, other researches may increase their samples for broader coverage and consequent generalization. Where possible, research assistants may be engaged while research grants may be sought for from governments or research sponsoring institutions in such elaborate cases.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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