A STUDY ON THE EXTENT TO WHICH EFFECTIVE USE IS MADE OF QUESTIONING TECHNIQUE IN TEACHER TRAINING INSTITUTES

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BY
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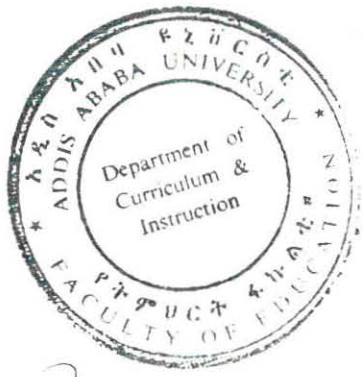

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ABSTRACT

The major objective of this study was to determine the extent to which effective use is made of the Questioning Technique of Teaching in the teaching learning process of the training of primary school teachers. To this end, attempts were made to gather information from instructors who teach in Teacher Training Institutes. This information was procured through classroom observation during the teaching learning process by the use of Observation Schedule.

Among twelve Teacher Training Institutes, two were selected using purposive sampling technique. Four teachers from each institute (that is, a total of eight trainers) were selected. Considerations were given to the subject areas while selecting teachers. These subjects included: Amharic, English, pedagogics, and psychology. Then, the data was interpreted using statistical methods (such as percentage distribution and chi-square statistical test).

Results revealed that trainers more frequently posed questions both at start and end of the daily lesson. Of the questions asked, the majority were used for obtaining feedback: so as to assess trainees' ability of recalling, recognizing, remembering, and the like. The majority of the questions were lower-order or knowledge level questions. Questions that demanded trainees' ability of comparing, reasoning, justifying/ exemplifying, judging/assessing, summarizing, and the like

(Middle and Higher-order questions) were minimal. The result also showed that the purposes of questions, the classifications for which questions were distributed, and the skills in questioning were not affected by years of teaching experience in Teacher Training Institutes, student population, and differences in subject area.

Questions posed when presenting the new lesson, besides being so few, were dominated by the approval-seeking knowledge questions. Trainers failed to give hints/clues for weak answers and incorrect responses. Their ability of stating a question so as to lead a trainee to a better answer; their ability of requesting fuller answers or the avoidance of surface answers were unsatisfactory. Generally, the teaching-learning process was a teacher dominated one that facilitated the rote type of learning. Questions were not effectively used in the training of primary school teachers.

Therefore, to avoid the rote type of learning in Teacher Training Institutes in particular and in primary schools of Ethiopia in general, trainers in Teacher Training Institutes should give much emphasis to Middle and Higher order questions in the teaching-learning process. They should prepare such questions ahead of classhours. Refreshing or upgrading courses that involve the Questioning Technique of Teaching should be given to primary school teachers.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Problem

"Good Instruction is more a matter of drawing out than of putting in." This is a statement made by Davies (1981:162). This means that learners have a lot to contribute to their own learning.

Children from the very beginning of their preschool age, start accumulating various experiences by interacting with their social and physical environment. Hence, the school has to start from what students already know. Whatever educational experiences the school provides, according to Chauhan (1983:5), must find their starting point in the child's life. Peterson and Walberg (1979:277) also contend that teachers must build on what students already know. This is a carnal principle of teaching and learning; very productive teaching outcomes are governed by this important principle.

Besides, relating teaching with children's background experiences, teachers have to use different techniques of teaching. Because, as the main function of techniques of teaching is to facilitate and stimulate learning, they serve the vital purpose of attaining specific learning outcomes.Moreover, teaching can be geared towards equipping students with the techniques of learning in lieu of the mere memoraization of

facts. As a result, children can learn how to explain, classify, relate, justify, reason, compare, contrast, change, integrate, produce, and the like. There cannot be a teacher dominating one. In short, teachers can strive to help students achieve important learning processes such as how to approach a learning task, sustain, interact in, and achieve learning outside school (op. cit: 210). Students can learn how to learn by their own efforts, for it is with this type of activity that students learn better. With regard to this, Rogers (1969) as cited in Clark (1991:49), has said that:

> The only man who is educated is the man who has learned how to learn; the man who has learned how to adopt and change; the man who has learned that no knowledge is secure; that only the process of seeking knowledge gives a basis for security.

The major intent in starting from the experiences of the child is in order to let him/her learn how to learn as well as to make learning more meaningful on one hand, and to make it yield better results on the other. This is so because when understanding is attained by meaningful learning, the scope of knowledge, and overall growth and development of the learner are enhanced.

Therefore, teachers as guides and facilitators of students' learning are expected to play a tremendous role in creating a stimulative environment with which they could interact meaningfully. To effect this, the creative ability and skill of

teachers that could be shaped by their training are indespensable. Because teachers are said to teach in a way they were taught.

This has been revealed by studies of beginning teachers, follow-up studies of graduates from teacher education programs, and student teachers' evaluations, according to Stratemeyer and Lindsey (1961:4), that student teaching and other kinds of laboratory experiences have a profound influence on determining the kind of teacher a student becomes. For instance, there are far too may teachers in primary schools who teach their children just what they learned in teacher training institutes (Farrant, 1965:2). This is to say, tomorrow's teachers will tend to teach by principles they observe in use during their student teaching; they will tend to behave in ways they see their advisors and teachers behave; they tend to operate on the values and to hold the attitudes they perceive as they observe, participate, and take responsibility in classrooms as student teachers (Op.cit).

All these can remind one that the quality of the educational exposure available to children of the coming generations largely depends upon the kind of teachers that teacher colleges and institutes prepare. Many factors and processes contribute to the development of skilful, creative, and artistic teachers, however, some seem to be more essential than others (Ibid). Hence, the question in what and how must teachers be prepared for dealing

with children and for providing learning experiences for the best of the learners and for the promotion of their continuous progress and development must be answered.

Teacher educators in teacher training instituts and in other higher education institutions, thus, have a responsibility to prepare teachers who are knowledgeable about the subjects they will teach; knowledgeable about how children learn those subjects and able to create learning environments in which procedures and concepts become meaningful and useful to the learner. This means, teachers are shouldered with a great burden of cultivating the future generations. With regard to this, a famous educator addressing classroom teachers, as cited in Stratemeyer and Lindsey (1961:3), has said that "you have the future of the world right in the palms of your hands." At this instant, it is pertinent to stress that teacher educators and trainers hold, to a large entent, the responsibility for the shaping of more of the future of the world than others; for the obvious fact that each day they work with the would be teachers who will in turn greatly influence the lives of hundreds of children and youth.

Therefore, teacher educators like Casey and Howson (1993:361) contend that fundamental changes have to be made in the preparation of teachers. A fundamental shift has to be made from the traditional model of education to cognitive approaches to education. Because the focus of cognitive approach to

education according to these scholars, is on the quality of thinking process students bring to their school tasks, not on the accuracy of the answers they produce.

Teacher educators and trainers should train teachers who can conduct effective teaching and learning in their future classrooms. These teachers should be those who are rated nearer to the positive poles-termed by Ryan (1960) as cited in Perrott (1986:1) of the factors warm and understanding; organized and business like; and stimulative and imaginative in their teaching. Teachers of tomorrow should be prepared in away that can be characterized, according to Flanders (1970) as cited in Perrott (1986:2), by their reliance upon asking questions, accepting pupils fellings, acknowledging in their teaching.

Teacher trainers, in short, should train teachers who can use techniques of teaching effectively so as to make teaching-learning process effective. Among the teachniques of teaching that promote effective teaching and learning, when used effectively, is Questioning Technique. Questioning is one of the observable indicator of effective teaching (Perrott, 1986:3). Qestioning is a principal technique of teaching which can possibly be referred as a versatile and all embracive, because it goes across any method of teaching, any grade level, and any subject area (Jacobsen, et.al, 1989:134). Moreover, kissock and Iyortsuun (1984:1) contend that questions are "fundamental tools

of teaching and lie at the very heart of developing critical thinking abilities." When well used, questions provide a "ladder up which the pupil climbs towards fuller and deeper understanding" (Farrant, 1988:168). Promotion of involvement, enhancement of learning, motivation of learners, promotion of student-centered learning, and the like are also the purposes/ uses of questions (Good, 1983 and Gall, 1984 as cited in Jacobsen, et.al, 1989:134). All such illustrations confirm that questions, when used effectively, have a prevalent importance in that they stimulate students to compare, conclude, infer, predict, apply, relate, design, generalize, propose, solve problems, and the like.

In general, to prepare or to train responsible teachers for future generations, teacher educators must themselves practice what they teach, using the techniques they advocate making their students classify, compare, contrast, apply, identify, change combine, integrate, produce, assess, defend etc. by the apropriate use of questioning technique.

1.2. Statement of the Problem

First, as a study conducted in primary schools of Ethiopia concludes that

> Pupils' achievement in a memory test was good. This should be seen as a result of the tradition of extensive rote learning in Ethiopian primary schools. On the other hand, pupils' level in other

> aspects, like comparing, transferring structures, relations, sequences, and in calculations was low (Nema and Wagner, 1993:79).

The study also reveals that primary school teachers' ability of stimulating students to interact and actively participate in the teaching learning process is low (Ibid:80). The authors' experience in field work, Nema and Wagner contend that, gave them the same idea. That is,

> Most primary school teachers (at least the ones observed during the period of data collection for various studies) usually prefer to use one method of instruction which emphasizes rote learning and discourages asking questions (Ibid).

Second, the researcher based on his experience, and on formal and informal discussion with elementary school teachers and students has come to realize that teaching is geared towards testing. As a result, learning is a simple rote type that children merely memorize facts, terms, truths, and the like without understanding.

Third, a survey study carried out in an elementary and junior secondary school of Addis Ababa, with which the investigator himself was involved in data collection, shows that grade two children were unable to solve problems and were unable to explain their answers. Besides, guessing, thinking error, and thinking error in giving reasons were discovered from an interview made with 36 children in mathematical problems (Zakaria, 1993).

Reviews of studies have revealed that problems of the teacher training system with respect to Admission Criteria, Skill of Teaching the Course Pedagogics, and Evaluation of the Professional Program about its Adequacy based on Objectives of the Training System are studied. Of these studies, non of them tried to see how effectively Questioning Technique of Teaching is used by Teacher Training Institute instructors. But on its quality study- ERGESE- MOE (1986:22), by citing the teaching and learning process in Teacher Training Institutes, has recommended that "teachers (trainees) must be trained in the project method and related techniques in order to make teaching and learning more practical." Nema and Wagner (1993:84) also recommended that Teacher Training Institutes and instructors should pay strict attention to fulfilling the teaching learning demands of primary schools by stimulating pupils to ask questions, participate actively, and discouraging rote learning. These,too, are mere suggestions that did not consider how Questioning Technique of Teaching is used in the training of primary school teachers.

The present practical problem in Primary schools of Ethiopia - a buring issue - interms of the teaching - learning process (teaching to testing and rote type of learning) has to be avoided, no matter how much memorization encouraging the primary school curriculum may be. Thus, the effectiveness of the teaching learning process in terms of the effective use of the Questioning Technique of Teaching employed by Teacher Training Institute

instructors which highly influences Primary school teaching-learning process, is really, has to be studied. It is this reason that makes this study to aim at the investigation of the effective use of Questioning Technique of Teaching in the teaching-learning process of Teacher Training Institutes. So, the study will attempt to answer the following basic questions:

1. How often do teachers/trainers ask questions?
2. For what purposes are these questions asked?
3. What type of questions are asked (The six levels of questions of Bloom (1956))?
4. What are the most frequently asked question types?
5. What indicators of skillfulness in the use of the technique of questioning are observed?

1.3 Objectives of the Study

The main objective of the study will be:

- to determine the extent to which effective use is made of questioning technique in the teaching-learning process of the training of primary school teachers.
- However, through the process, the study will also:
  - . assess the skill of instructors in questioning
  - . analyze the impact the state of affairs (effective or ineffective use of questions) has on the interaction and effective learning of trainees.

- provide grounds on which appropriate action could be taken in the training of would be primary school teachers.
- set a baseline information that will show directives for future research.

1.4. Significance of the Study

Basically, primary school education, by and large, plays a paramount role in the later educational success of children. Because, educational basis of children are founded at this level. Moreover, they begin to develop rationalizing, solving problems, critical thinking skills, giving justifications, explanations, and the like. One of the techniques of teaching that promotes and develops such high level thinking is Questioning Technique. Hence, teachers who teach children should stimulate and encourage them. Teachers themselves should be skilful in the use of such technique of teaching. It is due to this reason that it becomes pertinent to study on the effective use of Questioning Technique by instructors in Teacher Training Institutes. Therefore, it is the strong belief of the researcher that this study will contribute to:

- the development of the teaching skill of teacher educators who will demonstrate effective use of Questioning Technique on the training of primary school teachers that are efficient enough in the use of Questioning Technique of Teaching and there by to help

children to explain, compare, contrast, solve problems, judge, and the like by avoiding the rote type of learning.

- teacher education departments in the MOE can be assisted in how to follow up the achievement of one of the educational objectives - Develops problem - solving potential and ... - of learners in the New Educational Policy.
- If the result of the study is used and propagated to primary schools of the country, it can help teachers to be aware of the use of Questioning and there by to promote and develop children's reasoning power, critical thinking skills, problem-solving potentials, judging, generalizing, and the like

1.5. Delimitation of the Study

The scope of this study is limited merely to the effective use of Questioning Technique by trainers in the teaching-learning process in two Teacher Training Institutes. Thus, findings to be procured and conclusions to be reached are interms of the effective use of the Questioning Technique of Teaching and can serve for the mentioned Teacher Training Institutes and institutes which train teachers at the same level as to the target institutes. Moreover, due to the nature of the data collection instrument to be used (will be seen on its section), the study is limited only on two institutes.

1.6 Limitations of the Study

In research, there are different conditions/ situations/ factors that hinder/ prevent researchers from what they would like to do. Such factors as financial problem, time, instrument/ tool of measurement, location of the target population, and the like are some of them that limit researchers from what they are intending to do.

In this study, data was collected in classrooms during the teaching -learning process. Hence, to get reliable and valid information for the study, the appropriate instrument was found to seem observation. To carry-out this, observers were trained what to observe, what to use, and how to record findings. Moreover, observers were trained in the knowledge of the researcher - by the researcher.

Therefore, by taking the time required for observation and that of the observers' into consideration, this study is limited in two Teacher Training Institutes. Their selection was made on the basis of their proximity to the researcher for the fact that observers were graduate students of the Addis Ababa University.

Besides, sample subject areas were selected in the target institutes. Since media of instructiion in Teacher Training Institutes are Amharic, English, and Nation/Nationality Languages, the selection was a purposeful one. This was done for

the fact that the training of observers by using the Nation/Nationality languages by the researcher was impractical for he is not a native speaker of such languages. Hence, the sample of the study was limited on subjects whose media of instruction are Amharic or English.

Finally, it is worthnoting to indicate that the study is limited on the cognitive domain type of questions posed by teachers during the teaching learnign process. Because, the congnitive domain of questions are the most commonly used ones (Kissock and Iyortsuun, 1984:9).

Other than the mentioned obstructions, the researcher has attempted the study as complete as possible.

1.7. Definition of Important Terms

Terms can usually be interpreted or defined according to the context in which they are used. Hence, in this study, the terms below are used with the meanings given to each of them as follows:

1. Questioning: is the presentation or forwarding of a certain problem/puzzle to learners so as to give answers, to give his/her judgement, express his/her attitudes, to estimate, to generalize. etc.

2. Effective Questioning: It refers the posing of questions/problems based on acceptable principle. That is, forwarding questions that are clear, understandable, that demand learners to think, defend, apply, solve problems, etc.

3. Common Faults in Questioning: These are common mistakes or common errors that teachers make while forwarding a problem/a question to learners. If these are strictly followed, they hinder learning.

4. Questioning Technique: It is a procedure or way of phrasing or posing or forwarding questions/problems, puzles to students. It is a way questions are carried on in the teaching-learning process.

5. Teaching-Learning Process : It is a process or procedure of teaching and learning where knowledge/subject matter to be taught is imparted by the teacher and acquired by students during instruction in the classroom.

6. Techniques of Teaching: These are specific procedures, ways, steps, and manners that a teacher follows and applies in the teaching-learning process so as to attain specific-learning outcomes.

7. Rote type of Learning: This is a type of learning that requires and gives emphasis merely to student memorization of facts, terms, general truths, and the like from a baseless ground.

8. Effective Teaching-Learning Process: It indicates states or qualities of teaching and learning that gives the desired effect or the better result. The desired effect or the better result, for this study, does not accept the result of rote learning. Rather, it is the ability of students to compare, solve problems, summarize, integrate, reorganize, and the like

CHAPTER TWO

2 REVIEW OF RELATED RESEARCH AND LITERATURE

This part of the study is concerned with the review of research and literature related to the study. This is expected to serve as a conceptual framework for the study on the effective use of the Questioning Technique of Teaching in the teaching-learning process of Teacher Training Institutes. Hence, Concepts about teacher education and effective teaching will first be highlighted. Then, the questioning Technique of Teaching together with its subsections- frequency of questions and their impact on learning, characteristics and purposes, classifications, common faults in questioning, and skills of questioning- will be considered.

2.1. Teacher Education

In the introductory Chapter of this study, it was indicated that teachers are important personalities who play a paramount role in the shaping of the coming generation. Besides, research on teacher education-for instance, a study on the reorganization of teacher training in the former USSR-reveals that teachers are central figures in the educational system (Slastenin, 1989: 271). The way teachers cultivate children in the classroom highly influences both the learner, and the society at large. By the same token, teaching which is based on activities- specific steps, procedures, ways- that require reasoning, justification, critical thinking skills, explanation, problem-solving skill, and

the like, can help students learn better without memorizing facts and terms.

Therefore, the classroom teaching-learning process, according to Attagara (n.d,:2), has to be a problem solving-oriented one. Attagara contends that more emphasis must be given to what and how a teacher teaches and to how a student learns. This is due to the fact that "talking is not teaching, and that memorization is not learning-eventhough all of that may have helped us to pass examinations" (Ibid).

Giving much emphasis to teacher education, Attagara also added that

> teacher education represents the most effective approach for reaching an entire nation and affecting the skills, knowledge, and attitudes of its people. The key to raising the quality and quantity of learning at every level-elementary, secondary, university, and even adult and non-formal education-is the pre service and inservice training of teachers, trainers of teachers, and trainers of teacher trainers who instruct at various teacher training institutes. In a real sense, as teacher education goes, so goes the nation (Ibid:4).

Teacher education program should not be based on the notion of giving the prospective teacher some information he/she needs. Because, information giving may well have high carry-over into the teacher's later work with children. For instance, the teacher

may see that the most useful way of communicating any thing is by telling it. Nevertheless, Goddu and Ducharme (1971:475) argue that learning is more than being told something, that sometimes it is experiencing something; it is discovering something; it is putting some pieces of reality together; it is reading something; it is being told something; and sometimes it is all of these. Therefore, teacher education programs should reflect the model of how children learn. Because teachers do teach as they were taught (Ibid).

With regard to this, research on teacher education program confirms that teachers are going to do in their classrooms, in similar way, as they did or experienced in their training time. For instance, a result on the Impact of Creativity Training upon Teacher Empathy and Interaction with students, which, according to McConnell and Lecapitaine (1988:269), emphasizes experimentation, ideal development, positive interaction, and empathetic responses, reveals that after training, teachers were more open to student ideas and responses, reinforced students, allowed more experimentation, and listened to students more intently.

Generally, schools can serve their purposes and hence rote type of learning can be avoided as far as teachers are trained accordingly. Thus, to use education as a decisive instrument for development, teaching should not lie on rote type of learning.

Effective teaching-learning process has to take place; techniques of teaching have to be used in the right way; and dynamic and purposeful classroom interaction has to be carried out.

2.2. Effective Teaching

Teaching, which is geared towards the development of students' reasoning power, problem-solving skill, justification, ability to explain, illustrate, analyse, judge, synthesize, and the like, can be featured differently by different scholars though conveying similar meanings or implications. For instance, it may be success in teaching for Monroe (1956:745), or good teaching for Zaborick (1986:2), or effective teaching for Perrott (1986:1), are few concepts among the many ones. Educational researchers as a result of their extensive studies of what teachers do in the classroom,have produced criteria or factors for distinguishing effective teaching (Perrott,1986:1). Two main criteria are the Ryan's factors and the Flanders indicators.

According to the analysis of Perrott, Ryan (1960) and his colleagues conducted a program of observational studies to identify factors associated with what they called effective teaching. Thus, they defined their factors for identification as positive and negative poles as follows.

a) Warm and understanding versus cold and aloof.

b) Organized and business like versus unplanned and slipshod.

c) Stimulating and imaginative versus dull and routine.

Teachers rated nearer to the positive poles of each factor are considered more effective than teachers rated nearer to the negative poles (Ibid).

Besides Ryan's factors, Perrott (1986:2) analyzed Flanders's indicators for teacher effectiveness. Flanders and his associates (1970) carried out research studies that observed two contrasting styles of teaching: direct and indirect. The result of the study reveals that:

> Pupils of indirect teachers (which can be characterized by teacher reliance on asking questions, accepting pupils' feelings, acknowledging pupils' ideas, and giving praise and encouragement) learn more and have better attitudes towards learning than pupils of direct teachers (which are characterized by teacher reliance on lecture, criticism, justification of authority and the giving of direction) (Ibid).

Another important characteristic of an effective teacher is his/her responsiveness to students. This, according to Hunt (1976) as cited in O'keefe and Johnston (1989:20), refers a teacher's ability to read student cues and characterstics and flex

to individual students or groups by adjusting communication accordingly. The case for responsiveness as a charactersitc of effective teaching is rooted in the assumption that:

> effective communication is more likely to occur if the training agent (the teacher) takes account of the listener's frame of reference and adapt his/her approach to the listener's perspective (Ibid).

In general, a central dimension of responsiveness or teacher adaptability to students, is teacher reaction to group and individual differences.

Effective teaching is also characterized by the Tabular Summary of Frequency Mention of Correlation Between Aspects of Teachers or Teaching and Certain Criteria of Teaching Success of Monroe (1956:1949-52) that consists of:

- Resourcefulness (Originality, creativeness, initiative, versatility, imagination, adventurousness, progressiveness).
- Competencies (abilities to do) as a director of learning.
  - . Skill in identifying pupil needs
  - . Skill in choosing learning experiences
  - . Skill in using learning aids

A teacher who has such characteristics is successful in his/her teaching. Nevertheless, a teacher who can be characterized by:

. lack of control of the technique of teaching;

. lack of knowledge of what pupils can do; and

. tendency to talk excessively;

can never be successful in his/her teaching: these are, rather, causes for failurity in teaching (Ibid:1448).

Generally, success in teaching or effective teaching is the result of the use of different techniques of teaching. Because, techniques of teaching, according to Azeb (1982:122), indicate "how well and effectively the teacher applies and follows specific steps, procedures, ways, and manners in teaching for performing a specific teaching act." Thus, it is worth to consider one of the techniques of teaching-Questioning-that initiates and enables learners-when well used-explain, reason, justify, solve- problems, illustrate, compare, contrast, analyses, synthesize, assess/judge, and the like in any subject area at any grade level with any method of teaching.

2.3. Questioning Technique of Teaching

Questioning is a principal technique of teaching which can possibly be referred to as versatile. There is not any classroom activity that does not involve questions during the teaching-learning process no matter what their quality may be.

2.3.1. Frequency in Questioning and its Impact on Learning

Since Questioning Technique of Teaching is more widely used than any method of teaching (Deighton, 1971:188), it is frequently used by classroom teachers in the teaching learning process. To determine the frequency of questioning (timing of questioning) per school day or per lesson or per minute, a number of studies are carried out. For instance,

1. A study of classroom behavior which was performed back in 1912, according to Cooper (1986:142), reveals that 80 percent of classroom talk was devoted to asking, answering, or reacting to questions.
2. In their study about the occurrence of questioning, Dunkin and Biddle (1974) as cited in Dunkins (1988:410), show that in a total sample of 189 United States elementary and secondary classrooms, one -tenth to one-six of the classroom interaction time was occupied by teacher questions.
3. A study on the frequency of questioning as reported by Gall (1970) shows that teachers ask 348 questions per day, 180 per lesson, and 60 per 30 minute lesson (Ibid).
4. Research done on 76 professors about questioning reveals that they ask on the average about 25 questions per class hour (Duell, et.al., 1992:483).

5. A study conducted in a secondary school of Addis Ababa on 31 teachers shows that 358 questions are asked within 31 periods- on the average about 11.55 questions per class hour (Biadgelign,1992:26).
6. Another study, according to Cooper (1986:142), also shows that primary school teachers ask 3½ to 6½ questions per minute; and professors pause about 2.25 seconds after questions and 0.45 seconds after student responses (Duell,et.al 1992: 483).

All such frequently posed questions range from simple recall/memorization of facts to higher level of thought. Most of the questions, according to a study performed back in 1912, were strictly memory, calling for only a superficial understanding of the material (Cooper,1986:142). Gall (1970), as cited in Dunkin (1985:409), reported that of the questions asked, about 60 percent requires recall of facts, 20 percent thinking, and the remainder requires procedural activities. Moreover, 70.39 percent of the questions asked in a secondary school of Addis Ababa were badly worded ones such as ambiguous, multiple, elliptical, loosely-worded, and the like (Biadgelign, 1992:26). Nonetheless, the majority of the questions asked by professors were higher level ones (Duell, et-al., 1992: 483).

Questions have their own respective impact on students' learning /achievement. One of the relatively important areas of research in questioning, according to Dunkin (1988:410), has been the investigation of relationships between questioning frequency and student achievement. In a study that sought to determine the effectiveness of higher level questions, according to Hunkins (1968) as cited in Deighton (1971:188), found that elementary school students who used questions at the analysis and evaluation levels scored significantly better ($p. < 01$) on a social studies criterion test than students whose questions were almost at the knowledge level. Studies of peterson (1977) and Corno (1979) as cited in Dunkin (1988:410), reveal that teaching techniques involving high rates of questioning were linked with superior student achievement. Although research on the effect of questions on student achievement has accumulated slowly and at times is contradictory, in general findings, according to Cooper (1986:142), do suggest that higher-order questions, which require thought rather than memory, increase student achievement.

More specifically, studies conducted on the use of specific type of questioning (higher-order type)reveal that student achievement is significantly better in relation to those that merely require student memorization. For instance, research studies carried out on the use of Elaborative Interrogative questions reveal that student achievement is better than those who use memory questions. Elaborative Interrogations are why

questions (Woloshyn, 1994:84) that require students to elaborate; workout with much care and in detail; describe thoroughly; and the like. Regardless of the adequacy of answers, according to Wood and his associates (1990:741), the why questions facilitate students' learning. That is, improvements in learning occurred when answers were precise elaborations, when responses were other types of elaborations, or even when learners failed to generate elaborations (Ibid). Generally, the impact of a specific type of questioning-in this case, higher level-on students' learning can be summarized by Figure 2.1 as follows.

Figure 2.1. Summary of Research on the use of Higher Level (Elaborative Interrogations) Questions and their Impact on Learning.

Authors	Year	Participants/ subjects	R e s u l t s
Michael Presstey and his Colleagues	1988	. 60 under graduates who were enrolled for introductory psychology at selective candian University.	.Promotion of extensive analysis and thinking about the factual relation-ships. . Experimental group produced precise elaborations in response to the why questions much more so than reading control group.
. Eileen Wood; . Michael Pressley; . Philip H. Winne.	1990	. 139 English speaking elementary school (Grades 4-8) students attending a canadian Public School.	. Produced better learning than when learners were left to their own devices to study the facts. . Increased learning as age increases. . Even when a precise elaboration was not produced, the probability of recall was higher for older children compared to younger children.
. Vera E. Woloshyn; . Allan Paivio . Michael Pressley.	1994	. 60 students (Grades 6 and 7).	. Enhanced performance on both recall and recognition tasks in relation to instructing students to read for under standing. . Learning was facilitated regardless of whether students studied facts that were consistent with their prior knowledge or facts that were inconsistent with their prior knowledge. . Little effect on memory.

2.3.2. Characteristics and Purposes of Questions.

Question refers to a problem or puzzle which is presented to some one- in this study, to the learner- so as to give answers, to give his/her opinions, to express his/her attitude, to tell his/her wishes, and the like. A question is a statement for which

a replay is expected (Kissock and Iyortsuun, 1984:2). According to a dictionary definition, question is a

> sentence which by word-order use of interrogative words (who,why, etc.) or intonation,requests information, an answer, etc... it is something about which there is discussion, something which needs to be decided.. (Horny, 1987:687).

In the classroom, questions have a number of purposes/importances. For instance, they can be used to

- develop processes of thinking and guide inquiry and decision-making.
- acquire and clarify information, answer concerns, and develop skills.
- provide motivation by encouraging active participation in learning.
- lead students to consider new ideas and make use of ideas already learned.
- help students to clarify ideas, structure their study, and learn about things that interest them.
- provoke students and teachers to share ideas they have.
- help teachers assess the effectiveness of their own teaching (op.cit.:6).

Questions, according to Farrant (1988:190), also serve two purposes.

- To test what has been learned. For this purpose, the four interrogatives-who,what,where, and when- are generally used.

. To stimulate thought and lead to a deeper understanding. In this case, the interrogatives how and why are more often used.

This second purpose of questions plays a predominant role where learners are required to think critically in lieu of the mere memorization of concepts, facts, procedures, or ideas. Asking students questions which begin with phrases such as "Why do you suppose...?" and "How does the ...?", the teacher pushes the student beyond a rote memory exercise-promotes critical thinking skills on the part of learners (Jacobson, et.al., 1989:134). Such thinking skills have eminent importance to learners. Because, thinking skills are:

. essential processes, such as observing, comparing, inferring, generalizing, hypothesizing, and reasoning inductively and deductively.

. high-order cognitive processes, such as problem-solving, decision making, and critical and creative thinking (Ibid:187).

Generally, asking questions during the course of the lesson, according to Davies (1981:163), have four reasons /purposes.

1. Motivate trainees/students by gaining their interest and attention.

2. Promote mental activity.

3. Involve trainees as partners in the instructional process.
4. Obtain feedback on the trainees' ability to recall,understand, and apply what they have learned.

These four purposes of questions can respectively be attained by the use of questions listed in Figure 2.2 (Ibid: 164).

Figure 2.2. Purposes of Questions

1. Motivate trainees by asking questions that:
   - Stimulate curiosity
   - Stimulate interest
   - Confound
   - Puzzle
   - Challenge
   - Intrigue
2. promote mental activity by asking questions that obtain:
   - Breadth
   - Organization
   - Interaction
   - Analysis
   - Synthesis
   - Evaluation
   - Creativity
   - Action
   - Information
   - Feelings
3. Involve trainees by asking questions that elicit:
   - Information
   - Observation
   - Prediction
   - Explanation
   - Evaluation
   - Reasoning
   - Application
   - Analysis
   - Synthesis
   - Feelings
4. Obtain feedback on the trainee's progress by asking questions that determine:
   - Ability
   - Understanding
   - Recall
   - Recognition
   - Application
   - Belief
   - Evaluation
   - Analysis
   - Synthesis
   - Skill
   - Attitude

2.3.3. Classifications of Questions

While some questions require simple memorization, the others call for understanding, and students' capability of justification, illustration, or reasoning(Camp, 1993:17). To serve such purposes, there are many ways of classifying questions. Most of these classification systems are useful in that they provide a conceptual frame work, a way of looking at questions (Cooper, 1986:143 and Perrott, 1986:42). One of the best known classifications of questions is based on Bloom's Taxonomy of Educational Objectives (1956) (Kissock and Iyortsuun, 1984:9; Cooper, 1986: 143;and Perrott,1986:42). There are six levels of Bloom's Taxonomy, and questions at each level require the students' responding to use a different kind of thought process (Ibid). Teachers, therefore, should be able to use these six levels so as to encourage their students to engage in a variety of cognitive processes (Cooper, 1986:143 and Perrott, 1986:42). These six levels are: knowledge, comprehension, Application, Analysis, Synthesis, and Evaluation (Op.cit.).

Level I. Knowledge Questions

Knowledge questions require students to define,recall recognize, and repeat something already learned-certain specific facts, information, procedures, or ideas (Ibid). During this time, students are not asked to manipulate information, but merely to remember it just as it was learned.

Examples of knowledge questions are:

. What is the capital city of Ethiopia ?

. When did Menelik II become leader of Ethiopia ?

. How many meters are there in one Kilometer ?

. Who is the secretary of OAU ?

. Name two kinds of blood-vessels in the body ?

. What is your favorite food ? and so on.

Though knowledge question, according to Cooper (1986:144), uses to promote classroom participation and high success experience for students; and is critical to all other levels of thinking and reasoning for the fact that students can not be asked to think at higher levels if they lack fundamental information (Kissock and Iyortsuun, 1984:24), it has its own draw backs. A recall answer does not go beyond the information previously presented, nor does it change the form or organization of the information (Perrott, 1986 :42). Teachers tend to over use them; much of what is memorized is rapidly forgotten; and assess only a superficial and shallow understanding of an area are also some of the drawbacks of knowledge questions (Cooper, 1986:144).

To distinguish knowledge level questions from others, there are key words which are frequently found or associated with this level. They include:

define, recall, remember, where, who,when, recognize, what, which, name, list, tell, how many, how much, identity (Kissock and Iyortsuun,1984:25; and Cooper, 1986:144).

Level II. Comprehension Questions.

Comprehension questions are asked when the teachers' purpose is to help students organize facts in such a way as to make some sense of them. Such questions, according to Cooper (1986:146) and Perrott (1986:43), require learners to select those facts that are pertinent to answer the question by describing, comparing, or contrasting. That is, to answer comprehension questions, students should go beyond the memorization or recalling of specific information, facts, ideas, or procedures. The student, according to Cooper (1986:146),

> must demonstrate a personal grasp of the material by being able to rephrase it, to give a description in his or her own words, and to use it in making comparisons.

Frequently, comprehension questions ask students to interpret by making comparisons and showing relationships among ideas and information (Kissock and Iyortsuun, 1984:34); interpret material presented in the form of charts, graphs, tables, and cartoons (Cooper, 1986:146; and Perrott, 1986:43). Moreover, such questions require students to translate ideas from one medium to another-translation of ideas and information from one form of communication to another (Kissock and Iyortsuun, 1984:34; and perrott, 1986:43).

Examples of Comprehension questions are:

. What is the main idea that this chart presents ?

. Describe the kinds of problems faced by immigrants ?

. What does the rule mean when it says: "A player should not

wear anything which may cause injury to another player"?

. How would you say this in Amharic ?

. From the above graph, give the average annual rainfall for this country ?

. How did life in the eighteenth century differ from life today ? and so on.

Key words commonly found in comprehension Question are:

> Compare, contrast, differentiate, explain, rephrase, distinguish, describe, relate, interpret, rearrange, put in your own words, translate, predict (kissock and Iyortsuun, 1984:34; Cooper, 1986:147; and Perrott, 1986:43).

Level III. Application Questions.

Requiring students to memorize/recall information, ideas, or procedures; and asking them to rephrase and interpret what they have memorized are not enough for their learning. Students have to learn how to apply in new situations. Therefore, at the application level, students must decide what information to use so as to solve problems (Kissock and Iyortsuun,1984:41). Application questions require students to apply information they have learned in order to reach an answer to a problem (Cooper,

1986:148 and Perrott,1986:44). Moreover, questions of the application level of Taxonomy ask students to apply a rule or process to a problem so as to determine the single right answer to that problem (Ibid). In a biology lesson, for instance, a student may be asked to apply what he/she has learned about populations by answering the question:

> When organisms are living densely packed in a small area, are they more likely to compete if they belong to one species than if they belong to many different species ?

To find solutions to application seeking problems, many ways can be followed. For instance, according to Kissock and Iyortsuun (1984:42), some are dependent upon logical and rational basis, others are based on emotion or intuition, and still others are based on combination of approaches. To this end, one has to bring his/her knowledge, skills, and beliefs from which one selects ideas to help him/her find a solution to each problem.

Some of the key words often associated with application questions are:

> Apply,classify, use, choose, employ, give an example, calculate, solve, design, demonstrate, who, which, what is, (Kissock and Iyortsuun, 1984:45; Cooper,1986:149; and perrott, 1986:44).

Level IV. Analysis Questions

Analysis questions, such as cause and effect, explanatory types, are asked so as to help students analyse information for underlying reasons (Perrott,1986:44). Such questions, according to Cooper (1986:150), are higher-order ones that require students to think critically and in depth. Analysis questions ask students to engage in three kinds of cognitive processes. These, according to Cooper (1986:150-51) and perrott (1986:44-5) are:

.To identify the motives, reasons, and/or causes for a specific occurrence.

Example: -Why was scurvy once a common disease among sailors?

- What factors influenced the writings of Addis Alemayehu?

. To consider and analyse available information in order to reach a conclusion, an inference, or a generalization based on this information.

Example: - Look at the diagram of this new invention. What do you think the purpose of this new invention is? -Now that your experiments are complete. What is your conclusion about the factors affecting the growth of seedlings ?

. To analyse a conclusion, inference, or generalization to find evidence, to support or refute it.

Example:- What information could you use to support the

proposition that "president Mengistu was not a successful president" ?

- In what ways have public health measures contributed to a worsening of the state of the human population?

Analysis questions require students to analyse information so as to support a particular conclusion, inference, or generalization and to identify causes, to reach conclusions, or to find supporting evidence (Ibid). Therefore, if students develop the ability to analyse problems and statements people make, they will be developing a skill they can use through out their lives (Kissock and Iyortsuun, 1984:52). Being able to analyse a situation by determining its parts, their relationship to each other, and understanding the underlying principles can help students solve problems more easily (Ibid).

Some of the key words that frequently found in analysis questions are:

> Identify motives or causes, draw onclusions, determine evidence, support, analyses, why, what factors, compare, contrast, infer,(Kissock and Iyortsuun, 1984:52; Cooper, 1986:152; and Perrott, 1986:45).

Level V. Synthesis Questions

Synthesis questions are higher-order questions that ask students to perform original and creative thinking(Cooper,1986:154). Moreover, when the purpose of a lesson is to help students to perform relationships and put things together in new or original ways, synthesis questions are asked (Perrott,1986:45). Synthesis questions, besides helping students develop creative abilities and thorough understanding of a subject, they require students to .

.Produce original communications

e.g. What is a good name for this machine ?

.Make predictions.

e.g. How would life be different if the courts did not exist?

. Solve problems.

e.g. How can we measure the height of a building without being able to go into it ? (Cooper,1986:154 and Parrot,1986:45).

Some of the key words that often associated with analysis questions are:

> Create, plan, construct, formulate, put together, predict, produce, write, design, develop, synthesize, how can we improve, what would happen if, can you devise, how can we solve (Kissock and Iyortsuun, 1984: 60; cooper, 1986:155; and Parrot, 1986:46).

Level VI. Evaluation Questions

The last level of the Taxonomy-Evaluation-like analysis and synthesis, is a higher- order mental process. Evaluation questions, according to Cooper (1986:156), do not have a single correct answer. They require the student to judge the merit of an idea, a solution to a problem, or an aesthetic work; and also ask the student to offer an opinion on an issue (Ibid).

Examples of Evaluation questions are:

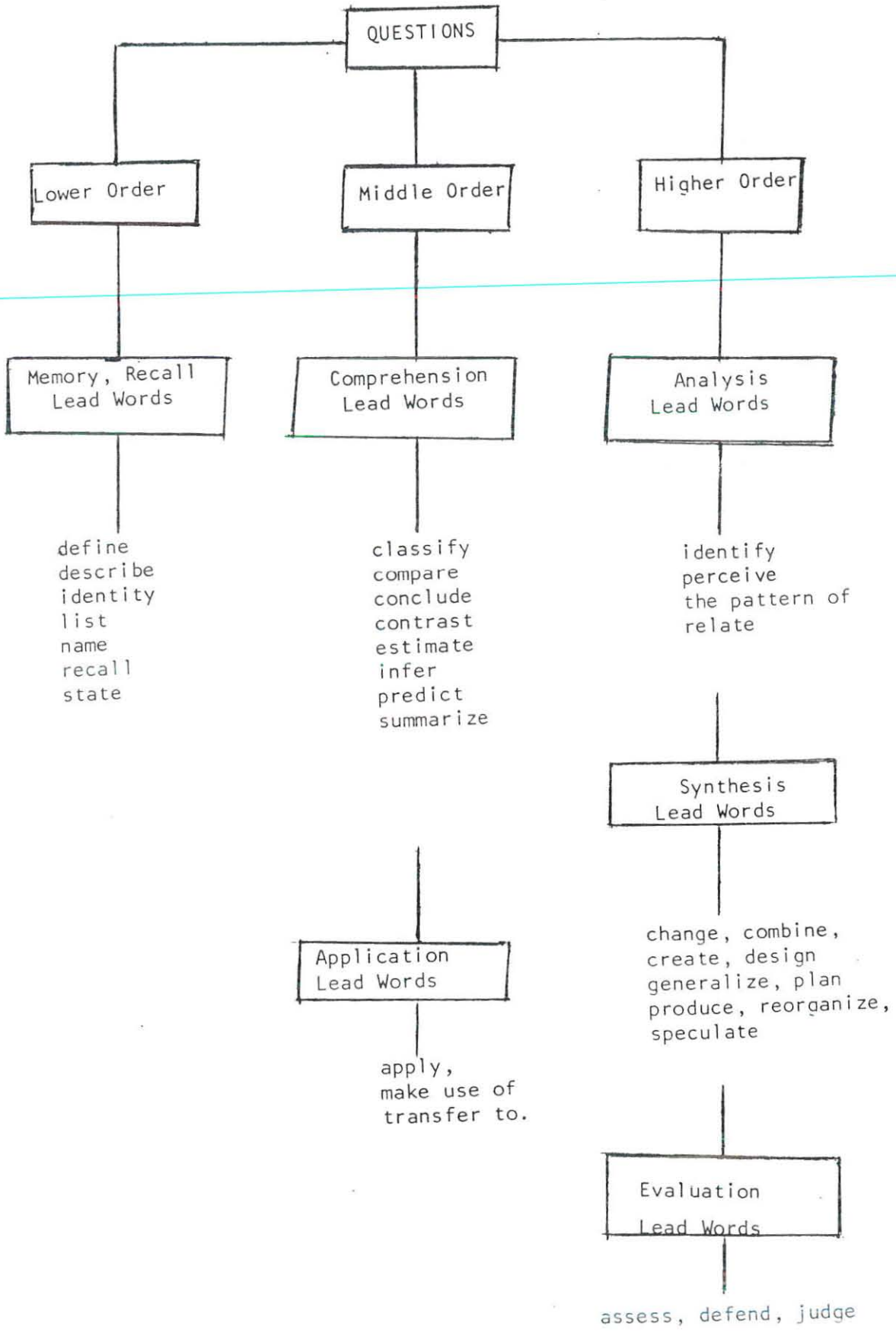
- Which approach offers the best method for attacking this problem ?
- Do you think that the statement "Ethiopians never had it so good" is true ?
- Which picture do you like best ? and the like.

Some of the key words often used in evaluation question are:

Judge, argue, decide, evaluate,assess, give your opinion, do you agree, would it be better, (Ibid:157).

Generally, these six Taxonomy levels of questions can be categorized into three levels-lower-order, middle order, and higher-order-according to Figure 2.3.(Farrant, 1988:191).

Figure 2.3. Classification of Questions by Levels



2.3.4. Common Faults of Teachers in Questioning

Most question types develop and promote students' critical thinking skills. Nevertheless, there are some questions that limit learning, that lead students to rote type of learning, and even that confuse them. Some of them are: Vague questions, multiple questions, trick questions, limited questions, elliptical questions, and loosely-worded questions.

Teachers, sometimes, ask questions that are not clear and that are not understandable by students. For instance, teachers may ask such questions as:

. Do you know how old mis X is today ?

. Where do you get electrons ?

. Where is these are ?

. What do you use it ? etc.

such questions are called vague or very general questions (Farrant, 1988:191). Vague questions may not have answers at all or there may be so many possible answers and hence it is not worth to ask such questions (Ibid).

Teachers also ask two or more questions at a time-without having an answer for the first one-for they may not think-out their questions in advance. Questions may grow as teachers see the problem from different angles for guarding against the children from getting the wrong idea (Ibid:192). For instance, teachers may proceed as follows.

- Where is cotton produced ?, Who is the major producer? What is the importance ?
- Who will tell us about "some?", about "any?", any information ?
- What is the use of rubber ?, Jute ?,Palmoil ?,Suger ?
- Who are the major producers in Africa ?, In Asia ?, In America ? and so on.

Such questions are referred to as multiple questions.

Teachers, intentionally pose trivial or non-sense questions that according to Davies (1981:167), serve only to show off the knowledge and skill of the teacher. They are designed to make a fool of the student and are called trick questions (Ibid).

Sometimes, teachers use questions only for emergency- as an airman regards his parachute- only when they run dry of information. Questions that serve such purposes are referred to as limited questions (Farrant, 1988:192). Limited questions include such questions as:

- Has any one any question ?
- Another question ?
- Any other ?
- If you have a question, you can ask ?
- Any question you have ? and the like.

Elliptical questions, according to Davies (1981:167), are those that take the form of incomplete sentences. Examples of such questions are:

- Early capitalism means.. ?
- Soil erosion is controlled by ... ?
- Are said to be ... ?
- Is used for ... ?
- The first method of testing protiens is ... ? and the like.

Lossely worded questions are those that immediately follow teachers' presentation or explanation. Examples of such questions are:

-... they believe in What ?

-... a point is what ?

-... a magnate is covered by what ?

-... is found where ?

-... is the combination of what ? and the like .

Questions such as vague, multiple, trick, limited, elliptical, and loosely-worded, are some of the weaknesses or common faults of teachers in questioning (Farrant, 1988:191). Chief indicators for weakness in questioning, according to Burton (1952:538), lie in:

- the teachers' conception of the purposes or aims of questions;
- lack of knowledge of the mental processes of learning;
- teachers own lack of general education and intellectual interest; and
- When teachers' knowledge and thinking is poor.

Faults in questioning can also be made from lack of experience in teaching. " Inexperienced teachers," according to Farrant (1988:191), "Frequently make bad use of questions and fall into

habits that tend to persist unless their attention is drawn to them." Hence, such questions- that are wrongly framed or faulty use of questions-should be avoided for they serve no purpose (Davies, 1981: and Farrant, 1988:191).

2.3.5. Skills of Questioning

"Questioning is a highly complex skill requiring an understanding of people and group psychology as well as thorough knowledge of what is being thought." This is a statement made by Farrant (1988:191). This means that inorder to attain the purposes of questions,the skill of the classroom teacher in posing questions is highly important. Questions have to be constructed or phrased with respect to the objective of instruction, and should be presented in a way that have the greatest effect. No matter how good the questions may be, according to Kissock and Iyortsuun (1984:106), if they are presented poorly, at the wrong time, or when interest is not directed towards the topic, questions will not have the desired impact. Therefore, to develop and promote the ability of children for comparing, contrasting, justifying, solving problems, and the like, effective questioning skill has to be employed. Because, DeGarmo (1902) as cited in Cooper (1988:141) has said that:

> To question well is to teach well. In the skillful use of the question more than anything else lies the fine art of teaching; for in it we have the guide to clear and vivid ideas, and the quick spur to imagination, the stimulus to thought, the incentive to action.

Moreover, it is contended that "inorder to be an effective teacher, one must be an effective questioner" (Ibid: 143); good questioning skill will keep the class on its toes, students become alert and mentally active and they know more than they imagine (Davies,1981:163).

Consequently, it is worth to consider how questions, can be directed or questioning skills. From the various ways of presenting questions, three of them are summarized as follows.

The first step toward developing effective questioning skill is to increase the number of student participation. Because, establishing positive patterns and high-level of interaction in a classroom are useful questioning skills. The art which involves in this case is known as Redirection. Redirection is a technique of questioning which, according to Jacobson, et.al. (1989:142), involves the framing of a single question for which there are many possible responses and the receiving of responses from several students. For instance, a classroom teacher may proceed as follows.

"Having completed our..., who do you think was...?" For such a question, a student may respond in one way; another in another way; and still another student, in another way. During this time, the teacher redirects the original question and, in so doing, eliminates any possible domination of the discussion and

increases the frequency of questions and student participation, both of which, according to Brophy and Everstson (1976), Deham and Liebermann, (1980), Soar (1973), all as cited in Jacobson and his colleagues (1989:143), are related to increased student achievement. In clearer terms, the way the teacher redirects questions can be put in the sequence as follows.

Teacher (T): Some of you mentioned... Why do you think...?

Student: I think... was... (First student).

T : Do you have something, X_1 ?

X_1 : I think... was... (X_1, is a second student).

T : X_2 ! can you add any thing else ?

X_2: They were all... because... (X_2 is a third student). and so on.

Here, it is important to note that the three students may not have been dealing with the same individual or answer though they were all responding to a single question posed by the teacher at start (Ibid).

How can one deal with students who cannot answer questions or whose responses are wrong ? This is the concern of the second skill of questioning called Prompting. Its application in a classroom can be illustrated by the following sequence between a teacher (T) and a student (S).

T: Regarding our discussion on ..., which pattern does...? student seems to be confused and does not respond.

T: Any idea ?

S: I don't know

T: Ok! letus take another look at the ... they are said to be...?

S: Equal

T: Right. Equal in what ?

S: Weight

The teacher nodes. Then;

T: Now, if we have these equal..., what happens ?

S: Balanced;

T: Great. This demonstration represents...?

S: The balance of ...

T: Now, you got it (Ibid:145-46).

Generally, prompting skill of questioning, which the preceding example demonstrated, involves the use of hints or clues which are used to aid the student in responding successfully. This method/skill can also be employed when a response is incorrect (Ibid:146).

The third skill of questioning is probing. This arises when,according to Jacobson and his associates (1989:149), the students' reply is correct but insufficient for it lacks depth. In such a case, it is important for teachers to have the student

supply additional information in order to have better, more inclusive answers. The following illustration vividly reveals that how this skill of questioning is applied in the classroom.

Teacher (T): Do you think trees are important to the land ?

A?(A is a student).

A: Yes

T: Why, A ?

A: Because, they...

T: What do you mean by that ?

A: Well, the roots...

T: That is very good, "A" and as we ...

(Ibid:149-50).

The eminent purpose of such a skill of questioning is to encourage students justify or further explain their responses, views, and suggestions so as to increase the depth of discussion. It also helps to move students away from surface or shallow responses (Ibid).

Generally, good questions, according to Wassermann (1992:n.p.) follow an interactive rhythm that produce reflection rather than interrogation, building trust in the interactive relationship. Moreover, effective questioning techniques can generate a high rate of teacher-student interaction; teacher assistance, through priming, prompting, and cueing, can be used to develop a high level of correct responses to questioning; and positive feedback can promote students' self-esteem (Goor and Roe, 1989:321).

Finally, it is worthwhile to cite that developing good questioning skill requires planning and continuous self-evaluation that provides a more enjoyable teaching experience on the part of teachers, and more enhanced learning experience for the students in the classroom at present and in the work place tomorrow (Greate house and Karmos, 1990:3).

CHAPTER THREE

3. METHODS AND PROCEDURES OF THE STUDY

The main purpose of this research was to study on the extent to which effective use is made of the Questioning Technique of Teaching in Teacher Training Institutes. Hence the descriptive survey approach is used.

3.1. Population and Sampling Procedures.

The population of this study is Teacher Training Institutes instructors. To make the study manageable two teacher training institutes were selected. Among the twelve teacher training institutes, two were selected on the basis of their proximity to the researcher. Such a selection technique was made due to the nature of data collection instrument used (described below).

In the selected institutes-Debre Berhan and Nazreth-instructors/trainers were taken as sources of information. That is, four intentionally selected teachers in an institute (teachers who teach subjects taught in Amharic or English: Pedagogics, Psychology, English, and Amharic) making up a total of eight instructors were observed. Although these four subject areas were chosen deliberately, they can serve as a representative sample. Because, whenever one employs a purposeful sample, according to Meyers and Grossen (1978:113), One must make the assumption that this subgroup is still representative at the time one takes his/her measurements.

3.2 Data Collection Instrument.

To get valid and reliable information for the study, one type of data collection instrument-observation-was used. Then, the observation was carried out on the basis of the following procedures.

1. Observation schedule or observation checklist was set that addressed the objective and intent of the study.
2. A tryout was made of the instrument of data collection so as to determine its reliability and validity. This tryout was carried out in one teacher training institute (in Jimma) different from the target institutes. This was proceeded as follows.

Four observers were selected and were oriented in how to use the observation checklist. Two of them were selected randomly from six teachers: three teachers teach Pedagogical Science and three of them teach psychology. The remaining two observers were also selected randomly from four teachers who teach Amharic (two of them) and the remaining two, English.

All observers have BA degrees: two teachers in Pedagogical science; one in Amharic and the remaining one in Psychology. Their teaching experience in Teacher Training Institutes ranges from 3 to 13 years (APPENDIX-A number 1).

Observers selected from Pedagogical Science and Psychology observed (two of them at a time) one Pedagogical Science teacher and one Psychology teacher for two consecutive class hours. Similarly, those selected in languages, observed (two of them at a time) one Amharic teacher and one English teacher for two consecutive classhours.

Regarding the qualification of the teachers' observed, all have BA degrees: three teachers in Pedagogical Science and the remaining one is in Linguistics. Their teaching experience in Teacher Training Institute ranges from 1 to 16 years (APPENDIX-A number 1).

These teachers were observed in their normal classrooms (with 46 trainees in each classroom) during the teaching, learning process.

To ascertain the reliability and validity of the instrument or the checklist, the following questions were asked:

- is the checklist objective ? Is there stability/consistency in the use of the checklist (Question of Reliability)?
- does the checklist fully measure the aspects of questions posed by the teacher during the teaching-learning process, that is, is the checklist adequate to cover the full range of teacher questions that are

supposed to be posed in the teaching-learning process (Question of validity-of content) ?

To answer these questions or to determine the reliability and validity of the checklist, the following steps were computed from the result of the tryout.

First, the reliability of the checklist was determined as follows.

- Scores for each item were determined by counting the tally marks.
- Correlation coefficients were determined for each subject area by using the pearson Product-Moment of Correlation Coefficient.
- Each session's correlation coefficient was summed up and averaged for each subject area.
- Finally, the averaged correlation coefficients of each subject area were summed up and averaged so as to determine the interrater reliability coefficient (for the calculations, see APPENDIX-B, numbers 1 to 4). It is summarized in Table I below.

TABLE I

Correlation Coefficient by Subject Area Per Session

Subjects	Correlation Coefficients for		Average
	$Session_1$	$Session_2$	
Amharic	0.91	0.88	0.90
English	0.98	0.97	0.98
Pedagogics	0.96	0.99	0.98
Psychology	0.94	0.87	0.91
		Average	0.94

Table I reveals that each rater agrees to each other in using the checklist. This is so because, the correlation Coeffecient between raters for each subject area seems highly correlated. This implies, therefore, that the checklist is reliable for the sample subject areas. Such a conclusion is reached due to the fact that Bennett and McNamara (1979:119) contend that:

> The most common strategy for estimating the accuracy of observation data consists of a comparison of the protocols of two or more observers who have independently recorded the same behavior. From this comparison, a reliability estimate is calculated, usually in the form of correlation..., and is understood by most investigators to be an estimate of observer accuracy.

Moreover, the interrater correlation coefficient (o.94) is also high. This shows that the checklist is used consistently by different raters for different subject areas. That is, the checklist is reliable.

Second, to determine the validity (particularly, content validity) of the checklist, the following procedures were followed:

- raters, during the tryout of the instrument, were required to write their suggestion regarding teacher's questions that should be included in the checklist; to give their comments upon the items that need improvement; and that need to be avoided in the checklist.
- Instructors and Graduate Students in the field of Curriculum and Instruction of the Addis Ababa University were consulted to give their comments upon the checklist.
- The reliability coefficient, calculated above, was also used for the fact that reliability is a necessary condition for validity though it is not a sufficient one (Gronlund, 1981:94).

At last, taking the comments into consideration and the reliability of the checklist, necessary improvements were made. From this, the researcher concluded that the checklist was valid (content wise), that could measure for what it was intended to measure.

3. At last, two observers (raters), for the final study, were trained in how to use the observation checklist and record findings. Regarding these observers the preliminary Information (APPENDIX-A number 2) reveals that they are very much similar with those in the tryout (APPENDIX-A, number 1) interms of qualification, area of study, years of experience in teaching in Teacher Training Institutes, and the like but their current status. Their current status has facilitated their training. Therefore, the study was not affected interms of observers.

Then, classroom observation was carried out in accordance with a deliberately selected courses in each institute. That is, among the subjects offered in each institute: Pedagogics, Practice Teaching, Psychology, Amharic, English, Nation/Nationality languages, Mathematics, Natural Science, Social Studies, Agriculture, Handcraft, Home Science, Art, Music, and Physical Education (MOE, 1992:4) only Pedagogics, psychology, Amharic, and English were selected and observed. Such an intentional selection was made because in one of the target institutes the medium of instruction is different from Amharic and English but for the selected subjects. Due to this, it was difficult and impractical for the researcher to train observers. Therefore, the researcher was compelled to choose subjects intentionally.

Finally, one teacher of the selected subject area was observed by the two trained observers for three consecutive classhours. Such a repeated observation of a single teacher was made to control the effect of a change in the teacher's teaching technique or his/her over all personality that may take place due to the presence of alien observers. With regard to this, Bennett and McNamara (1979:126) contend that a "teacher might not do under direct observation what he/she can do when not under direct observation." Therefore, to avoid such a condition, according to Simon and Boyer (1974) as cited in Bennett and McNamara (1979:126), the most widely used observational system requires the presence of one or more observers over a period of from one to three 30-minutes sessions. The assumption in this case-the use of repeated observation-is that an observer's presence does not affect teacher's personality (Ibid:127).

Thus, 12 observation class hours in an institute or a total of 24 classhours in the two target institutes were observed. Regarding the teachers observed for the final study, the preliminary Information (APPENDIX-A number 2) reveals that they are similar with those in the tryout (APPENDIX-A number 1) with respect to qualification. Nonetheless, there are differences with respect to area of study and years of teaching experience in Teacher Training Institutes.

3.3. Methods of Data Analysis

Depending upon the nature of basic questions of the study and the data collected, different statistical methods were employed. All the basic questions were directly tested based on the responses procured from the observation checklist. Then, an observer's score was determined by counting the tally marks of each item for each subject area per session. The three scores of an observer for a subject were summed up and averaged(for each item) so as to determine a single score for an observed teacher.

After this, a Correlation Coefficient was calculated by using the Pearson Product-Moment Correlation Coefficient (APPENDIX-E). The result gave a correlation coefficient of 0.99 which is high. This reveals that observers of the final study were very much consistent in using the checklist.

Following this, scores of the two observers were summed up and averaged for each item per subject area. With this process, 8 scores (because 8 teachers were observed) were found for each item of the checklist. Then, the 8 scores of each item were summed up so as to have a single score for an item within 8 class hours (APPENDIX-D). After this, each item's score was changed to percentile distribution with reference to category one-item 1. Then, the items were grouped within their respective category (Items 1,2,3,4, and 5 are the categories-APPENDIX C, the checklist).

Following this process, a Chi-square (X^2) statistical test was employed so as to show whether there exists a statistically significant difference within the items of a category (for categories 2 and 3) with Alpha 0.05 level of significance. Alpha 0.05 level of significance was selected because, it, according to Kerlinger (1964:54), is neither too high nor too low (5 chances in 100 trials) for most social scientific research. Nevertheless, 0.01 level of significance is quite a high level of certainly (1 chance in 100) is too stringent. And, 0.1 level of significance are too many (10 chances in 100) so that many researchers are not willing to risk a decision with such odds (Ibid:53). Then, whenever there was a statistically significant difference within the items of a category, a pair wise Chi-square (X^2) statistical test was employed with Alpha 0.05 level of significance so as to show where the difference lies.

Categories 1,4, and 5 of the checklist (APPENDIX-C) were interpreted with simple percentage distributions, where category 4 was seen in comparison with categories 1 and 2; and category 5 in comparison with category 1. The intent of comparing category 4 with categories 1 and 2 is to show/determine the number of purposeless questions posed by teachers with respect to the total number of question asked within the 8 class hours. Besides, it is to indicate the proportion of purposeless questions in comparison to purposeful ones. And, category 5 is compared with category 1 so as to show the number (proportion) of questions that are

skilfully posed-that manifest/reflect the skills of teachers in questioning.

In addition to these, three important concepts of the study (purpose of questions, classifications of questions, and skills of questioning) were seen with respect to subject areas, teaching experience of teachers in Teacher Training Institutes, and with respect to student population. Because these variables, according to APPENDIX-A number 2, are found to be different from institute to institute and from teacher to teacher. A Chi-Square (X^2) statistical test was also used within a concept and a variable at Alpha 0.05 level of significance.

CHAPTER FOUR

RESULTS AND DISCUSSION

In this section, the data collected through the observation checklist is presented with the the help of tables followed by interpretation and discussion of the results so as to give answers to the five basic questions denoted in the first chapter of this study.

4.1. Results

4.1.1 General

TABLE II

Frequency of Occurance of Teachers' Questions During a 45 Minute period.

	TIME									
	1	2	3	4	5	6	7	8	9	Total
Number of Questions	5.40	3.10	2.23	1.33	2.13	1.92	1.75	2.19	3.09	23.14
%	23.34	13.4	9.64	5.75	9.20	8.30	7.56	9.46	13.35	100.00

Note: Numbers 1,2,3,..., and 9 respectively refer to the first-five minute, the second-five-minute, the third five-minute,..., and the ninth-five-minute.

The frequency of teachers' questions, as Table II depicts, is 23.14 within one classhour (where one classhour is 45 minutes long). More questions are asked in the first two-five minutes and

in the last one five-minute. In the middle six-five minutes, the frequency of teachers' questions is less than the two extreemes. The frequency of teachers' questions, particularly those in the middle four-five minutes, does not have a regular pattern. One time, it increases and on the other it decreases. For instance, in the fourth and the sixth -five minutes, teachers' questions are less than those in the fifth-five minute. In short, for the first four-five minutes, frequency of teachers' questions decreases as time increases and for the last three-five minutes, frequency of teachers' qquestions increases as time decreases or as the classhour is going to end. This pattern can simply be indicated by the figure below.

Figure 4.1 Frequency of Occurance of Teachers' Questions per five Minutes for a 45 Minute long Period

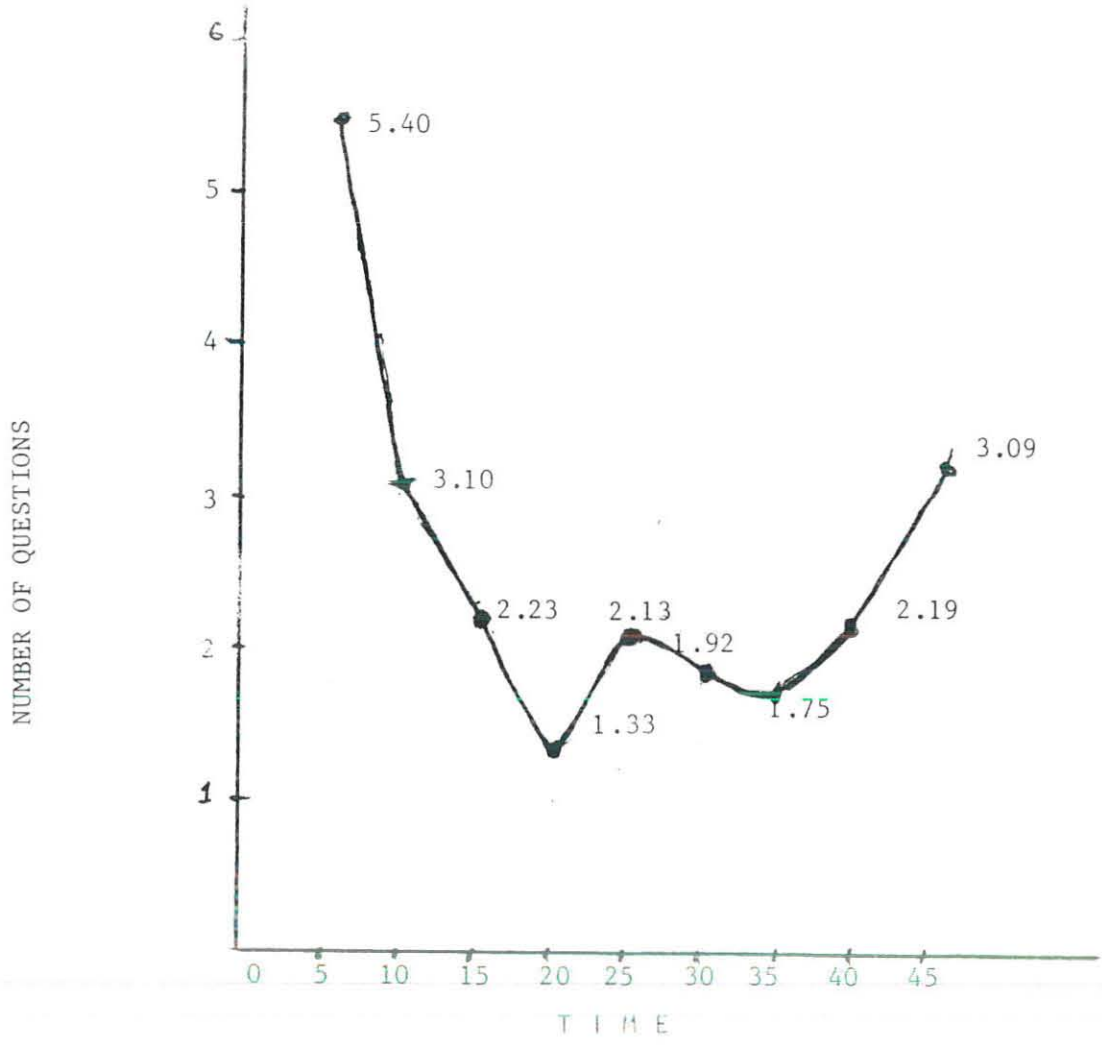


TABLE III

Purpose of Questions

p u r p o s e s	No. of.Questions	%
P_1 : Motivating Trainees	9.67	8.74
P_2 : Promoting Mental Activity	7.51	6.79
P_3 :Involving Trainees as Partners in the Instructional Process	23.99	21.68
P_4 : Obtaining Feedback	69.50	62.80
Total	110.67	100.00

Questions, as Table III reveals, are used for different purposes. Their usage ranges from 6.79 percent to 62.80 percent. Most of the questions (62.80 percent) are used for obtaining feedback. Questions that promote trainees' mental activity are the least used (6.79 percent) of all the purposes. However, is this variability in the use of questions statistically significant ? To give answer to such a question, a one-way Chi-squre (X^2) statistical test was used (see APPENDIX-F number 1 for the calculations).

The result in APPENDIX-F number 1 shows that the computed Chi-square value (X^2=90.12) is by far greater than the critical chi-square value ($X^2$3 , 0.05= 7.82). This implies that there is a statistically significant difference in the use of the four purposes at P<0.05 level of significance.

Therefore, it is pertinent to identify the purpose for which questions are most used and, at the same time, the purpose for which they are least used. To do so, the data of Table III above was seen in a way of the calculations of the pair-wise chi-square statistics of the four purposes of questions (See APPENDIX-F number 2 for the calculations).

The calculations in APPENDIX-F number 2 depict that each of the computed chi-square value but P_1 and P_2 is greater than the critical chi-square value. This implies that there is a statistically significant difference between the use of each of the purposes of questions (P_1 and P_3; P_1 and P_4; P_2 and P_3; P_2 and P_4; and P_3 and P_4) at $P<0.05$ levle of significance.

Since the fourth purpose-Obtaining Feedback-has the highest frequency, questions, most of the time, are used for this purpose than for the others. The frequency of the second purpose of questions-Promotion of Mental Activity-is the least of all the purposes. This reveals that the least used purpose of questions is the promotion of Mental Activity though there is no statistically significant difference between it and purpose one.

TABLE IV

Classification of Questions

	C L A S S I F I C A T I O N S			
	Lower order	Middle order	Higher order	Total
No.of Questions	84.16	23.67	2.84	110.67
%	76.01	21.39	2.57	100.00

Regarding the classification of questions, the observed teachers used all the three classifications. Most of the questions (76.01 percent), according to Table IV, posed by teachers are lower-order type: Knowledge level questions. The middle and the higher order ones are the least used question types. In short, Table IV shows differences in the distribution of questions from one classification to the other. To confirm such differences, a one-way chi-square statistical test was computed (see APPENDIX-G, number 1 for the calculations).

The result of the computed chi-square value (X^2=96.74) is by far greater than the critical chi-square value ($X^2$2, 0.05 = 5.99). This implies that there is a statistically significant difference in the distribution of questions in each of their three classification levels at P<0.05 level of significance.

Thus, it is necessary to prove statistically the classification that encorporates most questions and least questions. That is, which type of question is emphasized/the most used one ? and which is the least used ?

To give answers to such questions, the data of Table IV was seen in a way of pair-wise chi-square (X^2) statistics (see APPENDIX-G, number 2 for the calculations).

The result of this calculation reveals that all the computed chi-square values (X^2_i) are greater than the critical chi-square value ($X^2 1, 0.05 = 3.84$). This implies that there is a statistically significant difference in the distribution of teachers' questions into the three classifications at $P<0.05$ level of significance.

Since the frequency of questions in the first classification-lower-order, knowledge questions -is greater than the remaining one's, the most widely used question type is the lower-order one. And, the Higher-order classification of questions is the least used type.

TABLE V

Total Number of Questions Versus Purposeful and Purposeless Questions.

	Total No of Questions	Purposeful Questions	Purposeless Questions
Number of Questions	184.35	110.67	73.68
%	100.00	60.03	39.97

as shown in Table V, of the total number of questions (184.35) posed within 8 classhours, the majority (60.03 percent) were purposeful and the remaining (39.97 percent) of the questions were purposeless. Is this difference in percentage distribution statistically significant ? To show this, a chisquare (X^2) statistical test was used (see APPENDIX-H for the calculations).

The result of this calculation shows that the computed chi-square value ($X^2 = 7.42$) is greater than the critical chi-square value ($X^2 1,\ 0.05 = 3.84$). This implies that there is a statistically singificant difference between the distribution of questions that were purposeful and those that were puropseless at $P<0.05$ level of significance. Since the frequency of questions that are purposeful is greater than those that are purposeless, most of the questions posed during the teaching-learning process during the 8 classhours were useful.

Though this is the case, there were some questions (39.97 percent) which were wrongly framed, that do not have any purpose: that are usually called common faults of teachers in questioning. Thus, it is worthwhile to consider the skill of teachers in questioning.

TABLE VI

Skill of Teachers in Questioning

	S K I L L S			
Number of	Redirecting	Prompting	Probing	Total
Questions	12.17	2.17	1.67	16.01
%	76.01	13.56	10.43	100.00

In the teaching-learning process , teachers, according to Table VI, used the three skills of questioning. Nevertheless, the number of questions that are skilfully posed were so few compared with the total number of questions (184.35)asked. Of the three skills of questioning, as Table VI depicts, teachers more often seem to use the redirecting skill of questioning than the others; for its proportion (76.01 percent) is by far greater than those of the others. Nonetheless, only 16.01 questions from the total number of questions (184.35) posed within 8 classhours reflect the skill of teachers in questioning.

4.1.2. The Use of Questioning Technique of Teaching in Relation to Teaching Experience in Teacher Training Institutes.

The use of questions for the four purposes, the type of questions posed, and the skills of questioning seem to be affected by the number of years of teaching experience, years of teaching experience of respondents in the target Teacher Training Institutes ranges from 1 month to 14 years (APPENDIX-A numbers 2). Is there variation or difference with respect to the use of questions for the different purposes of questions ? to the types of questions ? and to the skills of questioning ?

To answer these questions, teachers were grouped into two-beginners and experienced. The first group, beginners, consists of teachers whose teaching experience in Teacher Training Institutes is less than three years and the second group, experienced, consists of those whose teaching experience is three years and above. Then, the scores of each group per session were determined from APPENDIX-D.

TABLE VII

Purposes of Questions used Related to Teaching Experience.

Group	Number of Teachers	PURPOSES								TOTAL	
		P_1		P_2		P_3		P_4			
		No.of Q/S	%	No. of Q/S	%	No.of Q/S	%	No. of Q/S	%	No.of Q/S	%
G_1	5	0.768	28.33	0.968	52.10	2.798	45.63	7.866	43.89	12.40	43.32
G_2	3	1.9433	71.67	0.89	47.90	3.3333	54.37	10.0567	56.11	16.2233	56.68
Total	8	2.7113	100.00	1.858	100.00	6.1313	100.00	17.9227	100.00	28.6233	100.00

Note: G_1 = Group 1 = Beginners

G_2 = Group 2 = Experienced Teachers

No.of Q/S = Number of Questions per session.

The use of questions for the four purposes seem to vary from beginners to experienced teachers. For instance, Table VII reveals that 71.67 percent and 28.33 percent of the questions were used for purpose one by experienced teachers and beginners respectively. Most questions were used for feedback purpose (P_4) for both groups of teachers where the majority were used by experienced ones. Are these variations or differences in the use of the purposes of questions statistically significant ? To check this, a chi-swuare (X^2) statistical test was used for each purpose (See APPENDIX-I, number 1 for the calculations). The result of the computed chi-square statistics depicts that the computed chi-square values (X^2_1 =0.01; X^2_2 = 0.46; X^2_3 =0.04; and X^2_4 =0.08 for the purposes one to four respectively) are all less

than the critical chi-square value (X^2_1, 0.05 = 3.84). This implies that though there is a difference in percentage distribution between the two groups of teachers in using questions for each purpose, this difference is not statististically significant at P<0.05 level of significance.

Regarding the distribution of questions with respect to their classifications, scores of the two groups-beginners and experienced-of teachers were determined from APPENDIX-D for each classification.

TABLE VIII

Classifications of Questions used Related to Teaching Experience.

Groups	No.of Teachers	classification							
		Lower Order		Middle Order		Higher Order		Total	
		No.of Q/S	%	No.of Q/S	%	No.of Q/S	%	No.of Q/S	%
1	5	9.232	42.16	2.934	49.44	0.234	29.59	12.40	43.31
2	3	12.6067	57.84	3.00	50.56	0.5567	70.41	16.2234	56.69
Total	8	21.8987	100.00	5.934	100.00	0.7917	100.00	28.6234	100.00

Teachers' questions used by both groups, are categorized under the three classifications of questions. Most of the knowledge level or lower- order questions (57.84 percent) according to Table VIII, were posed by experienced (group 2) teachers. From the percentage distribution of questions for each classification, experienced teachers' questions were greater than those of beginners'. This means that there is variation in the two groups. Is this difference statistically significant ? To

check this, a chi-square (X^2) statistical test was employed for each of the classifications between the two groups of teachers.

The result of the computed Chi-square (X^2) statistics (See APPENDIX-I, number 2 for the calculations) reveals that each of the computed chi-square value (X^2_1 = 0.54; X^2_2 =0.15; and X^2_3 =0.58) is less than the critical chi-square value (X^2_1, 0.05 =3.84). This implies that there is no statistically significant difference within the two groups of teachers' questions in a category/classification at $P<0.05$ level of significance.

Concerning the skills of questioning in the two groups of teachers, scores for each skill were determined from APPENDIX-D as follows.

TABLE IX

Skills of Questioning Related to Teaching Experience.

Group	No. of Teachers	Skills						Total	
		Redirecting		Prompting		Probing			
		No.of Q/S	%	No.ofQ/S	%	No.of Q/S	%	No. of Q/s	%
1	5	1.134	34.36	0.20	33.90	0.134	28.68	1.468	33.69
2	3	2.1667	65.64	0.39	66.10	0.3333	71.32	2.89	66.31
Total	8	3.3007	100.00	0.59	100.00	0.4673	100.00	4.358	100.00

The two groups of teachers, as Table IX reveals, have used the three skills of questioning. Nevertheless, the proportions of questions of the experienced teachers, in each skill, are greater than the beginners'. That is, experienced teachers' questions are more skilfully framed than those of the beginners'. However, is this variation/difference in the skill of questioning statistically significant ? To check this, a chi-square (X^2) statistical test was computed (See APPENDIX-I, number 3 for the calculations).

The result of the computation in APPENDIX-I number 3 depicts that each of the computed chi-square value (χ^2_1) for each skill of questioning between the two groups of techers is less than the critical chi-square value (X^2_1, 0.05 = 3.84). This shows that there is no statistically significant difference in the skills of questioning between experienced and inexperienced teachers.

4.1.3. The use of Questioning Technique of Teaching in Relation to Sample Subject Areas.

The purposes for which questions are used, the distribution of questions in the three classifications, and the skills of questioning, seem to vary from subject to subject. In this study, four subjects were taken as sample subject areas. Is there variation/difference among the subjects in the use of the purposes of questions ? on the distribution of questions in their classifications ? and on the skills of questioning ?

To answer these questions, scores for each subject area were determined in terms of purposes, classifications, and skills from APPENDIX-D. Then, a chi-square (X^2) statistical test was employed for each case as follows.

TABLE X

Distribution of Questions per purpose and Subject Area.

Sample	PURPOSES								Total	
Subjects	P_1		P_2		P_3		P_4			
	No.of Q	%	No.of Q	%	No.of Q	%	No.of Q	%	No.of Q	%
Amharic	4.33	44.78	4.67	62.18	7.16	29.85	17.84	25.67	34.00	30.72
English	2.17	22.43	2.34	31.16	11.16	46.52	24.00	34.53	39.67	35.85
Pedagogics	1.50	15.51	0.50	6.66	3.00	12.51	17.16	24.69	22.16	20.02
Psychology	1.67	17.27	0.00	0.30	2.67	11.13	10.50	15.11	14.84	13.41
Total	9.67	100.00	7.51	100.00	24.00	100.00	69.50	100.00	110.67	100.00

Table X reveals the distributions of questions for each of the purposes per subject area. Purpose one is more used for Amharic (44.78 percent); purpose two, as well, is used for Amharic (62.18 percent); purpose three for English(46.52 percent); and purpose four is more used for English (34.53 Percent). On the other hand, purpose one is less used for pedagogics(15.51 percent), purposes two, three, and four for psychology (which are respectively 0.00 percent, 11.13 percent, and 15.11 percent). In short, Table X depicts variations on the use of each of the purposes of questions from subject to subject. To show whether such variation is statistically significant, a

chi-square (X^2) statistical test was computed (see APPENDIX-J, number 1 for the calculations).

The computed chi-square value for each purpose, as APPENDIX-J number 1 reveals, is less than the critical chi-square value ($X^2 3$, o.05 = 7.82). This implies that though the distribution of questions with in a purpose vary from subject to subject, there is no statistically significant difference among subjects in the use of each of the respective purposes at $P<0.05$ level of significance.

TABLE XI

Distribution of Questions Per Classification of Questions and Subject Area.

Sample Subjects	CLASSIFICATION							
	Lower Order		Middle Order		Higher Order		Total	
	No of Q	%	No of Q	%	No of Q	%	No of Q	%
Amharic	23.33	27.72	9.50	40.14	1.17	41.20	34.00	30.72
English	28.66	34.05	9.84	41.57	1.17	41.20	39.67	35.85
Pedagogics	18.17	21.59	3.50	14.78	0.50	17.60	22.17	20.03
Psychology	14.00	16.14	0.83	3.51	0.00	0.00	14.83	13.40
Total	84.16	100.00	23.67	100.00	2.84	100.00	110.67	100.00

Questions, as Table XI reveals, are distributed differently from one subject to another in each classification. For instance, of all the lower-order questions (84.16), the majority (34.05 percent) were asked in English lesson. Moreover, of the total number of questions (110.67), the majority (35.85 percent) also

lie in English. Nonetheless, how far is this variation statistically significant ? To answer this question, a chi-square (X^2) statistical test was used (See APPENDIX-J number 2 for the calculations).

The result of the computation in APPENDIX-J number 2, reveals that each of the computed chi-square value (X^2_i) for each classification is less than the critical chi-square value ($X^2 3$, 0.05 =7.82). This implies that there is no statistically significant difference in the distribution of questions in each subject area over a classification of questions at $p<0.05$ level of significance.

TABLE XII

Distribution of Questions Per Skill of Questioning and Subject Area

Sample Subjects	SKILLS							
	Redirecting		Prompting		Probing		Total	
	No of Q	%	No of Q	%	No of Q	%	No of Q	%
Amharic	7.33	60.23	0.84	38.71	1.00	59.88	9.17	57.28
English	3.17	26.05	0.83	38.25	0.50	29.94	4.50	28.10
Padagogics	1.67	13.72	0.50	23.04	0.17	10.18	2.34	14.62
Psychology	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	12.17	100.00	2.17	100.00	1.67	100.00	16.01	100.00

The skill of questioning varies from subject to subject. For instance, as Table XII depicts, in the redirecting skill of questioning, more questions (60.23 percent) were posed

in Amharic lesson but in psychology no skill of questioning was observed. In the case of the probing skill of questioning, too, the majority of the questions (59.88 percent) were asked in Amharic lesson. Is this variation/difference in the skill of questioning statistically significant ? To check this, a chi-square (X^2) statistical test was used (see APPENDIX-J, number 3 for the calculations).

APPENDIX-J, number 3 reveals that the computed chi-square values (X^2_i) are all less than the critical chi-square values($X^2$3, 0.05 = 7.82). This implies that there is no statistically significant difference in the skills of questioning among the sample subject areas at $P<0.05$ level of significance.

4.1.4. The Use of Questioning Technique Of Teaching in Relation to Student-Population (Class-Size).

The use of questions for the four purposes, the type of questions posed, and the skills of questioning used seem to be affected by the number of students in each classroom. In the observed classrooms of the two institutes, there is variation in the number of trainees (APPENDIX-A, number 2). In Nazreth Teacher Training Institute, there are 50 trainees in each classroom. Where as, in Debre Berhan, there are 25 trainees in each classroom. Can this variation in student population create differences /variations in the use of the purposes of questions?, in the distribution of questions in each of the classifications

of questions ?, and in the use of the skills of questioning ? To answer these questions, the two institutes' scores for each category were determined from APPENDIX-D and were compared by using a chi-square (X^2) statistical test.

TABLE XIII

Purposes of Questions in the two Institutes.

Institute	No.of Teachers	P U R P O S E S									
		P_1		P_2		P_3		P_4		Total	
		No.of Q	%	No.of Q	%	No.of Q	%	No.of Q	%	No.of Q	%
Nazreth	4	6.83	70.63	3.34	44.47	12.83	53.48	41.34	59.48	64.34	58.14
D/Berhan	4	2.84	29.37	4.17	55.53	11.16	46.52	28.16	40.52	46.33	41.86
total	8	9.67	100.00	7.51	100.00	23.99	100.00	69.50	100.00	110.67	100.00

The proportions of questions for each purpose, according to Table XIII, vary from one institute to another. For instance, the majority (70.63 percent) of purpose one questions were asked in Nazreth Teacher Training Institute. Of the total purposeful questions(110.67) for which questions were asked the majority (58.14 percent) were again asked by teachers of Nazreth Teacher Training Institute. Nonetheless, is this variation/difference in the use of questions in the four purposes in the two institutes has a significant difference ? To check this, a chi-square (X^2) statistical test was used (See APPENDIX-K, number 1 for the calculation).

The result of the computation of the chi-squate (X^2) statistics (APPENDIX-K, number 1) depicts that each of the computed chi-square value (X^2_i) of the four purposes is less than the critical chi-square value ($X^2$1, 0.05=3.84). This reveals that there is no statistically significant difference in the use of the purposes of questions from one institute to another at P<0.05 level of significance.

TABLE XIV

Classifications of Questions Used in the Two Institutes.

Institutes	Number of Teachers	CLASSIFICATION						Total	
		Lower Order		Middle Order		Higher Order			
		No.of Q	%	No.of. Q	%	No.of Q.	%	No.of Q.	%
Nazreth	4	50.83	60.40	11.17	47.19	2.34	82.69	64.34	58.14
D/Berhan	4	33.33	39.60	12.50	52.81	0.50	17.61	46.33	41.86
Total	8	84.16	100.00	23.67	100.00	2.84	100.00	110.67	100.00

The distribution of questions in each of the three classifications, as Table XIV shows, are different from one institute to another. For instance, lower-order questions are more used (60.40 percent) in Nazreth Teacher Training Institute than Debre Berhan. Or of the total number of questions (110.67) encorporated in the classifications of questions, the majority (58.14 percent) were asked in Nazreth. Is this variation/difference in the two institutes statistically

significant ? To answer this question, a chi-square (X^2) statistical test was employed (See APPENDIX-K, number 2 for the calculations).

The computed chi-square statistics (APPENDIX-K, number 2) depicts that each of the computed chi-square value (X^2_i) is less than the critical chi-square value ($X^2_{1,0.05} = 3.84$). This implies that there is no statistically significant difference in the distribution of questions in a classification from one institute to another at $P<0.05$ level of significance.

TABLE XV

Skills of Questioning Used in the Two Institutes

Institutes	Number of Teachers	SKILLS						Total	
		Redirecting		Prompting		Probing			
		No.of.Q	%	No.of.Q	%	No.of.Q	%	No.of.Q	%
Nazreth	4	6.5	53.41	1.17	53.92	1	59.88	8.67	54.15
D/Berhan	4	5.67	46.59	1.00	46.08	0.67	40.12	7.34	45.85
Total	8	12.17	100.00	2.17	100.00	1.67	100.00	16.01	100.00

The skills of teachers in framing questions vary from one institute to another. For instance, from the total number of questions posed by the use of the redirecting skill of questioning (12.17, Table XV), the majority (53.41 percent) were asked by teachers in Nazreth Teacher Training Institute. Or of the total number of questions (16.01) that were skilfully posed, the majority (54.15 percent) was again asked by teachers in

Nazreth Teacher Training Institute. Nevertheless, is this difference in proportion statistically significant ? To confirm this, a chi-square (X^2) statistical test was used (see, APPENDIX-K, number 3 for the calculations).

The computed chi-square statistics (APPENDIX-K number 3) shows that the computed chi-square value (X^2_i) for each of the skills of questioning between the two institutes is less than the critical chi-square value ($X^2_{1,0.05} = 3.84$). This implies that there is no statistically significant difference in the skills of questioning in the two institutes at $P<0.05$ level of significance.

4.2. Discussion on the Results

From the data procured through the observation checklist, necessary information are obtained regarding teachers' questions that were posed during the teaching-learning process. This section discusses the results based on related literature.

Concerning the frequency of the occurance of teacher's questions, the result showed that on the average about 23.14 questions were asked within one classhour,where one classhour is a 45 minute long. Research done on 76 professors about the frequency of questioning, according to Duell and his colleagues (1992:483), reveals that professors posed on the average about 25 questions per classhour,no matter how much the duration of one

classhour is. Hence, frequency of questions posed by trainers in Teacher Training Institutes is very much anlike those of the professors'.

The result also showed that more questions were posed both at the beginning and at the end of the daily lesson. That is, more questions were asked when relating the previous lesson with the new one and when revising the new lesson. Nevertheless ,the frequency of questions in the middle six-five minutes was less. This implies that while presenting/explaining the new lesson, teachers talked much: classroom interaction that may be created due to teachers' questions was less, the involvement of trainees as partners in the instructional process was minimal.

As to the purpose of questions, the result revealed that most of the questions (62.80 percent, Table III) were used for feedback purpose. This happened because, in order to assess trainees' understanding or recalling ability of the concepts taught, trainers repeatedly asked questions that were answered by the use of words and phrases. Besides, such questions as "isn't it ?, ok! ?, right? Yes ?, understand ?, clear ?", and the like were repeatedly posed. That is why most of the purposeful questions (76.01 percent, Table IV) were knowledge level questions. Nevertheless, knowledge questions, according to Kissock and Iyortsuun (1984:9); Cooper (1986:143); and perrott (1986:42), require students to define, recall, recognize, and

repeat something already learned-certain specific facts, information, procedures, or ideas. Moreover, the four interrogatives-who,what,where,and when (which are also knowledge questions), according to Farrant (1988:190), are used to test what has been learned.

During this time (when knowledge questions were posed), the researcher observed that trainees, in mass, frequently answered by saying "Yes"/"No". Each trainee's ability of comparing, contrasting, analysing, synthesizing, reasoning, and the like was not as such given due consideration. That is, purposes of questions that promote the trainees' mental activity, though were not put aside at all, did not get attention by teachers. Surprisingly, Table III showed a reversed result, in that, the purpose of questions that promotes trainees' mental activity was the least used one.

Regarding the type of questions that were posed during the teaching-learning process by teachers, most questions (76.01 percent, Table IV) were under the classification termed as lower-order questions or knowledge level questions. A study conducted back in 1912 also reveals that most questions, according to Cooper (1986:142), were strictly memory, calling only for a superficial understanding of the material. Besides, a report which was made by Gall (1970) as cited in Dunkin (1988:409) shows that of the questions asked, about 60 percent required recall of

facts. Nevertheless, the majority of the questions posed by professors were higher level ones (Duell, et.al; 1992: 483). Therefore, the nature of questions posed by teachers in Teacher Training Institutes is similar with those posed back in the 1912s and with those in the 1970 as reported by Gall. However, it is contradictory with those of the professors' questions: the majority of professors' questions are higher order ones (Ibid).

Knowledge questions, as cited above, were dominated by approval seeking questions: questions that demanded trainee agreement/disagreement. Moreover, questions that were answered by a word were included to the knowledge level questions. Nevertheless, question types that required learners' ability to assess an idea/concept, make comparisons, explain, summarize, contrast, and the like (Middle-Order Questions); and that enable trainees analyse, synthesize, relate parts of a problem, illustrate/exemplify their responses, assess procedures, and the like (Higher-Order Questions) were only handful. That is, they were respectively 12.79 and 1.54 percents (APPENDIX-D) Compared with the total number of questions posed within 8 classhours.

To pose the middle and higher order questions, carefull preplanning was quite essential. However, trainers failed to do so. Because, the researcher, during his field work had carried out an informal checking or assessment of the periodic lesson plans and teaching notes. None of the lesson plans revealed

preset questions. And, the teaching notes did not consist questions that can be posed during the teaching-learning process other than the questions presented on the summary of each of the chapters. Even such questions were not seen in use during the observation sessions. From experience, nevertheless, questions, at the end of each chapter of the teaching notes, are used for outside classroom assignments.

The result of the study also revealed that 39.97 percent (Table V) of the questions from the total questions posed during the teaching-learning process within 8 classhours were purposeless ones. Hence, teachers made common faults in questioning and faulty use of questions was practiced. Chief causes for such weakness in questioning, according to Burton (1952:538), lie in:

- the teahers' conception of the purposes of questions;
- lack of knowledge of the mental processes of learning;
- teachers' own lack of general education and intellectual interest; and
- when teachers' knowledge and thinking is poor.

In addition to these causes, inexperienced teachers frequently make bad use of questioning (Farrant,1988:191). Hence, causes for bad use of questions in Teaher Training Institutes may be due to the causes identified by Burton (1952:538). Nevertheless, teaching experience may not be the cause for trainers bad use of questions. This is for the reason that teaching experience of all the observed teachers but one is more

than six years (APPENDIX-A, number 2) no matter, some teachers' teaching experience in the Teacher Training Institutes is less-about two years.

Teachers were observed while using such common faults in questioning as limited, ellipitical, loosely- worded, multiple, and vegue or general questions. From these faults in questioning, the following were practiced repeatedly.

Limited Questions: During this time, teachers completed what they prepared in time. However, in the name of using the classhour properly, they asked purposeless questions: questions that do not have any use in the teaching-learning process.

Example: . Has any one any question ?

. Has any one any doubt ?

. Any question you have? and the like.

Elliptical Questions: In this case, incomplete statements immediately followed teachers' presentation of a certain concept such as "steps in lesson planning" and "Components of Memory". That is, when they reached to a key term or something that they assumed important, teachers stopped their presentation and required trainees to complete the statement. Incomplete ideas were simply presented in question form.

Example: . Application is the highest form of ... ?

. The first component of memory is... ?

. Recording means ... ? and the like.

Loosely-Worded Questions: Here, too, teachers asked questions following their presentation of an idea. In the mean time, they required trainees to tell them the idea by questioning their explanation using the words " What" and "Where".

Example: . The significance of planning is what ?

. "What to teach" enables you to know what ?

. You teach because of What ? and the like.

All such common faults in questioning reveal that teachers have problems in the skills of questioning.

Regarding the skills of questioning, the result showed that 16.01 questions (Table VI) from the total questions posed within 8 classhours were skilfully presented. Moreover, of the total questions posed, the result showed that only 6.58 percent (APPENDIX-D) of the questions demanded trainees' interaction due to the teachers' use of the redirecting skill of questioning. Nevertheless, the first step toward developing effective questioning skill is to increase student participation (Jacobsen, et.al., 1989:14). The result also revealed that of the total questions posed within 8 classhours, only 1.17 percent and 0.01 percent (APPENDIX-D) respectively were prompted and probed. However, using hints/clues according to Jacobsen and his

associates (1989:146), are used to aid the student in responding successfully. Moreover, the ability of requiring fuller answers from students, helps to encourage them to justify or further explain their responses, views, suggestions and there by to increase the depth of discussion, and move students away from shallow responses (Ibid: 149-50).

Thus, questions of teacher trainers, in Teacher Training Institutes, that demanded trainees' ability to analyse, give reasons/justifications and the like were minimal; teachers' ability in requiring fuller answers from trainees or the avoidance of surface answers was unsatisfactory-almost it was nil. Hence, teachers who teach in Teacher Training Institutes failed in posing questions in the right way.

Results related to teaching experience revealed the presence of differences between experienced and inexperienced teachers in the use of the purposes of questions, classifications of questions, and in the skill of questioning. In each case, experienced teachers performed better than beginners. This may be the result of teaching more years in teacher training institutes. That is, if one is more experienced in teaching at a specific level, it enables him/her to perform better activities than those who do not have experience at a similar specific level. However, as the result of the study showed, such a difference is not statistically significant. This may be due to teachers who were

grouped under beginners. Because, in a real sense, they were not beginners: all but one had served as teachers more than six years.

Regarding the distribution of questions in the different subject areas, the result showed that questions were not evenly distributed in each subject for the four purposes of questions, the classifications of questions, and for the skills of questioning. Nevertheless, the computed chi-square statistics (APPENDIX-J, numbers 1 to 3) showed that such variation is not statistically significant. That is, all seem to be the same in all subject areas. In other words, variation in the subject area did not bring variations in the use of questions, in the type of questions that were posed, and in the skills of questioning.

Concerning the effect of student population on the use of the purposes of questions, on the distribution of questions in the three classifications, and on the skills of questioning, the result showed differences between the two groups of student population. However, this difference is not statistically significant. This implies that class-size is not a cause for the use of questions for any of the purposes, in the type of questions that can be posed during the teaching-learning process, and in the skills of questioning.

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CHAPTER FIVE

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.

5.1. Summary

The purpose of this research was to determine the extent to which effective use is made of the Questioning Technique of teaching in Teacher Training Institutes. Therefore, the research project attempted to:

- determine the frequency of teachers'/trainers' questions;
- identify the purposes for which these questions were required to serve;
- determine where these questions fall in the three classifications of questions;
- identify the most frequently asked question types; and
- identify the skills that reflect trainers' skilfuless in the Questioning Technique of Teaching.

For the attainment of the research requirements, the following procedures were followed:

- two teacher training institutes (Nazreth and Debre Berhan) were selected on the basis of their proximity to the researcher.
- data collection instrument (observation checklist) was developed and tried out in an institute different from the target ones;
- the reliability and validity of the checklist were determined;

- eight trainers were deliberately identified in the two target institutes. These eight trainers were taken as sources of information;
- two observers were trained in how to use the checklist and record findings;
- each selected trainer was observed for three consecutive classhours by the two trained observers;
- Observers tallied and recorded what they have observed regarding trainers' questions posed during the teaching-learning process;
- Finally, results were presented and interpreted using statistical methods (percentage distribution and chi-square statistical test) and discussions were carried out vis-a-vis relevant related research and literature. Then, the following findings are obtained:

5.1.1 On the Frequency of occurance of Teachers' Questions:

- Frequency of teachers' questions was on the average about 23.14 questions per classhour, where one classhour is a 45 minute long.
- More questions were asked both at start and end of the daily lession.
- Frequency of teachers' questions decreased as time increased (for the first four-five minutes) and increased as time decreased (as the classhour was going to end : for the last three-five minutes).

5.1.2 On the Purposes of Questions:

- The purposes for which questions were asked included:
  - . Motivating trainees;
  - . Promoting trainees' mental activity;
  - . Involving trainees as partners in the instructional process; and
  - . obtaining feedback.
- The majority of the purposeful questions (62.80 percent) were used for obtaining feedback.
- Questions that serve the promotion of trainees' mental activity were the least (6.79 percent) used ones.

5.1.3 On the classifications of Questions:

- Questions posed were distributed among each of the three classifications of questions, that is, in
  - . Lower - order questions;
  - . Middle - Order questions; and
  - . Higher - Order Questions.
- Questions were not evenly distributed in each of the classifications. Because the computed chi-square value (X^2=96.74) is by far greater than the critical chi-square value ($X^2$2, 0.05 = 5.99). This shows that there is statistically significant difference on the distribution of questions in each of the three classifications at $p<0.05$ levle of significance.

- Most questions (76.01 percent) were encorporated in the lower order question type.
- Questions that were included in the Higher-Order category were so-few (2.57 percent).

5.1.4 On the skils of Questioning:

- The three skills of questioning: redirecting, prompting, and probing were used in presenting questions.
- Questions encorporated in each of the skills of questions (12.17, 2.17, and 1.67 respectively for redirecting,prompting and probing)were so few in relation to the total number of questions (184.35) posed within 8 classhours.
- Questions included in the redirecting skill of questioning were the highest (36.01 percent) compared with the remaining two.
- The probing skill of questioning was the least (10.43 percent) used one.
- Faulty use of questions was also practiced. More than one-third of the questions (39.97 percent) were wrongly presented.

5.1.5 Results related to such variables as teaching experience in Teacher Training Institutes, subject area, and student population revealed that there is no statistically significant difference on the use of each of the concepts (distribution of questions in the four

purposes, in the three classifications, and in the skills of questioning) with each other within a variable.

Therefore, on the basis of the findings, the following conclusions are made:

5.2. Conclusions

5.2.1 More questions, within a 45 minute period, were posed at the beginning and at the end of the daily lesson. This implies that frequency of questions was high in the time of relating the previous lesson with the new one and when revising the periodic's lesson. Nevertheless, frequency of questions was low in the middle six-five minutes which is the time of presenting the new lesson. This implies that classroom interaction was less; questions that require trainees as partners in the instructional process were minimal; in short, the teaching -learning process was a teacher dominated one.

5.2.2 Questions served different purposes. However, most of them were used for obtaining feedback. This was made so as to assess trainees' ability of recalling or understanding the concepts of the last lesson and that of the day's. The nature of questions for the feedback purpose was knowledge levels and were dominated by approval types of questions, questions that were

answered by Yes/No. Questions that promote the trainees' mental activity were the least.

5.2.3 Although questions were distributed among each of the classifications of questions, the majority were lower-order ones-knowledge level questions. This implies that most questions required trainees to define, list, tell, recall, identify, and remember the facts, terms, and concepts taught. Higher-order questions that demanded the ability of determining and relating parts of a problem/concept; analysing ideas/procedures; giving reasons; illustrating/exemplifying responses; assessing procedures/ways; and the like, however were too less.

5.2.4 Trainers used three different skills of questioning. Nevertheless, all the questions that were skilfully posed were by far less than the total questions asked within 8 classhours. Hence, the ability of teachers in giving hints/clues for weak answers or for incorrect responses or the ability of stating a question so as to lead a trainee to a better answer; and the ability of requesting fuller answers or the avoidance of surface/shallow answers were minimal. Only 2.17 questions were prompted and 1.67 questions were probed from the total number of questions (184.35) posed within 8 classhours. This implies that most questions were not posed skilfully, they were simple questions-knowledge questions as mentioned above. The remaining

were purposeless questions that did not serve any purpose and that did not demand skill in questioning.

5.2.5 Generally, all these imply that effective use of the questioning Technique of Teaching is not made by trainers in Teacher Training Institutes. Hence, trainees (the would be primary school teachers) are not trained in a way they are able to reason, justify, determine/relate parts of a problem or concept or an idea, analyse, synthesize, assess/ judge what is wrong/right, and the like. Their learning is a rote type of learning. In their future teaching, thus, trainees' questions will be knowledge level ones that will help to check children's understanding, recalling, recognizing, or remembering a certain idea, concept, or fact taught. This will compell primary school children to memorize/recall the facts, terms, or general truths so as to answer their repective teachers' questions. Children's learning will be a rote-type of learning.

5.2.6 The main causes for the present failure of primary school children to compare, contrast, reason, justify, illustrate, and the like, therefore, could be attributed to trainers of primary school teachers. Hence, it is quite pertinent to suggest/recommend ways of how to improve primary school children's learning that minimizes or even that can avoid the rote type of learning.

5.3 Recommendations

Based upon the findings of the research and the conclusions reached, the following recommendations are made.

5.3.1 In order to avoid the rote type of learning in primary schools, trainers of teachers must themselves practice to avoid the rote type of learning in their institutes. To do so, they should pose questions that require trainees' to analyse; synthesize; reason determine/relate parts of problems, concepts, or ideas; illustrate/exemplify their responses; and the like during the teaching-learning process. Middle and Higher-Order questions should get due attention as lower order ones.

5.3.2 In order to make trainees partners/participants in the instructional process, to promote their mental activities, and to enhance their learning by generating interest on them; teacher trainers should make the appropriate use of Questioning Technique of Teaching. Trainers should not give stress merely to obtain feedback. Questions that can be answered by the use of words only and that can be answered in mass should be reduced, should not be overused. Common faults in questioning should be avoided. That is, teacher trainers should avoid the presentation of incomplete statements in question form; the tagging of their

presentation/ explanation by the use of "What", "Where", "Who", and "When" should also be avoided. Because, such questions obscure learning.

5.3.3 Teacher trainers should prepare non-knowledge questions prior to their entry in classrooms so as to conduct effective teaching and learning with respect to the Questioning Technique of Teaching.

5.3.4 Teacher trainers, first and foremost, should have a thorough understanding regarding the Questioning Technique of Teaching- the uses of questions, the types of questions that avoid and promote the rote types of learning, and skills in questioning. Hence, trainers of teacher trainers should acquaint and familiarize such teachers with this technique. Concerned teacher education departments of the MOE should refresh/up grade teacher trainers and primary school teachers with the Questioning Technique of Teaching.

5.3.5 Finally, the researcher recommends researchers to study on the impact of experience in teaching at a specific level on the use of the Questioning Technique of Teaching: the frequency of questions, the purposes of these questions, the types, and the skills in questioning. Besides, the curricula of colleges of trainers of teacher trainers, and their implementation should be assessed with respect to the Questioning Technique of Teaching.

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APPENDIX - A

PRELIMINARY INFORMATION

1. Regarding Observers and Teachers' Observed for the Tryout

	Sex	Years of Experience in Teaching		Qualification	Area of Study	Current Status
		In TTI	In Another			
Observers						
1	F	3	5	BA	Amharic	Students' Dean and Amharic Teacher
2	M	13	0	BA	Pedagogical science	English Teacher
3	F	5	7	BA	Psychology	Psychology Teacher
4	M	6	3	BA	Pedagogical Science	Pedagogics Teacher
Teachers Observed						
1	M	9	0	BA	Pedagogical science	Amharic Teacher
2	M	3	8	BA	Linguistics	English Teacher
3	M	1	8	BA	Pedagogical science	Pedagogics Teacher
4	M	16	0	BA	Pedagogical science	Psychology Teacher
Number of Trainees in Each Ceassroom is 46						

2. Regarding Observers and Teachers' Observed For the Final Study

	Sex	Years of Experience in Teaching in		Qualification	Area of study	Current Status	Institute
		TTI	Another				
Observers	M	7	0	BA	Pedagogical science	First year Graduate Student of Curriculum and Instruction	NAZRETH
	M	4	6	BA	Pedagogical science	Third year Graduate Student of Educational Psychology	
Teacher Observed	M	1	1	BA	Pedagogical Science	Amharic Teacher	
	F	0	0	BA	English	English Teacher	
	M	5	5	BA	Pedagogical Science	Pedagogics Teacher	
	M	7	7	BA	Psychology	Psychology Teacher	
NUMBER OF TRAINEES IN EACH CLASSROOM = 50							
Teachers Observed	M	1/12	6	BA	Amharic	Amharic Teacher	DEBREBERHAN
	M	2	5	BA	English	English Teacher	
	M	2	6	BA	Pedagogical science	Pedagogical Teacher	
	M	2	6	BA	Psychology	Psychology Teacher	
NUMBER OF TRAINEES IN EACH CLSSSROOM = 25							

APPENDIX - B

RELATIONSHIPS OF SCOORES OF OBSERVERS FOR THE TRYOUT OF THE INSTRUMENT

1. Amharic

Items	Scores of Session One O_1	O_2	Items	Scores of Session Two O_1	O_2
1.1	48	73	1.1	80	97
2.1	10	8	2.1	10	5
2.2	3	3	2.2	6	2
2.3	6	5	2.3	12	3
2.4	12	10	2.4	16	8
3.1	29	22	3.1	40	12
3.2	2	2	3.2	4	6
3.3	0	2	3.3	0	0
3.4.1	4	4	3.4.1	0	2
3.4.2	6	11	3.4.2	15	21
3.4.3	7	32	3.4.3	20	52
3.4.4	0	0	3.4.4	0	2
3.4.5	0	0	3.4.5	1	0
4.1	0	1	4.1	0	0
4.2	0	0	4.2	0	0
4.3	0	0	4.3	0	0

$N = 16$; $\Sigma O_1 = 127$ $\Sigma O_2 = 173$

$\Sigma O_1^2 = 3539$; $\Sigma O_2^2 = 7181$
$\Sigma O_1 O_2 = 4691$

Then, using the pearson product Moment Correlation Coefficient Formula;

$$r_1 = \frac{\Sigma O_1 O_2 - \frac{(\Sigma O_1)(\Sigma O_2)}{N}}{\sqrt{\Sigma O_1^2 - \frac{(\Sigma O_1)^2}{N}}\sqrt{\Sigma O_2^2 - \frac{(\Sigma O_2)^2}{N}}}$$

Substituting each of the values and then simplitying gives r1 =0.91

$N=16$ $\Sigma O_1 = 204$; $\Sigma O_2 = 210$

$\Sigma O_1^2 = 9178$ $\Sigma O_2^2 = 12844$
$\Sigma O_1 O_2 = 9845$

Now, use the formula, Substitute each of the Values, and then simplify

$r_2 = 0.88$

∴ Correlation Coefficient for Amharic

$$r = \frac{r_1 + r_2}{2} = 0.90$$

2. English

Scores of Session One

Items	O_1	O_2
1.1	106	125
2.1	13	12
2.2	6	5
2.3	21	14
2.4	14	16
3.1	32	28
3.2	8	12
3.3	4	7
3.4.1	12	18
3.4.2	21	41
3.4.3	13	15
3.4.4	10	7
3.4.5	6	0
4.1	5	14
4.2	4	1
4.3	2	3

$N = 16$ $\quad \Sigma O_1 = 277$; $\quad \Sigma O_2 = 315$

$\Sigma O^2_1 = 14117$; $\Sigma O^2_2 = 19609$

$\Sigma O_1 O_2 = 16360$

Substituting each of the values in the pearson product Moment Correlation Coefficient Formula; and then simplifying gives

$r_1 = 0.98$

Scores of Session Two

Items	O_1	O_2
1.1	130	130
2.1	12	13
2.2	10	10
2.3	16	13
2.4	16	18
3.1	33	42
3.2	15	5
3.3	6	5
3.4.1	13	7
3.4.2	42	25
3.4.3	15	34
3.4.4	6	12
3.4.5	0	0
4.1	13	6
4.2	2	0
4.3	4	0

$N = 16$; $\quad \Sigma O_1 = 333$; $\Sigma O_2 = 320$

$\Sigma O^2_1 = 21389$; $\Sigma O^2_2 = 21486$

$\Sigma O_1 O_2 = 20944$

Now use the formula:
Substitute and simplify
$r_2 = 0.97$

$\therefore$ Correlation Coefficient for English

$$r = \frac{r_1 + r_2}{2} = 0.98$$

3. Pedagogics

Scores of Session One

Items	O_1	O_2
1.1	30	30
2.1	5	2
2.2	4	1
2.3	2	0
2.4	12	13
3.1	17	15
3.2	3	1
3.3	1	0
3.4.1	2	2
3.4.2	5	6
3.4.3	1	6
3.4.4	0	0
3.4.5	0	0
4.1	0	5
4.2	1	0
4.3	0	0

$N = 16$; $\Sigma O_1 = 83$; $\Sigma O_2 = 81$

$\Sigma O^2_1 = 1419$; $\Sigma O^2_2 = 1401$
$\Sigma O_1 O_2 = 1368^2$

Using the formulat, substituting each of the values and then simplifying gives

$r_1 = 0.98$

Scores of Session Two

Items	O_1	O_2
1.1	86	49
2.1	5	3
2.2	3	1
2.3	14	6
2.4	21	12
3.1	32	23
3.2	12	5
3.3	1	0
3.4.1	6	5
3.4.2	15	10
3.4.3	20	6
3.4.4	1	0
3.4.5	0	0
4.1	0	0
4.2	3	0
4.3	1	0

$N=16$; $\Sigma O_1 = 220$; $\Sigma O_2 = 120$

$\Sigma O^2_1 = 9908$; $\Sigma O^2_2 = 3306$
$\Sigma O_1 O_2 = 5664$

Now, using the formula substituting and then simplifying gives $r_2 = 0.99$

$\therefore$ Correlation Coefficient for Pedagogics

$$r = \frac{r_1 + r_2}{2} = 0.98$$

4 Psychology

Scores of Session One			Scores of Session Two		
Items	O_1	O_2	Items	O_1	O_2
1.1	66	34	1.1	70	42
2.1	10	4	2.1	12	2
2.2	1	5	2.2	3	1
2.3	5	4	2.3	11	4
2.4	15	5	2.4	14	6
3.1	29	14	3.1	24	0
3.2	0	0	3.2	0	3
3.3	0	3	3.3	1	0
3.4.1	7	0	3.4.1	10	3
3.4.2	0	4	3.4.2	3	12
3.4.3	21	5	3.4.3	17	16
3.4.4	9	8	3.4.4	10	0
3.4.5	0	0	3.4.5	0	2
4.1	6	0	4.1	5	0
4.2	6	0	4.2	0	0
4.3	0	0	4.3	0	0

$N=16$; $\Sigma O_1 = 175$; $\Sigma O_2 = 86$

$\Sigma O_1^2 = 6191$; $\Sigma O_2^2 = 1548$
$\Sigma O_1 O_2 = 2967$

Substituting each of the values in the Formula and then simplifying gives
$r_1 = 0.94$

$N=16$; $\Sigma O_1 = 180$; $\Sigma O_2 = 91$

$\Sigma O^2_1 = 6470$; $\Sigma O_2^2 = 2243$
$\Sigma O_1 O_2 = 3433$

Working with similar fashion
$r_2 = 0.87$

$\therefore$ Correlation Coefficient for psychology

$$r = \frac{r_1 + r_2}{2} = 0.91$$

Generally, Correlation Coefficient of the four subject Areas;

$$r = \frac{r\,(\text{Amh.}) + r\,(\text{Eng.}) + r\,(\text{ped.}) + r\,(\text{Psy.})}{4}$$

$$= 0.94$$

APPENDIX - C

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF EDUCATION
DEPARTMENT OF CURRICULUM AND INSTRUCTION

OBSERVATION CHECKLIST

The purpose of this observation checklist is to collect information on the extent to which effective use is made of the Questioning Technique of Teaching in Teacher Training Institutes. The information to be procured through the observation checklist is strictly used merely for ACADEMIC purpose. Hence, your cooperation in giving genuine information is highly valuable to complete the study.

- No need of writing your name and the name of the observed teacher on the observation checklist.
- Thank you in advance for your cooperation

I. Name of the Institute _____

II. Biodata regarding the observer:
Sex _____; Years of experience inteaching: in TTI _____
in another _____
Qualification (Mark an "X" on the Blank space)
MA/MSc _____
BA/BSc _____
Diploma _____
Other _____
Specify _____
_____

Area of study _____
Current Status: _____

III. Biodata regarding teacher's be observed:
Sex _____; years of experience in teaching : in TTI _____
in another _____
Qualification (Mark an "X" on the Blank space)
MA/MSc _____
BA/BSc _____
Diploma _____
Other _____
Specify _____
_____

Area of study: _____
Subject he/she teaches _____

IV. Number of Trainees in the observed classroom _____

Teacher's Questions	Frequency of Occurance During a 45 minute perios									TOTAL
1. Frequency of Teacher's Questions 1.1. Teacher asks a question.....	5	10	15	20	25	30	35	40	45	

2. Purpose of Questions These questions are asked for	Tally Marks	TOTAL	%
2.1 Motivating Traineees: Teacher asks questions that stimulate interest, challenge, puzzle, etc.....			
2.2 Promoting mental activity: Teacher asks questions that require trainees' interaction, creativity analysis, Synthesis, evaluation etc.....			
2.3 Involving Trainees as partners in the Instructional process: Teacher asks questions that require trainees' ability to apply, predict, explain, reason, observe, etc.....			
2.4 Obtaining Feedback: Teacher asks questions so as to assess trainees' ability to understand, recall, recognize etc.....			
3. Classification of Questions 3.1 -Trainees are asked to .define a concept, term, procedure or an idea. .recall/remeber previously learned fact, procedure, or concept .list facts, concepts, or ideas taught .tell the meaning of a concept, idea, or procedure .identify procedures that work and, questions that can be answered by a word, yes, or No such as: Isn't it? Ok!? right? understand?; correct?;.....			

3.2 Middle-Order Questins: Trainees are asked to: .express an idea in their own words; .make comparisons between ideas procedures, concepts, or theories; .explain concepts, ideas, procedures or steps; .summarize procedures/steps; .use their own knoledge to solve problems; .contrast concepts, ideas, procedures, or steps; .distinguish concepts, procedures theories or steps from each other or from one another .describe concepts, procedures, ideas or steps; .design a procedure or step .demonstrate their views, ideas, openions; .choose concepts, steps, procedures, or ideas that go with the lesson under consideration. etc.....			
3.3 Higher-Order Questions Trainees are asked to .determine parts of a problem; .relate parts of a problem; .analyse ideas, procedures, or concepts; .reason out; .put ideas together .illustrate/exemplify their responses; .suggest an idea/openion; .assess procedures, steps, or ways, .give conclusions; .decide what is wrong/right; etc.....			
4. Common Faults of Teachers in Questining 4.1 Limited Questions: Teacher asks such questions as .Any other? .Another question? .Has any one any question? .Any Question you have? etc.....			

4.2 Elliptical Questions: Teacher presents incomplete statements in question form while presenting the lesson; such as; ..... means .....? ..... is/are said to be .....? ..... referred to as .....? ..... is/are called .....? ..... is/are used for .....? etc.....			
4.3 Loosely Worded Questions: Trainees are asked questions that immediately follow teacher's explanation/presentation of a concept procedure, or an idea; such as ..... in what? ..... of what? ..... as what? ..... is/are known as what? ..... is/are where? ..... by what? etc.....			
4.4. Multiple Questions Teacher asks two or more questions at a time without having the answer of the first question, such as: .who will tell us about "some?" about "any?", any information? .what is the use of rubber? Jute? palm oil?, sugar? etc.....			
4.5 Vegue or General Questions Teacher asks questions thatare not clear and that are not understandable by trainees, such as: .where do you get electrons? .where is these are? .what do you use it? etc.....			

5. Skills of Questioning 5.1. Redirecting Questions: .Teacher asks a question that requires many possible responses or, there is an increased student participation .The teacher may proceed as follows Teacher: Poses a question; $Student_1$: Responds in one way Teacher: Do you have something? calls a name of a student $Student_2$: Responds in another way Teacher: calls another student's name; can you add anything else? $Student_3$ Responds still in another way etc.....			
5.2. Prompting Questions: Teacher asks a question to a trainee. But the trainee's reply may be "I don't know" or weak, or partially correct, or completely incorrect. During this time, the teacher gives a hint/clue or asks a question designed to lead the trainee to a better answer to the initial question to the same trainee.....			
5.3. Probing Questions: Teacher requests fuller answers to his/her questions. This can be proceeded as follows between a teacher (T) and a student (S) T: Do you .....? S: Yes/No .....? T: Why, S? S: Because, ... T: What do you mean by that? S: It means,..... and the like			

APPENDIX-D

SCORES PER SESSION, SUBJECT AREA, AND OBSERVER

SUBJECT →	AMHARIC				ENGLISH				PEDAGOGICS				PSYCHOLOGY					
ITEMS ↓	OBSERVER	SS 1 2 3	AV.	T AV.	SS 1 2 3	AV.	T AV.	SS 1 2 3	AV.	T AV.	SS 1 2 3	AV.	T AV.	SS 1 2 3	AV.	T AV.	SS 1 2 3	AV.	T AV.	SUM	%
1-5	O1	4 5 2	3.67	3.50	5 1 1	2.33	2.83	10 12 6	9.33	8.83	6 11 13	10.00	7.67	5 3 11	6.33	5.67	7 8 8	7.67	7.33	5 6 6	5.67	5.67	3 1 1	1.67	1.67	43.17	23.34
	O2	6 2 2	3.33		5 3 2	3.33		7 11 7	8.33		3 5 8	5.33		4 3 8	5.00		5 6 10	7.00		2 10 5	5.67		1 1 3	1.67			
10	O1	4 0 4	2.67	3.67	3 2 2	2.33	2.17	16 10 1	9.00	9.33	10 2 2	4.67	4.33	1 4 0	1.67	1.67	0 0 0	0.00	0.33	1 4 2	2.33	2.83	1 0 0	0.33	0.50	24.83	13.42
	O2	5 4 5	4.67		4 0 2	2.00		9 18 2	9.67		6 4 2	4.00		3 2 0	1.67		0 0 2	0.67		0 7 3	3.33		0 1 1	0.67			
15	O1	2 8 3	4.33	4.00	2 3 1	2.00	1.83	2 9 0	3.67	3.17	3 2 0	1.67	3.00	1 2 1	1.33	1.83	0 0 0	0.00	0.00	0 2 2	1.33	2.00	2 2 2	2.00	2.00	17.83	9.64
	O2	3 6 2	3.67		3 1 1	1.67		1 7 0	2.67		6 3 4	4.33		2 3 2	2.33		0 0 0	0.00		0 5 3	2.67		3 1 2	2.00			
20	O1	2 2 1	1.67	1.83	2 0 1	1.00	0.83	5 1 0	2.00	1.33	2 1 2	1.67	1.83	5 1 0	2.00	2.67	0 0 1	0.33	0.17	2 1 2	1.67	1.83	1 0 0	0.33	0.17	10.66	5.76
	O2	3 3 0	2.00		0 0 2	0.67		2 0 0	0.67		3 2 1	2.00		3 4 3	3.33		0 0 0	0.00		1 3 2	2.00		0 0 0	0.00			
25	O1	4 2 2	2.67	3.17	1 1 2	1.33	1.33	3 1 1	1.67	1.50	7 1 4	4.00	3.17	2 0 3	1.67	2.50	1 2 2	1.67	1.50	1 2 1	1.33	2.83	2 0 2	1.33	1.00	17.00	9.19
	O2	4 4 3	3.67		1 2 1	1.33		1 1 2	1.33		6 1 0	2.33		4 2 4	3.33		2 1 1	1.33		1 1 0 2	4.33		1 0 1	0.67			
30	O1	3 2 2	2.33	2.67	0 1 0	0.33	0.83	5 0 2	2.33	2.33	9 2 0	3.67	3.17	7 3 0	3.33	3.17	1 1 0	0.67	0.50	0 5 0	1.67	2.17	1 0 0	0.33	0.50	15.34	8.29
	O2	6 1 2	3.00		2 2 0	1.33		5 0 2	2.33		5 3 0	2.67		5 2 2	3.00		0 0 1	0.33		1 7 0	2.67		2 0 0	0.67			
35	O1	3 1 0	1.33	1.33	1 1 1	1.67	1.67	8 0 1	3.00	2.33	7 2 7	5.33	4.50	2 1 0	1.00	1.33	0 0 1	0.33	0.17	1 2 0	1.00	1.83	3 0 1	1.33	0.83	13.99	7.56
	O2	2 2 0	1.33		1 1 1	1.67		5 0 0	1.67		3 3 5	3.67		2 3 0	1.67		0 0 0	0.00		0 8 0	2.67		0 1 0	0.33			
40	O1	8 3 0	3.67	4.00	3 0 5	2.67	2.33	8 1 2	3.67	3.67	8 3 0	3.67	2.67	7 1 0	2.67	2.17	0 0 0	0.00	0.00	2 3 0	1.67	1.83	0 1 2	1.00	0.83	17.50	9.46
	O2	6 3 4	4.33		2 0 4	2.00		6 2 3	3.67		4 1 0	1.67		4 1 0	1.67		0 0 0	0.00		2 4 0	2.00		0 1 1	0.67			
45	O1	10 3 2	5.00	5.50	3 0 5	2.67	2.67	12 4 0	5.33	4.67	3 1 1	1.67	2.00	10 5 3	6.00	5.33	0 0 0	0.00	0.17	3 5 0	2.67	2.67	2 1 3	2.00	1.67	24.68	13.34
	O2	13 4 1	6.00		3 0 5	2.67		7 4 1	4.00		2 1 4	2.67		7 5 2	4.67		0 0 1	0.33		3 5 0	2.67		2 0 2	1.33			
2-1	O1	3 1 4	2.67	3.00	3 2 1	2.00	1.33	2 1 1	1.33	1.00	4 1 0	1.67	1.17	4 1 0	1.67	1.33	0 0 0	0.00	0.17	0 3 1	1.33	1.50	0 0 1	0.33	0.17	9.67	5.23
	O2	5 2 3	3.33		1 1 0	0.67		2 0 0	0.67		2 0 0	0.67		2 1 0	1.00		0 0 1	0.33		0 5 0	1.67		0 0 0	0.00			
2-2	O1	2 3 0	1.67	2.17	3 3 3	3.00	2.50	0 0 2	0.67	0.67	2 1 0	2.00	3.67	2 1 0	1.00	0.50	0 0 0	0.00	0.00	0 0 0	0.00	0.00	0 0 0	0.00	0.00	7.51	4.06
	O2	3 2 3	2.67		2 2 2	2.00		0 0 2	0.67		3 1 0	1.33		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00			
2-3	O1	5 4 2	3.67	4.33	3 2 4	3.00	2.83	5 2 3	3.33	2.83	14 5 8	9.00	8.33	5 4 4	4.33	3.00	0 0 0	0.00	0.00	1 2 0	1.00	2.67	0 0 0	0.00	0.00	23.99	12.94
	O2	8 6 1	5.00		3 2 3	2.67		5 0 2	2.67		10 9 4	7.67		1 2 2	1.67		0 0 0	0.00		1 7 5	4.33		0 0 0	0.00			
2-4	O1	14 7 6	12.33	12.17	10 1 8	6.33	5.67	24 9 3	12.00	11.17	20 11 15	15.33	12.83	14 5 6	9.00	11.83	4 7 6	5.67	5.33	3 11 0	4.67	6.17	10 2 8	6.67	4.33	69.50	37.57
	O2	20 8 8	12.00		8 2 5	5.00		9 16 6	10.33		9 9 13	10.33		21 13 10	14.67		4 5 6	5.00		3 17 3	7.67		21 3 2	2.00			
3-1	O1	25 8 9	14.00	15.83	13 2 10	8.33	7.50	25 12 3	13.33	12.83	24 12 15	17.00	15.83	16 6 8	10.00	12.67	4 7 6	5.67	5.50	3 8 0	6.00	9.50	10 2 9	7.00	4.50	84.16	45.49
	O2	25 13 15	17.67		13 3 7	6.67		14 16 7	12.33		17 15 12	14.67		20 14 12	15.33		4 5 7	5.33		4 29 6	13.00		2 1 3	2.00			
3-2	O1	8 5 3	5.33	4.67	6 6 6	6.00	4.83	5 0 3	2.67	2.17	15 10 5	10.00	7.67	8 4 4	5.33	3.50	0 0 0	0.00	0.00	1 1 1	1.00	0.83	0 0 0	0.00	0.00	23.67	12.79
	O2	9 3 0	4.00		4 4 3	3.67		2 0 3	1.67		7 4 5	5.33		3 2 0	1.67		0 0 0	0.00		0 0 2	0.67		0 0 0	0.00			
3-3	O1	1 2 0	1.00	1.17	0 0 0	0.00	0.00	1 0 3	1.33	0.67	1 2 0	1.00	0.50	1 1 0	0.67	0.50	0 0 0	0.00	0.00	0 0 0	0.00	0.00	0 0 0	0.00	0.00	2.84	1.54
	O2	2 2 0	1.33		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00		1 0 0	0.33		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00			
4-1	O1	2 0 2	1.33	2.33	3 1 2	2.00	2.17	7 7 0	4.67	5.00	5 2 1	2.67	3.50	1 3 3	2.33	2.17	1 2 2	1.67	1.50	1 0 0	0.33	0.50	6 3 2	3.67	4.83	22.00	11.89
	O2	5 4 1	3.33		4 1 2	2.33		5 10 1	5.33		9 4 0	4.33		2 1 3	2.00		1 1 2	1.33		2 0 0	0.67		7 7 7	6.00			
4-2	O1	3 3 1	2.33	2.33	0 0 0	0.00	0.17	21 8 1	10.00	9.50	3 0 3	2.00	1.17	5 1 2	2.67	3.67	2 1 3	2.00	1.67	10 14 11	11.67	11.00	0 0 0	0.00	0.00	29.50	15.95
	O2	4 2 1	2.33		0 0 1	0.33		15 9 3	9.00		1 0 0	0.33		3 6 5	4.67		1 0 3	1.33		24 5	10.33		0 0 0	0.00			
4-3	O1	0 0 0	0.00	0.67	0 0 0	0.00	0.00	7 9 2	6.00	5.33	4 0 4	2.67	2.17	8 4 1	4.33	2.50	2 1 1	1.33	1.33	0 0 1	0.33	0.67	0 0 0	0.00	0.00	12.67	6.85
	O2	1 3 0	1.33		0 0 0	0.00		6 6 2	4.67		2 0 3	1.67		1 0 1	0.67		1 1 2	1.33		0 3 0	1.00		0 0 0	0.00			
4-4	O1	1 8 1	3.33	2.83	0 0 0	0.00	0.67	2 1 1	1.33	1.00	0 0 1	0.33	1.17	1 0 0	0.33	1.00	0 0 0	0.00	0.50	0 0 0	0.00	0.50	0 0 0	0.00	0.00	7.17	3.88
	O2	1 2 1	1.33		2 1 1	1.33		0 1 1	0.67		1 0 5	2.00		4 1 0	1.67		1 1 1	1.00		1 1 1	1.00		0 0 0	0.00			
4-5	O1	0 0 0	0.00	0.33	0 0 0	0.00	0.50	0 1 0	0.33	0.50	0 0 0	0.00	0.17	0 0 0	0.00	0.33	0 0 0	0.00	0.00	0 0 0	0.00	0.50	0 0 0	0.00	0.00	2.33	1.26
	O2	1 0 1	0.67		3 0 0	1.00		1 1 0	0.67		1 0 0	0.33		1 1 0	0.67		0 0 0	0.00		1 1 1	1.00		0 0 0	0.00			
5-1	O1	9 7 1	5.67	5.00	3 1 3	2.33	2.33	0 0 0	0.00	0.00	3 2 2	2.67	3.17	3 2 1	2.00	1.50	0 0 0	0.00	0.17	0 0 0	0.00	0.00	0 0 0	0.00	0.00	12.17	6.58
	O2	8 4 1	4.33		2 2 3	2.33		0 0 0	0.00		4 4 4	4.00		0 1 2	1.00		0 1 0	0.33		0 0 0	0.00		0 0 0	0.00			
5-2	O1	1 0 0	0.33	0.67	0 0 0	0.00	0.17	0 0 0	0.00	0.00	0 0 4	1.33	0.83	0 0 0	0.00	0.50	0 0 0	0.00	0.00	0 0 0	0.00	0.00	0 0 0	0.00	0.00	2.17	1.17
	O2	3 0 0	1.00		0 0 1	0.33		0 0 0	0.00		0 0 1	0.33		0 1 2	1.00		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00			
5-3	O1	0 1 0	0.33	0.83	0 0 1	0.33	0.17	0 0 0	0.00	0.00	0 3 0	1.00	0.50	0 0 0	0.00	0.17	0 0 0	0.00	0.00	0 0 0	0.00	0.00	0 0 0	0.00	0.00	1.67	0.01
	O2	2 1 1	1.33		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00		0 0 1	0.33		0 0 0	0.00		0 0 0	0.00		0 0 0	0.00			

APPENDIX E

RELATIONS OF THE SCORES OF OBSERVERS FOR THE FINAL STUDY

Items	O_1	O_2
1.1	186.35	181.36
2.1	11.00	8.34
2.2	8.34	6.67
2.3	24.33	24.01
2.4	72.00	67.00
3.1	81.33	87.00
3.2	30.33	17.01
3.3	4.00	1.66
4.1	18.67	25.32
4.2	30.67	28.32
4.3	14.66	10.67
4.4	5.32	9.00
4.5	0.33	4.34
5.1	12.67	11.99
5.2	1.66	2.66
5.3	1.66	1.66
N=16	ΣO_1=503.32	ΣO_2=487.01

$\Sigma O_1 O_2$=48656.35

ΣO_1^2 =49941.89, ΣO_2^2=47742.47

Then, using the pearson product-Moment Correlation Coefficient Formula;

$$r = \frac{\Sigma O_1 O_2 - \frac{(\Sigma O_1)(\Sigma O_2)}{N}}{\sqrt{\Sigma O_1^2 - \frac{(\Sigma O_1)^2}{N}} \sqrt{\Sigma O_2^2 - \frac{(\Sigma O_2)^2}{N}}}$$

Substituting each of the values and then simplifying gives r= 0.994.

APPENDIX - F

STATISTICAL CALCULATIONS FOR THE PURPOSES OF QUESTIONS

1. Computation of the Chi-square (X^2) statistics

	Purposes			
Frequencies	P_1	P_2	P_3	P_4
Observed (O)	9.67	7.51	23.99	69.50
Expected (E)	27.67	27.67	27.67	27.67
O-E	-18.00	-20.16	-3.68	41.83
$(O-E)^2$	324	406.4255	13.5424	1749.7489
$\frac{(O-E)^2}{E}$	11.7094	14.6883	0.4894	63.2363

$X^2 = \Sigma \frac{(O-E)^2}{E} = 90.1234$ Computed value

$d_f^* = 4-1 = 3$, Critical chi-square ($X^2_{3,\ 0.05=7.815}$).

d_f^* = The degree of freedom (d_f) for a one-way classification chi-square is K-1, or the number of categories minus one (Meyers and Grossen, 1978:255).

2. Computations of the Pair wise chi-square (X^2) Statistics

Purposes	Frequencies		0-E	/0-E/-.5*	(/0-E/-0.5)²	$\frac{(/0-E/-0.5)^2}{E}$	X^2_c
	0	E					
P_1 P_2	9.67 7.51	8.59 8.59	1.08 1.08	0.58 0.58	0.3364 0.3364	0.0392 0.0392	0.0784
P_1 P_3	9.67 23.99	16.83 16.83	7.16 7.16		51.2656 51.2656	3.0461 3.0461	6.0922**
P_1 P_4	9.67 69.50	39.585 39.585	29.915 29.915		894.9072 894.9072	22.6072 22.6072	45.2144**
P_2 P_3	7.51 23.99	15.75 15.75	8.24 8.24		67.8976 67.8976	4.3110 4.3110	8.6220**
P_2 P_4	7.51 69.50	38.505 38.505	30.995 30.995		960.69 960.69	24.9497 24.9497	49.8994**
P_3 P_4	23.99 69.50	46.745 46.745	22.755 22.755		517.7900 517.7900	11.0769 11.0769	22.1538**

Note:

d_f = 2-1 = 1; then $X^2_{1, 0.05}$ = 3.841.

X^{2**} refers that there is a statistically significant difference at P<0.05 level of significance.

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*One of the assumptions for the use of chi-square, according to Brown (1990:190), is all the expected frequencies should be higher than 10. If not, it is necessary to apply yates's correction for continuity. Thus, the corrected formula is $X^2 = \frac{\Sigma(/0-E/-0.5)^2}{E}$

(Edwards, 1950:67)

APPENDIX - G

STATISTICAL CALCULATIONS FOR THE CLASSIFICATION OF QUESTIONS

1, Computation of the Chi-square (X^2) Statistics

Frequencies	CLASSIFICATIONS		
	Low order	Middle order	Higher order
Observed (O)	84.16	23.67	2.84
Expected (E)	36.89	36.89	36.89
(O-E)	47.27	-13.22	-34.05
$(O-E)^2$ =	2234.4529	174.7684	1159.4025
$\frac{(O-E)^2}{E}$ =	60.5707	4.7376	31.4286

$$X^2 = \sum \frac{(O-E)^2}{E} = 96.7369$$

d_f = 3-1=2, Critical chi-square ($X^2_{2}, 0.05=5.991$)

2, Computation of the Pair wise chi-square (X^2) statistics

Frequencies	CLASSIFICATIONS					
	Lower order	Middle order	Lower order	Higher order	Middle order	Higher order
O	84.15	23.67	84.16	2.84	23.67	2.84
E	53.915	53.915	43.50	43.50	13.255	13.255
O-E =	30.245	-30.245	40.66	-40.66	10.415	-10.415
$(O-E)^2$ =	914.7600	914.7600	1653.2356	1653.2356	108.4722	108.4722
$\frac{(O-E)^2}{E}$ =	16.9667	16.9667	38.0054	38.0054	8.1835	8.1835
X^2_i =	X^2_1 = 33.9334 $X^2_{cr.}$ = 3.841		X^{2*}_2 = 76.0108 $X^2_{cr.}$ = 3.841		X^{2*}_3 = 16.3670 $X^2_{cr.}$ = 3.841	

Note: X^{2*} refers that there is a statistically siginficant difference between the two compaired pairs

APPENDIX - H

COMPUTATIONS OF THE COMPARISON OF PURPOSEFUL AND PURPOSELEESS QUESTIONS

Frequencies	Purposeful Questions	Purposeless Questions
Observed (O)	110.67	73.68
Expected (E)	92.175	92.175
O-E =	18.495	-18.495
$(O-E)^2$ =	342.0650	342.0650
$\frac{(O-E)^2}{E}$ =	3.7110	3.7110

$X^2 = \sum \frac{(O-E)^2}{E} = 7.4220$ Computed value.

d_f 2-1 =1 critical chi-square (X^2_1, 0.05=3.841)

APPENDIX - I

Computations of the chi-square (X^2) Statistics Related to Teachers' Teaching Experience

1, For the Purposes of Questions

Purposes	Groups	Frequancies		O-E	(O-E- 0.5	(O-E/ 0.5)^2	(O-E/ 5)^2 / E	X^2_i
		O	E					
P_1	1	0.768	1.3557	0.5877	0.0877	0.0077	0.0057	0.0114
	2	1.9433	1.3557	0.5876	0.0876	0.0077	0.0057	
P_2	1	0.968	0.929	0.039	0.461	0.2125	0.2288	0.4576
	2	0.89	0.929	0.039	0.461	0.2125	0.2288	
P_3	1	2.798	3.0657	0.2677	0.2323	0.0540	0.0176	0.0352
	2	3.3333	3.0657	0.2676	0.2324	0.0540	0.0176	
P_4	1	7.860	8.9614	1.0954	0.5954	0.3545	0.0396	0.0791
	2	10.0567	8.9614	1.0953	0.5953	0.3544	0.0395	

$d_f = 2\text{-}1 = 1$

Critical chi-square ($X^2_{t,\ 0.05} = 3.841$)

$X^2_t = X^2_1, X^2_2, X^2_3, X^2_4$

2. For the Classifications of Questions

Classifications	Groups	Frequencies		O-E	/O-E/-.5	$(/O-E/-0.5)^2$	$\frac{(/O-E/-.5)^2}{E}$	X^2_i
		O	E					
Lower-order	1	9.232	10.9494	-1.7174		2.9495	0.2694	0.5387
	2	12.6667	10.9494	1.7173		2.9491	0.2693	
Middle-order	1	2.934	2.967	-0.033	-0.467	0.2181	0.0735	0.1470
	2	3.00	2.967	0.033	-0.467	0.2181	0.0735	
Higher-order	1	0.234	0.3954	-0.1614	0.3386	0.1146	0.2900	0.5801
	2	0.5567	0.3954	0.1613	-0.3387	0.1147	0.2901	

$X^2_i = X^2_1, X^2_2, X^2_3$

$d_f = 2-1 = 1$

Critical chi-square (X^2_1, 0.05 = 3.841)

3. For the Skills of Questioning

Skills	Groups	Frequencies		O-E	/O-E/-0.5	$(/O-E/-0.5)^2$	$(/O-E/-0.5)^2$	X^2_i
		O	E					
Redirecting	1	1.134	1.6504	-0.5164	0.0164	0.0003	0.0002	0.0004
	2	2.1667	1.6504	0.5163	0.0163	0.0003	0.0002	
Prompting	1	0.20	0.295	-0.095	-0.405	0.1640	0.5560	1.1120
	2	0.39	0.295	+.095	-0.405	0.1640	0.5560	
Probing	1	0.134	0.2337	-0.0997	-0.4003	0.1602	0.6857	1.3717
	2	0.3333	0.2337	0.0996	-0.4004	0.1603	0.6860	

$d_f = 2-1 = 1$

Critical chi-square (X^2_1, 0.05 = 3.841)

APPENDIX - J

COMPUTATION OF THE CHI-SQUARE (X^2) STATISTICS FOOR THE SAMPLE SUBJECT AREAS.

1. Per-purpose

Purposes	Sample subjects	Frequencies		O-E	/O-E/-0.5	(/O-E/-0.5)^2	(/O-E/-0.5)^2/E	X^2_i
		O	E					
P_1	Amharic	4.33	2.4175	1.9125	1.4125	1.9952	0.8253	0.9491
	English	2.17	2.4175	-0.2475	-0.2525	0.0638	0.0264	
	Pedagogics	1.50	2.4175	-0.9175	0.4175	0.1743	0.0721	
	Psychology	1.67	2.4175	-0.7475	0.2475	0.0613	0.0253	
P_2	Amharic	4.67	1.8775	2.7925	2.2925	5.2556	2.7992	4.2207
	English	2.34	1.8775	0.4625	-0.0375	0.0014	0.0007	
	Pedagogy	0.50	1.8775	-1.3775	0.8775	0.7700	0.4101	
	Psychology	0.00	1.8775	-18775	1.3775	1.8975	1.0107	
P_3	Amharic	7.16	5.9975	1.1625	0.6625	0.4389	0.0732	6.0709
	English	11.16	5.9975	5.1625	4.6625	21.7389	3.6247	
	Pedagogy	3.00	5.9975	-2.9975	2.4975	6.2375	1.0400	
	Psychology	2.67	5.9975	-3.3275	2.8275	7.9948	1.3330	
P_4	Amharic	17.84	17.375	0.465		0.2162	0.0124	5.2615
	English	24.00	17.375	6.625		43.8906	2.5261	
	Pedagogics	17.16	17.375	-0.215		0.0462	0.0027	
	Psychology	10.50	17.375	-6.875		47.2656	2.7203	

d_f = 4-1=3, Critical chi-square ($X^2_{3, 0.05}$ = 7. 815

2, **Per-classification**

Classifications	Sample subjects	Frequencies		O-E	(/O-E/-0.5)	$(/O-E/-0.5)^2$	$\frac{(/O-E/-0.5)^2}{E}$	X^2_i
		O	E					
Lower-order	Amharic	23.33	21.04	2.29		5.2441	0.2492	5.7560
	English	28.66	21.04	7.62		58.0644	2.7597	
	Pedagogics	18.17	21.04	-2.87		8.2369	0.3915	
	Psychology	14.00	21.04	-7.04		49.5616	2.3556	
Middle-order	Amharic	9.50	5.9175	3.5825	3.0825	9.5018	1.6057	7.7529
	English	9.84	5.9175	3.9225	3.4225	11.7135	1.9795	
	Pedagogics	3.50	5.9175	-2.4175	1.9175	3.6768	0.6213	
	Psychology	0.83	5.9175	-5.0875	4.5875	21.0452	3.5564	
Higher order	Amharic	1.17	0.71	0.46	-0.04	0.0016	0.0023	0.1852
	English	1.17	0.71	0.46	-0.04	0.0016	0.0023	
	Pedagogics	0.50	0.71	-0.21	-0.29	0.0841	0.1185	
	Psychology	0.00	0.71	-0.71	0.21	0.0441	0.0621	

$d_f = 4-1=3$

Critical chi-square (X^2_3, 0.05=7.815)

3. Per-skill of Questioning

Skill	Sample subjects	Frequencies		O-E	/O-E/-0.5	(/O-E/-0.5)^2	$\frac{(/O-E/-0.5)^2}{E}$	X^2_i
		O	E					
Redirecting	Amharic	7.33	3.0425	4.2875	3.7875	14.3452	4.7149	7.13
	English	3.17	3.0425	0.1275	-0.3725	0.1388	0.0456	
	Pedagogics	1.67	3.0425	-1.3725	0.8725	0.7613	0.2502	
	Psychology	0.00	3.0425	-3.0425	2.5425	6.4643	2.1247	
Prompting	Amharic	0.84	0.5425	0.2975	-0.2025	0.0410	0.0756	0.55
	English	0.83	0.5425	0.2875	-0.2125	0.0452	0.0832	
	Pedagoics	0.50	0.5425	-0.0425	-0.4575	0.2093	0.3858	
	Psychology	0.00	0.5425	-0.5425	0.0425	0.0018	0.0033	
Probing	Amharic	1.00	0.4175	0.5825	0.0825	0.0068	0.0163	0.60
	English	0.50	0.4175	0.0825	-0.4175	0.1743	0.4175	
	Pedagoics	0.17	0.4175	-0.2475	-0.2525	0.0638	0.1527	
	Psychology	0.00	0.4175	-0.4175	-0.0825	0.0068	0.0163	

d_f= 4-1=3
Critical chi-square (X^2_3, 0.05=7.82).

APPENDIX - K

COMPUTATION OF THE CHI-SQUARE (X^2) STATISTICS IN THE TWO INSTITUTES

1. Regarding the Purposes of Questions

Purposes	Institutes	Frequencies		O-E	/O-E/-.5	$(/O-E/-0.5)^2$	$\frac{(/O-E/-0.5)^2}{E}$	X^2_i
		O	E					
P_1	N	6.83	4.835	1.995	1.495	2.2350	0.4623	0.9246
	D/B	2.84	4.835	-1.995	1.495	2.2350	0.4623	
P_2	N	3.34	3.755	-0.415	-0.085	0.0072	0.0019	0.0038
	D/B	4.17	3.755	0.415	-0.085	0.0072	0.0019	
P_3	N	12.83	11.995	0.835		0.6972	0.0581	0.1162
	D/B	11.16	11.995	-0.835		0.6972	0.0581	
P_4	N	41.34	34.75	6.59		43.4281	1.2497	2.4994
	D/B	28.16	34.75	-6.59		43.4281	1.2497	

N = Nazreth
D/B = Debre Berhan
$X^2_i = X^2_1, X^2_2, X^2_3, X^2_4$.

$d_f = 2-1 = 1$
Critical chi-square (X^2_1, 0.05=3.841)

2, Regarding the Classification of Questions

Classification	Institutes	Frequencies		O-E	/O-E/-0.5	$(/O-E/-0.5)^2$	$\frac{(/O-E/-0.5)^2}{E}$	X^2_i
		O	E					
Lower-order	N	50.83	42.08	8.75		76.5625	1.8195	3.6390
	D/B	33.33	42.08	-8.75		76.5625	1.8195	
Middle-order	N	11.17	11.835	-0.665		0.4422	0.0374	0.0748
	D/B	12.50	11.835	0.665		0.4422	0.0374	
Higher-order	N	2.34	1.42	0.92	0.42	0.1764	0.1242	0.2484
	D/B	0.50	1.42	-0.92	0.42	0.1764	0.1242	

$d_f = 2-1=1$

Critical chi-square (x^2_1, 0.05 = 3.841)

3. Regarding the Skills of Questioning

Skills	Institutes	Frequencies		O-E	/O-E/-0.5	$(/O-E/-0.5)^2$	$\frac{(/O-E/-0.5)^2}{E}$	X^2_i
		O	E					
Redirecting	N	6.50	6.085	0.415	-0.085	0.0072	0.0012	0.0024
	D/B	5.67	6.085	-0.415	-0.085	0.0072	0.0012	
Prompting	N	1.17	1.085	0.085	-0.415	0.1722	0.1587	0.3174
	D/B	1.00	1.085	-0.085	-0.415	0.1722	0.1587	
Probing	N	1.00	0.835	0.165	-0.335	0.1122	0.1344	0.2688
	D/B	0.67	0.635	-0.165	-0.335	0.1122	0.1344	

Note: N = Nazreth
D/B = Debre Berhan
$d_f = 2 - 1=1$ Critical chi-square (X^2_1, 0.05 = 3.84)

DECLARATION

I, Biadgelign Ademe, hereby declare that this thesis is my original work done under the guidance of Azeb Desta (Ph.D.), Associate Professor of Curriculum and Instruction; Dean, Faculty of Education of the Addis Ababa University. All relevant sources used for the thesis are duly acknowledged.

Name : Biadgelin Ademe

Signature: 

Date : May 26, 1995