ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

THE RELEVANCE OF THE TEACHER EDUCATION COLLEGE PHYSICS CURRICULUM TO SECOND CYCLE PRIMARY PHYSICS EDUCATION: A STUDY IN THE AMHARA REGION

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ABSTRACT

The national policy expects teacher education colleges to make their programs appropriate and relevant for the second cycle primary (SCP) education. The purpose of this study is to examine, via one subject (physics) in Gondar College of Teacher Education, the extent to which these expectations are achieved. To increase the study's likely wider applicability, reliable and valid sources of data were built in. The sources were 17 of the college's graduate physics teachers who have taught in SCP schools, the 17 school principals, 3 physics instructors, college dean, 6 officials at the Amhara Regional Education Bureau and Zonal Education Departments, and an expert at the Institute for Curriculum Development and Research. Instruments used to collect data were questionnaires, an interview guide and observation checklist.

The findings indicate that the college physics objectives over-emphasize theory and are narrowly focused; are either strongly mismatched with ETP (1994) and somewhat with the SCP schools objectives. There is a fair coverage of content and balance between the topics of the college and primary, but the College's focus is theoretical and inclined more towards higher education than teaching physics in SCPS. Again the methods used by trainers do not enable teachers to teach primary physics effectively. The equipment in the college physics laboratory is barely sufficient and its use during the training is not sufficient. The duration for teaching practice is not enough to prepare teachers to teach physics in SCPS appropriately. The physics teachers also needed some support in the early periods of their career, but later had confidence and efficiency to teach general science and physics. However, they seldom used learner-centred methods and instructional equipment in their teaching.

The recommendations include: the college physics course objectives should derive from the objectives of the ETP (1994) and of the SCP; the physics courses should relate more to SCP than to higher education and emphasis be given to varied methods appropriate to the college and primary physics curricula; trainers should use equipment as befits the curricula; the college physics laboratory should be replenished; teaching practice should be longer and strong links with primary schools made; school-based staff training programs should be organized and stakeholders should assess the training program at regular, set intervals.

CHAPTER ONE

INTRODUCTION

1.1. Background

Since the introduction of modern education early in the 20^{th} century, Ethiopia had undergone through a number of educational reforms in terms of organizational structure, curriculum content, teacher training, and others. Through the process, the objectives, duration, entry level, and content of teacher education went through a series of reforms, expansion, and quality enhancement. This is because the place of teachers in the education system was considered to be at the heart of educational activities.

In this respect, it is indicated in SIDA (2000:5) that Educational changes and reforms, expected to take place in the classroom, must also be reflected in teacher education. Teachers are expected to be the main facilitators of learning. As such they should ensure the best interest of the child and know how to adapt the curriculum to children's needs. Moreover, they are required to be administrators and act as the link between parents and schools. The gap between what is required from the ideal teacher and the skills that he/she possesses appears to be widening. In order to enable teachers to meet the various demands placed on their profession, it is increasingly recognized that teachers' skills need to be continuously upgraded.

In indicating how important teachers are in the implementation of any curriculum, it is indicated in (SIDA, ibid.5) and in IICBA (1999:5) that "Teachers have crucial roles to play in preparing young people not only to face the future with confidence but also to build it with purpose and responsibility. The importance of the role of the teacher as an agent of change, promoting understanding and tolerance, has never been more obvious than today. It is likely to become even more critical in the twenty-first century".

What teachers learn must correspond to what they are expected to teach as indicated in SIDA (ibid. 6). Therefore, teachers must be involved in defining new teacher education curricula. Moreover, curricula must be developed in coherence with the school system itself. Teachers also need to learn about the relationship between society and school in order to be able to cope with the specific learning needs of the children.

It is currently necessary to produce teachers who could provide education that meets policy and school objectives. Teachers are expected to facilitate learning, not merely instruct predetermined facts and knowledge. (SIDA, ibid.10) indicated that teachers are nowadays expected to interpret, apply, adapt and further elaborate the curriculum; to search for and select information and contents to meet the different learning needs of the pupils. To meet the uncertain and changing future that faces students, teachers must be able to promote essential competencies and attitudes among their students (i.e., creativity, critical thinking, problem solution, and adaptability to changing situations). Steps need to be taken to reduce the increasing gap between the ideal teacher required to implement new education policies, and what is currently available.

On paper, the curricula at the primary and secondary levels and of teacher education institutions in Africa are relatively of good quality. However, according to IICBA (ibid. 5), there is a significant gap between the intended and the implemented/achieved curricula. This gap is widening and thus there is an urgent need to address the problem.

The training of teachers, according to Dove (1986:254-255), must relate to the roles which teachers are expected to play. Such role expectations arise from official policy statements, public pressure and professional opinion. Another important source of guidance in planning the curriculum of teacher training is the opinion of trainees and new teachers themselves. In this respect, much has not been done in conducting tracer studies to gather feedback about the effectiveness or limitations of teacher training programs from teachers in the schools.

When describing this situation (Dove, ibid. 257) stated that "It is a sad fact that much research into learning and teaching originates still in industrialized countries. It is then published in prestigious journals, which set international fashions. Indigenous, culturally appropriate research in developing countries needs to be strengthened".

The principles for selection of objectives and content of teacher training curriculum are policy goals and aims; the characteristics and needs of trainees; the roles expected of teachers, and the findings of evaluation and research (Dove, ibid. 257). What follows is a checklist of questions, which should be asked by those who design teacher training programs.

Ben-Peretz in Husen (1994:5991) stated that the curriculum of pre-service teacher education programs across different countries and cultures may vary in important aspects, such as institutional context, content areas, time allocations, and the forms of practical experiences for students. In spite of this variability, however, most programs share some common cultural features. Curricula of teacher education programs are generally based on subject matter studies, professional studies, and the practicum (supervised practice)".

Schott (1989:57) supported this when he stated, "dissatisfaction with teacher education is accompanied by demands for teacher accountability-demands that teachers be held responsible for the achievement, or lack of achievement, of their students. But practicing teachers replied that their training has not provided them with the skills and strategies necessary for insuring student achievement to the degree demanded by proponents of accountability".

Ben-Peretz in Husen (ibid.5992-5993) further stated that "professional studies may include methods courses, curriculum courses, and courses based on knowledge generated through research on teaching. The common prevailing view concerning the professional content of teacher education perceives it to be a component of preparation for which institutions of teacher education are specifically responsible. The skills and knowledge taught in these courses are supposed to have a direct bearing on professional practice".

If any thing is to be regarded as a specific preparation for teaching, priority must be given to a thorough grounding in something to teach. As Peters (1980:151) asserted, a teacher, in so far as he/she is concerned with teaching, must have mastered something, can be imparted to others.

The issue that teaching practice is neglected is supported by Ben-Peretz in Husen (ibid.5993) when he indicated, "In many countries, the practicum is the most favourably viewed component of teacher education. Tisher (1990), focusing on teacher education in Australia, claimed school experience to be an extremely important, practical, satisfying component of pre-service education. The trainees say they gain a lot from it, it is the most realistic aspect of their courses, it fosters their practical teaching skills...they feel it should be increased".

The appraisal of the process and content of teacher training has been the concern of evaluation studies (Alexander, 1984,p.293) and these are valuable exercises which are indicators of institutional validity and a preparedness to evaluate current educational practices, reflect upon them, and where necessary, amend their teaching or syllabuses.

The training of teachers in Ethiopia has been criticized for its lack of relevance in terms of content, methodology of training, and exposure of trainees to school situations (experience). Even if components of teacher education (subject matter studies, professional studies, and the practicum or supervised practice) are included in the teacher training programs, less emphasis has been given to methodology courses and the practicum.

In addition to this, school experience (teaching practice), which is a vital component of the training of teachers to be effective implementers of the school curriculum, has been given less emphasis and little time compared to what teachers should do. What most teachers lack in primary schools of Ethiopia is not only content but mainly the how (methodology) of teaching the subjects for which they are trained. Our training institutions should thus give more emphasis to subject methodology, which has become the focus of primary teacher education nowadays.

These various studies indicate that teacher education programs have to be evaluated for program effectiveness, relevance of training curricula to classroom teaching conditions, etc., from time to time and then improved based on findings of studies. Thus, it is reasonable to conduct a study on the relevance of the current teacher training college physics courses for the second cycle primary (SCP) school (grades 5-8) physics education in the Amhara Region.

The Amhara region occupies the northwestern part of the country with an estimated population of 14.49 million, an area of 170,152-km sq., and the administrative structure comprises 11 zones (AREB, 1997). The economy is mainly dependent on subsistent agriculture and nearly 90% of the annual production is from this sector. As indicated in EMIS (2000: 4) the gross enrollment ratio for primary was 46.8% for both sexes and 43.2% for females whereas it was 8.1% for secondary education out of which 7.7% was for females. There are 2,958 primary and secondary schools, 24,401 primary and 2269 secondary school teachers, two teacher training institutes, one teacher education college, one college of medical science, and a university in the region.

1.2. Statement of the Problem

As stated in Marew (2000:179-187), "Modern western-type secular education in Ethiopia started with the opening of Menelik II School in 1908. Initially the teachers were expatriates. It was only in 1944/45 that the Ministry of Education and Fine Arts opened its first teacher training institution." The opening of pre-service teacher training program for junior secondary school teachers was based on the recommendations of the Long Term Planning Committee in the Ten-Year Plan of the country. The change of the education system from a two-tier (6-6) to a three-tier (4-4-4) system necessitated a training program for the middle schools, especially for grades seven and eight. Since then the curricula for the training of teachers have been revised, but have been criticized for lack of relevance to prepare teachers for the schools.

The quality and standard of education in a given country is mainly determined by the essence of its curriculum and the process of its implementation. The relevance of any curriculum, on the other hand, is determined by the extent it meets the educational objectives. In this respect, the existing educational curriculum of Ethiopia has not been properly developed to meet the societal and pedagogical demands. As indicated in Education Sector Strategy, ESS (1994:3), one of its major drawbacks has been that the learners' profile and the corresponding educational structure and inputs to achieve it are not well defined, since the educational objectives in relation to the societal needs have not been clearly formulated and stated.

In the ESS (ibid. 3-4), which was formulated along side the new Education and Training Policy (ETP, 1994), it is stated that "With respect to teachers, the problem is more of quality rather than quantity. The process of preparation of teachers, starting from recruitment right through the actual training to the quality and competence acquired at the end, is unsatisfactory. The training facilities in most of the centres are inadequate and the objectives and contents of their curriculum lacks coherence and coordination with the curriculum of schools that they are supposed to serve".

The prevalent problems of teacher education in our country have been clearly indicated by the Ministry of Education (1999:1) as "Teacher education in the past has been characterized by its limitations in recruiting interested and committed trainees into the teaching profession, weakness in balancing academic knowledge and professional skills, unequal opportunities for candidates from disadvantaged communities and females. It was also characterized by lack of correspondence between the training curriculum and the needs of the schools".

Regarding the quality and relevance of teacher training, it is indicated in the ESS (ibid.17) that, " The training and professional competence of teachers shall be upgraded with the view of improving the quality and standard of education. To this end the teacher training program and curriculum will be made relevant to the new educational objectives and responsive to the curricula of general education. Teachers training institutions shall also be upgraded diversified and expanded in line with the requirements of the new educational system and service".

Concerning the relevance of the training for effective teaching in primary schools Yosef (1998:3) indicated "Preliminary reports coming from different corners indicate that there is a mismatch between primary education and the respective teacher training curriculum. The SCP teacher training curriculum was initially developed by a task force at the central level. The curriculum seems to emphasize theoretical aspects of education rather that practical ones. It is essential that this training be designed to closely match the trainees' needs when they become teachers."

Thus, determining the relevance of the teacher education college physics courses to the second cycle primary education needs investigation, particularly in the areas of content, training methods employed and problems encountered by practicing teachers in schools.

1.3. Objectives of the Study

The study was carried out to find whether the college physics courses as conducted at Gondar College of Teacher Education are relevant to second cycle primary physics education or not. The study focused on second cycle primary (SCP) physics teachers in the Amhara Region, taking into account the training materials in this college, the college dean, physics course instructors, syllabuses of physics for the SCP schools (grades 5-8) in the Amhara region, teachers and principals of SCP schools in North Gondar, East Gojam, South Wollo and Awi Zones in the Amhara region, and concerned officials/experts within the Ministry of Education and the Amhara Education Bureau. The general and specific objectives of the study were the following.

1.3.1. General Objectives

The general objectives of this study were:

1. To explore whether the contents of the teacher training college physics curriculum address the second cycle primary physics curriculum.
2. To assess if the trainees are supplied with the necessary knowledge and skills of teaching physics in grades 5-8.
3. To examine whether teachers of physics in grades 5-8 have problems of teaching physics in second cycle primary schools.

1.3.2. Specific Objectives

The specific objectives of this study were to:

1. Examine the whether the objectives of the college physics courses reflect both the objectives of the policy and primary physics.
2. Assess whether the scope of training content is sufficient for would-be teachers.
3. Find out whether the courses address the second cycle primary physics content.
4. Explore methods of instruction frequently used by instructors.
5. Study the extent of school experience (teaching practice) trainees get.
6. Examine the provision and utilization of instructional materials during the training.
7. Assess the extent to which physics teachers in second cycle primary (grades 5-8) use the knowledge and skills they acquired during training.
8. Study the major problems teachers of grades 5-8 faced when implementing curriculum.

1.4. Research Questions

With the aim of investigating issues such as the content of diploma level college physics courses, training methods made use of, and problems encountered by practicing teachers, the following tentative questions were proposed to be answered in the process of this study.

1. To what extent is the content of the teacher training college (TTC) physics curriculum relevant to the primary school physics education?
   - Do the courses address primary physics content?
   - Are the courses developed based on the goals of the TTC/primary physics?
   - Is there a gap between intended and developed courses?
   - Is the scope of course content sufficient (proportional to duration)?

2. Are the trainees provided with the necessary physics teaching methodologies at the TTC?
   - Do trainers provide subject methodological training relevant to primary?
   - Do trainees attain sufficient school experience (teaching practice)?
   - Are relevant instructional resources available at GCTE?

3. Do physics teachers in second cycle primary (grades 5-8) have the necessary knowledge and skills to teach?

- Do they feel that they have got sufficient training?
- Are they confident to teach physics at the second cycle primary schools?
- Do they encounter problems with regard to availability of instructional resources and other school conditions at the schools where they teach?

1.5. Significance of the Study

Teacher education in the past in Ethiopia has been characterized by its limitations in recruiting interested and committed trainees into the teaching profession, weakness in balancing academic knowledge and professional skills, unequal opportunities for candidates from disadvantaged communities and females. It was also characterized by lack relevance of the training curriculum to the needs of the schools. To overcome these and other problems of education in Ethiopia, the new Education and Training Policy was formulated in 1994. In this policy (1994:20) it is stated that, "Teacher education and training components will emphasize basic knowledge, professional code of ethics, methodology and practical trainings".

To achieve this the various teachers training colleges, in collaboration with the Ministry of Education, revised the diploma-level teacher training curriculum in 1995/96. This study tried to assess the relevance of this curriculum, specifically the physics teacher training curriculum, for the second cycle primary. Hence, this study was intended to contribute in the following ways.

1. The findings of the study may help in suggesting valuable ideas for making the teacher training college curriculum more relevant.

2. The results could provide resources for curriculum experts and teacher trainers to emphasize the content of second cycle primary education when they design or revise courses in the future.

3. Finally, this study may be of use as a source for other researchers who may wish to do further researches on the improvement of teacher training curricula.

1.6. Delimitation of the Study

Similar diploma level training programs are run at Abiy Adi, Kotebe, Jimma, Adama, Gambella, and Awassa colleges of teacher education. Because of time, budgetary and other constraints, the study on the relevance of the college physics curriculum to second cycle primary physics curricula was limited to Gondar College of Teacher Education (GCTE), and on teachers of second cycle physics in North Gondar, East Gojam, South Wollo, and Awi zones of the Amhara region. There are about one hundred physics teachers who graduated from GCTE in the last three years (1997/98-1999/2000). However, it was not possible to do the study on all the hundred physics teachers who are placed throughout the Amhara region because of time and costs.

1.7. Limitations of the Study

Originally the study was intended to be conducted on twenty sampled second cycle primary physics teachers in three zones (East Gojam, North Gondar, and South Wollo) of the Amhara region. Some of the teachers were found to have left the teaching profession and others were not easily accessible by the writer of this paper since they were in very remote rural areas of the three zones. Thus, it was found necessary to include another sample zone and Awi zone was randomly selected in order to get the twenty sample teachers. However, even then it was still possible to get only seventeen second cycle physics teachers. .

Because the study focused on graduate teachers in the last three years, the sample teachers had to be recent graduates of GCTE. Recent graduates however tend to be placed in rural schools. The sample teachers were thus geographically scattered and, purposive sampling, which might have been possible if the teachers had been in urban schools, was not feasible in the real circumstance.

It also proved impossible to hold focus group discussions because of the wide geographical dispersal of the schools, teachers and principals. The main reason why the study was limited to few sampled physics teachers instead of the 100 was that the schools where these teachers are placed are widely dispersed through out the Amhara region. Time pressure was a major limitation on the part of the writer because he has to cover his office work fulltime. Distance provided another limitation because the sample physics teachers have few years of service and most of them were placed far away from urban areas.

1.8. Acronyms Used

AAEB- Addis Ababa Education Bureau.

AREB- Amhara Regional Education Bureau.

ESDP- Education Sector Development Program.

ESS- Education Sector Strategy.

ETP- Education and Training Policy.

GCTE- Gondar College of Teacher Education.

ICDR- Institute for Curriculum Development and Research.

IICBA- International Institute for Capacity Building in Africa.

KCTE- Kotebe College of Teacher Education.

MOE- Ministry of Education.

REB- Regional Education Bureau.

SCP- Second cycle primary.

SIDA- Swedish International Development Agency.

TTC- Teacher Training College.

ZED- Zonal Education Departments.

1.9. Definition of Terms

Relevance of curriculum - The extent to which the curriculum is related to the real-life situations in which the learner may apply the learning.

Second cycle primary school- Part of the primary schools (grades 1-8) that includes the upper grades. that is grades 5 to 8.

What teacher trainers should take into consideration is clearly indicated by Barnes (ibid., 20) that "What is needed is an integrative conception of teaching (and teacher education) which bring together all of the variables, to create such a conception, those who teach teachers must themselves engage in serious deliberations and develop a coherent conceptual framework for the curriculum". Trainers should deal with questions such as: what should beginner teachers know, and develop the capacity to do? What should be expected from the beginners to understand? Trainers can create clearer and more comprehensive conceptions of teaching that provide a framework for identifying the expertise to be developed.

Schott (ibid., 44), in identifying the competencies that trainees should acquire, stated that "The pre-service institution must evaluate the relative importance of identified teaching competencies and determine which competencies are most amenable to being transmitted and successfully acquired by students within the institutional setting. That is, the institution must determine the competencies for which it will accept responsibility".

Teachers are central to the delivery as well as the quality of education. As stated by Lockheed (ibid., 62-63), the academic and professional training of teachers has direct and positive bearing on the quality of their performance and consequently on the achievement of students. Effective teaching is determined by the individual teacher's knowledge of the subject matter and mastery of pedagogical skills.

In describing issues what teachers need to learn SIDA (2000:29) stated "Firstly teachers must be involved in the process of defining a new teacher education curriculum in order to make sure that it responds to their needs and also as basic democratic requirement. Secondly, it is essential that the teacher education curriculum correspond to the school curriculum. In other words what and how teachers learn and what they are expected to teach must be compatible. Teachers need to be empowered with the competencies considered necessary for a modern, democratic approach to teaching that stimulates reasoning, critical thinking, group work and self-study".

2.3. Content of Teacher Education Courses

Critical to teacher education is the question of the balance and relationship between specific subject mastery and mastery of the content of the subject for teaching.

2.3.1. Specific Subject Mastery.

Content knowledge refers to the amount and organization of knowledge *per se* in the mind of the teacher. To think properly about content knowledge requires going beyond knowledge of the facts or concepts of a domain. Teachers must not only be capable of defining for students the accepted truths in a domain. They must be able to explain why a particular proposition is deemed warranted, why it is worth knowing, and how it relates to other propositions, both within the discipline and without, both in theory and in practice (Shulman in Pollard, 1996, p. 164).

2.3.2. Mastery of Subject for Teaching

Another aspect of knowledge is pedagogical knowledge, which goes beyond knowledge of subject matter *per se* to the dimension of subject matter knowledge for teaching. Since there are no single most powerful forms of representation, the teacher must have at hand a veritable armament of alternative forms of representation, some which derive from research whereas others originate in the wisdom of practice. Shulman (ibid., 65) stated that pedagogical content knowledge includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons.

2.4. Methods of Instruction

The ideal in teacher preparation is recognizing the fact that there is no one way of approach and, recognizing the principle of individual differences, teacher educators frequently tell their students to adjust the content and objectives of their lessons in the light of variables in the characteristics of the learner. Just as children differ, so do beginning teachers. As Schott (ibid., 59) stated, there are those who wish a more theoretical approach, while others demand a more 'how to' approach, while still others are excited by exploring alternative frameworks for viewing teaching.

As indicated in Callahan and Clark (1988:9) and Schott (ibid., 54), the education staff are commonly charged with making only limited use of instructional technology, relying primarily on the lecture method, which, for some pedagogical critics, has limited effectiveness. The mode of learning determines what is learned. One does not learn to write by parsing sentences. Neither does one learn to swim by listening to lectures. Much school learning is superficial because the teaching methods used are not really appropriate for the understandings. skills and attitudes desired. To make learning real to pupils. teachers should use direct. realistic experiences, whenever possible. All of these could be achieved if only teachers themselves are trained by participatory methods in order to address student learning needs through the development of knowledge. real experiences or skills, and attitudes that will lead to expected learner outcomes.

Direct Instruction and Indirect Instruction

Instructional approaches could be generalized or grouped into two major categories, i.e., direct and indirect instruction. Both direct and indirect (sometimes called experiential) teachings have a place in the repertoire of teachers. Direct instruction is primarily large-group, teacher-directed, highly structured expository teaching focused on academic content. It features lecture and explanation, controlled practice. and question-answer sessions as well as other highly teacher-directed activities. Teachers maintain virtually complete control of the content, pace. sequence, and the processes of direct instruction. As Callahan (ibid.. 11) stated, indirect or experiential teaching is more student-centered than direct teaching is. Teachers attempt to get the students to find out and think out things themselves. Among these approaches are open discussions. inquiry and discovery, action learning. individual and small-group work. various projects, and many multitask activities in which students control. mainly, the conduct of their learning.

The better way to train science teachers, especially physics, who could use various teaching methods in primary schools is to equip them with knowledge and skills that will enhance their ability to provide students with opportunities to learn. In this respect Hargreaves (1993:2) stated that Deeper knowledge of and greater confidence in teaching their subject(s); and being aware of and becoming proficient in new teaching methods like cooperative learning can certainly help teachers increase their pupils' opportunities to learn. Teachers who are skilled and flexible in using teaching strategies and knowledgeable about the subject matter are more able to improve the achievements of students.

On the issue of putting students at the center of learning and problem-solving, Barnes (ibid., 14) asserted "In recent years, the traditional view that knowledge could be transferred more or less intact from teacher to learner has been challenged by a view of learning that reaffirms the place of the learner at the center of an active learning process. Learners are seen as constructing meaningful understandings as a result of engagement in activities within an instructional situation that takes into account the context, the learners' prior knowledge, and their goals for learning.

2.5. School Experience (Teaching Practice)

Concerning the issue of teaching practice, Kirk (1988:28) has asserted that "Generations of students have bemoaned the irrelevance of theoretical perspectives which courses have sought to develop and have regarded " teaching practice" as that part of the period of professional preparation which was most valuable. even if the theoretical part of the course did not impinge directly upon it. Indeed, the literature on teacher education internationally has demonstrated a continuing dichotomy between theoretical and practice components of programmes.

Stones in Dunkin (1988:681) has described practice teaching in the following manner. Practice teaching is one of a variety of terms applied to that part of a student teacher's professional training that involves the student in trying to teach pupils. Practice normally takes place in school and although arrangements are sometimes made for students to teach pupils in college, the use of the term practice teaching implies that the activity takes place in school. Other terms used for this aspect are teaching practice, school experience, student teaching, field experience, and practicum.

Positive experience underlines the importance of learning by doing, i.e. teaching practice. Self-reflection on personal pedagogical practice in order to improve and adjust teaching is an example of this practice-oriented modality of teacher education. Critical and systematic reflection on practice is necessary. Without this, teaching practice does not necessarily mean professional development (SIDA, 2000,p.21). It is if teachers of SCP physics teachers do practice teaching before placement that they could effectively teach without facing many problems.

Schott (ibid., 45) has supported this view when he stressed that provision should be made early on in the teacher training program for field experiences through which prospective teachers can, on their own, determine their suitability for teaching, and, provided with articulated, sequential practice, have the opportunity to eliminate weaknesses and enhance strengths in a cooperative arrangement of shared responsibility between university and college supervising personnel and teacher associates within the school placement.

As regards the methods of effecting teaching practice, Dunkin (1988) and Miyat in Rajput (1996) stated, "Approaches to the development of professional skills and competencies in pre-service teachers revolve around the provision of guided experience in school or school - like situations. Almost universally this involves the placement of student teachers in actual schools or classrooms for varying periods of time and at varying stages in their preparation." In primary schools they gain an experience of the actual classroom situation, practicing in simulated teaching or microteaching, as a method of teacher preparation, they develop certain teaching competencies and skills in the college itself.

Describing the purpose of supervising the teaching practice conducted by trainees, Miyat in Rajput stated that "The practice teaching lessons may be supervised to locate weaknesses of trainees and assist them in the improvement of teaching; to help them to solve their difficulties; to help them with the techniques and methods of teaching; to help them face different classroom situations; and to see whether they adopt the methods taught to them in the training institutions. Overall, the purpose of supervising practice teaching is to evaluate the performance of student teachers in the class and help them improve upon their performance by offering suggestions".

Another important issue that should be given consideration is the trend in shifting from teaching practice to school experience. In this regard Kirk (1988:30-31) stated "*Firstly*, there is a change of designation from *teaching practice* to *school experience*". This is in recognition of the fact that students' activities on placement should extend beyond the practice of teaching skills such as discussion with teachers on curriculum, co-curricular activities, and studying school-community links. *Secondly*, he stated "it is now acknowledged that both theoretical understandings and skills are developed across training locations, in school and in college through actual practice teaching at schools and through various types of simulation and micro-teaching activity".

It is thus important to give greater emphasis to teaching practice, and as Schott (ibid., 49) has stated, the main responsibility for monitoring the initial development of and personal qualities that comprise teaching, should be in the province of the teacher preparation component and a major responsibility of college staff. supervisors and cooperating teachers at the pre-service level.

2.6. Science Education

When the human desire for understanding the world is organized into careful ways of collecting, testing, and sharing information, it is called *science* (Harlan, 1988.p.3). When we offer intriguing science experiences to young children, we nourish their natural, human capacity to know. If we do this with sensitivity to their interests, nature, and needs, we release and enhance the powerful affective component of knowing and learning.

Science education is concerned with developing scientifically or technologically literate citizens who understand how science, technology, and society influence one another and who are able to use this knowledge in their everyday decision making. As Carin (1989:70) stated Science is more than facts, concepts, and principles, for it also includes values.

In promoting science and technology education, Driver in Layton (1988:59) has stated " Many arguments have been put forward in recent years for broadening the focus of school science courses in order to make them more relevant to the concerns of the individual and to modern society. Teaching programs are being developed, for example, which present science principles in contexts which are in themselves seen to be of practical use, (for example, optics in photography, electricity in the home, health science).

As McNeil (1990:335) stated, a major goal of science teachers should be to provide students with the basic problem-solving skills they will need to cope with a technological society. Instead of teaching students a single direct path between questions and answers, teachers should teach them to deal with questions that give rise to a number of plausible alternatives. In this way children could analyze cause and effect relationships, a technique that has been profitable in the sciences.

To know science is not merely to learn the words, the names of science. "Science," the way it has often been taught, emphasizes what is *known* – the naming and the labeling of certain bits and pieces of information. Such an approach is unidimentional, moving from what is already known into the heads of the pupils. As Wassermann (1988:5) stated this picture of science teaching is that of a body of knowledge, well delineated and utterly without equivocation, from which all the profound implications of hypothesizing, of tentatively held concepts, of experimentation, have been extinguished. There is no margin for error; answers are either right or wrong.

Approaches of teaching

There are many ways to teach science. According to Wassermann (ibid., 80), the way one chooses to teach is very much tied up with what one considers important in teaching the subject, as well as with the instructional strategies one chooses to ensure that those important learnings are effectively realized. It is also helpful for teachers to acknowledge what they consider to be the important learning goals they are after and to devise teaching strategies that are most likely to bring them to those goals.

Didactic teaching, sometimes called direct instruction, according to Wassermann (ibid., 80), is probably the most popular and widespread means of instruction in science. In direct instruction, the emphasis is on students' learning the *facts* of science. Direct instruction puts the teacher at center stage; it is the teacher who plays the more active role. The students are more passive; they listen and respond to the teacher's cues and are otherwise expected to be quite.

Science activity can also be described in terms of the methods or processes for carrying out scientific activity such as designing investigations, observing, experimenting, inferring, interpreting, and constructing explanations from the data. It is quite possible for children to become proficient at using the science processes, while at the same time gaining concepts through practicing discovery activities (Harlan, ibid., 25-26). One of the best means of helping children know the world at hand is to organize materials so that they can explore, question, reason, and discover answers through their own physical and mental activity.

Discovery: Any teacher who is capable of maintaining a classroom atmosphere of warmth, acceptance, and nourishment has the basic qualifications for young children in discovery science. A positive attitude toward science, and the ability to carry out the consultant, and facilitator roles are needed for good teaching. Describing how students could learn science using the discovery approach, Harlan (ibid., 250) stated in discovery science, learners actively seek information. Regardless of level of sophistication, be it in the research laboratory or in the preschool, science is a way of thinking and gaining knowledge that consists of four steps: Become aware of a problem, Hypothesize (propose an explanation), Experiment, and Communicate the results.

Presentation (demonstration): Another approach to teaching science, according to Wassermann (ibid., 80), may be called "presentation". Such an approach combines information dispensing with "showing how." The teacher may do much talking, but demonstrations of how things work are also included. Teachers who choose this approach implicitly or explicitly see the acquisition of information and comprehension of certain basic scientific principles as primary learning goals. The effectiveness of this approach depends largely on the teacher's ability to present with style.

It is further stressed by Wassermann (ibid., 83-84) that an effective science program is dependent not only on the teacher's awareness of the differences between activities that call for students to function at lower or higher cognitive levels but also on the incorporation of higher-order tasks into the science curriculum. Higher-order tasks are inquiry-oriented (open-ended), and do not lead students to a predetermined, correct answer(s). On the other hand lower-order tasks generally lead to "correct" responses, and the purpose is to help pupils arrive at that answer.

Problems of teaching science

One of the most important reasons for the failure to implement new curricula, as indicated by Harlan in Lewy (1991:909), might be that new materials require teachers to introduce new content and also to adopt an unfamiliar role in teaching. For a majority of teachers this requires a major change from the established role of teachers as providers of information. Such a change cannot be made quickly and not easy to expect teachers to take a great step in too short a time.

To learn science the active discovery method would be better than the lecture method, which limits students to be passive recipients of information. Supporting this issue Harlan (1988:27-28) stated that more than 300 comparative performance studies in recent years have confirmed the superiority of the discovery to the lecture method. Yet it appears that primary teachers continue to use the less effective methods. The most common reason teachers give for not offering hands-on learning activities is their conviction that they lack enough science background to be able to answer children's questions. The open-endedness of problem solving bothers them, and they feel uneasy when more than one solution can be appropriate.

Strategies to overcome problems of teaching science

Teachers should be trained with curricula relevant to the level they teach. As Harlan (ibid., 910) indicated, studies of implementation strategies have shown that those consisting principally of the production and distribution of teaching materials have little effect on classroom practice. Since primary teachers generally lack skills and confidence to make use of new science programs, some training is required to develop skills and positive attitudes before ideas can be implemented.

2.7. Physics Education

One of the most exciting discoveries concerning science is that all of it is tied together by a few simple and fundamental mathematical relationships. There are laws that are basic to all the sciences. The science that examines these fundamental laws is called physics. It examines the relationships of matter and energy. In physics we try to have a total understanding of how the universe operates. As Murphy (1982: 3-5) stated the discovery process moves at an ever-increasing pace. Ideas that were sheer speculation a few years ago are common knowledge to today's physicist. For example, are we the only intelligent beings in the universe? We can speculate from the latest scientific evidence that probably we are not.

Physics is characterized among other things by the formal system of relationships that have been established between variables. Everyday thinking is not characterized by such a formal system and thinking is characteristically closely tied to experiences. As Driver in Layton (1988:72) stated, in learning physics, students have to learn how to redescribe physical situations in terms of the formal system, then perform manipulations within that system, after which they have to redescribe the product of those manipulations in terms of the physical situation again.

In Sears (1980) and Lewy (1991) it is further indicated about physics that it is an empirical study. Everything that is known about the physical world in which we live and about the principles that govern its behavior has been learned through observations of the phenomena of nature and generalizations from these observations. Thus physics is a science of measurement. The rationale for teaching physics is to provide experiences for some students to reach the frontiers of physics and other natural sciences, and to provide a general understanding and reasoning for students who will learn science that is sufficient for enlightened citizenship in a technological age.

Science curricula responsive to societal problems are nowadays being advocated in our country, and physics is one of the subjects that should address these needs and problems. In this regard Lunetta in Lewy (1991:931-932) asserted the importance of physics when he said "Physics curricula are now responding to a growth of information, to changing perceptions of the nature of the physics discipline, and to a variety of factors in the community and society.

Environmental problems are becoming more visible, causing further demands for relevance in science teaching from groups both within and outside the physics teaching profession. Subsequently, groups all over the world have advocated the use of societal problems as foci for study in science".

Physics and practical activities

There is evidence that students often acquire a simplistic view of science through science curricula, a view that is isolated from their reality and from the reality of science progress. Yet, over the years many have written that the physics curriculum should reflect the nature of physics, and developing an understanding of the nature and process of science has been among the more important goals of physics teaching. As Lunetta (ibid., 932) stated, a primary concern of educators is to communicate that physics is more than a collection of facts and static concepts and laws; it is a growing, dynamic network of evolving models and conceptual schemes.

As Lunetta (ibid., 933) has described, over the past 100 years, there has been an exponential growth in knowledge about the physical world. Concurrently, there has been great growth in the apparatus, material resources, and media available for physics teaching as well. With relatively simple though not necessarily inexpensive apparatus, students today can easily observe some of the fundamental phenomena of physics such as motion in almost frictionless conditions and interference effects in light.

The Education and Training Policy (1994) has given emphasis to science education. In grades 5 and 6 of second cycle primary, physics is integrated with other science subjects whereas it is given as a discrete subject in grades 7 and 8. Offering physics in this way in these two grades is justified (ICDR: 1996) by the fact that students should be made academically and psychologically ready by their experiences in the preceding grade levels. As a science subject, physics should be taught not only by teacher-centered methods but also mainly through approaches that encourage students' active participation so that they could develop a variety of scientific skills in planning and designing, in observing and interpreting data.

When one looks at the situation of SCP schools, most are not equipped with the necessary facilities and equipment and hence require replenishment or full supply. As stated in the ETP (1994) "Inadequate facilities, insufficient training of teachers, overcrowded classes, shortage of books and other teaching materials, all indicate the low quality of education provided".

Findings of the studies of the college training curricula, specifically physics, made by Gondar and Kotebe Colleges of Teacher Education (KCTE) and their recommendations are discussed below. The studies were conducted on the newly developed (1990) college level teacher education curricula based on the new ETP (1994) objectives and second cycle primary curricula. Findings, conclusions and recommendations are included here under.

2.8.1. Study made by Gondar College of Teacher Education

As indicated by the Amhara REB (1998), a study was undertaken to assess the pre-service SCP Teacher Training Program in GCTE. The study was intended to identify problems in the training program, the profile of teaching staff, and adequacy of physical facilities in order to review the curriculum and other factors related to improve the quality of teacher training program in GCTE. The findings related to this study are the following (AREB, 1998, pp. v-vi):

- Although most instructors agreed that the courses offered at GCTE had link with SCP school curriculum, some of the GCTE instructors disclosed that the training curriculum is linked more to higher-level teacher education program (secondary teacher training) rather than preparing teachers for the second cycle primary school.

- Major problems encountered by GCTE instructors were lack of reference books to prepare teaching materials, and lack of adequate laboratory equipment, chemicals for science courses, and inadequacy of rooms for instructors.

- Classroom activities mainly adhered to lecture method do not give options for trainees to be acquainted with other alternative methods. It is obvious that teachers teach the way they are taught. Lecture method is incompatible to the new primary school curriculum.

CHAPTER THREE

METHODS OF THE STUDY

3.1. Research Design

To study the relevance of the TTC physics curriculum of Gondar College of Teacher (GCTE) to second cycle primary schools, three major research questions were proposed to be answered:

- To what extent does the content of the teacher training college (TTC) physics curriculum address second cycle primary physics education?
- Are trainees provided with the necessary subject teaching methodologies at the TTC?
- Do physics teachers in second cycle primary (grades 5-8) have the necessary knowledge and skills to teach?

To get relevant and sufficient information on the research problem, it was vital to identify an appropriate research design. For this a quantitative research method (the descriptive method) was used for the acquisition, quantification and description of data gathered from primary and supplementary sources.

The primary sources of data were physics teachers who graduated from GCTE and teaching in SCPS in the sample zones of the Amhara region. Supplementary data sources were a curriculum expert at ICDR, and concerned officials at the Education Bureau and four Zonal

Even though the pilot study was conducted in a different region from where the actual study was conducted, due to time constraints on the part of the researcher, participants of the pilot study were appropriate to give useful information or feedback. This is because all those who were involved were similar in terms of the level of the education offices or institutions they work, in their status and responsibilities, and also in terms of the fields of study on the part of college instructors and second cycle primary physics teachers. The four physics teachers who participated in the pilot study were trained by courses similar to those given at GCTE in the last three years.

All participants in this pilot study were first informed about the objectives of the pilot study and on how to fill, evaluate, and give feedback on the relevance of content, item length, types of questions, layout, etc. of the questionnaires. Respondents were given one week to review questionnaires and provide feedback in which all of them did. Based on their suggestions and comments instruments were improved (some relevant items added and others removed, lengthy items shortened, item responses increased, unclear ideas restated) for use in the main study.

3.5. Sample size for the main study

The major sources of data for the study were SCP physics teachers who graduated from GCTE and teaching in the Amhara region. The graduates of the physics department of GCTE in the last three years were not more than a hundred. Even though this number seems to be

Program output

- Achievement of program objectives in preparing teachers
- Adequate performance of graduates on the job
- Problems in the program and increasing its effectiveness

The above criteria were used to evaluate and compare whether there is match or mismatch between the objectives, content, instruction methods of the college and SCP physics courses, and to assess the availability of resources.

CHAPTER FOUR

FINDINGS AND INTERPRETATION

In this section, all the data that were collected are presented in different tables. Data were collected from questionnaires distributed to different target groups; from the document analysis of both college level and SCP school physics contents and objectives of ETP; from interviews with an REB official (curriculum expert) and one college instructor, and from the observation made at the GCTE physics laboratory. The data are then followed by interpretation in order to answer the research questions of the study indicated in chapter one.

4.1. Findings

4.1.1. Demographic characteristics of the respondents

Tables 1-3 present the summary of the qualifications, age, sex, and years of service of instructors of physics courses and the dean of GCTE in Table 1, physics teachers and principals of sample SCP schools in Table 2, curriculum experts and education officials at the Amhara Regional Education Bureau and sample zones, and that of a curriculum expert at ICDR in Table 3.

Table 1: Personal Data of GCTE physics instructors and dean

Item	Sub-Item	Respondents	
		Instructors	Dean of College
		Frequency	Frequency
Qualification	M.A. M.Sc.	- 3	1 -
Age	31-40	3	1
Sex	Male Female	3 -	1 -
Service Years	Current Post 1-5 Other (5-20)	 3 -	 1 1

All the three physics instructors at GCTE have a master's degree (M.Sc.) in physics (Applied Physics or Geophysics) and the college dean has a Master of Arts (M.A.) qualification in TEFL. Both the physics instructors and the college dean have indicated that they had no teaching experience in primary schools. The college dean had been an instructor for five years before he was appointed as a dean. It can be seen from the table that there is no female in the sample.

Table 2: Personal data of physics teachers and principals in sample SCP schools

Item	Sub-Item	Respondents			
		Teachers		Principals	
		Frequency	Percentage	Frequency	Percentage
Qualification	B.A./B.Sc.	-	-	4	23.53
	Diploma	17	100.00	12	70.59
	Certificate	-	-	1	05.88
Age	21-30	14	82.35	6	35.29
	31-40	3	17.65	11	64.71
Sex	Male	16	94.12	17	100.00
	Female	1	05.88	-	-
Service Years	1-5	14	82.35	5	29.41
	6-10	-	-	3	17.65
	11-15	-	-	3	17.65
	16-20	3	17.65	4	23.53
	21-30	-	-	2	11.76

As can be seen above in Table 2, all the school principals are qualified as teachers for the level at which they work as principals except one primary school (grades 1-8) principal who has a certificate qualification. Out of the seventeen school principals, four (23.53%) have a Bachelor of Arts (B.A.) qualification. They are principals of secondary schools to which four of the seventeen diploma-holder physics teachers are currently transferred to teach physics from second cycle primary schools. All four teachers had previous experience in second cycle physics teaching.

All of the respondent school principals are male and there is only one female physics teacher. Fourteen (82.35%) of the physics teachers are between the ages of 21 and 30 whereas only three (17.65%) are between 31 and 40 years. Only six (35.29%) of the school principals are between 21 and 30 years where as the majority (64.71%) are between 31 and 40 years of age.

Regarding service, fourteen (82.35%) of the physics teachers have teaching services of five years or less whereas the rest three (17.65%) have sixteen to twenty service years. The service of principals in their current post is spread from one to twenty eight years.

Table 3: Personal data of REB/ZEO officials and ICDR expert

Item	Sub-Item	Respondents		
		REB/ZED officials		ICDR expert
		Frequency	Percentage	Frequency
Qualification	B.A./B.Sc.	6	100.00	1
Age	21-30	1	16.67	-
	31-40	4	66.66	-
	41-50	1	16.67	1
Sex	Male	6	100.00	1
	Female	-	-	-
Service Years	Current Post			
	1-5	6	100.00	-
	11-15	-	-	1
	Other (5-20)	6	100.00	1

Table 3 shows that all of the REB and ZED officials and the ICDR expert have qualifications of B.A. or B.Sc. Almost all of the regional and zonal education officials (83.33%) except one, and also the ICDR curriculum expert are below the age of forty. There was no female respondent from this group. The service of the REB and ZED officials in their current positions ranges from one to five years. They also have service in other positions for a range of five to twenty years. The ICDR expert had been a teacher for ten years and working at the MOE for fifteen years.

4.1.2. Comparison of objectives

In order to compare to what extent the objectives of the ETP (1994) and the SCP physics are reflected in the objectives of the physics courses at GCTE, data have been collected from college dean, the physics courses instructors and the physics expert at ICDR through questionnaires (Table 4), and from the discussion held with one of the instructors. A document analysis of the syllabi of both the college physics and second cycle primary physics and science courses has been conducted and comparisons made (see Table 5).

Table 4: Comparison of Objectives (from questionnaires)

Item	Sub-Item	Frequency of responses		
		Instructors	College dean	ICDR expert
		Frequency	Frequency	Frequency
The policy objectives are reflected in the objectives of the physics courses.	Yes No	1 2	1 -	1 -
The extent that these policy objectives are reflected in the physics courses	Adequately Partly Little	- - 1	- 1 -	1 - -
The general and specific objectives of college physics courses are related to those of second cycle primary	Adequately Partially Very little	- - 1	- - 1	1 - -
The objectives of the training courses are defined clearly to address learning needs of trainees	Yes No	1 2	1 -	1 -

As it could be seen in Table 4 above, one of the three physics instructors, the dean of GCTE and the physics expert at ICDR replied the general objectives of the ETP (1994) are reflected in the objectives of the college physics courses. Two instructors replied they are not reflected. It should be noted, however, that the three who replied the policy objectives are reflected in the physics courses, rated differently the extent the policy objectives are reflected in the physics courses. The instructor replied they are little reflected, the college dean rated it as partially, whereas the ICDR expert replied that the policy objectives are adequately reflected in the college physics courses. Even if these respondents agreed that the policy objectives are reflected, they differ in their views on the extent of reflection and, on balance, suggest that the connection is not a strong one.

In table 4 it could be further observed that one instructor and the college dean responded that, the general and specific objectives of the college physics courses are related to second cycle primary physics syllabi, but only very little, where as the ICDR expert replied they are adequately related.

While two of the three physics instructors replied that the objectives of the training courses are not defined clearly to address the learning needs of trainees, one instructor, the dean of the college and the ICDR expert replied affirmatively.

From the table it could be generalized that two of the three instructors disagree that the new Education and Training Policy and second cycle primary objectives are reflected in the college physics courses, whereas one instructor, the college dean and the physics expert at ICDR believe that the objectives are more or less reflected.

A discussion was held with one of the GCTE physics course instructors on the match or mismatch of objectives, the relevance of the college physics content to second cycle primary, methods of instruction and teaching practice. This instructor has expressed his view that there is a match between the course objectives of college physics and of the second cycle primary physics.

Table 5: Comparison of objectives (document analysis)

Education and Training Policy (ETP) general objectives	General college physics course objectives	Summary of Primary physics objectives
1. Develop the physical and mental potential and the problem solving capacity of individuals by expanding education and in particular by providing basic education for all. 2. Bring up citizens who can take care of and utilize resources wisely, who are trained in various skills, by raising the private and social benefits of education. 3. Bring up citizens who respect human rights, stand for the well being of people, as well as for equality, justice and peace, endowed with democratic culture and discipline. 4. Bring up citizens who differentiate harmful practices from useful ones, who seek and stand for truth, appreciate aesthetics and show positive attitude towards the development and dissemination of science and technology in society. 5. Cultivate the cognitive, creative, productive and appreciative potential of citizens by appropriately relating education to environment and societal needs. (*ETP, 1994: 7-8*).	1. Prepare teachers who will serve in the second cycle primary schools with sufficient theoretical background and a knowledge of appropriate use of equipments and experimental techniques. 2. Develop a knowledge, apprehension and appreciation of physics, its physical significance and relationships with other sciences. 3. Develop skills in scientific observation, measurement and analysis. 4. Develop an awareness of the vital role and value of experiments and models in scientific studies. 5. Develop the talent to convey this knowledge, skill and understanding to school children in particular and the community in general. 6. Equip teachers with the necessary theoretical and practical knowledge that enable them to pursue advanced studies in the country and elsewhere.	1. Get knowledge and understanding about and be able to explain about physical bodies, force, light, heat, electric current, electromagnet induction and electronics, plants, the environment, human respiration, reproduction, diseases, compounds 2. Develop the abilities and skills in measuring physical quantities; observing and describing physical phenomena; applying knowledge to practical problems; conduct experiments; conserving environment, identifying different compounds, 3. Develop habits and attitudes of protecting the environment, consciousness in observing and experimenting; habits in handling devices; proper eating habits; interest in physics and technology. 4. Understand basic scientific concepts, facts, regularities, principles and laws that are important to the society's activity in the immediate environment; 5. Appreciate and care for the processes and phenomena in their environment; 6. Be willing to change or develop themselves in accordance with the need of the processes and phenomena occurring in the environment; 7. Apply the scientific method in solving practical problems and social problems, measure physical bodies

As indicated above, a comparison of the general objectives of the new Education and Training Policy (ETP, 1984), the general objectives of the physics courses, and the objectives of the SCP science and physics subjects was made. Comparisons have been made, firstly, between the general objectives of the GCTE physics courses and the general objectives of the ETP and, secondly, between the GCTE set and the objectives of the physics course for grades 5-8.

Comparison of objectives (1): GCTE physics courses with general objectives of ETP.

College physics courses objective 1 prepares teachers with theoretical background and knowledge to use equipment and experimental techniques. It matches objectives 1 and 5 of the ETP in developing mental and cognitive potential. Developing problem-solving skills and relating education to environmental and societal needs is not clearly indicated in the objectives except that both of these are included in the specific physics course objectives of one course.

College objective 2 is specific to knowledge and appreciation of physics and how it relates to other sciences. This objective matches with ETP objectives 1 and 5 in developing "mental and physical potentials". Objective 3 of the physics courses is concerning the development of skills in scientific observation, measurement and analysis. It matches with policy objective 2 in developing "various skills" only and omits especially "can take care of and utilize resources wisely"; matches with ETP objective 5 in developing "cognitive potential" only.

College objective 4, on awareness of role and value of experiments and models in science, does not map, unless again with ETP objectives 1 and 5 in developing "mental potential" and "cognitive potential" respectively. College objective 5 is concerning the development of talent to communicate knowledge, etc., to children and the community. It matches with ETP objective 4 in the "dissemination of science and technology" but omits "differentiate harmful practices from useful ones" especially. College objective 6 is about giving teachers enough theoretical and practical knowledge, and pursuing advanced studies. It matches with ETP objective 1 regarding "mental potential" and with objective 5 in developing "cognitive potential" only.

Summary.

The college physics objectives are dominated by theoretical knowledge, appreciation of physics, scientific skills, value of experiments and models in science; and practical knowledge. The matches are principally on developing "mental potential", "cognitive potential", "various skills", "dissemination of science", etc. Omissions are significantly "problem solving", "care and Utilization of resources wisely", "differentiate harmful practices from useful ones". There is nothing on broad citizenship areas concerning ETP objective 3, whilst it would be unreasonable to expect that the objectives of the ETP (1994) should be comprehensively incorporated into those of every course, nevertheless the mismatches that have been noted are of concern in the area of physics.

Comparison of objectives (2): second-cycle primary with overall GCTE physics.

Comparing primary science and physics objectives to the objectives of college physics, objectives 1,2, and 3 of the primary science and physics and of the college match comfortably. Objectives 4 and 5 of the primary which refer to "understanding scientific concepts…laws", match with college objectives 1,2, and 5, but the relevance to society and environment is missing except in the specific objectives of "Earth Science". Objectives 5 and 6 of the primary science, which focus on the appreciation, care, for processes and phenomena, change and self-development with aspects of environment, are missing in the college course objectives except in the objectives of "Earth Science". Objective 7 of the primary set matches with college objectives 1 and 3, except on social problem-solving.

Summary of comparisons of objectives (1) and (2).

It can be said that the college course objectives are narrowly focused, and therefore, are mismatched with the general ETP objectives, and the objectives of second cycle primary science and physics. The most serious mismatches are: ignoring mention of practical problem-solving; ignoring the environment (except to some extent in Earth Science) and important associated issues such as "differentiating harmful practices from useful ones"; overly-emphasizing academic content, knowledge and theoretical understanding.

Comparison of objectives (3): analysis of the objectives of 11 GCTE physics courses.

In order to confirm, or otherwise, the findings from these two lots of comparisons, it seemed advisable to look in greater detail at the objectives of the individual physics courses at GCTE. Such an examination could help to validate or to invalidate these conclusions suggested from the above comparisons: that the general objectives, and so by implication, the course as a whole emphasized theoretical knowledge at the expense of practical skills and activities; that its primary concern was with the academic content and the teaching of that content was very much a secondary consideration; that there was heavy emphasis placed upon "cognitive" and "mental potential"; that the objectives tended largely to neglect the connections with and applications to the school students' lives and environments and that these general objectives ignored the broad areas of ethics, citizenship and democratic living.

In order to carry out this next search, the sets of objectives for eleven of the physics courses at GCTE were examined and the following characteristics emerged.

In one course, "Earth Sciences", 4 out of the 5 stated objectives lay emphasis on: "thinking scientifically"; ".... can contribute to their country in teaching how to preserve it (*the atmosphere*) unpolluted"; "To associate them (*the trainees*) with those information (sic) which they can teach in grades 5-8"; ".... to make them (*the trainees*) participant in advising our people how we are unknowingly affecting the stability of that corner of the earth with cultural ways of interactions (sic)." The effect of these objectives is that they mention areas that either were omitted or only lightly present in the general objectives. Specifically, they mention: connecting to the environment and caring for it, relevance to the schools' syllabus.

In another course, "Experimental Physics". 4 out of the 8 objectives either indicate or suggest an emphasis on practical investigation by the trainees. For example, "Give experimental analysis based on the collected measurement and data.", and "Measure electrical quantities such as voltage, current, resistance, etc." These and the other unquoted examples refer to some activity on the trainees' part in experimental procedures.

For a third one credit hour practical course, it is surprising that objectives are mainly about theory and content knowledge, but one objective says, "Use some of the laboratory apparatuses (sic) found in the schools where they are going to be assigned to teach." Another objective begins with, "Encourage their kids (sic) to learn by themselves, with a little bit of help from them (*the trainees*)...." and suggests a focus on learner-centered, active learning. But, the objective then states, ".... in trying to understand the theoretical knowledge given to them." The second part of the objective seems to contradict the first part because it suggests lecture methods. So, in this course, either 1 of the 7 objectives refers to the school situation and another is not clear, although some words suggest an intention to encourage the trainees to encourage independent learning.

Finally, in another course, "Heat and Thermodynamics", out of 5 objectives, 3 are about academic content, but the others include: ".... skill and methodology of applying the knowledge they (*trainees*) are given when leaving for work."; "To develop in the mind of a youngster (sic) a scientific way of thinking, reasoning...." But this one also ends with a puzzle as it says next, ".... rather than spiritualizing about the inter-molecular world: what they are; what they help for; etc." However, there are mentions of applying the knowledge gained and of scientific thinking.

(Note: *In all of the above, the words in italics and in brackets are inserted by this writer.*)

The above examples are almost all of the exceptions as the rest of the objectives are about academic content; mainly "cognitive and mental potential." A different way of presenting a summary of these objectives is that out of a total of 69, 59 objectives are about academic content and theoretical understandings. In a few cases they do contain words that could suggest practical activity, but the true meanings are not clear and, often words like 'discuss', 'explain' and 'verify' seem to be equivalent to 'show understanding'. In other cases it is not clear what the meaning is. However, even if a few changed category, the clear balance would still show that the result of this further analysis supported the results from the earlier sets of comparisons of objectives.

4.1.3. The relevance of the college physics curriculum

REB/ZED officials, the physics teachers, the principals, college physics instructors, and an expert at ICDR were requested to determine whether the GCTE physics courses are relevant to the SCP physics content or not. Their responses are organized in two tables (tables 6 and 7) below.

Table 6: Training curriculum relevance (REB/ZED officials, SCPS teachers and principals)

Item	Sub-Item	Respondents					
		REB/ ZED officials		2^{nd} cycle teachers		2^{nd} cycle principals	
		No.	%	No.	%	No.	%
Content of primary physics reflected in college physics	Highly	1	16.67	8	47.06		
	Moderately	5	83.33	6	35.29	N/A	N/A
	Low	-	-	3	17.65		
Extent of training to prepare trainees for primary schools	Strongly	-	-	14	82.35	3	17.65
	Moderately	6	100.00	3	17.65	12	70.59
	Low	-	-	-	-	2	11.76
The level of difficulty of the courses	High			-	-		
	Meets standard	N/A	N/A*	17	100.00	N/A	N/A
	Low			-	-		
Adequacy of time to cover courses	high			-	-		
	adequate	N/A	N/A	17	100.00	N/A	N/A
	low			-	-		
Practical activities and exercises put in the courses are	More than enough			-	-		
	Sufficient	N/A	N/A	12	70.59	N/A	N/A
	Insufficient			5	29.41		
What trained teachers lack	Content	3	50.00			1	05.88
	Lesson planning	3	50.00	N/A	N/A	-	-
	Methodology	-	-			1	05.88
Area in which training should focus more	Content	2	33.33	13	76.47	9	52.94
	Methodology	4	66.67	4	23.53	7	41.18
	Teaching practice	-	-	-	-	1	05.88
Solution to overcome lack of efficiency in teaching physics	Increase content and duration	1	16.67	5	29.41	5	29.41
	Focus training on primary	5	83.33	8	47.06	6	35.29
	Strengthen teaching practice	-	-	3	17.65	3	17.65
	More practical activities	-	-	1	05.88	3	17.65

- (N/A= Not Applicable)

As could be observed in Table 6 above, from among 6 REB/ZED officials and 17 teachers respondents, only one (16.67%) ZED official and eight (47.06%) physics teachers responded that the content of the second cycle primary physics is highly reflected in the college physics courses. The majority (83.33%) of the REB/ZED officials and a significant number (35.29%) of the teachers replied that it is averagely (moderately) reflected.

The proportion of respondents who believe that the training at the college averagely prepared the trainees to teach in SCP schools is 100% for REB/ZED officials and 70.59% for the school principals but only 17.65% for the physics teachers. On the other hand, 82.35% of the physics teachers and few (17.65%) of the principals have the view that the training prepared the trainee teachers strongly whereas two secondary school principals have a negative response towards it.

All of the respondent physics teachers replied the level of difficulty of the courses is neither high nor low, but it is to the standard (adequate). They also responded that the two years' duration is sufficient or adequate to cover all the courses. The physics teachers were requested to rate to what extent practical activities and exercises are included in the physics courses. The majority (70.59%) replied that they are sufficient whereas only five (29.41%) said they are insufficient.

The respondents were also provided with three alternative items with regard to what trained teachers lack and the solutions to overcome them. 50% of the REB/ZED officials and one school principal replied that the trained physics teachers lack academic content or knowledge. On the other hand, 50% of the REB/ZED officials and one school principal responded that these teachers lack lesson planning skills and methodological knowledge respectively.

They were asked to suggest solutions to overcome this problem. 33.33% of the REB/ZED officials, 76.47% of the teachers, and 52.94% of the school principals replied that the training should focus more on subject content. The majority (66.67%) of the REB/ZED officials, 23.53% of the teachers, and 41.18% of the principals responded that the training should focus more on methods. Only one school principal stated that emphasis should be given to teaching practice.

To overcome lack of efficiency in teaching physics, the most favored response from each group was that the training should focus on primary physics content: 83.33% of the REB/ZED officials, 47.06% of the physics teachers and 35.29% of the school principals. The proportion of respondents, whose suggested solution was to increase the duration of training and content depth, was 16.67% for REB/ZED officials, 29.41% for teachers and 29.41% for school principals.

Strengthening teaching practice is much less suggested as a solution, whereby only three principals and three teachers recommended it. The majority of all the respondents, 100% of education officials and 82.35% of the teachers, have the opinion that the physics training curricula have moderate and high relevance. On the other hand, it is suggested by 83.33% of officials, 47.06% of teachers and 35.29% of principals that emphasis should be given to subject matter training that is more related to primary content.

college physics instructors stated the practical activities and exercises indicated in the courses are sufficient whereas the other one has the view that it is insufficient.

Summary responses to open-ended questions

Tables 6 and 7, which give responses to the closed questions, indicate a shared view that the duration was enough. That view is expressed by all the teachers, all 3 instructors and the ICDR expert. However, in the open-ended responses, a different set of views emerges. Most of the teachers reported: the content is "too vast"; there is pressure to cover the syllabus, the pace of teaching was too fast and not enough assistance was given by instructors; concepts were hard to understand and some instructors could have made more efforts to help. In addition, one teacher and a school principal suggested raising the length of the courses to two and half years. Another teacher recommended reducing time given to other courses, whereas one instructor suggested increasing time given to major and minor courses and cut time for professional courses.

Such differences require some explanation. One part of the explanation is that whilst the closed questions force a choice, the open-ended allow for qualification of responses, more personalization and greater detail to be provided. The open-ended views are thus probably closer to what the teachers really thought of the courses. In other words, the duration is probably insufficient or alternatively, the content is too great.

The curriculum expert at the Amhara REB and one instructor recommended that the modern physics course should be reintroduced; that is, more content is necessary. Another education official stated that the content should be given in depth. An instructor, two teachers, one principal and one education official have the opinion that the content is closer to higher education than to the primary curriculum, and thus they suggested that the content should be interrelated with and the training based on second cycle primary content not on pure physics.

Table 8: Training curriculum relevance (content analysis)

A document analysis of the syllabi of both the college physics courses and those of the second cycle primary science and physics was made and summarized in the following table.

Summary of the content of second cycle primary syllabi	**Summary of the content of college physics courses**
Physical bodies and Basic measurement; Motion, Laws of motion; Mechanical work, energy and power; Force; Heat energy, Heating things; Pressure; Sound; Light; Magnets, electromagnets; Electric energy; Electronics; The solar system and major group of stars; Weather and climate; Basic environment; Conservation of resources; Human respiration; Human nervous system; Hormones; Reproduction in animals; Plants; Reproduction in plants; Conservation of resources; Diseases; Classification of substances; Compounds;	Fundamental, derived, scalar and vector quantities; Laws of motion; Impulse and momentum; Rotation; Equilibrium. Fluid mechanics; Motion; Mechanical work, energy and power; Temperature and heat; Fluid Statics; Wave motion; sound waves; optics; electromagnetic waves; Electric charges, field, and potential; Capacitors and dielectrics; Electric current and circuits; Alternating current; Measuring voltage; Induced electromotive force; Wheatstone's bridge; Diodes; Rectifiers; Rectifier and filter circuits; Equivalent circuits; Vacuum tube; Semiconductors; Transistors; Modulation and demodulation; Magnetic fields; Electromagnetic induction and inductance; Magnetism; Electrical measuring instruments; The solar system; Stars & galaxies; Atmosphere of the earth; Geology of the earth There are also two courses (each 1 credit hour) experimental physics courses **which include 19 experiments**

Concerning the balance of content between the college and primary, in SCP physics content, there are 6 units on Mechanics; 5 units on Electricity, Magnetism and Electronics; 2 units on Heat; 1 unit for Sound, Light, and Weather each. On the other hand for college physics courses, there are 2 courses and one experimental course on Mechanics; 2 courses and one experimental course on Electricity, Magnetism and Electronics; one course for each of Wave and Optics, Heat and Thermodynamics, and Earth Science. There is also one General Physics course meant for giving general knowledge about physics. There is a fair balance of depth and treatment between the primary and college physics courses, and thus, the two match fairly.

The physics teachers are expected to have some knowledge about primary physics and science content. However, there is no mention of the link between the college and the second cycle primary curricula in any of the college physics courses except in one course content, that is, Earth Science. There is also no mention or inclusion of the primary student textbooks within the course content or as references. Even if the courses of the college match to the primary syllabi, the course contents are more inclined to theoretical physics and higher education than to what they were meant for: that is, to produce physics teachers for the primary.

There are some topics that are specific to biology and chemistry from the grade five and six content that are meant for equipping trainees for science in grades 5 and 6. These are handled by the courses that the trainees take from biology and chemistry departments.

Thus in terms of content both topics of the college physics and the primary physics curricula fairly match, but there is a gap in making the college physics curricula reflective of primary.

4.1.4. Methods of Training

The results obtained from respondents (instructors, dean of college, and teachers of second cycle primary) and from content analysis of both college and primary physics syllabi, regarding methods used for the training of physics teachers at GCTE, are presented in the following two tables (tables 9 and 10) and then analysed.

Table 9: Responses of instructors, 2nd cycle teachers and college dean on training methods

Item	Sub-Item	Respondents				
		Instructors		Teachers		Dean
		No.	%	No.	%	No.
Physics courses are designed to encourage learner-centered methods	Yes	-	-	2	11.77	N/A
	No	3	100.00	15	88.23	
The extent to which instructional methods used match curricular objectives	Highly	-	-	N/A	N/A	-
	Averagely	3	100.00			1
	Low	-	-			-
Use of varied instructional methods in the training process	Always	-	-	1	05.88	-
	Averagely	1	33.33	9	52.94	1
	Rarely	2	66.67	7	41.18	-
The level of trainees involvement in the classroom instruction	Usually	-	-	2	11.76	1
	Averagely	2	66.67	11	64.71	-
	Seldom	1	33.33	4	23.53	-
Instruction methods used could enable trainees to effectively utilize recommended methods	Strongly	-	-	3	17.65	1
	Fairly	3	100.00	12	70.59	-
	Not much	-	-	2	11.76	-
Frequency of assignments and/or projects given to trainees	Mostly	-	-	-	-	1
	Sometimes	3	100.00	13	76.47	-
	Rarely	-	-	4	23.53	-

As shown in Table 9, all the instructors and 88.23% of the teachers replied the college physics courses are not designed to encourage learner-centered methods. All the three instructors and the college dean believe the instruction methods used averagely match curricular objectives. 66.67% of the instructors and 41.18% of the teachers answered that varied training methods are rarely used, whereas one of the instructors, 52.94% of the teachers and the college dean responded varied methods are used averagely. One teacher asserted instructors always use varied methods.

According to the responses from 66.67% of the instructors and 64.71% of the teachers, frequency of involvement of trainees in the classroom instruction is average. One of the instructors and four (23.53%) teachers have the view that it is seldom that trainees are involved in the teaching learning process. However, contrary to what the majority of the instructors and most of the teachers responded, two teachers and the college dean asserted that trainees are always involved.

All of the three instructors, the college dean and 70.59% of the physics teachers have the view that the instruction methods used could fairly enable trainees to effectively utilize recommended methods in the primary syllabi. Three (17.65%) teachers believe that the methods used at the college were strongly useful, where as only two (11.76%) stated that the methods were not that much useful to them to teach in primary schools using methods indicated in curricula.

Regarding how frequently the instructors give trainees assignments and projects, the three instructors (100.00%) and 76.47% of the physics teachers responded that it was done sometimes; four (23.53%) teachers replied that it was rarely done; whereas the dean of the college has the view that it was mostly that trainees were given assignments and projects.

It could be reflected from the above table that: the majority of the respondents have the view that the training curricula were not sufficiently designed to effect participatory methods; instructors averagely used different instruction methods; trainees involvement was moderate but trained teachers were fairly prepared to teach in SCP schools.

Teachers and education officials provided suggestions and recommendations to the open-ended questions on methods of instruction at the college. Teachers commented that presentations at the college were not based on second cycle content. they were mostly teacher centered and left little room for learner participation. They did not give trainees enough time for discussion and also were poorly sequenced from simple to complex to build on what the trainees knew. The REB and ZED officials suggested the training duration should be increased to use practical-oriented and learner-centered methods, and also each principle, theory and concept should be taught in relation to local contexts. These officials further commented that the course is more content-based and emphasis should be given to practical activities and subject methods; it should be more group and project-oriented for trainees to present their findings and hold group discussions.

Table 11: Methods of instruction for five college physics courses

Courses	Percentage of usage of instructional methods						
	Lecture	Discussion	Short note	Solving problem	Doing experiment	Assignment	Diagram
Mechanics-I	28.20	28.20	28.20	12.83	2.57	-	-
Electricity and Magnetism	28.47	28.47	28.47	11.67	2.92	-	-
Gen. Physics	25.58	25.58	25.58	16.28	5.42	-	1.60
Wave & Optics	33.33	4.55	33.33	27.27	-	1.52	-
Basic Electronics	33.00	2.00	33.00	31.00	1.00	-	-

As shown in Table 11, 65.15% to 69.23% of the time is devoted to lecturing, discussing and solving problems. One fourth (25.58%) to one third (33.33%) of instruction time is used for short notes. Only 1.00% to 5.42% of the duration is used for experiments in four courses. It is only in Wave and Optics that giving assignments are suggested for only (1.52%) of the time. These data indicate that teacher-centered methods are mainly suggested for the majority of the courses.

4.1.5. Availability and usage of instructional materials

The availability of instruction materials such as books and equipment and the status of their usage at the college are shown in Table 12. The college physics laboratory was observed using a checklist and discussion held with the laboratory technician and a physics instructor.

Table 12: Availability and usage of instructional materials at the college

Item	Sub-Item	Respondents				
		Teachers		Instructors		College dean
		No.	%	No.	%	No.
Availability of 2nd cycle primary physics texts in college library	Yes	5	29.41	3	100.00	1
	No	11	64.71	-	-	-
	At department	1	5.88	-	-	-
How frequently trainers use primary textbooks	Always	-	-	-	-	-
	Sometimes	9	52.94	3	100.00	1
	Never	8	47.06	-	-	-
Availability of equipment in college physics laboratory	Very adequate	2	11.77	-	-	-
	Adequate	10	58.82	-	-	1
	Inadequate	5	29.41	3	100.00	-
Frequency of usage of equipment during the training by trainers	Often	7	41.17	-	-	1
	Averagely	8	47.06	1	33.33	-
	Very little	2	11.77	2	66.67	-

As shown in table 12 above, the three instructors, dean of the college, and 29.41% of the teachers said SCP school physics texts are available in the college library; 64.71% of the teachers replied on the contrary. One teacher stated the texts are available at the physics department. They were requested to rate how frequently the trainers use primary textbooks: 52.94% of the teachers, the three instructors and the college dean replied they are sometimes used while 47.06% of the teachers asserted primary textbooks were never used by trainers in the teaching-learning process.

As regards the availability of equipment in the college physics laboratory, 58.82% of the SCP physics teachers and the college dean view that it is adequate. The three physics instructors and 29.41% of the teachers responded that the equipment is inadequate. Only 11.77% of the physics teachers believe the equipment is more than adequate. Concerning the frequency of equipment usage by the trainers during the training. 41.17% of the teachers and the college dean replied that the equipment was often used; one college instructor and 47.06% of the teachers responded that it was used averagely, two of the three instructors and two (11.77%) of the seventeen respondent teachers have the view that it was very rarely that this equipment was used.

To one of the open-ended questions the physics teachers stated that the teaching was not supported by practical activities and that it was more theoretical. They stressed that the training should enable them to use physics equipment in primary schools. One of the instructors has commented on this issue. He justified that practical sessions are not done properly due to lack of laboratory space, shortage of materials and large number of students in a class.

An observation of the college physics laboratory was made and discussions held by the writer with one of the physics instructors and the laboratory technician. There is only one physics laboratory room with a capacity of 24 to 30 students, and a small room that currently serves as storage for equipment and as an office for instructors. There is no other room where the assembly of apparatus or demonstrations could be rehearsed.

The instructor and the laboratory technician said it is always necessary to divide students in a class into two groups and conduct experiments at different times. This takes double the time required for trainees to do each experiment. Moreover, the equipment in the laboratory was meant for the certificate level teacher training program before it was upgraded to a college. It was purchased almost a decade ago and thus the laboratory needs replenishment and upgrading to meet the requirements of the course objectives, content and methods.

4.1.6. Teaching practice

The duration for teaching practice, its implementation, and problems are presented below.

Table 13: Teaching practice

Item	Sub-Item	Respondents	
		Instructors	College Dean
		No.	No.
The duration given to teaching practice	More than sufficient		-
	Sufficient	1	1
	Insufficient	2	-
How often is teaching practice conducted	Once every semester	-	-
	At the end of 2^{nd} year	3	1
	No defined program	-	-
Tasks trainees should do during teaching practice	Lesson planning	3	1
	Classroom teaching	3	1
	Involve in school activities	1	1
The link with primary schools for teaching practices	During teaching practice	2	-
	All year with nearby schools	1	1
	No link at all	-	-
Who supervises trainees during teaching practice	Physics course instructors	2	-
	Education office experts	-	-
	Both instructors and experts	1	1
Problems that affect teaching practices in primary schools	Time to cover courses	1	-
	Budgetary constraints	2	1
	Large number of trainees	2	-
	Programming with schools	1	-
Teaching practice enabled trainees to teach in primary	To a large extent	-	-
	To some extent	3	1
	Not at all	-	-

The three physics instructors and the college dean have given their responses to the seven directed items in table 13. One of the three lecturers and the dean replied that the duration given to teaching practice is sufficient; the other two lecturers said it is insufficient. All of the lecturers and the college dean agreed it is only at the end of the second year that trainees conduct teaching practice. Regarding tasks trainees are expected to do during teaching practice, all the respondents agreed that trainees prepare lesson plans and conduct actual

The physics teachers, school principals, education officials and lecturers expressed their concerns and gave suggestions for the open-ended questions. The primary teachers stated a few days of practice teaching is not enough and makes measurement of performance difficult; and even if there were peer teaching, the time was insufficient and they didn't get enough experience. The principals asserted that to produce efficient teachers, longer time is required for teaching practice, at least one semester with continuous support and be rescheduled for second year first semester. The officials replied trainees should conduct teaching practice at different schools for a longer period, probably one semester, with continuous assessment and feedback to develop skills of subject teaching. The lecturers stated problems of teaching practice consist of shortage of time, inefficient organizational arrangements with schools and lack of transport for supervision. The lecturers stated enough time is given to practice teaching relative to time given for the courses.

4.1.7. Primary school situation

Table 14: General competence and attitude of teachers at schools

Item	Sub-Item	Respondents			
		Principals		REB/ZED officials	
		No.	%	No.	%
Have confidence to teach science in grades 5 and 6	Strongly agree	3	17.65	2	33.33
	Agree	10	58.82	3	50.00
	Undecided	1	05.88	1	16.67
	Disagree	2	11.77	-	-
	Strongly disagree	1	05.88	-	-
Are efficient to teach physics in grades 7 and 8	Strongly agree	4	23.53	1	16.67
	Agree	9	47.06	2	33.33
	Undecided	2	11.76	2	33.33
	Disagree	2	17.65	1	16.67
	Strongly disagree	-	-	-	-
Effectiveness of the teachers to teach when newly placed at the school?	Can teach on their own Needed some support Needed continuous support	5 10 2	29.41 58.82 11.77		

As it could be seen in table 14, 17.65% of the principals and 33.33% of the education officials strongly agree that the teachers have confidence to teach general science in grades 5 and 6. 58.82% of the principals and 50.00% of the education officials agree about the teachers' confidence. 5.88% and 16.67% of the principals and education officials respectively remained undecided. However, 11.77% of the principals and one other principal (5.88%) disagreed and strongly disagreed respectively that the teachers have such confidence. Two of the three principals who disagreed and strongly disagreed were found to be secondary school principals where the teachers are placed to teach secondary physics due to shortage of degree holder teachers. It could be inferred that 76.47% of the principals and 83.33% of the education officials have the view that these teachers are confident to teach science in grades 5 and 6.

As regards the efficiency of the physics teachers to teach physics in grades 7 and 8. 23.53% of the principals and 16.67% of the officials strongly agree, and 47.06% and 33.33% of the principals and the officials agree. 11.76% of the principals and 33.33% of the education officials are undecided whether the teachers are efficient or not to teach physics in grades 7 and 8. Only 17.65% of the principals and 16.67% of the officials disagree that the teachers are efficient. The figures show that 70.59% of the principals and 50% of the education officials have the belief that the teachers are efficient to teach physics in grades 7 and 8.

Out of the seventeen school principals, 29.41% replied that when the teachers were newly placed at their school, they were able to teach on their own effectively, while 58.82% responded that they needed some minor support. Some 11.77% of the principals. who are principals of secondary schools. indicated that these teachers were provided with continuous support.

There is a positive view towards the physics teachers about their general competence in teaching science in grades 5 and 6. and physics in grades 7 and 8 and about their effectiveness to teach when newly placed in primary schools.

the principals and 66.66% of the officials are undecided whether the teachers know what they teach or not. On the other hand, 17.65% and 5.88% of the school principals disagree and strongly disagree respectively that the teachers know the subject matter they teach. The figures show that there is a 58.88% agreement on the part of the principals, whereas the larger proportion (66.66%) of the education officials could not determine their positions.

The majority of the principals (52.94%) agree that the teachers relate classroom instruction to local situations and 23.53% are undecided. 66.67% of the REB and ZED officials disagree and 33.33% are undecided. The principals who disagree (17.65%) are those of secondary schools while the single principal, who strongly disagrees, is head of a second cycle school.

Another item that was included in the questionnaire was to gather information from respondent principals and education officials about the frequency of teachers' use of learner-centered methods of instruction. 23.53 % of the principals agree while the same percent of principals are undecided. On the other hand 41.18% of the principals and 100.00% of the education officials disagree that the teachers use learner-centered methods of instruction frequently. The principals who strongly disagree are one from primary and another from a secondary school.

Regarding the use of various instruction equipment that are suggested in the curricula, 41.18% of the principals agree; while 35.29% of the school principals and 83.33% of the education officials disagree. No one from the education officials seems to have a positive view about the use of equipment in the teaching learning process by the teachers. The principal who strongly disagrees is from one of the secondary schools where a diploma-holder physics teacher is placed.

Table 16: Resource availability at school

Item	Sub-Item	Respondents			
		Principals (17)		Teachers (17)	
		No.	%	No.	%
Availability of a physics laboratory at school	Yes	11	64.71	10	62.50
	No	6	35.29	6	37.50
Availability of equipment in the laboratory	Yes	15	88.23	14	82.35
	No	2	11.77	3	17.65
The extent to which the equipment are available	Highly adequate	5	27.27	2	11.77
	Adequate	10	63.64	7	41.18
	Less adequate	2	09.09	8	47.05

Table 16 shows that 64.71% of the principals and 62.50% of the teachers replied there are physics laboratories at their schools, while 35.29% of the principals and 37.50% of the teachers responded there are not. Only one teacher did not respond. Concerning the availability of equipment in laboratories. 88.23% of the principals and 82.35% of the teachers responded positively, whereas few principals (11.77%) and teachers (17.65%) indicated there is no equipment at all. Some schools, where there are no laboratories, have indicated that they have equipment and this is not unusual.

The next item was concerning the extent or adequacy of equipment in the laboratories. Almost a quarter (27.27%) of the principals and 11.77% of the teachers thought that the equipment is highly adequate, whereas the majority (63.64%) of the principals and 41.18% of the physics teachers believe that it is adequate. But, 11.77% of the principals and 47.05% of the teachers asserted that the equipment is less adequate.

Table 16 also shows that the majority of the respondent principals (11 of 17) and teachers (10 of 16) indicated that they have physics laboratories and equipment in their schools. More than half of both groups of respondents, that is, 88.23% of the principals and 52.95% of the teachers have the view that the equipment is adequate, and even more, to teach physics in primary schools. The teachers are less convinced of adequacy: 47.05% stated that it was less adequate.

4.2. Interpretation

The data that were organized, presented and analyzed in section 4.1. of this part are interpreted here under sub-headings (demographic characteristics, the relevance of the college physics curriculum to primary physics content. provision of trainees with subject teaching methods. availability and usage of instruction materials. teaching practice and primary school situation).

4.2.1. Demographic characteristics of respondents

The respondents for this study were. as tables 1. 2. and 3 show. SCP school physics teachers and principals in 17 sample schools of four zones of the Amhara Region. zonal education officials in the four zones and the Amhara REB. lecturers of physics courses and dean of GCTE. and an expert at ICDR.

14 out of the 17 physics teachers have 5 years or less service. There is enough experience to make their views valid, without loss of recency of college experience. The combination gives a solid basis for valid opinion. School principals, teachers, instructors and REB/ZED officials are all stakeholders with their own knowledge and perspectives on the issues; they are almost without exception appropriately qualified in the general academic sense for their positions. There is only one female respondent physics teacher from among the sample teachers. Even though it may not be the case with teachers in other schools, it might indicate that females should be encouraged to become physics teachers.

All respondent teachers and instructors are qualified for the levels they teach or train; the education officials, the dean, the ICDR expert, and all the school principals except one who has a certificate are qualified for the positions they are placed. The sample teachers and principals are spread across the four sample zones and thus have a representative nature. Thus, it is the writer's belief that the data collected from the different groups of respondents are valid and reliable.

4.2.2. The relevance of the college physics curriculum to primary physics content

A comparison of objectives and content was made through data collected by questionnaires from instructors (lecturers), the dean of the college, REB/ZED officials, from physics teachers and the principals of 17 sample schools, and an ICDR expert. A document analysis of both the objectives and the content was made. The findings are discussed and presented here.

Comparison of objectives

Pratt (1980: 139-140) defined an objective as a statement of a specific change to be brought about in a learner. Derebssa (1999: 134) further stated that objectives are more specific than goals, and this specificity increases in the progression from general curriculum objectives to unit objectives and lesson objectives at the classroom level. To alleviate the problems that the Ethiopian education system has faced, a comprehensive Education and Training Policy (1994) has been formulated. This policy document has clearly indicated the general and specific objectives that should be used as the guiding framework for the development and implementation of strategies and programs on specific areas such as teacher education. The diploma level teacher education curricula have been revised to produce teachers who could teach the new curricula to students.

The procedure of comparing sets of objectives should, therefore, reveal information of some value that can add to or modify those obtained from the other sources. In terms of comparisons of objectives, the following sets of data were scrutinized to provide information:

1. *Data from questionnaire responses* contained in tables 4 and 5: college physics objectives compared with ETP general objectives and GCTE physics courses compared with objectives of the second-cycle primary syllabi.
2. *Data from documentary analyses (A)* of the GCTE physics course's overall objectives with the general ETP objectives.

3. *Data from documentary analyses (B)* of the objectives of the GCTE physics courses (11 of them) with the general ETP objectives as a more detailed scrutiny.
4. *Data from documentary analyses (C)* of the objectives of the 11 GCTE physics courses with the objectives of the second-cycle primary physics syllabi.

Questionnaire Data.

These data concerned the attempt to compare whether or not the objectives of the college level physics course objectives match with those of the Policy's general objectives and with the primary level physics syllabi objectives. The comparison made between these sets of objectives was presented in Tables 4 and 5. Table 4 revealed, based on the views of one physics instructor, the college dean and the ICDR expert, the ETP (1994) objectives are reflected in the objectives of the college physics courses. However, they stated that the connection between these sets of objectives is not a strong one. Regarding the connection between the college and primary school objectives, the finding from the responses is that, on balance the GCTE objectives constitute a partial match and the course objectives are designed to meet the learning needs of trainee teachers. These were the opinions of the questionnaire respondents.

Documentary Analyses (A).

A document analysis was conducted to make a comparison between the general objectives of the ETP and the objectives of the college physics courses on the one hand, and, on the other, between the objectives of the college and the SCP physics courses. A closer look at the objectives of each college physics course revealed that most of the courses, except the two designated as practical and Environmental Physics. give emphasis to the attainment of theoretical knowledge at the expense of practical activities and skills. Derebssa (1999: 165) has stressed that the most useful form for stating objectives is to express them in terms which identify both the kind of behavior to be developed in the student and the content or area of life in which this behavior is to operate. However. the college courses largely tended to neglect the connections of the objectives with and their applications to learners' lives and environments. These objectives also ignored behavioral objectives such as ethics. citizenship and democratic living. This means more emphasis is given to cognitive or knowledge development than to the affective and psychomotor domains.

Documentary Analyses (B).

As indicated in Derebssa (1999:142) careful thought must be given to the creation of educational objectives because objectives indicate expected outcomes (end-points) in the educational process. Objectives should relate to the goals and aims from which they are derived. To this end. comparison between general objectives of the policy and the college physics courses was made. Each of the college physics objectives matches with some elements of one or two of the policy general objectives. The matches are predominantly on developing mental potential. cognitive potential. various skills. dissemination of science. etc. But the omissions are mainly in relating education to society. taking care of and utilizing resources wisely. differentiating harmful practices from useful ones. etc.. and there is no mention of broad citizenship areas.

Documentary Analyses (C).

A comparison made between the objectives of the college courses and those of the primary physics syllabi revealed that, except objectives 5 and 6, those of the primary comfortably match with the college objectives. Objectives 5 and 6 of the primary school syllabi focus on appreciation and care for processes and phenomena and on change and self-development in line with aspects of environment. These objectives are missing in the college course objectives, except in the objectives of Earth Science.

These documentary analyses strongly suggest that the college physics objectives are dominated by theoretical knowledge or over-emphasize academic knowledge and theoretical understanding and are narrowly focused. Thus, they are significantly mismatched with the ETP objectives and at least partially mismatched with the second cycle primary objectives for physics and science. It may not be reasonable to expect the policy objectives to be incorporated comprehensively in the college physics courses but the nature of the mismatches are of concern in the area of physics. However, the documentary analyses can be seen as coinciding with the main messages from the questionnaire data, but have a more pronounced negative inclination and are also more detailed.

Relevance of college physics curricula to second cycle primary physics curricula

As described by Postlethwaite in Lewy (1977:51) and Derebssa (1999:182), relevance means that the curriculum corresponds to an existing need in the society. To say that educational experiences are functional means that they should have maximal relation to life. Because transfer is greatest when the learning situation is most like the situation in which the learning is to be used, contexts must be chosen which enable the learner to make life applications.

In the matter of relevance, a procedure similar to that used for comparison of objectives (above) was applied: data from questionnaires (tables 6 and 7); and content analysis of the GCTE physics curriculum and of the second-cycle primary physics syllabi (table 8).

Questionnaire findings.

The finding from Tables 6 and 7 is that one education official, almost half (47.06%) of the physics teachers, 2 of the 3 instructors and the ICDR expert have the view that the content of the primary physics is reflected in college physics courses. Five (83.33%) of the education officials, 35.29% of the teachers, and one physics instructor responded it is averagely reflected. The opinions are that the college physics courses are designed to address the primary physics content.

Another finding concerns the extent to which the teachers were prepared for teaching in primary schools. 14 (82.35%) teachers, three school principals, one instructor and the ICDR expert believe that the training strongly prepares teachers. 6 (100.00%) education officials, 3 teachers, 12 (70.59%) of the school principals, and two of the three instructors stated that it averagely prepares teachers for second cycle primary teaching. It could be summarized that there is an agreement among the respondents that the training prepares trainees sufficiently.

Still another important finding is that the responses from all of the three college instructors, the ICDR expert and all of the physics teachers agree that the level of difficulty of the courses is neither too high nor low and that the two years' duration is enough to cover the courses. However, the majority of the teachers responded differently to the open-ended questions: the content is too vast, there is time pressure to cover it, and the lecturers give less support because the pace of instruction was fast. Even if they are minority opinions, one instructor, two teachers, one principal and an education official commented that the college physics content is more related to higher education and pure physics than to primary curricula.

Content Analysis Findings.

From the content analysis made to check whether there is match or mismatch between the college and primary physics courses, it was found that in both college and primary contents there is a fair coverage of and balance between different topics such as mechanics, electricity and magnetism, wave and optics, heat and thermodynamics. The college physics courses were designed to train teachers who would be able to teach physics in second cycle primary schools effectively.

To achieve this end it is necessary to make the college training curricula related to those of the primary. In relation to this issue Derebssa (1999: 182) stated that because transfer is greatest when the learning situation is strongly similar to those in which the learning is to be used, contexts must be chosen which will enable the learner to make life applications; and it is only in this way that learning becomes meaningful. This is also supported by SIDA (2000:29) where it is stated as essential that the teacher education curriculum should correspond to the school curriculum: that is how teachers learn and what they are expected to teach must be compatible and teachers must be provided with the competencies for teaching.

Outcomes.

However, it was found that there is no mention of the link between the college and the primary physics curricula in any of the college physics courses except in only one course content, namely Earth Science, and that the course contents are more theoretical and inclined to prepare trainees for higher education than to teach physics in second cycle primary schools. In the literature review it is indicated in SIDA (2000:29) that "It is essential that the teacher education curriculum correspond to the school curriculum. What and how teachers learn and what they are expected to teach must be compatible".

This finding agrees with the outcome of the evaluation made by Amhara REB and GCTE (AREB, 1998, p. v) which states that "Although most instructors agreed that the courses offered at GCTE had link with second cycle primary curriculum, some of the GCTE instructors disclosed that the training curriculum is linked more to higher level teacher education program (secondary teacher training) rather than preparing teachers for the second cycle primary school".

4.2.3. Provision of trainees with subject teaching methods

Teachers tend to implement teaching methods that they experienced while they were at training institutions. In this regard, Marsh (1996:93) stated that teachers tend to use predominantly indicated in the primary course content, which include group and project work, field study, role-play, practical activities among others. On the other hand, as indicated in Table 11, 68.00% to 85.41% of the methods of instruction indicated for five courses are discussion, short notes and lecture. An insignificant fraction of the time, that is less than 6%, is devoted to doing experiments or assignments other than the two experimental courses. This shows clearly that there is mismatch between the methods that are suggested for primary physics instruction and those that are indicated in the college physics courses. As indicated in the literature review by SIDA (2000:29), what and how teachers learn and what they are expected to teach must be compatible, and they also need to be empowered with the competencies necessary for teaching primary students using mainly participatory methods recommended in the curricula.

4.2.4. Availability and usage of instructional materials

A result obtained from Table 12 indicates that all of the three instructors, the college dean and some teachers (29.41%) replied that there are primary physics texts in the college library, whereas the majority (64.71%) of the trainee teachers were unaware of their availability. Even if these textbooks are available, it is only sometimes that they are used by the trainers in the classroom instruction according to the majority of the teachers, the three instructors and the college dean. Still, 8 of the 17 respondent teachers have the view that the textbooks were never used. From this it could be deduced that the textbooks were not often used to associate the instruction to primary school content and methods of teaching, and trainees go to primary schools after graduation without much awareness about primary school teaching or materials.

the findings from the closed and open-ended questions reveal that the equipment available in the college physics laboratory is barely sufficient, and its use in the training process is not as the curricula demand.

From the observation made by the writer at the college physics laboratory, it was found that since the demonstration room has a capacity of only 24 to 30 students, it was always necessary to divide students into two groups for practical activities; the equipment was purchased for the certificate program, and thus, inadequate for the college program. This finding coincides with that reported by AREB (1998:v) which discovered that the major problems encountered by GCTE instructors were lack of reference books to prepare teaching materials, lack of adequate laboratory equipment, chemicals for science courses and inadequacy of rooms for instructors.

4.2.5. Teaching practice

Teaching practice is essential in the integration of theory with practice in the education of teachers. As described by Stones and Morris (1981:7) the term teaching practice has three major connotations: the practicing of teaching skills and acquisition of the role of a teacher; the whole range of experiences that students go through in schools; and the practical aspects of the course, as distinct from theoretical studies. In this regard, data regarding the extent that teaching practice is implemented and problems encountered in the process were collected and analysed. It was found that the duration given to teaching practice is considered to be sufficient by an instructor and the college dean, and insufficient by two instructors.

As regards the tasks that trainee teachers are expected to do during practice teaching, it was found that lesson planning and classroom teaching are the focuses according to all of the three instructors and dean of the college. One of the instructors replied that the trainees are also involved in other school activities; however, this might not appear to be feasible when teaching practice is conducted only at the end of the second year.

Another finding indicates, according to two instructors, that it is only during the practice teaching period that the college communicates with primary schools where the trainees conduct practice teaching. On the other hand, one instructor and dean of the college replied it is through the year that the college has links with nearby primary schools. However, the writer of this paper has the view that it would not be possible to have a strong and profitable link between the college and the primary schools unless all the instructors have a common understanding of the activities. On this issue Stones and Morris (1981: 42) stated that although colleges depend on schools for teaching practice and schools depend on colleges for replenishing their staff, there is little evidence of an attitude of partnership between the two. There is, on the contrary, a fair degree of ignorance of each other's work. This shouldn't be the case in our institutions, but it does appear to be so.

As indicated in Table 13 problems encountered while implementing teaching practice include time pressure to cover the courses according to the academic calendar, budget constraints on the college to effect teaching practice in primary schools, large number of trainees who should do practice teaching and problem of arranging programs with primary schools.

Responses of teachers, principals, and education officials to open-ended questions indicate that time given to practice teaching should be increased and continuous support provided to produce teachers who are efficient and well exposed to skills of subject teaching and school situations. This view is supported by Stones and Morris (1981:24) when they suggested longer periods of teaching practice to come to terms with realities of teachers' duties, to see their way through complexities of unfamiliar organization, to gain familiarity with routine tasks, to experience teaching as a continuous process rather than as a series of expository exercises and to find out about their own strengths and weaknesses. It could be generalized that the duration given to teaching practice is not enough, and the link with primary schools should be strengthened.

4.2.6. Primary school situation

Concerning the competence and attitude of teachers, it was found from responses of the majority of the school principals and education officials that the physics teachers do have confidence and efficiency in teaching general science in grades 5 and 6, and physics in grades 7 and 8. Another issue was finding whether the teachers were able to effectively teach on their own when newly placed in the schools. As shown by the majority of the school principals (58.82%), the physics teachers needed some support in the early periods of their placement. One reason might be the limited school experience or teaching practice they did get at the college. Some of the principals (29.41%) stated that these teachers were able to teach on their own from the beginning. All these show that the principals have a positive view towards the teachers in having a fair confidence and efficiency to teach SCP science and physics. This finding is supported by the view of Grossman (1990:29), as indicated in the literature review, when he stated new teachers cannot be expected to know everything about their subjects before they begin to teach. They also need to be aware of their responsibility to acquire new knowledge throughout their careers.

Table 15 indicates that the physics teachers know the content of the subject according to the principals, although education officials were less convinced. School principals believed the teachers were able to relate the content to local situations, but the officials disagree that that was the case. As indicated in the literature review by Callahan and Clark (1988:9) and Schott (1989:54), the mode of learning determines what is learned. One does not learn to swim by listening to lectures. Much school learning is superficial because the teaching methods used are not really appropriate for the understandings, skills and attitudes desired. To make learning real to pupils, teachers should use direct, realistic experiences, whenever possible.

The school principals and education officials were asked to give their views about the extent or frequency of use of learner-centered methods by the physics teachers. Overall, the majority of the principals and all officials disagree that teachers frequently use learner-centered methods of instruction. However, learning science is not merely understanding concepts but also observing, experimenting, explaining and interpreting findings from the real involvement of the learner in the teaching learning process.

As regards the utilization of audiovisual or instructional equipment by the teachers, suggested in the curricula, a large portion (47.06%) of the principals has a positive view. On the other hand, however, a significant percentage (41.17%) of the principals and the majority of the education officials disagree. This on the average suggests that the physics teachers do not usually use instructional equipment in the teaching learning process. Only six out of the seventeen sample schools do not have laboratories: almost all principals and teachers responded that there is equipment in these laboratories: and the majority of these two group of respondents have the view that the equipment is just adequate for the practical activities suggested in the curricula.

4.2.7. Summary of interpretation

Objectives

The finding from the document analysis, done to make comparisons between the ETP (1994) and the college course objectives, showed that the college courses largely tended to neglect the connections of the objectives with and their applications to learners' lives and environments; the objectives also ignored behavioral objectives such as ethics, citizenship and democratic living. This means more emphasis is given to cognitive or knowledge development than to the affective and psychomotor domains.

The matches between the policy and college objectives are predominantly on developing mental potential, cognitive potential, various skills, dissemination of science, etc. But the omissions are mainly in relating education to society, taking care of and utilizing resources wisely, differentiating harmful practices from useful ones, problem solving etc., and there is no mention of broad citizenship areas. On balance, while not expecting to find total inclusion of all ETP objectives, the nature of the mismatches, and also of the matches, are sufficient to cause concern.

Scrutiny of the objectives of each college physics course revealed that most of the courses, except the two designated as practical and Environmental Physics, give emphasis to the attainment of theoretical knowledge at the expense of practical activities and skills.

The responses regarding the connection between the college and primary school objectives suggest that, on balance, the GCTE objectives constitute a partial match and the college course objectives are designed to meet the learning needs of trainee teachers. The college course objectives (other than Earth Science) do not comfortably match with those of primary schools. Furthermore, objectives 5 and 6 of the primary school syllabi are not strongly reflected. These objectives focus on appreciation and care for processes and phenomena and on change and self-development in line with aspects of environment.

The document analysis carried out to compare college and primary course objectives strongly suggests that the college physics objectives are dominated by theoretical knowledge or over-emphasize academic knowledge and theoretical understanding and are narrowly focused. Thus, they are mismatched with the ETP objectives and at least sufficiently mismatched with the second cycle primary objectives for physics and science to raise concerns.

Methods of instruction

The responses of instructors, teachers, and the college dean, as indicated in Table 9, indicate that the design of the college physics courses does not encourage learner-centered methods, and the course outlines show that teacher-centered methods are dominant and an instructor would have to have very strong commitment to alternative methods before going against what is set down.

The responses given by the instructors and the college dean reveal that the lack of use of varied instructional methods by the trainers does not strongly enable students to meet the objectives of the training curricula. Two of the three instructors believe that it is rarely that the trainers use varied instructional methods and they also admit that it could not be possible to effectively meet the objectives of the training program by limiting themselves to that narrow range of methods.

Again, the trainees' involvement in the classroom instruction was found to be moderate or average which means, for roughly half of the total instructional time, the trainees are not actively involved in the teaching learning process. Yet, there is an agreement by three instructors, 70.59% of the teachers and the college dean that the instructional methods used at the college could fairly enable trainees to effectively use the suggested methods for primary teaching. But most of the instructional methods indicated in the primary curricula require the direct involvement of students. Thus, there is a mismatch between the training methods used at the college and methods that trained teachers are expected to implement for most of the instructional time.

From the document analysis done to compare the methods of instruction suggested in college and primary physics courses, it was found that student centered and participatory methods are predominantly indicated in the primary course content (group and project work, field study, role-play, practical activities among others). On the other hand, as indicated in Table 11, the dominant methods of instruction indicated in the course content of five courses are discussion, short notes and lecture. Very small fraction of the time (less than 6%) is devoted to doing experiments or assignments other than in the two experimental courses. The findings from the questionnaires and from the document analysis show that there is mismatch between the methods that are indicated in the college physics courses and those suggested for primary physics instruction.

Availability and usage of equipment

A result obtained from Table 12 indicates that the majority (64.71%) of the trainee teachers were unaware of the availability primary textbooks. Even if the textbooks were available at the college, they were not often used to relate instruction to primary school content and methods of teaching, and trainees go to primary schools after graduation without much awareness about primary school content, materials and teaching.

Findings indicate the availability and utilization of instruction equipment at the college laboratory is inadequate to do all of the practical activities. From the responses given to one open-ended question, the instructional process at the college is not much supported by practical activities and is thus more theoretical. The reasons, according to one instructor and the laboratory assistant, are shortage of equipment, lack of laboratory space, and large class size (student number).

Both the findings from the closed and open-ended questions reveal that the equipment available in the college physics laboratory is barely sufficient, and its usage in the training process is not sufficient to meet the curricular demand. From the observation made by the writer at the college physics laboratory, it was found that since the demonstration room has a capacity of only 24 to 30 students, it was always necessary to divide students into two groups for practical activities; the equipment is inadequate for the college program. These findings also coincide with that of the AREB (1998:v), which indicated that the major problems encountered by GCTE instructors were lack of reference books to prepare teaching materials, lack of adequate laboratory equipment, chemicals for science courses, and inadequacy of rooms for instructors.

Teaching practice

From the responses of one instructor and the college dean it was found that time given to teaching practice is considered to be sufficient, whereas two instructors believe that it is insufficient. Still another finding from the responses to open-ended questions of teachers, principals and education officials is that the time given to practice teaching should be increased and continuous support should be provided in order to produce teachers who are efficient and well exposed to skills of subject teaching and school situations.

As regards tasks that trainee teachers are expected to do during practice teaching, it was found that it is on lesson planning and classroom teaching that they are mainly involved; that the link with primary schools to effect practice teaching is not as strong as it should be, and that problems were also faced while implementing teaching practice. Causes for the problems include time pressure to cover courses within the academic calendar; budget constraints on college to effect teaching practice in primary schools; large number of trainees who must do practice teaching, and problems of arranging programs with primary schools. It could be generalized that the duration of teaching practice is not enough, and the link with primary schools should be strengthened.

Primary school situation

Concerning the competence and attitude of teachers, it was found that the physics teachers have confidence and efficiency in teaching general science in grades 5 and 6, and physics in grades 7 and 8. Regarding whether or not the teachers were able to effectively teach on their own when newly placed in the schools, it was found from the majority of the respondents that the physics teachers needed some support in the early periods of their placement in the schools.

Another finding from Table 15 indicates the physics teachers know the content of the subject they teach, although questions are raised by officials as to whether they are able to relate content to local situations or context during instruction. The principals and education officials also view that the frequency of usage of learner-centred methods of instruction by the physics teachers is low.

Only six of the seventeen schools do not have a laboratory; almost all principals and teachers responded that there is equipment in these laboratories; and the majority of these two groups of respondents have the view that the equipment is just adequate to do the practical activities suggested in the curricula. With reference to the use of instructional (audiovisual) equipment by the physics teachers to do suggested experiments in the curricula, a large portion (47.06%) of the principals has a positive view, whereas an almost equal percentage (41.17%) of the principals and the majority of the education officials disagree. From this it might be understood that the physics teachers do not usually use instructional equipment in the classroom instruction.

mismatched with the ETP objectives and at least sufficiently mismatched with the second cycle primary objectives for physics for there to be some concern.

With regard to course contents, it was found that by comparing college and primary schools, there is a fair coverage of and balance between the various topics and that the college physics courses are generally designed to address the primary physics content. On the other hand, it was found that there is no mention of the link between the college and the primary physics curricula except in one course; the course contents are more theoretical and inclined to prepare trainees for higher education than to teach physics in second cycle primary schools.

The design of the college physics courses does not encourage learner-centered learning and the course outlines show that teacher-centered methods are dominant. The document analysis shows that there is mismatch between the methods that are indicated in the college physics courses and those suggested for primary physics instruction. The lack of use of varied instructional methods by the trainers does not strongly enable trainee teachers to meet the objectives of the training curricula. There is thus a mismatch between the training methods used at the college and methods that trained teachers are expected to use for most of the instructional time at primary schools.

Even though primary school textbooks are available at the college, they were not often used to associate college instruction with primary school content and methods of teaching. The laboratory and the equipment available in the college physics laboratory is barely sufficient for the college program to do all of the practical activities and its usage in the training process is not sufficient to meet the curricular demand. The instructional process at the college is not much supported by practical activities and is thus more theoretical.

The duration given to teaching practice is not enough to prepare trainee teachers who could teach effectively primary physics content using appropriate methods. The link with local primary schools is not strong to effect teaching practice.

The majority of the respondents have the view that the physics teachers needed some support in the early periods their placement in the schools. The physics teachers have confidence and efficiency to teach general science in grades 5 and 6 and physics in grades 7 and 8. The teachers use learner-centered methods infrequently in the teaching and learning process.

There are laboratories in almost all primary schools; the equipment available in the laboratories is just adequate to do the practical activities suggested in the curricula; the physics teachers usually do not tend to use instructional equipment in the classroom instruction.

5.2. Conclusions

Based on the above findings it might be concluded that:

First, the college physics objectives over-emphasize theoretical knowledge and are narrowly focused; and that they are either strongly mismatched or somewhat mismatched with the ETP and the SCP school objectives respectively. It was found that there is a fair coverage of and balance between the various topics of the college and primary content but the focus of the course contents is more theoretical and inclined to prepare trainees for higher education than to teach physics in SCP schools. The lack of use of varied instructional methods by the trainers does not strongly enable trainee teachers to teach primary physics effectively.

Second, primary school textbooks were not often used by teacher trainers to associate instruction to primary school content and methods of teaching; the equipment in the college physics laboratory is barely sufficient for the college program and its usage in the training process is not sufficient; the training is not much supported by practical activities and is thus more theoretical. This shows that even if the availability of instructional resources is a necessary condition to improve the quality of teacher training, it is not on itself sufficient, unless it is actually used by both the trainers and trainees.

Third, the duration given to teaching practice is not enough to prepare teachers who could teach primary physics content by effectively using appropriate methods, and the link with local primary schools is not strong enough to produce effective teaching practice arrangements.

Fourth, it could also be concluded that even though the second cycle primary (SCP) school physics teachers needed some support in the early periods of their placement in the schools, they have confidence and efficiency to teach general science and physics in SCP schools. On the other hand, the teachers were known to use learner-centered methods less frequently.

Fifth, even if the equipment available in the laboratories is just adequate to do the suggested practical activities, the primary physics teachers tended usually not to use instructional equipment in their teaching.

5.3. Recommendations

The study was conducted on Gondar College of Teacher Education and on selected second cycle primary physics teachers who graduated from the college in the last three years and currently teaching in the Amhara region. Its purpose was to evaluate the relevance of the college physics curricula to second cycle primary physics syllabi. Even though the study was conducted on one college and on schools in one region, the findings may be applicable to other colleges and schools in other regions. The likelihood of the applicability of some of the key findings will have been enhanced by: the spread of perspectives that were taken into account; the relevance, expertise and insights that informed these perspectives and the use of national policy, curriculum and syllabus documents. Therefore, recognizing the limitations of the study, the following recommendations are derived on the basis of the findings. The recommendations require all concerned parties to work concertedly to achieve the best outcomes.

1. The general and specific objectives of the college physics courses should derive from the objectives of the new Education and Training Policy (ETP: 1994) and that of the second cycle primary and they should be carefully designed to incorporate these objectives.

2. The college physics courses should be designed to relate more strongly to second cycle primary than to higher education, so that trained teachers would be able to relate instruction to learners' life situations. When designing courses, more emphasis should be given to the use of learner-centered methods than teacher-centered methods.

3. In order to provide trainee teachers with the competencies of teaching, trainers should use varied instruction methods appropriate to the courses and primary physics curricula, and also ensure more student involvement in the classroom instruction.

4. Mastery of science, and specifically physics, require the understanding of concepts, acquisition of skills and the development of abilities to apply these to real-life situations. These could be improved if trainers use audiovisual and other equipment as befits the curricula as much as situations allow.

5. The college physics laboratory should be replenished with appropriate and sufficient equipment and another demonstration room with enough space for larger class-size should be provided to the department.

6. Teaching practice should not be a one-off experience but instead, it should be a repeated activity and strong support and feedback should be provided to trainees. For this it should be given longer duration and strong links with primary schools should be made throughout the year, not only during the teaching practice period.

7. To familiarize newly-placed teachers with the school situation and their tasks, induction training should be given. Moreover, follow-up and continuous support has to be given to these teachers by senior teachers, principals and school supervisors.

8. As stated in the ETP (1994:22) teacher training institutions of all levels are required to gear their training programs towards the appropriate educational level for which they train teachers. In this regard, Gondar College of Teacher Education (GCTE), in collaboration with Amhara Regional Education Bureau (AREB), Zonal Education Departments (ZED), primary schools, and the Ministry of Education should conduct rigorous assessments of the relevance and effectiveness of its training program at regular, set intervals.

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Appendix A

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF EDUCATION

(Questionnaire for Second Cycle Primary Physics Teachers)

The purpose of this questionnaire is to gather data to study the relevance of the GCTE physics curriculum to second cycle primary (SCP) education. It is intended to gather information from physics teachers who graduated from GCTE on the relevance of the GCTE physics courses to the SCP education, particularly in the areas of content, training methods employed, and teaching practice that trainees were involved during the training program, and also how efficient they became in teaching the subject in SCP schools. As a vital source of information of the teaching learning process in the SCP school, the researcher strongly believes that you will give due consideration to your responses. The answers and suggestions you give are vital contributions for this study.

SECTION ONE

Personal Life History

Please select the answers for the items with alternative responses and complete those items that require you to give short answers.

- Name of the school____
- Zone ____________________ Woreda _________________________
- Town____
- Subject(s) you teach currently______________________________
- Sex Male ________ Female _________ Age __________________
- years of service teaching in primary schools ____________________

SECTION TWO

The training at college

1. Did the training at the college sufficiently prepare you to teach in second cycle primary?
   a) adequately b) to some extent c) none at all
2. The training you got focused more on
   a) academic content c) school experience (teaching practice)
   b) teaching methods d)other___________________________
3. While at the college, were you aware of the challenges you might face in schools?
   a) well informed b) fairly informed c) I had no awareness
4. To what extent did the training at college provide you with additional knowledge?
   a) it was high b) adequate c) it was low
5. On which of the following professional areas did you get adequate training?
   a) lesson planning and presentation b) classroom organization and management
   c) continuous assessment d) other ________________________________
5. On which of the following, do you think, should the training should focus more?
   a) academic knowledge c) teaching practice (school experience)
   b) teaching methods
6. To what extent are the college physics teacher training courses relevant to SCP physics?
   a) highly relevant b) moderately relevant c) hardly relevant
7. Were the second cycle primary physics textbooks available in college library?
   a) yes b) no c) other______________________
8. How frequently did trainers use second cycle physics textbooks in the teaching learning process? a) always b) sometimes c) never
9. To what degree was the college physics laboratory suitable for practical activities?
   a) highly convenient b) fairly convenient c) not convenient
10. Availability of equipment in the college physics laboratory was
    a) very adequate b) adequate c) inadequate

11. How frequently did trainers use physics equipment at the college during the training?

a) often   b) quite often   c) very little   d) never

5. Solution to overcome lack of efficiency in teaching physics

a) increase duration and content depth   b) focus training on primary content

c) strengthen teaching practice   d) more practical activities

SECTION THREE

Training Methods

1. The physics courses are designed to encourage learner-centered methods

a) Yes   b) No

2. Use of varied instructional methods by trainers in the classroom instruction

a) always   b) averagely   c) rarely

3. The level of trainees involvement in the classroom instruction

a) usually   b) averagely   c) seldom

4. Frequency of assignments and/or projects given to trainees

a) mostly   b) sometimes   c) rarely

5. The extent to which instructional methods used match to curricular objectives

a) highly   b) averagely   c) low

6. The instructional methods used could enable trainees to effectively utilize recommended methods in 2nd cycle primary schools

a) strongly   b) fairly   c) not that much

SECTION FOUR

Primary school situation

1. To what extent did you apply the knowledge you got at the college in your teaching process at primary schools? a) highly b) averagely c) very little
2. Did the practical skills you acquired at the college enable you to support your teaching with practical activities?
   a) very much b) averagely
3. To what degree was the training related to grades 5 and 6 science education?
   a) highly related b) related to some extent c) not related at all
4. If your response to question No. 15 is "a", were the training methods appropriate for science teaching? a) yes b) no
5. Did you ever use the skills you developed at college in producing instructional materials in the primary school(s)?
   a) most of the time b) some times c) very rarely
6. Is a physics laboratory available in the school?
   a) yes b) no
7. Availability of equipment in the laboratory
   a) yes b) no
8. The extent to which the equipment are adequate
   a) highly adequate b) adequate c) less adequate

SECTION FIVE

General (additional) remarks

1. Would you please describe the problems you encountered and the limitations you observed during stay at the college for the training.

a) Training curricula content and depth____________________________________

____

b) Training approach (methods) and trainees participation____________________

____

c) School experience (teaching practice)__________________________________

____

____

19. What would you suggest to alleviate the problems you encountered, if any, at the college and/or the primary school?

____

____

_____ 7. The balance of content between the professional and academic subjects is

a) Right b) about right c) below your expectation

_____ 8. Your opinion about the duration for covering the courses in the two years?

a) More than enough b) Enough c) Not enough

_____ 9. Are the courses designed to encourage participatory (learner-centered) methods? a) Yes b) no

_____ 9. The level of difficulty of the courses is:

a) High b) meets the standard c) low

_____ 10. The practical activities and exercises indicated in the courses are:

a) More than enough b) sufficient c) not sufficient

_____ 11. To what extent do the training enable trainees to develop research capacities?

a) Very much b) averagely c) very low

_____ 12. Your opinion about equipment for the physics laboratory at the college.

a) More than adequate b) sufficient c) inadequate

_____ 13. If your response to question 12 is (a) or (b), how often do you use instructional materials? a) Always b) averagely c) seldom

_____ 14. If your response to the above question is ©, why is that so?

a) Shortage of time b) inconvenience of laboratories

c) Large number of trainees

SECTION FOUR

Methods of instruction

____15. To what extent do instructional methods used match the curricular objectives?

a) Highly b) averagely c) very low

____16. Could instruction methods enable trainees to effectively utilize recommended methods in second cycle primary schools?

a) Strongly b) fairly c) not that much

____17. Do you use varied instructional strategies in the teaching-learning process?

a) Always b) most often c) rarely

____18. If your response to the above question is ©, what is the reason?

a) Course organization does not encourage b) shortage of time

c) Lack of awareness

____19. To what extent are trainees involved actively in classroom instruction?

a) Usually b) averagely c) seldom

____20. How frequently are trainees given assignments and/or projects?

a) Mostly b) sometimes c) very rarely

____21. How often do you involve prospective teachers in preparing instructional materials?

a) Frequently b) sometimes c) never

SECTION FOUR

Methods of instruction

_____15. To what extent do instructional methods used match the curricular objectives?

a) Highly b) averagely c) very low .

_____16. Could instruction methods enable trainees to effectively utilize recommended methods in second cycle primary schools?

a) Strongly b) fairly c) not that much

_____17. Do you use varied instructional strategies in the teaching-learning process?

a) Always b) most often c) rarely

_____18. If your response to the above question is ©, what is the reason?

a) Course organization does not encourage b) shortage of time

c) Lack of awareness

_____19. To what extent are trainees involved actively in classroom instruction?

a) Usually b) averagely c) seldom

_____20. How frequently are trainees given assignments and/or projects?

a) Mostly b) sometimes c) very rarely

_____21. How often do you involve prospective teachers in preparing instructional materials?

a) Frequently b) sometimes c) never

SECTION FIVE

School Experience/Teaching Practice/

____22. Is there any teaching practice that is conducted by trainees?

a) Yes b) no

____23. If yes, what is your opinion about the duration given for teaching practice?

a) More than enough b) sufficient c) not sufficient

____24. How often is teaching practice conducted?

a) Once every semester b) at the end of the second year

c) Not in a defined program

____25. What methods do you use to effect school experience/teaching practice?

		Yes	No
A	Peer teaching		
B	Micro teaching		
C	Real school experience		

____26. What are the tasks trainees are expected to perform during school experience

		Yes	No
A	Lesson planning		
B	Classroom teaching		
C	Involving in all school activities such as (administration, co-curricular programs, school – community interaction), project work, research.		

____27. How strong is the link with primary schools to effect teaching practices?

a) only during the period of teaching practice

b) through out the year with (at least) nearby schools

c) not link at all

____28. Who supervises trainees during teaching practice?

a) Physics course instructors b) instructors from education department

c) School supervisors

Appendix C

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF EDUCATION

(Questionnaire for the College Dean)

This study aims to study the relevance of the teacher education college physics courses to the second cycle primary education, particularly in the areas of content, training methods employed, and school experience (teaching practice) that trainees were involved during the training program. As the dean of the college and the sole source of information of the training program in the college, the researcher strongly believes that you will give it due consideration. The answers and suggestions you give are vital contributions for this study and feel free to give your responses with no reservations.

SECTION ONE
(Personal Life History)

Please complete the following the items.

- Name of the college____________________
- Your subject of specialization
  Major____________ Minor____________
- Qualification
  Ph.D. ____________ M.A./M.Sc./M.Ed. ____________
  B.A./B.Sc./B.Ed. ____________ Other ____________
- Sex ________ Age ____________
- Years of service as an instructor____________________
- Years of service as a dean ____________________
- Years of service teaching in primary schools ____________________

SECTION TWO

Comparison of Objectives

____ 1. Are the general objectives of the policy reflected in the objectives of the physics courses? a) Yes b) no

____ 2. If your response to the above question is yes, to what extent are they reflected?
a) Adequately b) Partially c) Very little

____ 3. Are the objectives of the college course(s) related to those of the second cycle primary school physics syllabi?
a) Strongly b) Partially related c) least related

SECTION THREE

(Course Content)

____ 4. To what extent could the content of the courses (syllabi) prepare the trainees for becoming a second cycle primary school teachers?
a) Very much b) to a certain extent c) not at all

____ 5. The duration /time/ allotted for the courses in the two academic years is
a) More than enough b) Enough c) Not enough

____ 6.Do designed courses encourage participatory (learner-centered) teaching-learning methods? a) Highly b) averagely c) least

____7. What is your opinion about the equipment in the physics laboratory at your college?
a) More than adequate b) sufficient c) inadequate

____8. If your response to the above question is (a) or (b), how often do instructors use the equipment? a) Always b) averagely c) seldom

____9. If your response to the above question is "seldom", why is that so?
a) Shortage of time b) inconvenience of laboratories
c) Large number of trainees d) any other____________________________

SECTION FOUR

(Methods of instruction)

_____10. To what extent do instructional methods used match the curricular objectives?

a) Highly b) averagely c) very low

_____11. Could instruction methods enable trainees to effectively use recommended methods in primary schools?

a) Strongly b) fairly c) not that much

_____12. Instructors use varied instructional strategies in the teaching-learning process.

a) Always b) most often c) rarely

_____13. If your response to the above question is ©, what is the reason?

a) Course organization does not encourage b) shortage of time

c) Lack of awareness

_____14. To what extent are trainees involved actively in classroom instruction?

a) Usually b) averagely c) seldom

_____15. How frequently are trainees given assignments and/or projects?

a) Mostly b) sometimes c) very rarely

SECTION FIVE

(School Experience/Teaching Practice)

____16. Is there any teaching practice that is conducted by trainees?

a) Yes b) no

____17. If yes, what is your opinion about the duration given for teaching practice?

a) More than enough b) sufficient c) not sufficient

____18. How often is teaching practice conducted?

a) Once every semester b) at the end of the second year

c) Not in a defined program

____19. What methods do you use to effect school experience/teaching practice?

	Always	mostly	averagely	sometimes	rarely
Peer teaching					
Micro teaching					
Real school experience					

____20. What are the tasks that trainees are expected to do during school experience

	Yes	No
Lesson planning		
Classroom teaching		
Involving in all school activities such as (administration, co-curricular programs, school – community interaction), project work, research.		

____21. How strong is the link with primary schools to effect teaching practices?

a) only during the period of teaching practice

b) through out the year with (at least) nearby schools c) not link at all

____22. Who supervises trainees during teaching practice?

a) Physics course instructors b) instructors from education department

c) school supervisors

____23. Are there any problems to effect teaching practice?

a) Yes b) no

____24. If your response to the above question is "Yes", is it because of:

		Yes	No
A	Shortage of time to cover courses		
B	Budgetary constraints		
C	Large number of trainees		
D	Lack of program coordination with primary schools		

____25. Do you think the teaching practice organized is enough for trainees to effectively teach second cycle primary school physics?

a) to a large extent b) to some extent c) not at all

____26. If there are any other problems, please specify in brief ____________________

____

____

SECTION SIX

General /Concluding Points

____27. What are your additional suggestions and recommendations with regard to the improvement of:

Relevance of the physics courses?

____

____

Appendix D

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACULTY OF EDUCATION

(Questionnaire for REB/ZED Officials)

In this study it is intended to examine the relevance of the teacher education college physics courses to the second cycle primary education. The purpose of this questionnaire is to gather information from the Amhara REB and ZED officials. As a vital source of information about the training program at the college and in the implementation of the teaching learning process at schools, the researcher strongly believes that you will give due consideration to your responses. The answers and suggestions you give are vital contributions for this study.

SECTION ONE

Personal Life History

1. Please complete the following items.

1.1. Your place of work
REB__________________ ZED______________________

1.2. Your position (responsibility)________________________________

1.3. Qualification
M.A./M.Sc./M.Ed. _______B.A./B.Sc./B.Ed. __________________
Diploma ______ ________ Certificate__________________
Other_____________

1.4. Sex Male_____________ Female__________

1.5. Age _______

1.6. Years of service
At current position ______ Total service____________

SECTION TWO

Course Content

2.1. To what extent could the content of the course (syllabi) prepare the trainees for becoming a second cycle primary school teachers?

a) Strongly b) to a certain extent c) not at all

2.2. To what extent are graduates of the college competent to teach in 2nd cycle primary?

a) highly competent b) averagely competent c) not well trained (least competent)

2.3. If your response to No. 2.2. is "C", what type training do they lack?

a) content b) lesson planning c) methodology

2.4. On what area should the training give more focus?

a) additional academic content b) methods of teaching primary science/physics

c) teaching practice/school experience

2.5. If you think these teachers who were trained to teach physics in second cycle primary lack competency, what are you suggestions?

a) increase duration to increase depth of training content

b) make the training more focused on primary education

c) strengthen teaching practice

2.6. Do you think the teaching practice that trainees conduct sufficient?

a) highly sufficient b) average c) insufficient

2.7. If your response to No. 2.6. is "C", what do you think are the solution?_____

____

_____ 9. Are the courses designed to encourage participatory (learner-centered) teaching-learning methods?

a) Yes b) no

_____ 10. The level of difficulty of the courses is:

a) High b) meets the standard c) low

_____ 11. To what extent do the training enable trainees to develop research capacities?

a) Very much b) averagely c) very low

SECTION FOUR

Methods of instruction

_____ 12. To what extent do instructional methods indicated match the curricular objectives?

a) Highly b) averagely c) very low

_____ 13. Could instructional methods enable trainees to effectively utilize recommended methods in second cycle primary schools?

a) Strongly b) fairly c) not that much

_____ 14. Do you think trainers use varied instructional strategies in the teaching-learning process?

a) Always b) most often c) rarely

_____ 15. If your response to the above question is ©, what could be the reason?

a) Course organization does not encourage b) shortage of time

c) Lack of awareness

SECTION FIVE

School Experience/Teaching Practice/

____16. What is your opinion about the duration given for teaching practice?

a) More than enough b) sufficient c) not sufficient

____17. Do you have information about how often teaching practice is conducted by trainees?

a) Once every semester b) At the end of the second year

c) Not in a defined program

____18. What methods do the college use to effect school experience/teaching practice?

		Yes	No
A	Peer teaching		
B	Micro teaching		
C	Real school experience (practice teaching)		

____19. What are the tasks that trainees are expected to perform during school experience (teaching practice)?

		Yes	No
A	Lesson planning		
B	Classroom teaching		
C	Involving in all school activities such as (administration, co-curricular programs, school – community interaction), project work, research		

____20. Do you think the college has strong link with primary schools to effect teaching practices?

a) very strong b) loose link c) no link at all

____21. If your response to the above question is "b" or "c", what do you think are the causes?

		Yes	No
A	Shortage of time to cover courses		
B	Budgetary constraints		
C	Large number of trainees		
D	Lack of program coordination with primary schools		

____22. If there are any other problems, please specify in brief____________________

____

SECTION SIX

General /Concluding Points

____23. What are your additional suggestions and recommendations with regard to the improvement of the:

Objectives of the training curricula?______________________________

____

Relevance of the physics courses?________________________________

____

Methods of instruction?____

____

Instructional materials?____

____

School experience/teaching practice?______________________________

____

____24. What other additional suggestions do you have?

____

____

Appendix G

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACULTY OF EDUCATION

Physics Laboratory Observation Checklist

(At Gondar Teacher Training College)

1. Availability of laboratory room(s).
2. Size and suitability of laboratory rooms.
3. Installation (electric, water).
4. Availability of Tables, stools, shelves.
5. Availability of equipment and sufficiency.
6. Relevance of equipment.
7. Observation of on going lab works.

Appendix H

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACULTY OF EDUCATION

(Interview Guide for REB officials)

(To Study the Relevance of the TTC Physics Curriculum to Second Cycle Primary Education)

1. **Are general objectives of the ETP reflected in the physics course objectives?**
   - To what extent are they reflected?
   - Are objectives of courses related to that of 2nd cycle primary physics syllabi?
   - Are they defined clearly to address the learning needs of trainees?
2. **To what extent could the courses prepare trainees for SCP teaching?**
   - Is primary content reflected in physics courses? Is duration enough?
   - Are learner-centered teaching learning methods encouraged?
   - Is the physics equipment enough? How often instructors use them?
3. **To what extent do instruction methods match the curricular objectives?**
   - Could instruction methods prepare trainees for SCP schools?
   - Are varied methods used in the instruction process? If not why?
   - To what extent are trainees involved actively in classroom instruction?
4. **Condition of teaching practice that is conducted by trainees**
   - Is duration of teaching practice sufficient? How often is it conducted?
   - Methods used for teaching practice? Who supervises trainees?
   - Tasks that trainees are expected to perform during teaching practice?
   - Link with primary schools to effect teaching practice?
5. **Additional suggestions /recommendations regarding the improvement of:**
   - Relevance of the physics courses
   - Methods of instruction and instruction materials
   - Teaching practice.

Declaration

The thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Name ALEBACHEW Mekonnen Zenebe

Signature ____________

Place Department of Curriculum and Instruction, Addis Ababa University. Addis Ababa.

Date of Submission June 2001

Approved by

Name Dr. Derebssa Dufera

Signature ____________

Date of Approval June 13, 2001