A SURVEY OF THE PROBLEMS AFFECTING THE IMPLEMENTATION OF THE 8:4:4 CURRICULUM FOR INDUSTRIAL EDUCATION IN SECONDARY SCHOOLS IN NAIROBI PROVINCE

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

KENYATTA UNIVERSITY

BY

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AUGUST 1989
DECLARATION

This Thesis is my original work and has not been presented in any other University.

S. G. WAINAINA

This Thesis has been presented for examination with our approval as University Supervisors.

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DEDICATION

Lovingly dedicated to:

My parents for their inspirations and unfailing love. My wife Karura, children Wainaina, Nyambura and Gituri, for their understanding, patience and encouragement.
ACKNOWLEDGEMENTS

The successful completion of this study leaves me indebted to many people who contributed immensely towards this accomplishment.

I am particularly indebted to Dr. L. K. Kanyike who kindly agreed to supervise this study and who throughout the study spent much of his precious time discussing the work and giving valuable suggestions and guidance.

I am equally indebted to my other supervisor, Dr. B. W. Kerre, for the friendly guidance and technical advice he gave me during the entire period of the study.

My thanks are due to Prof. J. O. Olembo for reading through my thesis and offering unique and constructive criticisms and suggestions for improvements.

I am grateful to the many anonymous school heads, Industrial Education teachers and students and IE curriculum developers for giving me a lot of their time and for voluntarily furnishing me with the information required for this study.

Special thanks are to Joyce Mwangi for her devotion and efficiency in typing this thesis.
I am most grateful to the Queens University KTTC Project who, on behalf of the Canadian International Development Agency, awarded me a two-year full sponsorship at Kenyatta University.

Lastly, the acknowledgements would be incomplete without expressing my appreciations to members of my family for their encouragements and my colleagues for their suggestions that led to the successful completion of this study.
ABSTRACT

The purpose of this study was to identify and describe the various problems affecting the implementation of the Industrial Education (IE) aspects of the 8:4:4 system of education in secondary schools. The study was restricted to schools in Nairobi Province. Problems were investigated with regard to philosophy of IE, utilization of IE teachers, availability of teaching facilities, time allocated for implementation of IE programme and financing of the programme.

Six research questions guided the study. These were:

1. Is IE at secondary school level in the 8:4:4 system a prevocational area of study or does it still have a predominantly general outlook?

2. What are the main qualities of IE teachers in secondary schools in Nairobi Province and how are the teachers utilized?

3. Do the teaching facilities for various IE subjects in Nairobi secondary schools measure up to the minimum requirements prescribed by the curriculum developers?
4. How is the IE programme being financed in secondary schools in Nairobi Province and has the mode of funding affected the implementation of the programme?

5. Was the time allocated to prepare for and implement the new curriculum adequate?

6. What do curriculum developers, school heads, IE teachers and students consider as problems affecting the implementation of IE programme in secondary schools in Nairobi Province?

Data were collected from school heads, curriculum developers, IE teachers and students through questionnaires and interviews. Observations were made on schools offering IE subjects to determine the adequacy and utilization of teaching facilities in those schools. The research findings revealed that there were some major factors affecting the implementation of IE programme in secondary schools in Nairobi Province. Some of the major problems that were identified include misconception of IE, lack of adequate motivation of IE teachers, lack of adequate teaching facilities, limited funds and time and inadequate supervision of the programme by the Inspectorate.

Various recommendations were made based on the findings of this study. The main recommendations
made include the need to either abandon the use of the term IE in referring to the present cluster of practical subjects offered in secondary schools or use the term IE but revise its objectives to conform with its formal definition; the need to establish schools with minimum teaching facilities before they start offering IE subjects; the need for more time to teach IE subjects in secondary schools and the need for replications of the study to cover the entire country.
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CHAPTER 1

INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

The 8:4:4 system of education was accepted by the Kenya Government in March 1982 following the recommendations of the Presidential Working Party on Second University. The new structure of education comprising eight years of primary, four years of secondary and at least four years of university education replaced the old one which was composed of seven years of primary, four years of secondary, two years of higher and at least three years of university education. The new system of education was introduced in standard eight and form I in 1985 and 1986 respectively.

According to the then Director of Education, the new system of education has two major advantages over the old one. First, the approach of 8:4:4 system of education is child-centred and emphasizes the importance of producing an all-round person who is soundly developed mentally, physically, spiritually and socially as opposed to the programme-centred approach which characterized the 7-4-2-3 system. Secondly, the new system of education
has a curriculum that is geared towards practical and technical education. The practical aspect incorporated in the new system lays great emphasis on imparting basic skills to students and providing a firm base that would enable students to participate in income generating activities or enter post-school vocational training with confidence.¹

The development of primary and secondary education curricula for the 8:4:4 system of education was undertaken by Kenya Institute of Education (K.I.E.). The Primary Education Project (P.E.P.) was responsible for the development of primary school curriculum while the Secondary Education Project (S.E.P.) catered for the secondary school curriculum. At secondary school level, an important consideration that was made by the curriculum planners was that the normal school going age for pupils is between 14 and 20 years. During this stage of life, boys and girls are naturally idealistic, imaginative, creative, inquisitive, conscious of changes in their bodies and capable of reasoning. Therefore, their school curriculum should of necessity encourage and enable the youth to develop in those aspects. The curriculum thus conceived for secondary school level was both

broad-based and practical-oriented to meet various aspirations of the learner and at the same time enable them to contribute directly towards national development.²

The SEP guidelines stipulated, among other things that:

... secondary education curriculum will be organized so as to lead to the acquisition of knowledge and development of skills and attitudes in communication, mathematics, science, humanities, applied education and physical education.³

As a result of this, every pupil must take eleven examinable and two non-examinable subjects in form I and II and nine examinable and two non-examinable subjects in form III and IV. Among the compulsory and examinable subjects to be taken in form I to IV are the practical subjects.

The four major areas of practical education that are currently being offered at secondary school level are Agriculture, Business Education, Home Science and Industrial Education. These major areas of practical education are composed of several subjects. For example, Industrial Education (IE), on which this study was focussed, comprised six subjects namely: Building Construction, Drawing and


³Ibid. p. 5.
Design, Electricity, Metalwork, Power Mechanics and Woodwork. Every secondary school in Kenya is required to offer at least one practical subject from any of the major areas of practical education stated above. The choice of a school to offer a certain practical subject dictates to its pupils what they will take.

Since the introduction of the new education system, some educators and other concerned parties including policy makers have conceded that there are some unfavourable conditions affecting the implementation of the 8:4:4 system. For instance, twelve months after the 8:4:4 system was introduced, The Weekly Review reported the following about the system:

To begin with, not very many people understood or knew the rationale behind the introduction of the new system since the government seemed to have jumped the gun .... And then there was the urgency and sheer enormity of the task which was coupled with the apparent lack of coordination .... All these gave room for pessimism, allowing for adverse speculation, including serious doubts about the viability of the programme .... The sensivity of the whole issue reached such a state that President Daniel Arap Moi directed that there should be no further debate on 8:4:4 system.


In another instance during the Education Administration Conference held in April 1987, the then Chief Inspector of Schools cited factors related to teachers, resources, school administration and curriculum as having affected the implementation of the 8:4:4 system.

Apparently, the introduction of the 8:4:4 system was not without numerous and great challenges. At primary level, the immediate challenge was to construct and equip standard eight classrooms and workshops which had to be done on harambee (self-help) basis. At secondary level, the challenge was even greater because it called for implementation of a much more diversified curriculum containing more practical subjects. Similarly, the universities will face the challenge of setting up and expanding appropriate facilities, development of materials and recruitment and orientation of personnel.

1.2 PURPOSE OF THE STUDY

In this study, the researcher focused on Industrial Education in Nairobi Province and addressed the

question: What are the problems affecting the implementation of IE curriculum in secondary schools in Nairobi Province?

The purpose of the study was therefore twofold: (1) to enumerate and describe the various problems affecting the implementation of IE in secondary schools in Nairobi Province as perceived by the curriculum developers, school heads, IE teachers and IE students, (2) to come up with recommendations for policy makers, curriculum developers, administrators, teachers educators and teachers based on the findings.

The study addressed the following subsidiary questions:

1. Is Industrial Education at secondary school level in the 8:4:4 system, a prevocational area of study or does it still have a predominantly general education outlook?

2. What are the main qualities of IE teachers in secondary schools in Nairobi Province and how are the teachers utilized?

3. Do the teaching facilities for various IE subjects in Nairobi secondary schools measure up to the minimum requirements prescribed by the curriculum developers?
4. How is the IE programme being financed in secondary schools in Nairobi Province and has the mode of funding affected the implementation of the programme?

5. Was the time allocated to prepare for and implement the new IE curriculum adequate?

6. What do curriculum developers, school heads, IE teachers and students consider as problems affecting the implementation of IE programme in secondary schools in Nairobi Province?

1.3 **SIGNIFICANCE OF THE STUDY**

In the past, several studies such as Ministry of Education in 1976, Balsdon in 1979, Kimani in 1982 and Waithaka in 1985 have been

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carried out on certain aspects of technical education in Kenya. More recently in 1985, an in-depth evaluation of the Swedish-supported Industrial Education Project in Kenya was completed. However, no study has been undertaken so far since the introduction of the 8:4:4 system of education to assess the difficulties being experienced in implementing the new IE curriculum.

It is anticipated that this study will provide useful information for the following people:

1. policy makers when formulating educational policies in future.

2. curriculum planners when developing or revising school curriculum.

3. school administrators and teachers in future implementation and revision of new curriculum.

4. teacher educators when carrying out their responsibilities.

5. other people who may be interested in the development of IE in Kenya.
It is also assumed that the results of the study will create some awareness among students, parents and the community about the current trends of IE in Kenya.

1.4 SCOPE AND LIMITATIONS

Inspite of the fact that IE subjects were offered in secondary schools all over the country, due to time and financial constraints, the study was restricted to Nairobi Province. The conditions prevailing in Nairobi were most likely different from those in other areas of Kenya. Application of the findings to other parts of the country should therefore be done with caution.

Since this study was primarily concerned with the implementation of IE curriculum in secondary schools in Nairobi Province, it was limited to the five IE subjects that were being offered in those schools. The subjects were Building Construction, Drawing and Design, Electricity, Metalwork and Woodwork. Power Mechanics, though part of IE, was left out in this study because none of the secondary schools in Nairobi was offering it.

The population from which the sample was drawn comprised boarding, day, mixed and non-coeducation schools. Despite the significant
effects these variables may have on the findings, the stratification of the sample was based on whether a school offered IE subject or not.

1.5 DEFINITION OF TERMS

8:4:4 System of Education

The 8:4:4 system is the new and current structure of education in Kenya which is composed of eight years of primary, four years of secondary and at least four years of university education.

7:4:2:3 System of Education

The 7:4:2:3 system is the former structure of education comprising seven years of primary, four years of secondary, two years of higher and at least three years of university education.

Practical Education

Practical education is the type of education concerned with physical work as done in industry, home, agriculture and business. It emphasizes creating some understanding of the relationship between industry, home, agriculture and business but does not emphasize on
Industrial Education

Industrial Education is a type of practical education which serves to familiarize students with the tools, processes and occupations of industry. It is considered by educators as part of general education, not only because it supports or fulfils many of the fundamental concepts of general education, but because it develops in learners greater understanding of the significance of industry in the world today.*

*Note

The formal definition of Industrial Education given in this study is different from the meaning commonly attached to IE in the Kenyan context. Attempts have been made in this study to make a distinction between the conflicting conceptions of IE and to make some appropriate recommendations. However, for the sake of convenience in communication, the researcher has used the term IE in two different ways. First, the term IE has been used very frequently to refer to a particular group of practical subjects which have been offered at secondary school level in both the 8:4:4 system of education and the preceding 7:4:2:3 system. In that context, the meaning of IE does not necessarily conform with the
formally accepted philosophy of IE. Secondly, the researcher has occasionally used the term IE to portray its formal meaning.

**Vocational Education**

Vocational Education is the type of education which is specifically planned and designed to prepare learners to enter and progress in selected jobs and occupations.

**Technical Education**

Technical Education is a vocationally-oriented instructional area offered primarily at post secondary level and is intended to produce a classification of workers who fall between craftsmen and engineers.**

**Prevocational Education**

The term prevocational education is used in this study to refer to a type of practical education which provides the learner with skills that are necessary for further training and education in a particular vocation. However, the skills learnt in prevocational education may be utilized to a certain degree in direct employment.

**NOTE**

While Technical and Industrial Education have some common characteristics and disciplines to the
point that they may appear similar when viewed on the surface, their differences in philosophy makes them two distinct and independent areas of study. Therefore, it is worth noting that the former is a vocationally-oriented area of study offered at post-secondary level while the latter provides a broad exposure of industrial activities at upper primary and secondary school levels.

1.6 **LIST OF ABBREVIATIONS**

CIDA - Canadian International Development Agency.
CIS - Chief Inspector of Schools.
IAE - Industrial Arts Education.
IDA - International Development Agency.
IE - Industrial Education.
KIE - Kenya Institute of Education.
KSTC - Kenya Science Teachers College.
MEST - Ministry of Education Science and Technology.
PEP - Primary Education Project.
SEP - Secondary Education Project.
SIDA - Swedish International Development Agency.
CHAPTER II

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter the literature related to Industrial Education (IE) in Kenya is reviewed. The review is necessary in order to establish the origin, objectives, evolution and present status of IE. The chapter is divided into three major parts. The first part gives a brief historical perspective of practical education and highlights some of the events that led to the introduction of IE in Kenya. The second part traces the development of IE from birth up to 1984 when the 8:4:4 system of education was introduced. Lastly, the third part is concerned with the recent development of secondary education in Kenya with special emphasis on IE in the 8:4:4 era.

As indicated in chapter one, the term IE is used frequently in this study to refer to a particular group of practical subjects offered in secondary schools in Kenya. Occasionally, the term IE is used to denote the formal definition which has been given in Chapter I.
The definition given in this study was considered formal and adopted because of the following two reasons.

The first reason is that the Evaluation study of IE carried out in the early eighties, established that IE in Kenya was of North American origin. Several American authors have written extensively about the development of IE in North America. Although the terms Industrial Arts (IA), Industrial Arts Education (IAE) and IE have often been used to refer to the same areas of study, the definition and objectives given by various authors are quite similar. For instance, Giachino defines IAE as:

part of general education not only because it supports or fulfils many of the fundamental concepts of general education but because it develops greater understanding of the significance of industry in the world today.

Similarly, Bartel defines IAE as:

an area which provides a general education emphasis ... to study about tools, materials and processes relating to industrial sector as it functions today.

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In essence, most educationists, portray IE as part of general education which acquaints students with tools, products and occupations of industry. The definition given by Giachino is therefore quite typical and has been adopted as formal definition of IE in this study.

Secondly, the objectives of IAE given by the American Industrial Arts Association (AIAA) include, among others, the following:

- to develop insights and an understanding of industry regarding its place in the society.
- to discover and develop individual talents, aptitudes, interest and potentials as related to industry and technology.
- to develop basic skills in the proper use of common industrial tools, materials and processes.
- to develop problem solving and creative abilities involving the materials, processes and products of industry.\(^4\)

The four objectives together with one additional objective were reproduced in the original IE syllabus

in Kenya with some minor alterations. They formed what was known as general objectives of IE in Kenya between 1972 and 1985.

Thus, the definition and objectives of IE in Kenya originated and were adopted from North America. Further, the titles Industrial Arts and Industrial Arts Education were used initially in Kenya, just like in North America, to refer to the same area of study. However, in March 1972 the use of the title IE was formally effected in Kenya because, according to the then Chief Inspector of Schools (CIS), it

"gives a more realistic picture of the subject ... [and] it also falls in line with other titles such as Religious Education, Physical Education and Technical Education."

2.2 HISTORICAL PERSPECTIVE OF PRACTICAL EDUCATION

Practical education in this study refers to the type of general education which is concerned with such physical work as done in agriculture, home, business and industry. It lays emphasis on creating some understanding of the relationships between these areas but not on occupational competency. In Kenya, practical


education, like general education, developed through three broad and overlapping phases, namely, the traditional, missionary and governmental phases.7

The traditional phase was dominant during the years before the European influence had reached the indigenous groups of Kenya. The Kenyan tribes used to have their own technology of fabricating tools and weapons using wood, stone, bones and iron. They used distinctive means of preparing an individual for his role within their tribal society. The most common system used was the apprenticeship offered to craftsmen. Although methods varied from one group to the other, they provided opportunities for the youth to develop specific skills and knowledge which they required to survive in their respective tribal societies.8

The appearance of explorers and missionaries in Kenya had a significant influence on traditional education and arts. No sooner had the missionaries settled than they introduced their technology which was quite attractive to the local people. The basic


elements of the curriculum for practical education were gardening, carpentry, wood curving, pottery, basket making and knitting. Although the meaning of the terms practical, technical, industrial and vocational education varies from one author to the other, the reasons suggested by different authors for introducing such types of education in African schools are quite similar. The version of Sifuna is quite representative of what other authors have given and sums it up as follows:

First were the racial ideas about the educable capacity of black people, a thing that necessitated providing an African with the kind of education that was deemed suitable to his mental capacity. Second were the Christian missionary views about the kind of education given to low classes. As with English workers, the ... industrial blended with some elements of the 3Rs. Finally was the general need to adapt education to the environment so as to arrest migrations to urban areas.9

According to Sheffield, the missionary phase gradually replaced the traditional phase and continued even after independence though at a much smaller scale.10


10Sheffield, op. cit. p. 7.
The government phase consisted of the colonial and the present independent government era. The colonial government did not concern itself with education until 1911 when the department of education was created. The department advocated a strictly separate racial education system for Africans, Asians and Europeans which was greatly unfavourable for Africans because the system was limited to a low level of education and was meant for only a few Africans. Never-the-less, in 1914, the first government school for Africans was established at Machakos town. Sheffield (1971) described it as:

an industrial school modeled on the Negro industrial schools of America ... to educate the boys mainly through the hands, providing a sound general education and technical training in one trade for each pupil. 11

The 1925 Memorandum was the first official policy statement on African education and was presented to the British government by the Colonial Office to provide, among other things, more technical and vocational training for Africans. This led to the establishment of more technical and trade schools at post-primary level. The main courses offered in such schools were carpentry, metalwork, masonry, building construction and mechanics. 12

After the second world war, arts and craft were introduced in some primary schools. However, due to lack of sufficient funds and learning facilities, the growth of the programme was quite limited. Moreover, as observed by Sheffield, most parents were not in favour of arts and crafts.

As these parents observed the academic schooling given to European children and to children of a very few select in the rural villages, they understandably came to regard agricultural, technical and other practical subjects as second rate designed to keep Africans in the traditional inferior position.13

Thus, despite the early introduction of practical education and its perpetuation over the years, its growth was hindered by the attitude of Africans towards it, lack of qualified staff, insufficient funds and learning facilities.

A rapid growth, however, was experienced in the fifties when the colonial government appointed the Technical Institute Committee under the Chairmanship of G.P. Willoughby. Following the committee's recommendation to the government, the Royal Technical College was established in 1956. Later on in the early sixties the Royal Technical College became

13Ibid, p. 11.
a constituent college of the University of East Africa. The influence of the Committee, coupled with the rapid expansion of industries, also sparked off a high demand for artisans, tradesmen and technicians. As a result, during the five years before independence, more opportunities opened for Africans to be trained in technical subjects. In 1961, the Kenya Polytechnic was established as a centre for training in engineering, domestic science and commercial subjects up to diploma level. By 1963, boys with a pass in Kenya Preliminary Examination would enroll in any of the seven newly established trade schools to pursue a trade or a craft course.

From the foregoing brief historical overview of education for Africans, two points are worth stressing. The first point is that practical education in Kenya had been in existence even before the introduction of formal education by the missionaries.

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However, whilst the missionaries and the colonial government were in agreement that practical education should form the main components of education for African natives, they had different motives for educating Africans. The missionaries provided education in basic reading, writing and arithmetic to facilitate mastery of religion and practical skills. This enabled Africans to be effective in their evangelical and practical involvements. The colonial government on the other hand, considered Africans to be different from Europeans to merit uniform education. Therefore, the government provided Africans with basic education which was suitable for production of skilled labourers and clerks required to work on European farms and in the administration offices. This was done in the interest of producing a docile and submissive working class.

The second point to be stressed is that before 1963, education in Kenya was administered along racial lines. The curriculum for Africans emphasized practical education at the expense of other forms of education. As a result, Africans resented practical education and desired to have what they viewed as a more superior education similar to that of Asians and Europeans.
2.3 INTRODUCTION OF INDUSTRIAL EDUCATION AND ITS GROWTH BETWEEN 1960 AND 1984

The first attempt to introduce Industrial Education in a Kenyan Secondary School was made by Chester Bergey, an American teacher, at Chavakali Pilot School in Western Kenya in 1960. According to Stabler, Chester Bergey wanted to develop a course that would include instructions and practical work not only in wood but in metal, technical drawing, mechanics and additional shop projects in local materials leather, stone and fiber. 16

Bergey's intention was to impart skills to his students in the use of and care for both hand and power tools. He wanted to follow his own syllabus but he overlooked the fact that examinations were considered very important by students and the community. As a result, his attempt failed because the school had to offer one of the fields whose syllabus was available for Cambridge examination. To start with, the school settled for woodwork but this choice did not satisfy Bergey because he felt the syllabus required too much time for theory and practice and its emphasis was on hand tools.

16 Ibid, p. 126.
Bergey was convinced that the development of a new syllabus to replace the one by Cambridge syndicate was necessary. As Stabler records it,

with the advice from specialists in related fields, Bergey drew up a new and broader syllabus and with the blessing for the Ministry of Education, sent it to Cambridge syndicate. It was however, not approved and Chavakali boys have since followed the narrow wood working syllabus.17

For a period of about ten years up to the early seventies, the Cambridge syllabus included Woodwork, Metalwork and Geometrical and Mechanical drawing. Although the syllabuses were characterized by short descriptions of a series of topics, their objectives were quite similar to those of IE syllabus which was developed later on. According to Lauglo,

The Cambridge exams syllabuses did not aim at vocational preparation but at teaching practical knowledge and skills that would be suitable for all students irrespective of their subsequent career.18

Shortly after independence, education in Kenya underwent a very major overhaul which, among other things, abolished the racial schools following the


18 Jon Lauglo, op. cit. p. 15.
recommendations of the Kenya Education Commission. But, IE still remained too unfamiliar and expensive to be offered by most schools. The few schools that managed to offer at least one subject area of IE were mainly the former European and Asian schools which had already been integrated into the new non-racial system.

The first move by the Kenya Government to establish Industrial Education in secondary schools was in 1968. At the beginning of that year, the Ministry of Education released a syllabus entitled *Industrial Arts Interim Scheme for Secondary Schools*.\(^\text{19}\) Essentially, the document gave a detailed outline of topics in sequential order for Woodwork, Building Construction, Metalwork, Agriculture, Electricity, Motor Vehicle Mechanics and Technical Drawing for form I to IV. In addition, the document contained a brief outline of topics for nine subject areas of Graphic and Cultural Arts. Its rationale was based on educating and training youth in the skills required for economic growth and development.

The general objective of IE at that time was:

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to provide the student with necessary information which will develop his attitude towards practical work and improve his manipulative skills consequently assisting him in becoming a contributing member of Kenya.20

Other characteristics of the programme that are indicated in the initial syllabus include the following:

1. the IE subjects should be accorded examinable status like the other subjects leading to East African School Certificate.

2. practical and experimental aspects of the courses should not be neglected but should be given the same emphasis as the theory.

3. class sizes should not exceed 18 or 20 pupils.

The interim syllabus had two major drawbacks which, coupled with lack of teachers and facilities, rendered it hard to implement. The first is that the syllabus was too ambitious in scope and covered an extremely wide range of subjects. The second is that it lacked the status of an examinable subject at form IV level. As a result of these shortcomings, the government embarked on revising the Wood and

Metal syllabuses and at the same time developing the Power Mechanics and Electricity syllabuses. In addition, the government identified as priorities the need to train teachers, build IE staff houses in some schools and renovate the old workshops and put up new ones in selected schools.

In accordance with these priorities, the Kenya government in conjunction with the Swedish International Development Agency (SIDA) started training IE teachers at Kenya Science Teachers College (KSTC) in 1969. While the training of Kenyans was going on, the government invited Swedish Volunteers to teach IE in secondary schools. Thus, by 1982 when the IE training programme was phased out at KSTC, 60 percent of the IE teachers in schools had been trained and a total of 45 Swedish Volunteers had taught in Kenyan Secondary Schools.21

Concerning the establishment of the new workshops and the renovation of the old ones, SIDA again generously came to the aid of Kenya Government. As a result, by 1982 when the aid was stopped, a total of 25 schools offering metal and woodwork and 10 schools offering power mechanics and electricity

21Jon Lauglo, op. cit. p. 29.
had been established and fully equipped. Further, by 1982, SIDA had put up 22 units of housing for IE staff in some schools.

As for the revision and development of the syllabuses, the Kenya Institute of Education (KIE) was charged with that responsibility. By 1972, KIE had produced revised syllabuses for Woodwork and Metalwork which were examinable at form IV level. Four years later, the task of developing the syllabuses for Electricity and Power Mechanics was also completed.

The primary purpose of offering IE and other practical subjects at secondary school level as expressed in the Development Plan for 1970 to 1974 was:

not to produce individuals who are qualified to pursue course-related profession upon leaving school, but to instil in children an appreciation for skills required in broad range of vocations ... More important, the course will help to eliminate undesirable and unrealistic attitudes towards these skilled manual vocations which are so essential in national development.  

\[22\]

This policy statement concurs with the general objectives of IE listed in the revised syllabuses. The terms used in the syllabuses such as "acquaint students," "develop awareness" and "enable pupils to understand" imply that IE was initially meant to be part of general education. However, as pointed out in the Evaluation Report by Lauglo, a high degree of prevocational specialization is evident in the scheme of work and examination procedure. To quote Lauglo,

The aims and objectives of IE are fraught with ambiguity. The general aims define IE as part of general education; but the objectives ... imply training of a prevocational type.23

While these observations may be correct, it should also be realized that the growth of IE has been influenced by other prevailing factors. For example, the worsening labour market for school leavers has forced planners to promote IE at secondary school level from general education to prevocational education.

Yet, despite the effort to change the status of IE to prevocational education, there is no evidence that taking any IE subject increases job

opportunities for school leavers even in self-employment. In fact, this was one of the conclusions arrived at by A. Narman in a recent tracer study of former IE students. However, the results of the same study confirmed that the skills learnt in IE have been put to good use by all the group members in their private lives to repair manufactured articles or make simple articles. This observation in essence, supports the initial objectives of offering IE as part of general but not prevocational education.24

The Evaluation study by Lauglo also shows clearly that IE programme is more costly to implement than academic subjects. According to Lauglo, there are many reasons for this:

Workshop buildings are more expensive than classrooms. Tools, equipment, materials and consumables maintenance and repair add to the greater cost of practical subjects. Many practical subjects - IE is one example - require smaller classes. This greatly adds to the unit teaching cost of the subject.25


In conclusion, it has been seen that IE has grown gradually and steadily since it was introduced in an African secondary school in 1960. This growth has been from a broad, ambitious and non-examinable practical area of study to a more specific and examinable area with separate syllabus for each IE subject. Further, although the philosophy of IE has been to provide general education, due to factors such as limited opportunities for employment, IE has tended to change to prevocational education.

But, despite of these recent developments and changes, an appropriate conclusion about the trend of IE between 1960 and 1984 that is given in the background report for Evaluation study still stands that:

the realities of teaching IE may in many respects be far removed from the original intentions of introducing the subject in Kenyan secondary schools. However, the present teaching methodology has been shaped by many factors. Whilst it cannot be claimed that the way in which it is taught is totally successful in attaining all the stated objectives, neither is it entirely a failure. There can be no doubts that many ... have come to understand themselves better through the study of this subject.26

2.4 THE SECONDARY EDUCATION PROJECT IN THE 8:4:4 ERA

As indicated in the first chapter, the secondary cycle is the second level of the 8:4:4 system. It builds on the concepts, principles and skills established in the primary cycle. Prior to the introduction of the new education system, a Steering Committee for the Secondary Education Project (SEP) was formed to provide among other things, guidelines on the design, development and implementation of the curriculum for the secondary level. It has also been the responsibility of the committee to monitor and evaluate the development and implementation of the curriculum.\(^{27}\)

The secondary education curriculum has been developed by various subject panels at KIE. It is designed to offer numerous and varied learning experiences that should provide a balanced development of affective, cognitive and psychomotor skills. Precisely, the secondary education should provide learning opportunities to:

(a) lead to an all-round mental, social, moral and spiritual development of the learner.

(b) prepare the learner to make positive contribution to the development of the society.

(c) enable the learner to choose with confidence and cope with vocational education after school.

(d) build a firm foundation for further education.

(e) ensure parity in the cognitive, psychomotor and affective skills for all students at this level in the country.

(f) lead to the acquisition of attitudes of national patriotism, self-respect, self-reliance, cooperation, adaptability, sense of purpose, integrity and self-discipline, respect and consideration for others, loyalty and service to home, society and the world.\textsuperscript{28}

To facilitate the accomplishment of these objectives SEP is structured into six subject categories namely Communication, Mathematics, Science, Humanities, Applied Education and Physical Education.

\textsuperscript{28}Ibid, p. 5.
All these categories except two, have several subject groups which are composed of several subjects. Currently, a total of 29 examinable subjects and two non-examinable subjects are offered at secondary school level. Of these 31 subjects, fourteen are practical-oriented subjects.  

Secondary education curriculum is indeed highly diversified where diversification does not just mean a wide variety of subjects but according to King,

it is often used to refer to technical studies in general academic schools. It is immediately clear that what is intended is complementing an otherwise academic school structure,...  

This trend of secondary education is both recent and worldwide as Lauglo in his Project Evaluation Report observes:

The development of IE and other practical subjects in Kenyan schools is part of an international policy trend of diversifying curricula of secondary school in a practical education.  

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31 Jon Lauglo, op. cit. p. 4.
Lauglo attributes the recent diversification of education in developing countries to at least two factors. First, there has been a "tendency to hope or believe that practical subjects will make youth more employable or even that they can provide a basis for self-employment." Secondly, the connotations of "modern and advanced technology" in practical studies make diversifications attractive.

2.5 IE IN THE 8:4:4 SYSTEM

It has been noted earlier that the term Industrial Education has been used in both the 7:4:2:3 and 8:4:4 systems in Kenya to refer to a cluster of practical subjects offered at secondary school level. However, the characteristics of IE and the philosophy attached to it in both cases is completely different. A close examination of the characteristics of IE in each system of education reveals these significant differences.

In the former education system:

1. IE was considered as part of general education intended to create general awareness of materials and tools used in industry. It was a non-vocational subject.

32Ibid, p. 4.
2. IE was a broad area of study comprising four subjects namely, Electricity, Metalwork, Power mechanics and Woodwork.

3. Students were exposed to either Wood and Metal or Power mechanics and Electricity in form I and II before specializing in one of those subjects in form III and IV.

4. The total time allocated for IE subjects was three periods per week for each subject area offered in form I and II and six periods for the area taken in form III and IV.\(^{33}\)

In the 8:4:4 system of education:

1. IE is intended to provide practical skills and knowledge that can be utilized for either self-employment, salaried employment or further training. IE is therefore considered a prevocational subject.

2. IE comprises six subject areas which are independent except for the general objectives which they all have in common.

3. Specialization in any of these subject areas start in form I and is in the area which the learner finds being offered by the school he happens to join.

4. IE is offered for only three periods per week in form I and II and four periods per week in form III and IV.

The objectives of IE in the 8:4:4 system like in the former system, are not free from ambiguity. For example, a phrase such as "develop an insight and appreciation in practical skills" is likely to be interpreted differently by various people. To some people such as the IE teachers, the objectives may bear the connotations of general education while to others it may imply a pre-vocational type of education. But, the effect of such curriculum depends on the interpretation given by its planners and the entire society. As King puts it:

Perhaps the most fundamental lesson of all for the planners to absorb is that the subject matter of technical and vocational education is socially defined and therefore can be socially redefined ... the planner need to understand that the present categorization of fields are man-made, tentative and alterable.

In the 8:4:4 system, the Kenyan society expects much of what it views as IE together with the other

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practical subjects. IE should, among other things, provide practical skills and attitudes which will lead to income earning activities through salaried and self employment. Whilst it is too early to determine whether IE is actually meeting its objectives it is quite timely to determine the problems affecting the implementation of IE syllabus, hence this study.

SUMMARY

In this chapter, some relevant literature has been reviewed with a view of determining the origin, growth and status of IE in Kenya. The following three areas have been investigated.

First, a historical review showed that practical education is as old as any other form of education and according to the Ministry of Education it was meant to prepare Africans to serve particularly on European farms.\textsuperscript{36} As a result, the Africans resented practical education and desired a more academic curriculum similar to the one offered to European children. The attitude of Africans towards practical education and lack of facilities and qualified teachers contributed adversely towards the

growth of practical education.

Secondly, the introduction of IE in African secondary schools and its evolution between 1960 and 1984 has been considered. The literature reviewed shows that in the early sixties, IE was not an immediate concern for the newly independent state. This resulted in a very slow initial growth of the subject. However, the government input in terms of establishing new schools, training teachers and improving existing facilities boosted the growth of IE in the late sixties and early seventies. But due to the high cost of establishing and maintaining IE schools, and also lack of qualified teachers, the number of IE schools did not change until 1984 when the 8:4:4 system was introduced.

Thirdly, the status of IE in the new system of education has been examined. It has been observed that IE is one of the practical education subjects required to be offered at secondary school level. In the 8:4:4 system, the Ministry of Education expect IE to lead to salaried and self-employment or further training and education. Since 1986, a number of new schools have started offering at least one IE subject and more IE schools will continue to be established. Further, the IE schools in the former system of education were required by the
Ministry of Education to adjust accordingly and continue offering IE. This study sought to establish what problems there were that affected the implementation of the IE programme at secondary school level in Nairobi Province.
3.1 INTRODUCTION

This chapter deals with the methodology applied in data collection. It outlines the selection of the sample and describes the respondents who were involved in the study. In addition, the chapter discusses the types of instruments used and describes how they were developed and administered.

3.2 SAMPLING

The sample was drawn from a population of all the secondary schools in Nairobi Province which offered the Kenya National Examinations Council (KNEC) syllabuses for the 8:4:4 system of education. The researcher chose this geographical area because it had the highest concentration of Industrial Education (IE) schools in the country. The choice was also dictated by the limited time and money available for the study.

In July 1988, there were 85 secondary schools in Nairobi which were offering the KNEC syllabuses. Of these, 38 schools were either government aided or assisted and 47 were private
schools. Further, the population consisted of boarding, day, mixed or non-coeducation schools. The KNEC records also showed that only eight schools were offering IE before 1986 when the 8:4:4 system was introduced and that 12 additional schools had been established by the end of 1986.

Whilst all these variables may have significant effect on the findings of this study, the researcher based his stratification of the population on the fact that some schools offered IE while other schools did not. Therefore, for the purpose of this study, the population consisted of 20 IE schools and 65 non-IE schools. It was assumed that the latter were offering other practical education subjects as stipulated in the Secondary Education Project (SEP) guidelines.

All the IE schools in Nairobi were included in the sample except Eastleigh, Arya Boys, Kennedy and Guru Nanak secondary schools. The first two schools were used for pilot testing the instruments used in this study while the other two schools had closed down at the time the data were being collected. There was a fifth IE school which was left out in the study because the researcher was refused access to it by the school head.

With regard to the 65 schools which were not
offering any IE subjects, random sampling was applied in order to get a manageable sample. All the schools in this stratum were listed in alphabetical order and every fifth school was selected to come up with a total of 13 schools. Thus, the sample for this study comprising 15 IE schools and 13 non-IE schools was obtained. Appendix VIII shows all the schools which were involved in this study.

The respondents were composed of all the school heads, all the 31 teachers involved in teaching IE subjects in the 15 IE schools, 15 form III students selected from each IE school and nine officers or teachers who were involved in the development of the syllabuses for various IE subjects. The officers and teachers who participated in the development of the syllabuses are in this study referred to as curriculum developers inspite of the fact that they may not necessarily have been formally trained. The curriculum developers were drawn from secondary schools, Kenya Institute of Education (KIE), Inspectorate and some teacher training colleges. Table 3.1 shows a breakdown of all the respondents who were involved in the study.
### TABLE 3.1

**RESPONDENTS INVOLVED IN THE STUDY**

<table>
<thead>
<tr>
<th>DESCRIPTION OF RESPONDENTS</th>
<th>TOTAL NUMBER INVOLVED</th>
<th>NUMBER THAT RESPONDED No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>School heads for IE schools</td>
<td>15</td>
<td>14</td>
<td>93.3</td>
</tr>
<tr>
<td>School heads for Non-IE schools</td>
<td>13</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>IE Teachers</td>
<td>31</td>
<td>26</td>
<td>83.9</td>
</tr>
<tr>
<td>Curriculum Developers</td>
<td>9</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>IE Students</td>
<td>15</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>83</strong></td>
<td><strong>72</strong></td>
<td><strong>86.7</strong></td>
</tr>
</tbody>
</table>

#### 3.3 RESEARCH INSTRUMENTS

Three types of instruments were developed and used to collect data for this study. These were questionnaires, interview and observation schedules. The questionnaires were administered to school heads and teachers, while the curriculum developers and students were interviewed by the researcher. The researcher also organized observation schedules for all the 15 IE schools which were involved in the study. The purpose of the observation was to assess the condition and utilization of the teaching facilities in those IE schools.
All the instruments used in this study were developed by the researcher. Three different questionnaires were used. The questionnaire for school heads for IE schools comprised a total of 19 items (see Appendix 1). The questions, which were a combination of unstructured and open-ended questions, sought information about the headteacher, the size, history, staff establishment, teaching facilities of the school and the problems affecting IE in the school. The questionnaire for heads of schools which were not offering IE subjects was relatively short and requested for two types of information. First, it called upon the respondents to give personal and school information. Secondly, it requested the school heads to indicate why their schools were not offering any IE subjects (see Appendix II). The teachers' questionnaire (Appendix III) was composed of 24 questions. The respondents were required to give personal data, their teaching load, their belief about IE, teaching facilities and problems affecting the implementation of IE in their respective schools.

Fifteen open-ended questions were used by the researcher to interview the curriculum developers. The discussions centred around the definition of IE,
the problems experienced during the process of development of the syllabus and the problems affecting the implementation of IE curriculum. The interview for IE students mainly sought to determine the students' knowledge about IE, their feelings about the facilities and teachers and the benefits of taking IE subjects. Lastly, visual inspection was carried out to determine the quality and quantity of tools and equipment available in schools and the utilization of the workshops. The researcher used a checklist and based his assessment on his experience in teaching workshop planning and organization courses in a technical teachers college.

3.4 RESEARCH PROCEDURE

As soon as the draft instruments were ready to be administered, permission was obtained from the office of the President to conduct the research. To start with, the instruments were pilot tested using appropriate respondents who were drawn from the population but were not part of the sample. The purpose of testing the instruments was to determine whether:
1. the items of the questionnaires were free from ambiguity.
2. the questions would elicit the anticipated data.
3. the acquired data could be meaningfully analyzed.

After the pilot test was completed, all the necessary amendments were made.

The process of collecting data included making an initial visit to the schools to meet the school heads, explaining to the school heads the purpose of the study and who would be involved and in what way each respondent would be involved in the exercise. After permission to conduct research was granted by the school heads, the researcher gave the school head and the IE teachers questionnaires to complete. Each questionnaire had brief and clear instructions for the respondents. During the initial visit, the researcher also made arrangements for a second visit during which he collected the questionnaires from the respondents and at the same time interviewed the students. Any subsequent visit after the second one was arranged when it became necessary.

At the time of collecting the data, most of the curriculum developers who were to be interviewed,
happened to be attending a writing workshop in one of the beach hotels at the coast. The researcher, with permission from the organizers of the workshop, visited the venue of the workshop and had ample time to interview a total of seven curriculum developers. Two more curriculum developers were interviewed at their work stations in Nairobi. Thus, a total of nine curriculum developers were interviewed - two for electricity, Drawing and Design, Metalwork and Woodwork and one for Building Construction. Although the researcher had planned to interview two curriculum developers for each IE subject offered in schools in Nairobi, it was not possible because only one respondent was available for Building Construction. The observation schedules were carried out by the researcher during subsequent visits to the schools after the initial visit. The IE teachers were available to assist the researcher when necessary during the inspection of the teaching facilities.
CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

4.1 INTRODUCTION

The data for this study were solicited by use of questionnaires, interviews and observations from the following:

i. fifteen heads of Industrial Education (IE) schools.

ii. thirteen school heads for non-IE schools.

iii. nine curriculum developers.

iv. thirty one IE teachers.

v. fifteen IE students in form III (pioneer class in the 8:4:4 system).

Questionnaires were used to collect data from all the school heads and the IE teachers while the curriculum developers and the IE students were interviewed by the researcher. In all cases where the questionnaires were used, the response was very good. Fourteen headteachers for IE schools, eight headteachers for schools not offering IE and 26 IE teachers completed and returned the questionnaires. Thus the overall return of all the questionnaires given out to both the school heads and the
IE teachers was 86.7%.

The data put forward in this chapter, though collected from various sources and using different methods, were categorized and presented in six parts. Part 4.2 below deals with the data concerning the qualifications and deployment of IE teachers. Part 4.3 is concerned with the data about the teaching of IE and its philosophy in the current system of education. Parts 4.4 and 4.5 deal with the data about teaching facilities and the funding of IE programme. Part 4.6 is concerned with time allocation while part 4.7 is a presentation of the major problems identified by various respondents.

4.2 INDUSTRIAL EDUCATION TEACHERS

This part of the analysis examines the data received from school heads, teachers and students concerning the qualifications, deployment and performance of IE teachers.

Tables 4.1 to 4.4 show the number, sex, age, qualifications and teaching experience of the IE teachers who were involved in the study.
### TABLE 4.1

**SEX AND AGE OF THE IE TEACHERS**

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>MALE</th>
<th></th>
<th>FEMALE</th>
<th></th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Under 21</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>21 - 25</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>26 - 30</td>
<td>7</td>
<td>26.9</td>
<td>1</td>
<td>3.85</td>
<td>8</td>
</tr>
<tr>
<td>31 - 35</td>
<td>7</td>
<td>26.9</td>
<td>1</td>
<td>3.85</td>
<td>8</td>
</tr>
<tr>
<td>36 - 40</td>
<td>7</td>
<td>26.9</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
</tr>
<tr>
<td>Over 40</td>
<td>1</td>
<td>3.85</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td><strong>GROUP TOTAL</strong></td>
<td><strong>24</strong></td>
<td><strong>92.3</strong></td>
<td><strong>2</strong></td>
<td><strong>7.7</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

### TABLE 4.2

**ACADEMIC QUALIFICATIONS OF IE TEACHERS**

<table>
<thead>
<tr>
<th>Qualification</th>
<th>No. of Teacher</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Graduate</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Diploma in Education or Sl</td>
<td>19</td>
<td>73.10</td>
</tr>
<tr>
<td>Ordinary National Diploma</td>
<td>3</td>
<td>11.50</td>
</tr>
<tr>
<td>Technician Part III</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Technician Part II</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Craft Part II</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>26</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
### Table 4.3
PROFESSIONAL QUALIFICATION OF IE TEACHERS

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Institution of Training</th>
<th>Other Institution</th>
<th>Total</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Graduate Teacher</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Diploma in Ed. (Technical)</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>15.40</td>
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<tr>
<td>Diploma in Ed. (Humanities)</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>SI</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>50.00</td>
</tr>
<tr>
<td>Untrained Teacher</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>26.90</td>
</tr>
<tr>
<td><strong>GROUP TOTAL</strong></td>
<td><strong>14</strong></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
<td><strong>26</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

### Table 4.4
TEACHING EXPERIENCE

<table>
<thead>
<tr>
<th>No. of Years</th>
<th>No. of Teachers Trained</th>
<th>No. of Teachers Untrained</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>11.50</td>
</tr>
<tr>
<td>1 - 3</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>23.05</td>
</tr>
<tr>
<td>4 - 6</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>7 - 9</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>15.40</td>
</tr>
<tr>
<td>More than 9</td>
<td>12</td>
<td>0</td>
<td>12</td>
<td>46.20</td>
</tr>
</tbody>
</table>
Of the 26 teachers who were involved in this study, 17 were teaching their major IE subjects, eight were teaching their minor IE subjects and one was teaching Drawing and Design though he was not trained as an IE teacher.

The following information was given in respect to utilization and the status of IE teachers during the third term of 1988.

i. Twelve teachers were teaching only IE subjects while fourteen teachers taught both IE and other subjects.

ii. Thirteen IE teachers had continued teaching in the same schools since 1986 when the new IE curriculum was introduced.

iii. Seven teachers felt that their teaching load was heavier than that of the other teachers in their schools while 18 teachers felt that their teaching load was average. Only one teacher indicated that his teaching load was lighter than normal.

The teachers were also asked to indicate the number of students they were teaching in their largest and their smallest classes for both theory and practical lessons. The recommended size of a class is 40 students for theory and 20 students for practical. Table 4.5 shows the teachers responses with regard to class size.
<table>
<thead>
<tr>
<th>CLASS</th>
<th>SMALLER THAN RECOMMENDED</th>
<th>RECOMMENDED SIZE</th>
<th>LARGER THAN RECOMMENDED</th>
<th>NO RESPONSE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Largest Practical</td>
<td>6</td>
<td>23.05</td>
<td>7</td>
<td>29.9</td>
<td>12</td>
</tr>
<tr>
<td>Largest Theory</td>
<td>18</td>
<td>69.2</td>
<td>1</td>
<td>3.85</td>
<td>4</td>
</tr>
<tr>
<td>Smallest Practical</td>
<td>10</td>
<td>38.5</td>
<td>4</td>
<td>14.35</td>
<td>10</td>
</tr>
<tr>
<td>Largest Theory</td>
<td>18</td>
<td>69.2</td>
<td>1</td>
<td>3.85</td>
<td>5</td>
</tr>
</tbody>
</table>
In an ideal situation, the question of the smallest and the largest classes for both theory and practical classes would not arise because all classes would be equal to the recommended sizes. In reality, the situation in IE schools as shown in Table 4.5 was that a large proportion of the teachers had classes containing either more or less students than the recommended number for both theory and practical classes. For example, as the table shows, twelve (46.2%) teachers who responded had classes which were larger than recommended.

The data presented in Table 4.6 explain the situation indicated in Table 4.5. While the majority (57.1%) of the schools had classes with an average of 40 students, six (42.9%) of the schools (i.e. 02, 05, 11, 12, 13 and 14) had classes whose average sizes were either too small or too large. As a result, it was not possible for those six schools to have the recommended sizes for the practical and theory classes. Moreover, eight schools had at least two additional practical subjects to offer while four schools did not have any other practical subject to offer except the IE subject. The schools offering several practical subjects could afford to split their classes into groups which were even smaller than recommended. On the other hand,
schools offering only one IE subject and having no facilities for other practical subjects ended up having extremely large classes.

Having classes which are too large can be detrimental to the implementation of a curriculum especially for IE subjects. For instance, students would be overcrowded in the workshops thus posing a danger to the users. In addition, the teacher will have difficulties in supervising such groups effectively. When on the other hand a class is too small, it would be uneconomical to assign such a class to a teacher on a full time basis.
TABLE 4.6

INFORMATION ABOUT THE IE SCHOOLS INVOLVED IN THE STUDY

<table>
<thead>
<tr>
<th>SCHOOL CODE</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF STREAMS</td>
<td>FORM I</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>FORM II</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>FORM III</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>AVERAGE NO. OF STUDENTS PER STREAM: FORM I</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>36</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>46</td>
<td>35</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>FORM II</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>37</td>
<td>35</td>
<td>41</td>
<td>40</td>
</tr>
<tr>
<td>FORM III</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>35</td>
<td>34</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>IE SUBJECTS OFFERED BY THE SCHOOL</td>
<td>Metal</td>
<td>Metal</td>
<td>Metal</td>
<td>Wood</td>
<td>Metal</td>
<td>Wood</td>
<td>Metal</td>
<td>Metal</td>
<td>D &amp; D</td>
<td>D &amp; D</td>
<td>D &amp; D</td>
<td>D &amp; D</td>
<td>Metal</td>
<td>D &amp; D</td>
</tr>
<tr>
<td>NUMBER OF OTHER PRACTICAL SUBJECTS OFFERED</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PERCENTAGE NO. OF STUDENTS TAKING IE SUBJECTS: FORM I</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>47</td>
<td>100</td>
<td>80</td>
<td>69</td>
<td>29</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>FORM II</td>
<td>25</td>
<td>100</td>
<td>50</td>
<td>46</td>
<td>22</td>
<td>20</td>
<td>82</td>
<td>14</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>37</td>
<td>55</td>
<td>100</td>
</tr>
<tr>
<td>FORM III</td>
<td>25</td>
<td>32</td>
<td>25</td>
<td>8</td>
<td>25</td>
<td>20</td>
<td>39</td>
<td>12</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>40</td>
<td>54</td>
<td>100</td>
</tr>
</tbody>
</table>

* D & D = Drawing and Design
Asked when they first learnt of the new curriculum for IE subjects, 17 teachers indicated that it was before 1986. The rest of the teachers learnt of the new curriculum in or after 1986. Fifteen teachers had formal orientation to the new curriculum either through an in-service course or during their learning in college.

All the IE teachers indicated that they had received the syllabuses for their respective IE subjects and 13 teachers had the teachers guide for form 1 and II. Only one out of the 26 teachers had received help from the subject inspectors.

Of the 14 school heads who completed the questionnaires for IE schools, eleven indicated that they had the right establishment of IE teachers while three school heads felt their schools were understaffed. Apparently, the heads' responses were based on the number but not the qualifications of the IE teachers.

The performance of IE teachers was reported as either average or above average by 13 school heads. It was too early for one school head to assess the performance of his IE teacher. It was noted by two curriculum developers that due to lack of opportunities for further education
for the IE teachers, some teachers had resorted to identifying themselves with their second teaching subject with a hope of better prospects for further education.

4.3 TEACHING OF IE AND ITS PHILOSOPHY

In the questionnaire for teachers, the respondents were asked to state what they considered to be the definition of Industrial Education. All the teachers except four came up with a definition of IE. However, a comparison of what they gave with the most widely accepted definition, that IE is part of general education which exposes students to tools, processes and occupations of industry, revealed that the teachers had a totally different conception of what IE is. For a definition to be complete, the researcher expected the teachers to state that IE is a type of practical education which forms part of general education and broadly exposes students to the tools, processes and occupations of industry. One teacher for example, defined IE as general education which exposes students to modern industrial occupations and creates general awareness of the various techniques used in industry. In the interpretation of the data the respondent was considered by the researcher to have some idea of what IE is because he
mentioned general education, general awareness and industrial techniques. Another teacher defined IE as the "learning of skills in different lines and their practical application" in life. The teacher was considered to have a slight idea of what IE is. The information given in Table 4.7 was arrived at by comparing the definition given by the teachers with the formal definition of IE.

TABLE 4.7
CONCEPTION OF WHAT IE IS BY TEACHERS

<table>
<thead>
<tr>
<th>DESCRIPTION OF CATEGORY OF RESPONDENTS</th>
<th>NO</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers with full idea of what IE is</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Teachers with some idea of what IE is</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>Teachers with slight idea of what IE is</td>
<td>10</td>
<td>38.5</td>
</tr>
<tr>
<td>Teachers with no idea of what IE is</td>
<td>12</td>
<td>46.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>26</td>
<td>100</td>
</tr>
</tbody>
</table>

A similar question was posed to the curriculum developers during the interview. Unlike the IE teachers, the curriculum developers' responses demonstrated a correct conception of what IE is. In fact, two respondents gave a complete definition of IE while seven respondents had some idea of what IE is. Asked whether they thought IE was being taught in secondary schools, four curriculum developers
indicated that it was not because its philosophy had been misconstrued. The respondents however thought that some aspects of IE were being taught in schools. Two respondents had difficulties in deciding whether IE was in reality being taught or not.

The four curriculum developers who admitted that the philosophy of IE at secondary school level in the 8:4:4 system had been misconstrued felt that they were not to blame. They indicated that their involvement in the development of the IE curriculum was partial because the Steering Committee for the 8:4:4 system gave them "IE" as the name of the area of study, the six subjects to constitute IE, the general objectives for Secondary Education Project (SEP) and the subject structure and time allocation. The responsibility of the curriculum developers was to develop the syllabus for each IE subject in compliance with the guidelines given.

Despite the apparent poor conception of what IE is by the teachers, the majority (73.1%) of them were in agreement with the main official purposes of IE subjects as stipulated in the general objectives of the 8:4:4 system of education. Table 4.8 shows the teachers' beliefs about the official purposes of IE which were given in the teachers' questionnaire.
### TABLE 4.8

**TEACHERS' LEVELS OF AGREEMENT WITH IE PURPOSES**

<table>
<thead>
<tr>
<th>STATEMENT GIVEN</th>
<th>STRONGLY AGREE</th>
<th>AGREE</th>
<th>DISAGREE</th>
<th>STRONGLY DISAGREE</th>
<th>UNDECIDED</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>i. IE should provide students with adequate knowledge and skills for self or salaried employment</td>
<td>4</td>
<td>15.4</td>
<td>15</td>
<td>57.7</td>
<td>4</td>
<td>15.35</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>3.85</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. IE should prepare students adequately for vocational training</td>
<td>8</td>
<td>30.8</td>
<td>14</td>
<td>53.8</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.85</td>
<td>1</td>
<td>3.85</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. IE should provide some occupational exposure to aid students in selecting a career</td>
<td>6</td>
<td>23.1</td>
<td>17</td>
<td>65.35</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>7.7</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. IE should provide practical skills and knowledge to enrich the students' education</td>
<td>1</td>
<td>3.85</td>
<td>5</td>
<td>19.2</td>
<td>15</td>
<td>57.7</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>57.7</td>
<td>4</td>
<td>15.4</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v. IE is not useful at all in students' life</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>80.8</td>
<td>2</td>
<td>7.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As in Table 4.8, 19 out of 26 teachers agreed with the first purpose of IE that it should provide students with adequate skills for self or salaried employment. Fourteen teachers agreed and eight teachers strongly agreed that IE should prepare students adequately for vocational training. Another purpose of IE which the teachers agreed with is that it should help students in determining their future career.

Similar beliefs were expressed by form III students as shown in Table 4.9 concerning the IE subjects which they were taking. With regard to preparing students for self or salaried employment, nine students were in agreement with the statement, four students disagreed and two students were undecided. Regarding preparation of students for further training, eleven students agreed with the statement, two students disagreed and two were undecided. As for enriching skills and knowledge, 14 students were in agreement and only one student was undecided. With regard to application in students' life, seven respondents agreed with the statement and eight were undecided.
TABLE 4.9

STUDENTS RESPONSES ON PURPOSES OF IE

<table>
<thead>
<tr>
<th>BELIEF EXPRESSED</th>
<th>AGREE</th>
<th>DISAGREE</th>
<th>UNDECIDED</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation for employment</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Preparation for further education and training</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Enriching ones practical knowledge</td>
<td>14</td>
<td>0</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Application in life</td>
<td>7</td>
<td>0</td>
<td>8</td>
<td>15</td>
</tr>
</tbody>
</table>

All the 15 form III students who were interviewed were asked to name the six subjects which constituted IE at secondary school level. Only two students could name four subjects, eight students named three subjects, three students named two and two students could only identify the subject they were taking. This was a further indication that even the students were not conversant with the other subjects that made up IE.

4.4 TEACHING FACILITIES

The researcher carried out visual inspection of teaching facilities for one IE subject in each of the 15 IE schools involved in the study. He was
interested in establishing whether appropriate workshops and drawing rooms were available and also how they were utilized and maintained. As for the tools and equipment, the researcher's attention was focused on their quality, quantity, utilization and storage. The assessment was done on the basis of the researcher's experience in teaching courses in workshop planning and organization in a teacher training College. The observations made concerning various aspects of the workshop were expressed in terms of good, average or poor. For example, if a building had all the major features such as walls, roof, floor, windows and finishing, then it was rated as good. If one major feature was missing, it was rated average and if more than one major feature was missing then its completeness was considered poor. Similarly, if there was no major defect like cracked floor or damaged roof, the maintenance of the building was considered good. One major defect rendered the maintenance of the building average while more than one defect meant poor maintenance of the building.

With regard to the interior conditions of the teaching facilities, the researcher used a checklist to determine whether a specific provision was there or not. Tables 4.10 and 4.11 give a record of the major observations made by the researcher concerning the teaching facilities.
### TABLE 4.10

**MAJOR OBSERVATIONS MADE ON WORKSHOP AND DRAWING ROOMS**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>GOOD</th>
<th>AVERAGE</th>
<th>POOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completeness of the building</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Suitability of the building</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Utilization of space</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Maintenance of the building</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Number of tools and equipment available</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>

### TABLE 4.11

**INTERIOR CONDITIONS AND PROVISIONS IN THE WORKSHOP AND DRAWING ROOMS**

<table>
<thead>
<tr>
<th>DESCRIPTION OF WORKSHOP PROVISION</th>
<th>NO. OF WORKSHOPS OR ROOMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES (AVAILABLE)</td>
</tr>
<tr>
<td><strong>TOOLS:</strong> Proper strange</td>
<td>8</td>
</tr>
<tr>
<td>Adequate security</td>
<td>12</td>
</tr>
<tr>
<td>Right quantity</td>
<td>9</td>
</tr>
<tr>
<td>Right quality</td>
<td>9</td>
</tr>
<tr>
<td><strong>Services Available:</strong></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>15</td>
</tr>
<tr>
<td>Water</td>
<td>10</td>
</tr>
<tr>
<td>Sufficient safety of user</td>
<td>10</td>
</tr>
<tr>
<td>Adequate ventilation</td>
<td>11</td>
</tr>
<tr>
<td>Adequate lighting</td>
<td>10</td>
</tr>
</tbody>
</table>
The IE teachers were also asked to give their own assessment of some aspects of teaching facilities in their respective schools. Three teachers out of the 26 respondents did not respond to this question because they considered their workshops too inadequate to comment on. The following are the data obtained from the rest of respondents.
## TABLE 4.12

TEACHERS ASSESSMENT OF IE FACILITIES

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>VERY GOOD</th>
<th>GOOD</th>
<th>SATISFACTORY</th>
<th>POOR</th>
<th>VERY POOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completeness of the building</td>
<td>12</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Working space available</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Suitability of space available</td>
<td>10</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Maintenance of the workshop</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Security of tools and equipment</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Condition of hand tools</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Condition of power tools (where applicable)</td>
<td>4</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>Consumables available</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>23</td>
</tr>
</tbody>
</table>
Of the 15 students who were interviewed, five students considered the teaching facilities inadequate in their respective schools while the rest of the students were satisfied with the facilities available in their schools.

Overcrowding was evident in schools offering Drawing and Design. Although the number of students recommended by the curriculum designers for a drawing class is twenty, four out of the six schools offering Drawing and Design did not adhere to this particular recommendation. Instead, they struggled to fit classes as large as 40 students in small rooms which were not originally designed for Drawing and Design. The students were therefore overcrowded in those rooms.

4.5 FINANCING IE PROGRAMME

The school heads were asked to indicate how the IE programme in their schools was funded with particular reference to putting up and equiping of the facilities, daily expenses of running the programme and maintenance of the facilities.

Seven out of 14 school heads indicated that complete and fully equipped IE facilities were in existence before 1986 when the 8:4:4 system was introduced and did not need new facilities.
other seven schools had to raise funds from parents, donors or proprietors to establish the required teaching facilities.

As shown in Table 4.13, the primary source of funds for running the IE programme for 13 schools was fees collected from parents and the grants from the government while the rest of the schools depended on fees paid by the parents. The repair and service of the facilities, tools and equipment for ten schools was met by the government while the rest of the schools depended on fees paid by the parents.

**TABLE 4.13**

PRIMARY SOURCES OF FINANCING THE IE PROGRAMME

<table>
<thead>
<tr>
<th></th>
<th>GOVERNMENT</th>
<th>PARENTS</th>
<th>OTHERS</th>
<th>NO RESPONSE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructing and equipping the workshops</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Daily cost of running the programme</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Maintenance of tools, equipment and facilities</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>14</td>
</tr>
</tbody>
</table>

The annual cost of offering various IE subjects that was given by school heads ranged from sh. 100/- to 1500/-. The range was so wide because some IE
subjects like Drawing and Design are quite cheap to offer while subjects like Woodwork and Metalwork are very expensive to offer. Eight school heads indicated that the cost of offering IE subjects was higher than other subjects. Asked if the funds for establishing and running the IE programme had been enough, eight school heads indicated that the funds had not been adequate.

Asked what criterion the school used to decide which IE subject to offer in the 8:4:4 system, four school heads out of the seven schools which started offering IE subjects in 1986 admitted that their choice was dictated by the cost involved in establishing teaching facilities for an IE subject. In other words, four school heads admitted that they opted for Drawing and Design because they considered it to be the least expensive IE subject. Seven school heads reported that their schools continued to offer the same IE subjects which they were offering during the former education system. All the school heads for the schools which were not offering any IE subjects attributed it to lack of teaching facilities and the high cost of running the programme. They admitted that they deliberately chose to offer the least expensive practical subjects to avoid the enormous cost involved in offering IE subjects.
4.6 TIME ALLOCATION

There was a general outcry from the respondents that the time allocated for IE subjects was too little to facilitate adequate coverage of the syllabus. The time recommended for teaching IE subjects was two hours (4 periods) in form III and IV. A summary of the time allocated for IE subjects in the schools involved in the study is presented in Table 4.14.

### TABLE 4.14
TIME ALLOCATION

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>LESS THAN RECOMMENDED</th>
<th>RECOMMENDED</th>
<th>MORE THAN RECOMMENDED</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Form I</td>
<td>1</td>
<td>3.8</td>
<td>19</td>
<td>73.1</td>
</tr>
<tr>
<td>Form II</td>
<td>1</td>
<td>3.8</td>
<td>17</td>
<td>65.4</td>
</tr>
<tr>
<td>Form III</td>
<td>4</td>
<td>15.4</td>
<td>13</td>
<td>50.0</td>
</tr>
</tbody>
</table>

In Table 4.14, it is shown that most of the schools allocated either the actual time recommended in the Secondary Education (SEP) guidelines (see Appendix VII) or more than the time recommended in...
the syllabus for each level. However, despite getting the actual or extra time for teaching IE subjects, only four (15.4%) teachers considered the time enough. The other 22 teachers (84.6%) indicated that the time allocated for IE was less than enough. There was however a total of six teachers whose classes were allocated less than the recommended time. This can be attributed to the fact that some schools did not have any other or enough options for practical subjects to accommodate all their students. For example, the school coded number 11 in Table 4.6 needed a total of 74 (18 + 24 + 32) drawing periods per week for all its students who were taking Drawing and Design. The load was too much to accommodate in a single drawing room. This resulted in reducing the time allocated for each class to less than the recommended time. The schools which allocated IE subjects more than the recommended time managed to do so by extending their days and weeks beyond the official working hours. For example, two of the schools involved in the study had classes on Saturday morning.

Eleven out of the 14 school heads also indicated that the time allocated for IE subjects was not adequate.

All the students who were interviewed felt
that they needed more time to cover the syllabus content adequately for each level.

Similar sentiments were expressed by the curriculum developers during the interview in which the following general points were made:

i. The time allocated for the IE subjects by the curriculum designers was not enough to facilitate meeting the anticipated goals for secondary school level.

ii. The time for preparation of the new syllabuses for the IE subjects was inadequate.

iii. There was no time provided for pilot testing the new syllabuses. This point was also echoed by the school heads who lamented that the time given for preparation for the new curriculum was inadequate.

4.7 PROBLEMS CONSIDERED BY THE RESPONDENTS TO BE AFFECTING THE IMPLEMENTATION OF IE PROGRAMME IN SCHOOLS

In the questionnaire for school heads and IE teachers and during the interview with curriculum developers and the IE students,
the respondents were asked to state specific problems which they considered to be affecting the implementation of the IE programme. Additional problems were also identified during informal discussions between the researcher and some IE teachers. Most of the problems which were given were related to teachers' qualifications, morale and supervision, teaching facilities, time allocation, funds and reference materials. Tables 4.15 to 4.18 present the main problems which were identified by various respondents.

TABLE 4.15

PROBLEMS IDENTIFIED BY CURRICULUM DEVELOPERS

<table>
<thead>
<tr>
<th>DESCRIPTION OF THE PROBLEM</th>
<th>NUMBER OF RESPONDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lack of suitable workshops or drawing rooms.</td>
<td>2</td>
</tr>
<tr>
<td>2. Lack of adequate and appropriate tools and equipment.</td>
<td>2</td>
</tr>
<tr>
<td>3. Lack of adequate and suitable reference materials for teachers and students.</td>
<td>4</td>
</tr>
<tr>
<td>4. No adequate guidance and supervision from the Inspectorate and the Ministry of Education.</td>
<td>3</td>
</tr>
<tr>
<td>5. Limited funds available yet the programme is very expensive to establish and run.</td>
<td>5</td>
</tr>
<tr>
<td>DESCRIPTION OF THE PROBLEM</td>
<td>NUMBER OF RESPONDENTS</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>6. Lack of qualified teachers.</td>
<td>2</td>
</tr>
<tr>
<td>7. Implementation was done in a hurry without carrying out a pilot study first.</td>
<td>7</td>
</tr>
<tr>
<td>8. Inadequate time allocation to prepare the curriculum and other relevant materials.</td>
<td>7</td>
</tr>
<tr>
<td>9. Inadequate time allocated to teach the IE subjects.</td>
<td>2</td>
</tr>
<tr>
<td>10. Poor attitude of some school heads towards IE</td>
<td>3</td>
</tr>
<tr>
<td>11. Poor attitudes of some students towards IE</td>
<td>3</td>
</tr>
<tr>
<td>12. Misconception of IE philosophy</td>
<td>4</td>
</tr>
<tr>
<td>13. Low morale of IE teachers due to:</td>
<td></td>
</tr>
<tr>
<td>i. Lack of consideration in the scheme of service.</td>
<td>4</td>
</tr>
<tr>
<td>ii. Lack of promotions.</td>
<td>5</td>
</tr>
<tr>
<td>iii. Very limited opportunities available for further studies</td>
<td>3</td>
</tr>
<tr>
<td>iv. Lack of facilities conducive to effective teaching</td>
<td>1</td>
</tr>
<tr>
<td>14. IE overshadowed by Agriculture.</td>
<td>2</td>
</tr>
<tr>
<td>15. Uncertainty of some IE teachers in the new IE programme.</td>
<td>3</td>
</tr>
<tr>
<td>DESCRIPTION OF THE PROBLEM</td>
<td>NUMBER OF TEACHERS</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>1. Lack of suitable workshops or drawing rooms.</td>
<td>9</td>
</tr>
<tr>
<td>2. Lack of adequate and appropriate tools and equipment.</td>
<td>11</td>
</tr>
<tr>
<td>3. Lack of adequate suitable reference materials for teachers and students.</td>
<td>21</td>
</tr>
<tr>
<td>4. No adequate guidance and supervision from the Inspectorate and the Ministry of Education.</td>
<td>20</td>
</tr>
<tr>
<td>5. Limited funds available yet the programme is very expensive to establish and run.</td>
<td>10</td>
</tr>
<tr>
<td>6. Implementation was done in a hurry without doing a pilot study first.</td>
<td>4</td>
</tr>
<tr>
<td>7. Inadequate time allocation for teaching IE subjects.</td>
<td>17</td>
</tr>
<tr>
<td>8. Poor attitude of some school heads towards IE</td>
<td>5</td>
</tr>
<tr>
<td>9. Misconception of IE philosophy</td>
<td>6</td>
</tr>
<tr>
<td>10. Poor attitude of some students towards IE</td>
<td>5</td>
</tr>
<tr>
<td>11. Low morale of IE teachers due to:</td>
<td></td>
</tr>
<tr>
<td>i. Lack of consideration in the scheme of service</td>
<td>9</td>
</tr>
<tr>
<td>ii. Lack of promotions</td>
<td>8</td>
</tr>
<tr>
<td>iii. Very limited opportunities available for further studies</td>
<td>17</td>
</tr>
<tr>
<td>iv. Lack of facilities conducive to effective teaching</td>
<td>6</td>
</tr>
<tr>
<td>DESCRIPTION OF THE PROBLEM</td>
<td>NUMBER OF TEACHERS</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>12. IE overshadowed by Agriculture</td>
<td>5</td>
</tr>
</tbody>
</table>

**Table 4.17**

**Problems identified by school heads**

<table>
<thead>
<tr>
<th>DESCRIPTION OF THE PROBLEM</th>
<th>NUMBER OF SCHOOL HEADS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lack of suitable workshops or drawing rooms.</td>
<td>6</td>
</tr>
<tr>
<td>2. Lack of adequate and appropriate tools and equipment</td>
<td>5</td>
</tr>
<tr>
<td>3. Lack of qualified IE teachers.</td>
<td>5</td>
</tr>
<tr>
<td>4. No adequate supervision and professional guidance from the Inspectorate and Ministry of Education.</td>
<td>12</td>
</tr>
<tr>
<td>5. Lack of adequate and appropriate reference materials for teachers and students.</td>
<td>4</td>
</tr>
<tr>
<td>6. Limited funds available yet the programme is very expensive to establish and run.</td>
<td>11</td>
</tr>
<tr>
<td>7. Implementation was done in a hurry without doing a pilot study first.</td>
<td>7</td>
</tr>
<tr>
<td>8. Inadequate time allocation to prepare for implementation</td>
<td>11</td>
</tr>
<tr>
<td>9. Inadequate time allocated to teach IE subjects</td>
<td>8</td>
</tr>
<tr>
<td>10. Poor attitude of some students towards IE.</td>
<td>1</td>
</tr>
</tbody>
</table>
TABLE 4.18

PROBLEMS IDENTIFIED BY IE STUDENTS

<table>
<thead>
<tr>
<th>DESCRIPTION OF THE PROBLEM</th>
<th>NUMBER OF STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lack of suitable workshops or drawing rooms</td>
<td>6</td>
</tr>
<tr>
<td>2. Lack of adequate tools and equipment</td>
<td>5</td>
</tr>
<tr>
<td>3. Lack of IE teachers.</td>
<td>3</td>
</tr>
<tr>
<td>4. Lack of adequate and appropriate reference materials</td>
<td>11</td>
</tr>
<tr>
<td>5. Inadequate time allocated for teaching IE subjects</td>
<td>8</td>
</tr>
</tbody>
</table>

Most of the problems which were identified by various respondents and are presented in Tables 4.15 to 4.18 were quite similar. This is an indication that problems related to the philosophy of IE, teaching facilities, funds, IE teachers and time allocation in the 8:4:4 system were so common and profound that various groups of people, who may not necessarily be curriculum implementors, could easily identify them. However, it should be noted that the number of responses for every problem identified was rather low compared to the number of all the respondents who completed the questionnaires or were
interviewed. The primary reason for this is that there were some respondents particularly from the schools which were offering IE subjects before 1986 who felt that their schools did not experience any problems during the implementation of the new curriculum. Therefore, the general impression given by the frequencies of those responses is that while about 50% of the IE schools were experiencing a wide variety of problems during the implementation of the new IE programme, the other group of schools was enjoying relatively better teaching facilities.
5.1 INTRODUCTION

The primary concern for this study was to establish whether there are any problems affecting the implementation of Industrial Education (IE) curriculum in secondary schools in Nairobi Province. The study endeavoured to answer some specific questions designed to:

1. determine whether Industrial Education is in reality being taught in secondary schools in the 8:4:4 system.
2. determine the quality of IE teachers and how they were being utilized in schools.
3. establish if the teaching facilities for various IE schools measured up to the minimum requirements prescribed by curriculum developers.
4. establish how the programme was financed and examine the financial implications on the implementation of the programme.
5. determine whether the time allocation to prepare for and implement the programme was adequate.
6. identify the problems affecting the implementation of IE programme as viewed by curriculum developers, school heads, IE teachers and students.

7. facilitate drawing of conclusions and recommendations based on the findings.

In order to achieve the objectives of this study and also obtain answers to the research questions, the data presented in Chapter IV were collected. Questionnaires, interviews and observation schedules were used. The respondents involved in the study were composed of curriculum developers, school heads, IE teachers and students.

In this chapter, the data generated by the study are discussed in an attempt to provide answers to each of the research questions. In addition, inferences and recommendations are made based on the findings of the study.

5.2 DISCUSSION OF THE FINDINGS

5.21 Philosophy of Industrial Education

The data collected in this study show that the majority (84.6%) of IE teachers involved in the study either had a slight idea or no idea of the formal definition of IE. They however seemed to be conversant and agreed with the official purposes of
IE in the 8:4:4 system of education. The majority of the curriculum developers on the other hand demonstrated a correct conception of the formal meaning of IE. However, half of them felt that it was not being taught in secondary schools because the KIE subject panels which developed the curriculum failed to adhere to the philosophy of IE. Unlike in normal circumstances, the KIE panels in this case were acting on instructions from the Ministerial Steering Committee for the 8:4:4 system of Education.

None of the IE students who were interviewed knew that IE comprised six independent subjects and they only happened to be taking one of those subjects. Only one student could name four of those subjects.

As indicated in the literature review (Chapter II), the in-depth evaluation of IE carried out just before the 8:4:4 system was introduced revealed a number of pertinent points about the perception of IE. Lauglo came up with the following two inferences, among others, about IE.

i. The aims and objectives of IE were fraught with ambiguity. The general aims defined IE as part of general education; but the objectives and content specific to each subject syllabus implied training of a pre-vocational type.
ii. Students, parents and teachers tended to see IE as a prevocational subject rather than part of general education.¹

No doubt the perception of the philosophy and the objectives of IE during the former education system was characterized by misconception and confusion among teachers, parents, curriculum developers and students.

In the 8:4:4 system of education, the use of the term IE was retained. IE was still constituted by the same four subjects that were offered in the former education system plus two more subjects namely, Building Construction and Drawing and Design. However, the general objectives were redefined to clearly advocate a prevocational type of education. For instance, one of the aims of IE at secondary school level in the 8:4:4 system is to prepare students for self or salaried employment. The formal meaning of IE, on the other hand, advocates a general practical education designed to acquaint students with tools, processes and occupations of industry. There is therefore a clear contradiction between the

formal meaning of IE and the official objectives of IE at secondary school level.

It is evident that the new system of education is offering a prevocational programme at secondary school level in the name of IE. While the confusion about the philosophy and the objectives of IE which was inherent in the former education system has been perpetuated in the new system, the formulation of new objectives of IE which distinctly represent prevocational education has really compounded the problem. Clarification of this confusion is therefore necessary and urgent.

In order to clarify the confusion about IE in Kenya, the curriculum designers seem to have two alternatives. They can either abandon completely the use of the term IE and retain the current specific objectives for each of its subjects or they can redefine the objectives of the six subjects in question to conform with the formal definition of IE. Since the latter would advocate an exposure to a broad type of practical education, it will definitely be in conflict with the objectives of the 8:4:4 system which require a mastery of one subject to a degree of making the students employable or self-reliant. Besides, it would be too expensive
to cope with because of the wide variety of teaching facilities such a broad programme would demand. Apparently, the first alternative is more favourable; hence, the use of the term IE should be abandoned and the independent practical subjects in that cluster should be referred to by their official names while their present objectives should be upheld.

From the foregoing discussion, the use of the term IE evidently portrays two distinct meanings - the formal meaning and the meaning attached to IE in the Kenyan secondary school education. While the term IE will continue to be used right to the end of this thesis, an attempt to make a distinction between the two usages will henceforth be made. The term Industrial Education or IE without quotation marks will be used to denote the formal meaning while 'Industrial Education' or 'IE' with quotation marks will denote its usage in the Kenyan situation.

5.22 'Industrial Education' Teachers

The data concerning 'IE' teachers show that the majority (73.1%) of the teachers who were involved in this study were professionally trained. Sixty five percent of the trained teachers had been teaching 'IE' even before the 8:4:4 system was introduced
and 50% of the teachers had been in their present school since 1986. In addition, 12 (46%) teachers were teaching their major 'IE' subjects and had had formal orientation to the new syllabuses. However, information received from some curriculum developers and teachers who completed the questionnaire indicated that the morale of some teachers had declined remarkably due to several reasons.

First, some teachers particularly those who taught Drawing and Design, were required by their school heads to teach very large classes in rooms which were not originally designed for 'IE' subjects. For example, some teachers used classrooms with inadequate space and equipment and insufficient lighting to teach Drawing and Design. The five teachers who identified poor attitude of some students towards 'IE' as one of the problems affecting its implementation, attributed the poor attitude to lack of suitable teaching facilities. Lack of sufficient facilities as identified by various respondents, coupled with large classes comprising unmanageable number of students, resulted in low morale of teachers.

Secondly, as indicated in Tables 4.15 and 4.16, some respondents pointed out that 'IE' teachers had been ignored by the officers who were entrusted with
promoting teachers on merit. The data presented show that only one out of 16 teachers who had taught for at least five years had been promoted to approved graduate teacher. Further, some teachers and curriculum developers lamented that there were no opportunities for higher studies available in the country for 'IE' teachers despite the fact that they were all holders of either Diploma in Education or SI certificates. Incidentally, their counterparts who taught other subjects in secondary schools had access to university education. It was observed by two curriculum developers that as a result of this situation, some 'IE' teachers were seeking to identify themselves with their second teaching subjects with a hope of better prospects for further education.

Thirdly, some teachers and curriculum developers felt that the non-graduate teachers had not received due recognition in the recently introduced scheme of service. They complained that the scheme of service addressed exclusively approved and graduate teachers and failed to recognise that even SI and diploma teachers were entrusted with the same responsibility of teaching at the same level with the graduate teachers. One of the UNESCO reports on technical teacher training has underscored the importance of avoiding such discrimination by stating that:
The emoluments and conditions of service which are offered should compare favourably with those enjoyed by persons with similar qualifications and experience.\textsuperscript{2}

Since the SL and diploma teachers and the approved and graduate teachers are similar in the sense that they all qualify to teach at secondary school level, it is imperative that there be no unjustifiable discrimination among the two groups of teachers in order to sustain professional morale.

Another aspect of 'IE' teachers worth highlighting is the fact that some (26.9\%) teachers involved in this study were untrained. The need for training teachers cannot be over-emphasized. Technical teachers are no exception as recommended by UNESCO that:

\begin{quote}
... all [technical teachers] should have a good general education, theoretical training in specific fields and practical experience in exercising this speciality.\textsuperscript{3}
\end{quote}

The training of teachers should not only be pre-service but in-service training should be considered equally necessary. The latter was necessary


for both the untrained and trained 'IE' teachers to tune them up just before the transition period. Unfortunately, only one inservice course has so far been mounted for the teachers. As a participant of that in-service course, the researcher considered the time allocated for it rather too short since the course attempted to cover the entire secondary education curricula in three days. Yet, the participants were required by the course organizers to master the syllabus content for their respective subjects to be able to in-service other teachers at provincial level.

In the absence of adequate orientation to the new education system, some 'IE' teachers, as observed by three curriculum developers, have demonstrated great uncertainty in what they are required to do. Moreover, as indicated by both the school heads (89%) and the teachers in Table 4.16 and 4.17, very little help has been received from the subject inspectors. By the end of 1988, very few 'IE' schools in Nairobi had been visited by the inspectors since the new system of education was introduced. The teachers expressed that they had missed the professional advice and supervision they so much needed during the transition period.

Thus, some 'IE' teachers no longer wanted to be associated with teaching 'IE' subjects because
they were not receiving due recognition and motivation from those responsible for training, promotion and renumeration. As a result some teachers in Nairobi have opted to teach their other teaching subject to avoid these undue frustrations.

5.23 Teaching Facilities

One of the major observations made by Lauglo in his evaluation study was that the teaching facilities which were used during the 7:4:2:3 system were characterised by very expensive buildings with sophisticated equipment. The cost of putting up and equipping an 'IE' workshop greatly exceeded the cost of teaching facilities for other subjects. Lauglo viewed simplification of those facilities as necessary and he made recommendations to that effect. In the 8:4:4 system, Lauglo's recommendations have been favourably considered and the equipment prescribed for various 'IE' subjects is highly simplified.

The type of teaching facilities that were examined in this study may be classified in three categories. First, there were those schools which were offering 'IE' subjects
before the 8:4:4 system was introduced. The schools had workshops which were much better equipped than the prescribed minimum requirements. Seven out of the 15 schools which were involved in this study belong to this group.

The second category consisted of workshops which were being used for the general maintenance of the school before 1986 but not for teaching purposes. Although the workshops were quite well equipped, the quality and quantity of tools and equipment and the general workshop set up needed to be improved to comply with the requirement of the 8:4:4 system. One wood workshop and an electricity workshop belong to this category.

The third category was composed of six drawing rooms which were established in or after 1986. The drawing rooms were initially built as classrooms and had been converted into drawing rooms for Drawing and Design. The rooms were generally small in size and their lighting was quite inadequate.

It is worth noting that in the assessment of teaching facilities given by the 23 teachers who responded to the question (Table 4.12), the combined responses for poor or very poor produced an average of three respondents for each item listed. The rest of the respondents were convinced that the various
conditions of their workshops were satisfactory, good or very good. This is an indication that the teachers had difficulties in judging accurately the state of their own workshops unless very clear guidelines were followed. Therefore, in addition to giving a list of prescribed tools and equipment for each subject, guidelines concerning aspects like workshop size, auxiliary space and basic services should also be given to the teachers.

When different respondents were asked to state specific problems which were affecting the implementation of the IE programme, a total of 23 out of all the 72 respondents identified lack of suitable workshops and drawing rooms as one of the problems. During a conference for education administrators held in 1987, the Chief Inspector of schools singled out lack of teaching facilities as a major problem affecting the implementation of 'IE' programme. It is imperative for subject inspectors to ensure that the guidelines for establishing a new workshop are strictly followed to avoid setting up sub-standard workshops and drawing rooms in secondary schools.
5.24 Time Allocated for Preparation and Implementation

Time was another major factor which this study addressed. Specifically, two aspects were considered namely, the time allocated to prepare for implementation and the time allocated to implement the new programme in secondary schools. Various respondents clearly indicated that the time allocated to prepare for and implement the 'IE' programme was not adequate. Ten (71%) school heads and seven (78%) of the curriculum developers indicated that the time given by the government to prepare for the new programme was not adequate. Similarly, eight (57%) school heads and 17 (65%) teachers and all the 15 students indicated that the time allocated to cover new syllabuses for any IE subject was enough.

Clearly, the abrupt manner in which the new programme was introduced adversely affected the implementation of the programme. Although seven schools simply changed from the old to the new syllabus the other eight schools had to acquire teachers, construct the workshops and equip them adequately within a time of two years. As a result, schools were forced to
look for a shortcut to achieve those requirements. First, they looked for the least expensive 'IE' subject to offer as indicated by three school heads. Secondly, they converted some existing classrooms and laboratories into workshops or drawing rooms. The hurried manner in which this was done resulted in failing to come up with adequate teaching facilities.

In his evaluation study, Lauglo has given a caution against attempting to establish 'IE' subjects within a short time when he wrote:

... practical and technical subjects are in a number of ways more complicated to develop than academic subjects ... they have complicated logistic requirements: workshops, equipment, tools, materials, consumables, provision, repair maintenance ... [it] requires a good deal of personal initiative and management skills in the schools.\(^4\)

Ample time was therefore required to obtain funds for constructing suitable buildings, buying the required equipment and tools, recruiting and orientating the teachers and acquiring the necessary teaching materials and consumables. Further, one of the reasons why there was no pilot programme for the 8:4:4 system was because the time given by

\(^4\)Jon Lauglo, op. cit. p. 31.
government had no provision for it. Yet an experimental programme should have been mounted to determine the most effective way of implementing a nationwide programme for 'IE' subjects. Model workshops, for example, should have been set up for each subject before the actual implementation.

The other aspect regarding time that is worth discussing, is the fact that the time allocation for teaching 'IE' subjects at secondary school level in the 8:4:4 system was not enough. Eight school heads and 17 teachers expressed this concern. Assuming that one school year has 39 weeks, the total time allocated to a single 'IE' subject in the 7:4:2:3 system was 468 hours. But, inspite of the time given for 'IE' subjects in the preceeding system, Lauglo, in his evaluation study observed the following:

It is unrealistic to expect that practical subjects taught within general secondary school lead to self-employment of a durable kind for all but a tiny minority of students.

This observation was based on 'IE' offered in an education system where time allocation was greater than the present system and the objectives of 'IE'

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subjects advocated a general type of education.

In the 8:4:4 system where the objectives of 'IE' advocate imparting enough skills to students to make them employable, the total time allocated for teaching one 'IE' subject in a complete secondary school cycle is 350 hours.\(^7\) This allocation includes the time for theory, practicals and evaluation. It is evident from this comparison that a total of 350 hours is far too short for students to be introduced to a practical subject and be expected to develop enough skills to be employable. Besides, it should be borne in mind that those students take at least seven other subjects which are equally demanding. Whilst a clear fact emerges from these observations and the recommendations made by the school heads, 'IE' teachers and students that more time for teaching 'IE' subjects should be allocated, a comprehensive study would be necessary to determine the additional time required.

5.24 Cost of Financing 'IE' Programme

In the foregoing discussion, reference has often been made to the high cost of financing 'IE' programme. Specifically, it has repeatedly been noted that building,  

---  
equipping and maintaining a workshop is very expensive and sometimes too expensive to accomplish. While there exists no data on the cost of offering 'IE' in the 8:4:4 system of education, the background report for the evaluation study of 'IE' in the preceding 7:4:2:3 system provides some comparison between the cost of offering 'IE' and the cost of offering other subjects. According to Cumming, Davies, Lillis and Nyagah:

The Industrial Education component of a school's curriculum appears to be about twice as expensive, in terms of unit recurrent costs, as other subjects. Development costs, being building and equipping, are more expensive for IE than for other practical subjects in the curriculum.8

In the absence of any recent data concerning the development and recurrent costs of 'IE' these deductions support the observations made by various respondents that 'IE' subjects are relatively expensive to offer.

During the preceding education system, the burden of financing 'IE' programme was shouldered by the government. In fact, due to the magnitude of the funds and expertise required, the government

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relied on foreign aid to accomplish that task. In particular, the Swedish International Development Agency and the International Development Agency, contributed generously towards the establishment of 'IE' schools which were in existence before 1986. During the 8:4:4 era, cost-sharing has been intensified. According to the Ministry of Education, Science and Technology, the government can no longer sustain the high level of education budget and the responsibility has been shifted to the parents. As a result, parents have to construct, equip and maintain facilities for the various practical subjects offered by their schools. With regard to establishing 'IE' facilities, some parents dread the enormous cost involved and have consequently been forced by the prevailing circumstances to look for cheaper alternatives.

5.3 CONCLUSION

The researcher, on the basis of the findings and the accompanying discussion, drew the following conclusion:

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5.31 The formal definition portrays IE as part of general education whose primary objective is to acquaint students with industry by exposing them to its tools, process and occupations. The general objectives of 'IE' currently advocated that it should prepare students for employment or further training. No doubt, there is a contradiction between the formal definition of IE and the rationale and objectives of 'IE' offered in the 8:4:4 system. In reality, IE in its original form is not being taught in secondary schools despite the official reference to it as 'IE'. Instead, six practical subjects with independent objectives are offered at secondary school level. Reference to these subjects as 'IE' is purely on historical but not philosophical basis.

5.32 The majority of the teachers involved in this study were qualified and experienced technical teachers. Indeed, they contributed immensely during the implementation of the new curriculum. However, the professional morale of some 'IE' teachers had gone down due to the following reasons:
i. they complained of not getting adequate supervision and professional guidance from the inspectorate particularly during the transition period.

ii. there were no opportunities for further studies available in the country for 'IE' teachers.

iii. Trained 'IE' teachers together with other S1 and diploma teachers were totally overlooked in the recently introduced scheme of service.

iv. The teachers were not receiving due recognition and motivation from those responsible for promotion of teachers.

In addition, some 'IE' teachers were not professionally trained and some had not had enough orientation to the new curriculum. All these factors concerning teachers have adversely affected the implementation of the 'IE' programme in the 8:4:4 system of education.

5.33 While the old 'IE' schools had more tools and equipment than they actually needed, all the new schools did not have the minimum facilities prescribed for the subjects they were attempting to offer. As a result, some new schools were
using sub-standard facilities for teaching 'IE' subjects. Lack of adequate and suitable buildings, tools and equipment was identified as one of the major problem affecting the implementation of the programme.

5.34 It was also shown in this study that the high cost of building, equipping and maintaining 'IE' facilities compared to other subjects has adversely affected the implementation of its programme at secondary school level.

5.35 The process of establishing the 'IE' subjects in a school has complicated logistic requirements. The time given by the government to prepare for and to implement the new curriculum was not adequate at all and has adversely affected the implementation of the programme.

5.36 In addition to the problems cited above, the following specific problems were identified by the respondents as having negative effect on the implementation of the 'IE' curriculum in secondary schools in Nairobi.

i. Lack of adequate and appropriate reference materials for teachers and students.

ii. There was no pilot or experimental study for 'IE' programme prior to the
large scale nationwide implementation.

iii. Poor attitude of some school heads and students towards the 'IE' subjects.

iv. Since 'IE' subjects and agriculture are classified together and the latter is considered a cheaper option to offer, some schools have opted to offer agriculture at the expense of 'IE' subjects.

5.4 RECOMMENDATIONS

5.4.1 In view of the misconceptions and confusion that exist regarding the term Industrial Education, it is recommended that either:

i. the use of the term IE be abandoned, the independent subjects in that cluster be referred to by their names and the collective objectives be ignored or

ii. the formal definition and philosophy of IE be upheld and the general objectives and structure of IE at secondary school level be revised accordingly.

Whilst the second alternative will portray the real form of IE programme at secondary school level, it has a major shortcoming when
viewed in the light of the 8:4:4 system. The rationale behind offering practical education in the 8:4:4 system is to impart skills to students to enable them to be employable or pursue further education and training. Providing students with a broad exploratory experience of various industrial occupations will therefore defeat the purpose of the 8:4:4 system of producing employable students at the end of secondary school education.

5.42 In order to maintain a high professional morale of teachers, it is recommended that:

i. all the SL and diploma in education certificate holders who can benefit from more training and education should be afforded the necessary opportunities by the government and other appropriate agencies. The introduction of appropriate programmes for those teachers should therefore be treated as a major priority in our public institutions of higher learning.

ii. all teachers who are trained to teach at secondary school level should enjoy similar terms and conditions of
service that correspond to their grade. By virtue of being qualified to teach at secondary school level, the S1 and diploma teachers should also benefit from the recently introduced scheme of service.

iii. 'IE' teachers should receive a fair consideration for promotion on merit once they meet minimum requirements and have expressed interest in being considered. It is further recommended that preference be given to those teachers who are already serving as untrained teachers because they will take much shorter time to train than fresh school leavers.

5.43 With regard to teaching facilities, serious disparities exist between the old and the new 'IE' schools. The former have large workshops which are much better equipped than the latter. The Ministry of Education should therefore ensure that the imbalances are removed. Any excess equipment in schools should be retrieved by the Ministry of Education for future reallocation.

Further, it should be mandatory for schools
to have minimum facilities prescribed for a particular 'IE' subject before they start mounting the course. Schools without minimum teaching facilities should not be allowed to register students for external examinations.

5.44 In order to realize fully the objectives of each 'IE' subject, it is recommended that the time allocated for teaching those subjects be increased by at least two periods per week at every level. One way of creating extra time is to reduce the total number of compulsory subjects and have a wider variety of optional subjects. While this adjustment will result in a slight violation of the initial 8:4:4 structure of subjects, it should be accepted as one of the errors which a pilot study of the system would have corrected.

5.45 It is recommended that the future utilization of science laboratories for schools which have been offering sciences at advanced level be determined. In case they are underutilized and there is need for 'IE' facilities, the laboratories can easily be converted into workshops at a much lower cost than putting up new workshops.
5.46 It is recommended that replications of similar study but covering a sample drawn from the entire country are necessary in order to give a genuine basis for generalization. The results of this study are likely to be urban biased and the study did not include any schools offering Power Mechanics and Building Construction.

It is further recommended that a study be conducted in the near future to determine the impact of offering practical subjects to students in secondary schools.
BIBLIOGRAPHY


APPENDIX I

QUESTIONNAIRE FOR SCHOOL HEADS

This questionnaire is one of the instruments being used to collect data to be used in a survey meant to identify the problems affecting the implementation of the new Industrial Education syllabus at secondary school level. The study will be restricted to Nairobi Province.

Your assistance in this exercise is requested. Please complete the attached questionnaire by either putting a tick or filling in the blanks with appropriate responses for each item. Any information you give will be handled with strict confidentiality.

Do not identify yourself anywhere in the questionnaire.
QUESTIONNAIRE FOR HEADTEACHERS (IE SCHOOLS)

1. (a) What type is your school?
   Girls only ......................
   Boys only ......................
   Mixed ..........................

   (b) Is your school (a) Government maintained .......
   (b) Government assisted .......
   (c) Private ........................

2. How many streams and students do you have in the following levels?

<table>
<thead>
<tr>
<th>Number of streams</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form 1</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td></td>
</tr>
</tbody>
</table>

3. How long have you served as a secondary school head? ....................

4. How long have you been the head of your present school? ....................

5. Which of the following Industrial Education (IE) subjects does your school offer?
   Building construction .........................
   Drawing and design ...........................
   Electricity .................................
6. (a) Does your school offer any other applied education subject? 

(b) If yes, specify which one 

7. When did your school start offering the IE subject(s)?

   Before 1986
   1986
   1987
   1988

8. How many students take IE subjects in the following levels?

   Form 1
   1
   11
   111
   IV

9. What is the establishment for IE teachers in your school? 

10. How many IE teachers are currently teaching in your school?

11. What is your own assessment about the performance of IE teachers compared to other teachers
12. What criterion did your school use to decide on which IE subject to offer in the 8:4:4 system of education?

(i) The school continued offering IE subject(s) which was (were) being offered during the former education system.

(ii) The school chose the least expensive practical subject to offer .....................

(iii) The school chose the subject with the highest prospects for employment and training ......

(iv) The school adopted the parents' and students' choice ..............................

(v) I do not know ....................... 

(vi) Other (specify) ......................

13. What is your assessment on the following aspects of implementation of the IE programme in the new education system?
14. How much help has your school received from the following sources during the implementation of the new IE syllabus?

A lot | Little | None
---|---|---
Inspectorate
Kenya Institute of Education
P.E.O.'s Office
Other IE schools
Other (specify)

15 (a) What is the average estimated cost per student per year for offering an IE subject in your school?
Kshs ........................................

(b) How does this cost compare with the other subjects offered in your school?
Higher ........................................
Average ........................................
Lower ........................................
16. What has been the primary source of funding the following aspects of IE programme in your school?

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Parent</th>
<th>Donors</th>
<th>Others (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructing and equiping the workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running the program (daily expenses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of facilities, tools and equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. What do you consider to be the three major problems which have been experienced in your school during the implementation of the new IE curriculum? 

18. Please indicate how you have solved each of the problems cited above.

19. Please use the space below for any additional comments concerning the implementation of the new IE curriculum in your school.

THANK YOU FOR SPARING YOUR PRECIOUS TIME TO COMPLETE THIS QUESTIONNAIRE.
APPENDIX II

QUESTIONNAIRE FOR SCHOOL HEADS H: NIE

This questionnaire is one of the instruments being used to collect data to be used in a survey meant to identify the problems affecting the implementation of the new Industrial Education syllabus at secondary school level. The study will be restricted to Nairobi Province.

Your assistance in this exercise is requested. Please complete the attached questionnaire by either putting a tick or filling in the blanks with appropriate responses for each item. Any information you give will be handled with strict confidentiality.

Do not identify yourself anywhere in the questionnaire.

[Attached questionnaire with options for responses]
QUESTIONNAIRE FOR HEADTEACHERS (NON-IE SCHOOLS)

1. (a) What type is your school?
   Girls only ..............................
   Boys only ..............................
   Mixed .................................

   (b) Is your school government maintained...........
       government assisted ..............
       private ..........................

2. How many streams and students do you have in the following levels?

<table>
<thead>
<tr>
<th>Form</th>
<th>Number of streams</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>II</td>
<td>111</td>
<td>111</td>
</tr>
<tr>
<td>III</td>
<td>111</td>
<td>111</td>
</tr>
<tr>
<td>IV</td>
<td>111</td>
<td>111</td>
</tr>
</tbody>
</table>

3. How long have you served as a secondary school head? ..........................

4. How long have you been the head of your present school? ..........................

5. Which of the following applied education subject(s) does your school offer?
   Accounting ....................... Home Science .............
   Agriculture ..................... Music ......................
   Arts and Design .............. Typing and Office Practice .............
6. When did your school start offering the applied education subject(s)? ..........................

7. What criterion did your school use to decide on what applied education subject to offer in the 8:4:4 system of education?

(i) My school opted to continue offering the same applied education subject(s) it had been offering in the former system ......

(ii) My school chose the least expensive practical subject ..........................

(iii) My school chose the subject with the highest prospects for employment and further training ..........................

(iv) My school went by the parents' and students' choice ..........................

(v) Other (specify) ..........................

(vi) No specific criterion was used .........

8. Why did your school not choose to offer any of the six Industrial Education (IE) subjects?

(i) All the IE subjects require very expensive facilities, tools and equipment and are
relatively expensive subjects to teach

(ii) IE subjects are unpopular among students in my school

(iii) Our choice was made on the recommendations of the parents

(iv) My school did not consider IE subjects appropriate for our students in selecting their future career.

(v) The time available to implement an IE syllabus was too short

(vi) Other (specify)

THANK YOU FOR SPARING YOUR TIME TO COMPLETE THIS QUESTIONNAIRE.
APPENDIX III

QUESTIONNAIRE FOR IE TEACHERS  T: IE

This questionnaire is one of the instruments being used to collect data to be used in a survey meant to identify the problems affecting the implementation of the new Industrial Education syllabus at secondary school level. The study will be restricted to Nairobi Province.

Your assistance in the exercise is requested. Please complete the attached questionnaire by either putting a tick or filling in the blanks with appropriate responses for each item. Any information you give will be handled with strict confidentiality.

Do not identify yourself anywhere in the questionnaire.

Your level of education:

[ ] University Graduate
[ ] Other (specify) ____________________________

Your major field of education:

[ ] Industrial Education  (specify) ____________________________

Your current position:

[ ] Head of Industrial Education  (specify) ____________________________

This questionnaire is part of a study to identify which areas of the syllabus are

[ ] Not essential (specify) ____________________________
1. Are you male or female?

   Male .................................

   Female ..............................

2. How old are you?

   Under 21 years ........... 31 - 35 years ......

   21 - 25 years ........... 36 - 40 years ......

   26 - 30 years ........... 41 - 45 years ......

   Over 45 years ......

3. What is your academic qualification?

   SC/EACE/KCE ..........................

   HSC/EAACE/KACE ..........................

   Diploma in Ed. or S1 ..........................

   Ordinary National Diploma ..........................

   University Graduate ..........................

   Other (specify) ..........................

4. What is your professional qualification?

   S1 .................. Diploma in Education ......

   B.Ed. .................. Other (specify) ............

5. Where did you train as an Industrial Education (IE) teacher?

   KSTC .......................... KTTC ..........................

   University (specify which one) ..........................

   Other (specify) ..........................
6. What is your (i) Major IE teaching subject? .......
   (ii) Minor IE teaching subject? .......

7. How long have you been an IE teacher? .......... 

8. When did you start teaching IE in your present school?
   
   Before January 1986 ...... In 1987 ...... 
   In 1986 ..................... In 1988 ...... 

9. What IE subject(s) do you teach in your present school?

10. How many IE periods are you teaching this term? 

11. What is your total teaching load this term? ....

12. How is your teaching load compared to other teachers' load? Heavy ................. 
    Average ..................... 
    Light ....................... 

13. How many periods per week are the following classes scheduled to take IE subjects?

<table>
<thead>
<tr>
<th>Form I</th>
<th>Practical</th>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. What is Industrial Studies teaching? - ....

15. What industrial training are your students doing? - ....

16. Are you satisfied with the present orientation for the IE subject(s) you teach? ....
14. What do you think of the time allocated to cover the IE subject(s) offered by your school?

   It is more than enough .................
   It is just enough ......................
   It is less than needed ..................

15. How many students do you have in the following IE classes?

   (a) Your largest practical class ........
   (b) Your smallest practical class ........
   (c) Your largest theory class ...........
   (d) Your smallest theory class ..........

16. In which year did you first learn of the new syllabus for the IE subject(s) you teach?

   ........................................

17. Have you had any formal orientation at all to the new IE syllabus for the subject you teach?

   ........................................

18. If yes, indicate how the orientation was done?

   Through inservice course ..............
   During training at College ..........
   Briefed by Heads of Department ......
   Other (specify) .....................

19. What is Industrial Education according to your own understanding? ...................
20. The following are some purposes of the IE subjects offered in the new system. Please indicate your belief about each of them (use a tick in the space provided).

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>IE provides students with adequate knowledge and skills for self/salaried employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>Prepares students adequately for vocational training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>Provides some occupational exposure to aid students in selecting a career</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(iv)</td>
<td>Only provides practical skills and knowledge to enrich the students' education</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Not useful at all in students' life</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. Which of the following sources of information have been available to you during the implementation of the new IE syllabus?

Syllabus and examination regulations
22. (a) Please indicate your own assessment of the following aspects of the present facilities for the IE subject(s) in your school.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Very Good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Completeness of entire IE workshop building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Workshop space: amount available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) Workshop space: suitability</td>
<td></td>
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<tr>
<td>(iv) Maintenance of the workshop</td>
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<tr>
<td>(v) Security of the workshop</td>
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<tr>
<td>(vi) Hand tools</td>
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<td></td>
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<td></td>
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<tr>
<td>- number available</td>
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<tr>
<td>- condition</td>
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<td></td>
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<td></td>
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<tr>
<td>(vii) Condition of power tools available</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>(viii) Consumables available</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

(b) Who maintains the tools and equipment in your workshop? ..........................
23. (a) What three problems do you consider to be the main problems of implementing the IE programme in your school? .................
(b) What possible solutions would you suggest for each of the problems you have cited? ...................................................

24. Please comment in the space below on any other aspect of the implementation of the new IE programme which you consider relevant to this study. ..............................................................

THANK YOU FOR YOUR ASSISTANCE AND COOPERATION IN COMPLETING THIS QUESTIONNAIRE
APPENDIX IV

INTERVIEW SCHEDULE FOR CURRICULUM DEVELOPERS

1. What subject area of Industrial Education (IE) were you involved in developing its curriculum?

2. How did you become a member of the curriculum development team for that subject?

3. For how long did you participate in the exercise?

4. How long did your team take to develop the syllabus for your IE subject?

5. (a) Do you think you are qualified to be a curriculum developer?
(b) If yes, why do you think so?

6. What difficulties have you experienced as an individual during the exercise?

7. What constraints has your team experienced during the process of developing the new IE curriculum?

8. What is Industrial Education according to your own understanding?

9. (a) Do you think IE is really being offered in secondary schools?
(b) If no/yes, why do you think so?
10. Was there an initial clear plan for implementation of the I.E. curriculum at secondary school level?

11. Was your team or the entire subject panel involved in making recommendations on how the new IE curriculum should be implemented?

12. (a) In what ways have you been involved in the implementation of the I.E. curriculum at secondary school level?
(b) If none, have you been monitoring the progress of its implementation?

13. Do you think there was adequate time given to prepare for and implement the new I.E. curriculum?

14. (a) What is your opinion about the commitment of secondary school administrators and teachers to the implementation of the new I.E. curriculum?
(b) Why do you think adequate commitment has/has not been there?

15. (a) In your own assessment, what specific problems are schools experiencing during the implementation of the new I.E. curriculum?
(b) How can each of the problems you have cited be solved or alleviated?
APPENDIX V

STUDENTS' INTERVIEW SCHEDULE

1. Which Industrial Education (IE) subjects are currently being offered at secondary school level?

2. Which IE subject are you taking in your school?

3. If you were to choose one subject from all the IE subjects, which one would you choose?

4. In what ways do you think you will benefit from the IE subject you are taking?

5. What is the condition of the IE facilities, tools and equipment in your school?

6. What do you think of IE subjects offered at secondary school level with regard to:
   (a) Preparing students for self or salaried employment?
   (b) Preparing students for further education and training?
   (c) Enriching ones practical skills and knowledge?
   (d) Their application in life.

7. What do you feel about the following:
(a) The syllabus content for the IE subject you are taking.

(b) The time allocated for the IE subject?

(c) The performance of your IE teacher?

(d) The workshop facilities for the IE subject in your school?

8. What specific improvements do you think could be made in the IE programme offered at secondary school level?
APPENDIX VI

OBSERVATION SCHEDULE

1. What subject area(s) of IE is/are being offered by the school? .................

2. Is there a workshop for the IE subject? ......

3. Is the workshop suitable for that subject area? .................

4. What is the condition of the workshop in terms of:

   (i) Completeness of the building  |  good | Average | poor  .........  .........  .........

   (ii) Maintenance  .........  .........  .........

   (iii) Utilization of space  .........  .........  .........

   (iv) Tools and equipment available  

       Quality  .........  .........  .........

       Quantity  .........  .........  .........

5. How many work places are available in the workshop? ............................

6. Is there adequate space for other related activities? ............................

7. Are the tools and equipment secure? ..............

8. Does the arrangement of tools and equipment allow for:
9. Are the following services available in this workshop?

(i) Quick checking  Yes .... No ....
(ii) Easy Location  Yes .... No ....
(iii) Easy accountability  Yes .... No ....

10. Is the classroom organization in the workshop satisfactory? ......................................

11. Does the workshop have the following safety features?

(i) Safety exits  Yes .... No ....
(ii) First aid kit  Yes .... No ....
(iii) Fire extinguisher  Yes .... No ....
(iv) Marked working areas  Yes .. No.. N/A..
(v) Safety lanes  Yes .. No.. N/A..
(vi) Safety clothing e.g. aprons, goggles, gloves etc.  Yes ...... No ...... N/A ....
(vii) Safety guards on machines  Yes .. No.. N/A..
(viii) Proper ventilation  Yes ...... No ......
(ix) Adequate lighting  Yes ...... No ......
## APPENDIX VII

### SUBJECTS AND TIME ALLOCATION IN THE SECONDARY EDUCATION PROJECT

(a) **Nine examinable subjects**

1. English 6 periods per week
2. Kiswahili 5 periods per week
3. Mathematics 6 periods per week
4. Physical Sciences 4 periods per week
5. Biological Sciences 4 periods per week
6. Geography 4 periods per week
7. History and Government 4 periods per week
8. Agriculture 4 periods per week
9. One subject from the following
   i. Religious Education 4 periods per week
   ii. Music 4 periods per week
   iii. Art 4 periods per week

<table>
<thead>
<tr>
<th>Industrial</th>
<th>iv. Wood technology 4 periods per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>v. Metal Technology 4 periods per week</td>
</tr>
<tr>
<td></td>
<td>vi. Power Technology 4 periods per week</td>
</tr>
<tr>
<td></td>
<td>vii. Electrical Technology 4 periods per week</td>
</tr>
<tr>
<td></td>
<td>viii. Drawing and Design 4 periods per week</td>
</tr>
<tr>
<td></td>
<td>ix. Building Construction 4 periods per week</td>
</tr>
<tr>
<td>Home Science</td>
<td>x. Home Science 4 periods per week</td>
</tr>
<tr>
<td>Business</td>
<td>xxi. Accounts</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Education</td>
<td>xii. Commerce</td>
</tr>
<tr>
<td></td>
<td>xiii. Typing and Office practice</td>
</tr>
<tr>
<td></td>
<td>XIV. A foreign language</td>
</tr>
</tbody>
</table>

(b) Two compulsory non-examinable subjects

| 10. Social Education and Ethics | 2 periods per week |
| 11. Physical Education | 2 periods per week |

Source: Ministry of Education, Science and Technology

## APPENDIX VIII

### SCHOOLS INVOLVED IN THE STUDY

<table>
<thead>
<tr>
<th>INDUSTRIAL EDUCATION SCHOOLS</th>
<th>NON-IE SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aquinas High School</td>
<td>1. Aga Khan High School</td>
</tr>
<tr>
<td>7. Lenana School</td>
<td>7. Loreto Convent Msongari</td>
</tr>
<tr>
<td>8. Nairobi School</td>
<td>8. Muslim Girls High School</td>
</tr>
<tr>
<td>15. Starehe Boys Centre</td>
<td>15. Wakulima Sec. School*</td>
</tr>
<tr>
<td>16. Strathmore College</td>
<td></td>
</tr>
<tr>
<td>17. Technical Institute</td>
<td></td>
</tr>
</tbody>
</table>

* Schools involved in the pilot study.