KAMPALA INTERNATIONAL UNIVERSITY

TITLE:

VOCATIONALISATION OF SECONDARY EDUCATION

CASE STUDY:

MENYENYA SDA

NYANDAURA HIGH SCHOOL

MUTUMA HIGH SCHOOL

64%

BY

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DECLARATION

I, MUGANE KARIMI SYLVIA , BED 13412/61/DF

do declare that the information given in this research report is made by myself and has never been presented by any other person, for the award of the degree of Bachelor of Education

Signature:.....

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APPROVAL

This is to certify that MUGANE KARIMI SYLVIA , BED 13412/61/DF has successfully completed her / his research report and now is ready for submission with my approval.

Signed: ..... Rev. Erich Kasirye .....

REV. ERICH KASIRYE

KIU SUPERVISOR

DATE..... 14.04.2009. .....

DEDICATION

To my beloved husband, Tiberius Murithi and children –Emmanuel and Grace.

ACKNOWLEDGEMENT

I would like to thank the good Lord for giving me strength and courage to compile this research report because without Him I would not be able to accomplish anything.

Special thanks go to my supervisor, Rev. Erich Kasirye who was a good mentor and advisor during the compilation of this work. To my family members and staff members of Isaangwa Primary School.

May the Good Lord reward you abundantly.

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List of Abbreviations

KCPE:	Kenya Certificate of Primary Education
IE:	Industrial Education
FKE:	Federation of Kenya Employers
KCSE:	Kenya Certificate of Secondary Education
KCPE	Kenya Certificate of Primary Education
KIE:	Kenya Institute of Education
KNEC:	Kenya National Examinations Council
KSTC:	Kenya Science Teachers College
KTTC:	Kenya Technical Teachers College
MoEST:	Ministry of Education, Science and Technology
NAPAHICA:	Nairobi Provincial Art, Home Science, Industrial and Arts Competition
NCEOP:	National Committee on Educational Objectives and Policies
PDE:	Provincial Director of Education
TIQUET:	Totally Integrated Quality Education and Training
TSC:	Teachers' Service Commission
TVET:	Technical and Vocational Education and Training
7-4-2-3:	Refers to Kenya's education structure prior to 1985 comprising of 7 years of primary education, four of junior secondary, two of senior secondary and a minimum of three of university
8-4-4	Refers to the current system of education comprising of 8 years of primary education, four of secondary and a minimum of four of university
SIDA:	Swedish International Development Agency

Executive Summary

1 Origin and Purpose of Vocatinalization

Interest in vocationilizing the secondary school curriculum dates back to the mid 1970s and early 1980s following the recommendations of two government appointed commissions. However, it was not until 1986 that the current system of vocationalizing school curriculum was institutionalized with the implementation of a new national educational system popularly known as the 8-4-4 system. This new structure which comprises of 8 years of primary education, 4 of secondary and a maximum 4 of university replaced the former 7-4-2-3 system composing of 7 years of primary education, 4 of junior secondary, 2 of senior secondary and 3 of university education. Under the new system the general secondary curriculum was expanded to include a number of practical subjects that are vocational in nature with the aim of enhancing the transition of secondary school graduates into the world of work as well as opportunities for further training in relevant post-secondary training institutions.

2 Planning for Implementation and Implementation Experiences

The introduction and implementation of the new system was a rushed political event. The first step in the implementation of the system was preparation of a policy brief and syllabi by the Kenya Institute of Education (KIE). This was followed by a hasty dissemination of the content of the new curriculum. The dissemination was done at a very high level as it involved the highest-ranking Ministry of Education officials, namely the Minister, Permanent Secretary, Director of Education and other senior officials. To cater to the newly introduced practical and vocational subjects, the government launched a crash in-service training programme for teachers and recruitment drive for additional ones and school inspectors. As the inclusion of the new practical and vocational subjects required the provision of relevant infrastructure - workshops, laboratories and books - the government pledged to support the arid and semi-arid areas while other regions of Kenya were asked to provide for their own schools in accordance with the cost-sharing policy. With regard to the provision of books, the government commissioned the Kenya Literature Bureau through the K.I.E to publish students' books and teachers' guides at affordable prices. Meanwhile, teachers were asked to continue using existing books from the previous system but were to use only those aspects of content that related to the new curriculum.

3 Syllabi and Input Requirements

The vocational aspect of the secondary school curriculum includes agriculture, business studies, computer studies, home science and industrial education. Business studies comprises accounting, commerce, economics and typing with office practice. The industrial education syllabus includes building and construction, drawing and design, electricity, metalwork, power mechanics and woodwork. In addition to promoting self-reliance, the content of these subjects is aimed at preparing learners for further education and training. Most of these subjects are taught through a combination of theory and practice and as such, practicals are an essential element of their teaching. Agriculture, computer studies, home science and industrial courses are allocated an average of three theory and two practical 40-minute lessons each week, although students and teachers can, and often spend more that the allotted time. The business education courses are allocated three to four lessons per week. Most teachers of the industrial courses are trained at three-year diploma colleges while those of agriculture, business education and computer studies are trained at the national universities. In addition to limited opportunities for in-service training, teacher shortage is a problem for all subjects but is particularly serious for agriculture, accounting and computer studies. The shortage in agriculture has to do with the fact that this is the most commonly provided vocational subject but whose teachers are trained in only one public university. Shortages for business and computer studies are related to the market value of persons who could teach these subjects outside of the education system. The other teaching inputs are: workshops and relevant equipment such as machinery

and hand tools for the industrial courses; pieces of land, plants, seeds and farming tools for agriculture; a computer laboratory, computers and printers, printing stationary, diskettes and appropriate software for computer studies; a workshop, cooking equipment, sewing machines, worktops and other tables, refrigerators, sofa sets for home science; a typewriting workshop, typewriters and appropriate stationary for typewriting with office practice; and a stable supply of electricity for computer studies, industrial education and typewriting. Beginning in 2003, all the industrial courses, computer studies and typewriting with office practice, will not be offered in Kenya's secondary schools. Their removal from the syllabus has mainly been justified on the basis of the costs associated with teaching them.

4 Costs of Financing Vocational Education

The cost of teaching most vocational subjects except business studies is on average higher than that of teaching all other subjects including the sciences. These higher costs relate to construction and equipping of workshops and their running costs including consumables and equipment maintenance; the extra cost of training vocational education teachers many of whom are not maximally utilized; the cost of books, many of which are imported; smaller class sizes; and the additional costs associated with examining practical subjects by the Kenya National Examinations Council (KNEC). The financing of vocational courses is shared between the government and parents. Government pays teachers salaries while parents meet the costs related to consumables. Parents also pay to have their children taught some vocational courses such as computer studies and home science. Apart from religious organizations, the rest of the private sector is not involved in financing this curriculum. International donors, most notably SIDA contributed to establishing industrial education subjects in 35 public secondary schools.

5 Quantifiable Achievements

The number of graduates of the vocational courses increased from 201, 444 in 1990 when the second lot of 8-4-4 system graduated from secondary to 240,244 in 2001. Available data are not disaggregated by gender. Likewise the number of diploma level teachers who teach agriculture and industrial courses has increased from 7,000 to 10,000 between 1990 and 1995 and to 18,000 in 2000. Only about 40% of vocational education graduates have university level qualifications. Women comprise an estimated 40% of all vocational education teachers. The most popular vocational courses are agriculture, commerce and to a limited extent, home science, which are taught in 96, 95, and 24 % of all Kenya's secondary schools, respectively. In addition to requiring minimum physical inputs, agriculture is popular due to its familiarity and applicability in most of Kenya's rural settings. It is not so popular in schools located in or near urban centers. Commerce's popularity has to do with the perceived higher employment prospects associated with this course, which is also the case with accounting offered by 23% of all schools. But these subjects are also popular because of the relatively low investment costs involved in their establishment and teaching. Home science has been taught in Kenyan schools longer than most other vocational subjects and like commerce, has been associated with high employment prospects particularly in the tourism sector. The least commonly provided courses are the industrial ones particularly metalwork, power mechanics and electricity mainly because of the costs associated with their set up and maintenance. For the same reason, computer studies is offered by only 2% of secondary schools. The small numbers of schools offering computer studies is further associated with lack of qualified computer teachers, the cost of purchasing and maintaining relevant equipment, lack of electricity in most rural areas and limited opportunities for graduates with these skills in the rural areas of Kenya. The extra fees which they are required to pay for this course, discourage some students who may also be interested in enrolling.

The popularization of vocational courses has not materialized. In particular, the industrial courses have not been easy to introduce in most schools. The number of graduates of the industrial courses has decreased from 6,816 in 1990 to 6,097 in 2001. According to teachers, in addition to parents and students

no longer having any illusions regarding improvements in employment prospects due to enrollment in these courses, parents and school administrators are discouraged by the higher costs of teaching these courses. The provision of the relevant teaching/learning facilities for industrial and other courses has largely been left to parents.

6 Schools and Students

There are regional disparities with regard to the distribution of students who enroll for vocational courses. More students from the Rift Valley enroll for vocational courses than students from any other region in Kenya, perhaps because of the political way in which the system was introduced by a head of state who hails from this region but also because this is the largest of Kenya's provinces.

Within regions, six main factors differentiate between schools where vocational subjects may or may not be popular. Most top academic schools limit their vocational offerings to those subjects that require the least investments in resources and time. Some vocational courses such as agriculture, home science and building construction are more common in rural environments while computer studies, business studies and most industrial courses are more popular in schools located in towns or their neighborhood. Schools, which are managed by churches or philanthropic organizations tend to have better facilities for vocational subjects and subsidize the costs of teaching them, which tends to attract more students to these courses. Boys' schools are more likely to offer industrial courses, business studies and computer studies while more girls' schools offer home science and typewriting with office practice. Commerce and computer studies are also popular among girls. Finally, schools that do well in a given vocational subject in the Kenya Certificate of Secondary Education (KCSE) examination tend to show more interest and to set aside more resources for their teaching.

Students enrollments for given vocational courses are influenced by four main factors, the main one being the courses offered by the school a student has been admitted to. Vocational subjects tend to be more popular with the academically weak students because they are perceived to be easier than other subjects. Related to this is the fact that students from economically disadvantaged backgrounds are more likely to enroll in vocational courses because economically well off parents have more ambitious career designs for their children. Cultural factors also play a role in determining popularity of vocational courses. Pastoral communities, for example, view non-pastoral careers such as carpentry, metalwork and related ones as not fit for their children. Although unemployment of school leavers has been a problem for a while, the situation has worsened in the 1990s and may very well be the single most important determinant of whether students enroll in vocational courses or not.

7 Assessment Methods and Learning Outcomes

Mastery of vocational skills is assessed at the school level, through continuous assessments, the collaborative project between schools and the national examinations administered by KNEC. School level assessments have no bearing on a candidate's final grade on completing secondary school partly because their validity and reliability are difficult to establish and because those examined and their examiners are not operating under comparable circumstances. Collaborative assessments between schools and KNEC involve assessing a student's practical subjects. This assessment accounts for 10% of the final student examination score. Several weaknesses, the most prominent of which relate to validity and reliability of these assessments have opened them to much criticism from teachers, students and parents. Criticism has also been labeled on the final KCSE examination which accounts for 90% of a student's final high school grade and which is therefore the main determinant of post-secondary school placement. Its critics point to the fact that the examination defeats the very purpose of vocationalization by emphasizing examination of factual as opposed to practical knowledge. This examination does also not address disparities in school facilities or gear the contents of what is examined to the environments in which students are based. The

KCSE examination has further failed to encourage improved communication skills, as the emphasis of examiners has tended to be on memorized facts and not how they are presented.

Students who do well in this examination target university education and other post-secondary training opportunities. Schools and students thus place much emphasis on good performance in vocational subjects for good grades more than for their potential in promoting employment, unless one happens to be a top student in business and computer studies and in a top school. For the best students in vocational education however, the university and a variety of other training opportunities are within reach. In fact, good performance in specific vocational courses has a direct bearing on the degree courses a student may enroll in. Finally, although not necessarily the principal objective for registering in these courses, students value them for the skills they pick up which they hope to apply in their daily lives.

8 Main Problems Encountered in Implementation

Because of the hasty nature in which the new curriculum was introduced, its implementation has not been easy. First, its design was too ambitious in assuming that education was capable of resolving the youth unemployment problem without addressing the underlying causes of this problem. As a result of inadequate planning, most schools found that they could not introduce the new vocational courses in the curriculum as they lacked basic resources including teachers qualified to teach these subjects. At the same time, most schools could not construct and equip the needed workshops as in most parts of Kenya, this responsibility was left to parents in the spirit of cost sharing. An additional handicap is that the books to be used for teaching the new curriculum content were unavailable; and where K.I.E prepared some books, many of these books were characterized by numerous errors.

The biggest obstacle to the successful implementation of the new curriculum was its limited acceptance by most education stakeholders outside of government not only because they were not consulted on its introduction but also because it turned out to be an expensive system to implement for parents already burdened with other educational responsibilities with the onset of cost-sharing. In addition, the vocational curriculum has been criticized for overlaps in coverage between subjects, poor sequencing of teaching topics within individual subjects and for the limited time allocated for some subjects. Time constraints, lack of or inadequate infrastructure, facilities and books has resulted in a situation where the teaching of theoretical knowledge has dominated over practical content. Also problematic is the failure of the curriculum to impart new ideas focusing instead on the old and obsolete knowledge most teachers know best, as they have virtually no opportunities to update their knowledge. Moreover, school inspectors rarely visit vocational education teachers. A combination of all these factors means that graduates of vocational courses are not necessarily advantaged over their academic education counterparts with regard to entry into a fiercely competitive labor market and post-secondary training institutions.

8 Recommendations

A number of measures could enhance the quality and relevance of this and future vocational education curriculum reform. First, with regards to setting objectives for any educational reform, it is important to have realistic expectations on what education can and cannot do. Second, planning for implementing a new curriculum has to be widely consultative, and granted adequate time for putting in place relevant human and physical resources. Implementation is likely to succeed if done in phases as the needed resources become available. On the curriculum, it would help if its objectives are realistic and achievable and if its content is based on the immediate and everyday needs of learners. Also important is regular upgrading of teachers' skills as well as of the books used for teaching. In-servicing of teachers and regular advice by school inspectors should contribute to enhancing their ability to introduce new knowledge and to improvise in the absence of adequate learning/teaching facilities.

On financing, the removal of industrial courses from the syllabus will contribute to reducing the cost of teaching this curriculum. For those subjects that will remain on offer, it may is important to reduce their coverage to what is feasible. It may also be necessary to limit the teaching of some vocational courses to a few well-equipped schools. Where possible, the private sector and local communities need to do more with regard to supporting what remains of vocational education depending on their ability and areas of interest. At the school level, there are opportunities for cost saving through a more cost-efficient use of available time, physical and human resources within and across schools.

A case can be made for retaining industrial education and the computer course in those schools that have the relevant physical and human resources and where performance in these subjects in the KCSE examination is exemplary. After all there are students who value these subjects for a variety of reasons including their potential in enhancing employment and higher education opportunities. Moreover, developments in science and technology call for an increased output of middle-level technicians. Likewise, computers are increasing becoming an element of everyday life as well as in promoting participation in the global village. In any case, there is value in any type of education that may justify its retention especially if there are interested consumers of the product. More importantly the resources invested in these courses should not be put to waste.

Increased acceptance of vocational subjects by most students and their parents however, is likely to result if what is taught is seen to have immediate and long-term benefits. This can be accomplished through regular reviews of the curriculum that involves the main stakeholders including employers, and through regular meetings with parents during school open days, exhibitions of products of vocational courses and related measures. Parents are also likely to be persuaded if they do not have to meet the bulk of the costs associated with establishing and retaining these subjects. Gender stereotyping in course preferences by boys and girls is likely to be broken if it can be demonstrated that available career opportunities are open to both genders and if in the case of girls, efforts are made to reveal examples of women who have succeeded in careers traditionally viewed as men's domains. Parents, teachers and students have also to do their part in encouraging and not discouraging girls to enroll in vocational courses.

Relegating all vocational courses to the optional category with regard to national examinations has not motivated many students and parents to be keen on them. One way of generating interest in these subjects is by making it mandatory for schools to offer a certain minimum of vocational subjects. Also likely to be of help is the strengthening of partnerships between schools, parents and communities aimed at getting them to place more value on the teaching of these subjects. Interest in these and other subjects is however likely to be heightened in the context of a vibrant national economy that is seen to generate valuable employment and training opportunities for vocational and other school graduates.

Finally, the national examination system needs to be remodeled to be more supportive of the goals of vocationalization. To the extent possible, more practical knowledge needs to be examined. Second, more emphasis has to be placed on the testing of general knowledge and analytical skills. Finally, it is necessary to consider other criteria, apart from excellence in academics, for determining whether graduates of vocational subjects join higher educational or vocational training institutions.

Vocationalization of Secondary Education: Kenya Case Study

1 The Introduction and Rationale for Vocationalization of Secondary Education

1.1 Background

This report is on Kenya's experience with vocationalization of some aspects of the secondary school curriculum since the introduction of the current system of education in 1986. This system of education, better known, as the 8-4-4 system, comprises of 8 years of primary education, 4 of secondary and a minimum of 4 years of university education. The current system replaced the British type 7-4-2-3 education structure, which was organized around 7 years of primary education, 4 of junior secondary, 2 of senior secondary and a minimum of 3 years of university education. Vocationalization in the context of this report refers to the teaching of applied subjects or vocational courses that aim at improving learners' capacity for employment in the formal and informal sectors of Kenya's economy, and for a limited number of graduates, for further education in areas of their interest. Some of the applied subjects such as agriculture, business studies (accounting, commerce and economics), home science and industrial education were introduced into the curriculum prior to 1986. Industrial education courses were however only offered in 35 selected public schools assisted by the Swedish International Development Agency (Sida). Also introduced prior to 1986 were art and design, and aviation technology, which are taught in a very limited number of schools. Subjects introduced following the introduction of the 8-4-4 system in 1986 include an additional business studies course (typewriting with office practice), computer studies and industrial education in more schools than the 35 public secondary schools referred to above. Under the industrial education curriculum are six courses, namely building and construction, drawing and design, electricity, metalwork, power mechanics and typewriting with office practice. The focus of this report is the vocational subjects of agriculture, business studies, computer studies and industrial education. Beginning in 2003, all the industrial courses, as well as typewriting with office practice, and computer studies will no longer be part of the official secondary school curriculum following a recent Ministry of Education, Science and Technology (MoEST) directive. Nevertheless, these subjects are discussed in this report as they are still being taught in schools.

Four main approaches were utilized for collecting the data used to inform this report. The first involved a review of available official and non-official documentation, research and evaluation studies and workshop reports. Curriculum review materials produced by the Kenya Institute of Education (KIE), the organization responsible for curriculum development in Kenya, formed a valuable source of data. The second method involved an analysis of the secondary education syllabi and national examination results for vocational subjects released by the Kenya National Examinations Council (KNEC) for the years 2000 and 2001. Third, unstructured interviews were conducted among teachers of vocational subjects in 10 secondary schools and among MoEST officials responsible for ensuring that the curriculum of vocational subjects corresponds to national education objectives. The schools visited were mostly the top performers in vocational subjects in the Kenya Certificate of Secondary Education (KCSE) examination although one poor achiever was also visited. They represented both rural and urban settings. These schools were: Strathmore School, Moi Forces Academy, Starehe Boys' Centre and Precious Blood Riruta (Nairobi), Kagwe Girls' Secondary School (Kiambu), Lugulu Girls, Friends High School Kamusinga and Friends School Bukembe (Bungoma), Kambandi High School (Meru) and Nyandarua High School (Nyandarua). It was not possible to interview teachers of the top school in typing and office practice (Pangani Girls Secondary School in Nairobi) because the head teacher of this school does not allow such "distractions" to interfere with the school's teaching programme. Although aware of the fact that the national system of education may sometimes be contradictory of the objectives of vocationalization, good performances in national examinations on any subject could be taken to be an indication of interest in the subject. This is

because schools that perform well in the subject have shown greater commitment to them on the part of both teachers and students than would be the case for poorly performing schools.

Thirty-eight teachers of vocational subjects were interviewed in groups in their respective schools to maximize on limited time and on their shared experiences. They were asked for their views on a number of issues. Regarding students, they were asked to comment on their backgrounds and motivation for enrolling in vocational subjects. On the quality and relevance of vocational education, questions related to the facilities available for teaching the subjects offered at the school, the number of students enrolled in vocational courses and their preparation for teaching these subjects. On the management and planning for teaching of vocational subjects, they were requested to comment on the kind of support they receive from MoEST, factors external to the school that may limit or promote appreciation of vocational subjects and on the time they have for teaching these subjects. Other questions related to their perceptions on internal and external assessments, student and parental perceptions of vocational subjects and on the relevance of the courses taught for labor market placement. From head teachers, data were collected on the numbers and qualifications of teachers of vocational subjects and their distribution by gender, academic qualifications and experience in teaching vocational subjects.

The report is organized around eight main sections. In the following section, the genesis of Kenya's current system of vocational education and its broad aims and objectives are described. The third section highlights the nature of planning undertaken for the implementation of the curriculum including the more notable implementation experiences. Section four is an analysis of the specific objectives of vocational education curriculum, the content of the syllabi and the inputs availed for its implementation. The fifth section discusses the costs and financing of vocational subjects. Section six describes the main achievements of vocationalization from the point of view of numbers of students and teachers. The seventh section is on the characteristics of schools offering vocational subjects and the students who enroll for these courses. The final section is a summation of the whole report focusing on the main obstacles to successful implementation, lessons learned and the way forward.

1.2 Origins of the Current System of Vocational Education

The Government of Kenya's commitment to the vocationalization of the secondary school curriculum dates back to the recommendations of the 1976 *National Committee on Educational Objectives and Policies* (NCEOP) and the sessional paper that clarified them (Kenya 1978). Among other recommendations, this Committee called for a restructuring of the education system in order for it more effectively to meet basic needs and promote income earning opportunities for school leavers, a change in the attitudes of pupils in favor of agriculture, crafts and productive manual labor and pre-vocational skills that would stimulate self-confidence and creativity related to self-employment. Curiously, the Committee made a case for influencing society's system of rewards in favor of rural occupations and self-employment but without indicating clear strategies for making this possible. The recommendations of the NCEOP were later to form the basis for the restructuring of Kenya's education system from the British 7-4-2-3 system to the American 8-4-4 system following *The Report of the Presidential Working Party on the Second University in Kenya* (Kenya, 1984). Although this Committee's brief was mainly on the establishment of a second university in Kenya, its recommendations on the restructuring of the national education system turned out to be by far the more famous because they affected most Kenyans in one way or another.

Within no time, the KIE had published the relevant curriculum and a policy document on the new system (Kenya, 1984). Both the syllabus and the policy brief stress the need to engender in school leavers, at both the primary and secondary school levels, a predisposition to manual work and some kind of missionary dedication to working in rural areas and the informal sector of the urban centers of the country. Education would accordingly equip students with appropriate skills and attitudes for life and employment in these

settings by emphasizing the teaching of vocational and technical skills. Completely uninformed by previous experiences and debates on the limited role of education in determining occupational success (see for example, Foster 1965, among others) the naive assumption that education creates employment was accepted without any questioning.

Although in a less forceful manner, a more recent commission report, *Totally Integrated Quality Education and Training (TIQUET); Report of the Commission of Inquiry into the Education System* (Kenya, 1999), but whose recommendations have not received presidential approval three years after they were released to the public due to their controversial nature, underlines the recommendations of its two predecessors. Unlike the two previous commissions however, this report charges education with the additional responsibility of teaching "*. . . a core of generic skills that would aid the graduate to better communicate, work in teams with less supervision, use information technology to access new ways of doing things, promote entrepreneurship education that has become invaluable to those in paid employment or in self-employment...and the ability to be creative, innovative as well as an intrinsic initiative for problem-solving...*" (Kenya, 1999: 146-1470). Nevertheless, this particular commission was less ambitious with regard to how many vocational subjects could be taught arguing instead for the reduction of subjects and in particular for the scrapping of the industrial courses from the secondary curriculum. Thus, although the appointment of this Commission with a Chairman from the President's home area was meant to stem mounting criticism of the system and guard against radical changes, it did just that.

1.3 The Broad and Specific Objectives of Vocationalization

In brief, the policy documents cited above point to six ambitious broad aims for vocationalization, namely:

- Provision of increased training opportunities for the rising numbers of school-leavers with a view to preparing them for self reliance and self-employment through the promotion of practical skills and attitudes;
- Promotion of education and training that responds to Kenya's overall economic development and in specific sectors such as agriculture, industry and commerce;
- Development of vocational entrepreneurial skills as the basis for further individual development;
- Improvement of the production of skilled artisans, technicians and technologists for both the formal and informal sectors;
- Exposure of students to scientific and technological trends, skills and ideas and promotion of life long skills that enable learners to better adjust to their work and domestic worlds through the inculcation of competencies that promote creativity, communication, cooperation, innovativeness and problem-solving abilities; and
- Preparation of students for further training in post-secondary middle-level training institutions as well as the university.

The above broad objectives were operationized through the non-academic subjects that were introduced in 1986 with the implementation of the 8-4-4 system of education as well as the additional ones that have been introduced afterwards to reflect changing times such as computer studies. Thus, more generally, the 8-4-4 secondary education curriculum is organized with a view to promoting the acquisition of knowledge and the development of skills and attitudes in the key areas of communication, mathematics, science, humanities, applied education and physical education. To a limited extent, appropriate communication skills, which are imparted through the teaching of English, Kiswahili and some foreign languages, could be considered vocational in that they enhance survival skills. However, it is the applied education subjects namely, agriculture, business and computer studies, industrial education and home science that are seen as the centerpiece of the vocational aspects of the secondary school curriculum (Kenya, 1992).

2 Planning for Implementation and Planning Experiences

2.1 Planning for Implementation

Planning for the new system of education and its vocational component was influenced by three main factors, namely: the education commissions prior to *The Presidential Working Party on the Second University;* the influence of North America's education system through the commission's chairperson who was Canadian; and the personality of Kenya's Head of State whose authority was then virtually unquestionable. *The Report of the Presidential Working Party on the Second University in Kenya* did not give any direction regarding the outlook of the system it was recommending. However, there was an implication to the effect that introduction of the system at the primary and secondary school levels would support the structure of university education, which the Committee recommended, should comprise of 4 years as opposed to the 3 years of the existing system. In view of this, the "A" level segment of secondary education, which comprised of two years, was to be abolished and the two "A" level years were to be shared between the primary and university cycles as these cycles' duration were lengthened from 7 to 8 years and 3 to 4 years, respectively. In this connection, the Committee's report explains that: "...*The Working Party has already recommended the restructuring of the education system following on the dropping of the "A" level segment. It has recommended the lengthening of university education to at least four years. Under the present system, education from primary to university is of at least 16 years duration, and the working party considers this to be reasonable and should be retained. The party appreciated the NCEOP reasoning that primary school leavers should acquire some basic education in addition to numeracy and literacy skills. In order to achieve this, it is considered necessary that the primary school segment should be longer than it is at present. The working party therefore recommends that in order to streamline the education system of the country as a whole the present primary education system be extended from (7) to (8) " years"* (Kenya, 1981:10).

The curriculum content of the new system was also to be supportive of the role of the second university, which was named Moi University in honor of Kenya's Head of State who had commissioned the formation of the Committee. This was to be made possible through the introduction of a vocational curriculum in both primary and secondary education. Among the courses introduced at this new higher education institution were wood technology and information technology both of which were to be an important aspect of the 8-4-4 system of education. It was not lost to cynics that this committee's deliberations were highly influenced by its chairman, Professor C.B Mackay, a Canadian whose country followed the structure of education it recommended for Kenya. His influence was further buttressed by the fact that the terms of reference for the committee he chaired related to working out a mechanism for establishing a university in the Rift Valley province of Kenya, the President's home region. This may explain the speed with which the recommendations of this particular commission received official government approval. Thus, although the hurried nature with which the new system was being implemented was the subject of much controversy and debate, most of this criticism was ignored within official circles. At some point, parents, teachers and others who voiced their disapproval of the new system were reminded that the implementation of the system was a presidential decree that had to be followed to the letter.

2.2 Implementation Experiences

Following the preparation of the 8-4-4-policy document and the curriculum of the new system, the next step in the implementation of the curriculum was a dissemination of its content. A K.I.E research report on the secondary school curriculum, which was made public only after government accepted the criticisms of the 8-4-4 system, is quite candid about the political motive for reform and the political way in which the reform was launched. Notes the report:" . . .*It was evident and accepted, through the*

discussions with the Ministry of Education headquarters' personnel that the decision to launch the 8-4-4 system at the time it took place (1985) and with the impact it did was political. It was accepted that the idea had emerged from the Mackay Report of 1981. However, the decision to launch it came with a bang. This explains why the then Minister of Education, the Permanent Secretary, the Director of Education and essential others took it upon themselves to travel round the country to legitimize the system by explaining the policy on the new curriculum. The team visited all the eight provinces meeting community leaders and head teachers, carefully explaining the policy and giving information on the general implication of the system. According to some members of that team, there was no retreat to another system but points for clarification could be raised during the meetings. At one point when the public had started giving their views openly, the public debate was closed. Members of the public were therefore, left to synthesize any answers for any questions they had. Another interesting dimension is that at the material time, the political system was receiving negative publicity from a significant section of the public (K.I.E, 1985; 55-56).

The K.I.E report goes on to state that muzzling the views of the consumer of the new education system was a false start, which was contradictory to the expectation that much of the costs of implementing the vocational aspect of the curriculum was to be a responsibility of parents. It thus came as no surprise that when *The Commission of Inquiry into the Education System of Kenya* (Republic of Kenya, 1999) was appointed to review the system in 1998, the overwhelming majority of Kenyans argued for its abolition for reasons related to its cost, overburdening of learners and its lack of competitiveness in the world education arena, among other reasons. Also disappointing with regard to the implementation of the new curriculum is the fact that it was not piloted, which would have given curriculum developers and implementers the required experience on its most appropriate coverage. Due to lack of its piloting many mistakes were exposed after thousands of students had gone through the curriculum. Moreover, post-secondary education institutions were not well prepared for the graduates of the new system with most not making any adjustments to their curriculum. As a result, mass failures of the first crop of 8-4-4 secondary school graduates were experienced at tertiary education institutions, particularly at public universities.

Inclusion of subjects that were largely practical and vocational in nature in the new curriculum called for different types of human and physical resources. One of the more urgent needs of the new system therefore was in-service training of the existing cadre of teachers to enable them cope with new challenges. Thus in 1986, the government quickly launched a crash in-service training programme for primary school teachers that comprised of a training programme of a selected number of subject specialists on the content, methodology and expected outputs of the new system during a week's workshop. This team of subject specialists was then deployed to their provincial headquarters to train teachers of their respective provinces, again for a week. The teachers benefiting from this training then in-serviced their colleagues at their respective schools. An obvious shortcoming of this scheme was the brief training duration and lack of adequate preparation of the training seminars. Second, because the existing cadre of teachers was inadequate to keep up with the increased load of subjects, the government also embarked on a teacher recruitment drive. As there were no unemployed trained teachers then, the new recruits were mostly professionally untrained. It was estimated that by the time the new system was being introduced, almost half of the teachers recruited to support the system were professionally untrained (K.I.E, 1995). Thus in addition to the inadequate in-service period, new entrants into the teaching profession did not have the relevant teaching skills, a particularly serious problem in the context of a newly introduced product. A second level of resource mobilization related to the deployment of additional school inspectors. Both the established and the newly appointed inspectors however acknowledged the difficulties of examining the newly introduced subjects on which they had received no training.

The inclusion of the new practical and vocational subjects further called for the provision of relevant infrastructure, namely workshops, laboratories and books. The government came out clearly and indicated that only the arid and semi-arid areas would receive state support in this regard. Other areas of Kenya had

to provide for their own schools in accordance with the cost-sharing policy. This course of action was an unfortunate one, as parents who did not support the introduction of the system simply did not bother to contribute the necessary provisions for schools which their children attended. Also because of the way the system was introduced and the financial difficulties faced by many parents, most schools were unable to put up the required workshops and science laboratories while the few that could put up such structures failed to equip them. The government did however intervene with regard to the provision of books by commissioning the Kenya Literature Bureau (KLB) through the K.I.E to publish students' books and teachers' guides at affordable prices. Meanwhile, teachers were asked to continue using existing books from the previous system but were to use only those aspects of content that related to the new curriculum. In addition to parents therefore, teachers were also put under much pressure as their performance was going to be judged by how well their students did in the national selection examinations irrespective of the facilities, which they had at their disposal to attain the required standards.

3 Syllabi Content and Input Requirements

3.1 Syllabi Content

KIE was mandated to develop curricula for the newly introduced subjects and to make modifications on the existing ones. In addition to promoting self-reliance, the teaching of all the vocational subjects is meant to prepare learners for further education and training. Most of these subjects are taught through a combination of theory and practice and as such, practicals are an essential element of their teaching.

3.1.1 Agriculture

The teaching of agriculture is expected to promote the acquisition of skills for self-reliance in farming. It is viewed as particularly critical for the development of Kenya as agriculture is the main economic activity in most parts of the country. The overall objective of the course is the development of basic agricultural skills relevant to Kenya and the learner's home environment. The subject is meant to have a large practical component to enable learners acquire useful agricultural practice skills. Among other goals, its teaching aims at reinforcing interest and awareness of opportunities existing in agriculture by demonstrating that farming is a dignified and profitable occupation. A second aim is to expand the students' knowledge on basic principles and practices in agriculture. The third aim is to develop students' understanding of the value of agriculture to the family and community with a view to promoting self-reliance, resourcefulness, problem solving abilities and an occupation outlook in agriculture. Fourth, students who take this course are expected to be active participants in rural development activities while in school. The content of the agriculture syllabus includes crop and livestock production, farm machinery, farm structures and agricultural economics. Students are also introduced to the practice and role of agriculture in Kenya's economy. Key areas of coverage include soils and soil fertility, water conservation supply and irrigation, land reclamation, farm layout, principles of crop production, crop parts and diseases, crop production practices, crop types, principles of livestock production, farm power tools, equipment and machinery, farm records, land tenure and land reform, production economics, farm accounts, agricultural marketing and agricultural organizations.

3.1.2 Business Education

The business education curriculum comprises of four courses namely, accounting, commerce, economics and typewriting with office practice. These courses have some common objectives. The first is the promotion of learners' general business literacy, basic knowledge and skills related to self-reliance and employment and their understanding and appreciation of the importance of business activities in society. The second objective is the development of basic accounting skills and desirable attitudes and habits for efficient business operation. The third objective is the promotion of understanding of the role of government in relation to business activities. These common objectives also have some common teaching

topics, namely: satisfaction of human wants, economic resources and supply; trade and chain of distribution, forms of business organizations, government involvement in business activities and consumer protection, location of business enterprises, business office, communication, keeping business records, business transactions, ledger and types of ledgers, the cash-book, preparation of final accounts, source documents and books of original entry, types of errors and their correction, end of year adjustments, bank reconciliation, evaluation of stock, accounting for incomplete records, partnership and company accounts, non-profit organizations, and elements of costing and budgeting. Business courses also introduce students to basic concepts of entrepreneurship through practical sessions and organized interactions with the business community.

The three courses also have their specific objectives and coverage in addition to the common ones as follows:
(a) Accounting. The teaching of this course aims at inculcating in learners skills that would contribute to getting them to improve their understanding and appreciation of measurements of business results; operations of economic entities; the importance of neatness and attendance to everyday work; and of the value of accuracy in business calculations. In addition to the common core topics of the business education curriculum, students who enroll for accounting are introduced to business record keeping, bank reconciliation, evaluation of stock, partnership and company accounts, non-profit organizations and to the elements of costing and budgeting.

(b) Commerce. Commerce aims at improving learners' knowledge, understanding and awareness of the business environment and their acquisition of business knowledge for general use and for preparing them for self and formal employment. A second objective is to develop an understanding and appreciation of the role of commerce in improving the standards of living in society and for effective participation in the development of Kenya. Outside the core topics, the commerce syllabus covers: transport, warehousing, sales promotion, money and banking, insurance, business finance, international trade, business calculations and financial statements, large scale organizations and distribution of commodities.

(c) Economics. The specific aims of teaching economics are to improve learners' understanding of: general principles of economics and its role and that of the learner in Kenya's development; regional and international trade; and use of economic data. In this course, students are introduced to the theory of the firm, product market structures, the factory market, national income, population and development, money, banking and public finance, international trade, and economic development and development planning.

(d) Typewriting with office practice. This course's specific objectives include promotion of communication and manipulative skills needed for efficiency in an office, appreciation of the purpose and importance of good working habits and procedures in the office and of typewriters and other word processing equipment. More practically, students are introduced to typing and word processing equipment, typewriting techniques for various functions, publishing and reproduction of documents, office materials and stationary, sources of information and filing.

3.1.3 Computer Studies

The computer studies course was launched in 1996. Its broad aim is to promote appreciation of computers and the acquisition of skills for using computers which have become an integral element of current and future developments in science and technology (Kenya, 1996). The course has three main aims. The first is the promotion of learners' appreciation of computers and their components including developing basic skills in their safe use and care. The second is improvement of learners' understanding of fundamental concepts of computing and the use of computers in different areas of application including application packages and basic programming. The third objective is enhancement of students' appreciation of the impact of computer technology on society. The topics taught in this course are: computer and its components, use of computers, basic computer concepts, word processing, programming, fundamentals of

spreadsheets, application areas, databases, networks, data communications and impact of computer technology on society.

3.1.4 Home Science

The home science course is the oldest of the vocational subjects. Its main objectives are the promotion of self-reliance and he improvement of the quality of life of learners, their families and immediate community. The subject is meant to enable learners to: acquire and practice principles of hygiene with respect to self, food and the environment and to develop knowledge and skills in maternal health and child care; skills for selection, use and care of fabrics for various uses; appreciation of the nutritive value of various foods and the importance of a balanced diet; creative ability in the selection, preparation and use of a wide variety of foods; basic knowledge and skills in the use, storage and preservation of foods; appreciation of foods from different communities; and to attain artistic values and appreciation of good designs in clothing, interior decoration and those related to eating habits. Learners are also expected to develop the ability to understand and adapt to the environmental and social and economic changes taking place around them. Third, those going through the course are expected to acquire some awareness of the sources of consumer information with a view to using this information intelligently in developing their ability to improvise resources when necessary. Fourth, students are expected to acquire skills related to time management, energy and finance in the home, ability to apply principles involved in the selection and care of household equipment and furniture and relevant knowledge and skills in home science to make items for the home and income generation.

Home science is taught around five units. Unit one on home management focuses on personal health, homes and their care, environmental hygiene, safety at home, laundering care and storage of clothes, methods of providing shelter, lighting and ventilation, fuel use at homes, choice, use and care of household utensils, and time and energy management. Unit two covers food and nutrition with the main teaching topics including food hygiene, kitchen equipment and tools, food nutrients and related disorders, cooking methods, floor mixtures and raising agents, meal planning and management, use of left over foods and food preservation. Unit three centers on clothing and textile, specifically textile fibers, sewing equipment and tools, stitches, body measurements, various types of designs, commercial patterns, clothing construction, repair and maintenance of clothes, and choice of clothes for different occasions. Unit four is on pre and post – natal care and covers pregnancy and related topics, weaning the baby and childhood ailments. Unit five is on consumer education and focuses on consumer awareness, problem of the consumer, consumer buying, budgeting, advertising, consumer protection and facilities available to the consumer.

3.1.5 Industrial Education

Before the introduction of the 8-4-4 system of education, the teaching of industrial education was limited to 35 selected public secondary schools. The industrial education curriculum is organized around six subjects; building and construction, drawing and design, electricity, metalwork, power mechanics and woodwork. These courses have some joint objectives. The first is development of learners' insights on practical skills and their place in the society. The second is the identification, development and application of individual talents in practical subjects. The third is the promotion of learner's ability to interpret and express practical ideas more effectively and to select and use tools to make valuable items using locally available material in solving problems related to the design and construction of projects. The fourth objective is to promote the acquisition of skills and attitudes that will enable learners to select, use and care for manufactured products in an informed way. As with the business studies curriculum, there are some areas of overlap, particularly in woodwork and metalwork where the common topics include safety, building materials, measuring and marking out, separation and planning. Information related to occupations and further training is covered in all the seven courses, which also have their specific objectives and content as follows:

(a) Building Construction. This course strives to develop in students the ability to: select and use tools safely; select and use building materials more effectively; awareness on the requirements of building services and finishes; skills in the interpretation of working drawings; and to construct functional structures. The course content comprises of: shelter selection and preparation of sites; foundation types, including laying of foundations and building foundation walls; designing, excavating and leveling trench bottoms; and backfilling openings in walls, roofing, fixings, services, finishes and external looks; and related drawings.

(b) Drawing and Design. This course is intended to enhance the ability of the learner to: express ideas through the use of freehand sketching and technical drawing; read and interpret working drawings; distinguish between good and bad design with a view to identifying solutions to design problems and to appreciating the constraints involved in designing; and to make simple models using available materials. The main topics covered in this course are principles of design, general communication, use and care of instruments, types of drawings and their applications, drawing conventions, symbols and lettering, scale measurements and dimensioning, plane and solid geometry and orthographic projections.

(c) Electricity. The objectives of this course are to improve learners' ability to acquire skills in the safe use and care of tools and electrical components, materials and equipment; develop safety awareness related to electrical systems; troubleshoot and repair faults in electrical circuits; and to research on and develop individual projects. The topics taught therefore are fundamentals of electricity, safety and workshop behavior, magnetism and electromagnetism, measuring instruments, electrical machines, domestic installation, semi-conductors, troubleshooting and circuit analysis and project fabrication.

(d) Metalwork. The objectives of the course are to engender in the learner the ability to: develop skills in the safe use and care of materials used in metalworking processes; identify various common materials used in metalworking processes; interpret drawings related to metalwork projects; recognize various tools and equipment used in metalwork; perform accurately any given metalwork activity using correct tools and equipment; and make functional articles to suit relevant design requirements by applying correct metalwork skills and techniques. The metalwork syllabus thus concentrates on the teaching of metal cutting and preparation, sheet metalwork, riveting; forge work, brazing, oxy-acetylene welding, finishing and related drawings.

(e) Power Mechanics. This course aims at imparting to learners skills that should enable them to: develop an insight into and understanding of operations, maintenance and servicing of power producing machines and transmitting systems; develop individual talents and use them in desirable skills in the field of power mechanics; read mechanical drawings and interpret information available in service manuals; select correctly, use safely and care for common repair tools and equipment; identify and solve common problems related to construction and operation of machines and their power transmitting components in a sequential manner; select quality spare parts and replace defective parts; and to show desirable attitudes in handling manufactured products. The course content includes: topics on related technical drawings; hand tools and their use in fastening devices, riveting, soldering, and oxy-acetylene welding; engine and other energy converters and the dissemble and reassembly of engines; engine bearings, lubricants, gaskets and engine seals; engine systems and engine troubleshooting; power transmission systems, brake systems, wheels, suspension systems; chassis and body construction; automobile electrical systems; and physical concepts and law.

(f) Woodwork. This course aims at developing in the learner skills related to: proper use and care of basic woodworking tools and equipment; identification of and use of local wood and manufactured wood products; their ability to acquire skills related to constructing functional items; developing awareness of the safety aspects related to personnel, tools, materials and equipment used in woodworking; demonstrate ability to read and interpret working drawings; appreciate the basic aspects of good design with regard to

wood products; appreciate and apply related knowledge to solve problems with woodwork; and to understanding the importance and demonstrate methods of planting and conserving trees. Outside of the common topics listed above, the other topics covered in this course are cutting holes, shaping, furniture assembly and finishing and related drawings and designs.

3.2 Drawbacks of the Curriculum

The curriculum described above has been faulted for four main reasons (K.I.E, 1995 and 1999). First, some of its objectives are virtually unachievable in the face of available resources. A second problem relates to many overlaps across subjects. For example, the agriculture syllabus repeats many topics covered in biology, chemistry, geography and business education. Likewise, all the business education courses duplicate up to half of the curriculum content of the other courses in this cluster. There are also some repetitions among the industrial courses; the whole drawing and design course is repeated in the other industrial courses. Overlaps are also observable across the three levels of education, i.e. primary, secondary and university. The question of overlap in course content is significant given that most students enrolled for these subjects often take other subjects offering the same coverage. This leads to the third problem identified by teachers on the sequencing of the syllabus content namely that in some cases, there is little logical progression from one subject to another. Sometimes, difficult material is taught before students are introduced to simpler and more basic content. In other cases, material already taught in primary school is also offered at the secondary level and for some subjects such as home science, commerce and economics, some content has been viewed as better suited to university education.

In addition, the vocational curriculum has been criticized for being obsolete and not responsive enough to the needs of local, national and regional markets. This is tied to its failure to keep pace with changing times and the tendency to promote knowledge that is unfamiliar to learners. Some of this knowledge is also obsolete, as most schools do not have equipment that is needed to teach newly emerging knowledge in some of the vocational areas. Nor are teachers adequately prepared to convey such developments. Thus, the above objectives and content have proved difficult to implement for their being unrealistic and almost unachievable by most schools as more is being targeted than can be achieved given the available resources at the school level.

In view of the above and as a result of complaints by parents and educationists (Kenya, 1999), MoEST has recommended a revision of the primary and secondary education curriculum. In a June 14, 2002 press release, Education Minister, Henry Kosgey (Kenya, 2002), noted that evaluations of the *8-4-4* system in 1990, 1995 and 1999 "*... have shown that the curriculum was too broad and there was need to review and rationalize it. It was not therefore feasible to fully realize the expected objectives. In 1991 the curriculum was revised and an attempt made to reduce and reorganize the content in the various subject areas. The number of examinable subjects per student in secondary schools was reduced from 10 to 8. Despite these measures the school curriculum continued to be overloaded in subject content with overlaps across subjects and levels. It was also demanding in terms of books required to implement the curriculum and the households found it difficult to meet the cost of learning materials for their children. The reports also indicated that the curriculum at both primary and secondary schools was not meeting the needs of the learners fully and needed to respond to the needs of changing society. Following the foregoing a national survey was carried out in 1999 which has resulted in the reduction of subjects in primary schools from 13 to 9 and in secondary schools from 35 to 14...*" The revised secondary education curriculum will include mathematics, English, Kiswahili, biology, chemistry, physics, geography, history and government, religious education (Islamic, Christian, Hindu) and physical education. Thus all the industrial subjects and computer studies will not be offered under this new curriculum beginning 2003 and secondary schools with industrial education equipment have been asked to turn them over to technical training institutes. Although not so widespread, complaints have been raised on the wisdom of doing away with vocational education altogether in the face of the educated unemployment problem as well as

on the cost-efficiency of the move given that Kenya Technical Teachers College (KTTC), Kenya Science Teachers College and Moi University will continue to train teachers for these subjects and that there are already many teachers employed to teach them in secondary schools (Kavagi, 2002). There are those who argue that what is needed is to redesign a vocational education curriculum that is affordable and more in tune with changing times. In this connection, the withdrawal of computer studies has been particularly contentious.

3.3 Teaching Time and Methods of Delivery

3.3.1 Teaching Time

The time allocation for the teaching of vocational subjects is shown in Table 3.1. The Table gives an indication on the number of periods per week each of the vocational courses is supposed to be taught for as well as the estimated total number of hours it would be taught for after four years of secondary education. It is also apparent that each vocational subject is allocated between 7% and 11 % of the total time available (45 periods) for all 14 subjects offered at the secondary level. It is not possible to estimate the actual amount of time taken up by all vocational subjects in each school as none offers all of them and given that students can only select one for specialization in forms 3 and 4. It is also clear that home science, agriculture and computer studies courses are allocated the most time of the vocational subjects. During the four years of secondary education a student enrolled for these subjects is taught for up to 598 forty-minute periods and almost 400 hours. Each of the industrial courses is allocated up to 528 forty-minute periods and just over 350 hours. Business studies courses have the lowest time allocation at 462 periods and 308 total teaching hours in four years. For the industrial subjects, a clear distinction is made between time allocation for the theory and practical periods with 2 of each per week. This notwithstanding much of the teaching for these subjects tends to be theoretical in the absence of adequate equipment and workshops. For example, a KIE formative evaluation report (KIE, 1995) shows that although 3,131 workshops were needed for complete coverage of all the schools offering vocational subjects, only 1,788 (57%) were in place in 1991. According to the MoEST inspector for technical subjects (no recent data are available), the situation has not changed significantly from that of the early 1990s. With regard to home science and computer studies, some schools allocate an extra period each week. For home science, this is because the syllabus is too wide while for computer studies it is more because of the keen interest many students have in the subject.

Table 3.1: Time Table Allocation for Vocational Subjects (2002)

Subjects	Weekly lessons (theory)		Weekly lessons (practical)		Approximate # of lessons per 4 Years (theory & Practical)	Total Time in Hours (4 years)
	Forms 1-2	Forms 3-4	Forms 1-2	Forms 3-4		
Agriculture	3	5	Same Periods	Same periods	598	379
Business Studies	3	4	Same Periods	Same periods	462	308
Computer Studies	3	5	Same Periods	Same Periods	598	598
Industrial Education	2	2	2	2	528	352
Home Science	3	5	Same periods	Same periods	598	399
9 subjects	45	45	Same periods	Same periods	1,485	990

Source: Ministry of Education, Science and Technology (2002)

A major complaint by the teachers interviewed is that the time allocated for both the theory and practical teaching is hardly enough for effective teaching of most vocational subjects. The problem is most acute for agriculture and home science. According to teachers of the two subjects, the syllabus of the two courses is too broad. The situation is exacerbated by the perpetual shortage of relevant facilities and equipment for effectively teaching the many practical components of the syllabus supposed to be undertaken during the duration of teaching the two courses. In fact, in the case of agriculture, teachers noted that the requirement of handling so many practical sessions could hardly be met because most schools lack farm tools and plots (especially those located in urban areas) on which to use them. Instead, the majority of schools have only small-sized demonstration plots (the average is about one plot of 10 square meters), which are mainly used for the examinable practical projects by final year students.

3.3.2 Methods of Delivery

In the absence of adequate time to cover the syllabus, the pressure to excel in examinations has forced most teachers to use more of their free time at nights and weekends for the teaching of the practical component of vocational subjects. Although this is the case for most subjects, the problem is particularly serious for subjects that have a practical component, in particular home science and agriculture. This is the evidence provided by a KIE research report (KIE, 1999) and corroborated by all the home science and agriculture teachers interviewed in seven of the schools offering these subjects among those that were visited. In other cases both teachers and students give up some of their vacation time to teach these and other subjects. Other strategies used by teachers of these and other subjects include early morning lessons, giving too many assignments to students, rushing over topics, drilling students and concentrating on what is likely to be included in the KCSE, teaching practical work theoretically and use of group, team and block teaching. According to students, parents and teachers, the major drawbacks of extra-timetable teaching are that students: tend to experience exhaustion and stress, are denied time to socialize with peers and parents and for entertainment, are exposed to insecurity and are more likely to engage in irresponsible behavior. Extra tuition is also unpopular with parents as it increases the cost of education (K.I.E, 1999).

Some of the teachers interviewed suggested that industrial subjects should be allocated at least six lessons (instead of four) each week. Two of these lessons would be for the theory part of the syllabi while four would be for the practical lessons. In the case of home science, teachers did also explain that the assumption that students would have adequate time to practice the subject at home hardly holds water as most girls' schools which offer this subject are boarding institutions. Of the vocational subjects, business education courses were said to be the least demanding from the point of view of mounting them and the time they require for teaching. The only exception here is typewriting with office practice, which requires students to practice typing during their free time; however, time constraints is not nearly as serious as it is for agriculture and home science.

A number of teachers have sought innovative ways to make the teaching of some vocational subjects more attractive to their students in the absence of adequate teaching/learning resources. For example, at Kagwe Girls in Kiambu, one of the top performing schools in commerce in the 2001 KCSE examination, the commerce teacher uses a number of strategies including: arranging visits to commercial enterprises such as banks, post offices and local trading centers and markets; demystifying the mathematical aspect of the subject by simplifying relevant mathematical calculations and using familiar life experiences as examples; and through regular continuous assessment tests. In accounting, Starehe Boys Centre has introduced a post-secondary diploma-level training for interested students in accounting while some of the industrial subjects' teachers make an effort to use locally available materials and organize tours to agricultural and other trade exhibitions. For most subjects, some teachers invite guest lecturers to cover specific topics in which they possess relevant experience. In home science, some teachers organize visits to food processing factories, hotels and relevant university departments, among other initiatives. Finally,

some teachers of all vocational subjects in schools located in or near Nairobi organize a system whereby their students spend time with professional persons for a whole day(s) as a way of mentoring them.

3.4 Input Requirements

3.4.1 Teachers

The introduction of the 8-4-4 system of education resulted in a situation whereby teacher-training institutions could not match the demand for vocational subject teachers, particularly those for industrial subjects as more schools introduced these subjects in 1986. Thus, the number of schools offering industrial courses for the secondary school leaving examination rose from 44 in 1987 (the last year the old secondary school curriculum was examined) to 1,024 in 1989 (the first year 8-4-4 graduates did the KCSE examination). For individual subjects, the respective increases were: 4 to 289 for building and construction; 4 to 142 for drawing and design; 5 to 187 for electricity; 11 to 167 for metal work; 5 to 116 for power mechanics; and 12 to 250 for woodwork. As a result, many of the schools that opted to offer industrial courses had to do with untrained technical teachers who had been trained in the technical institutions and national polytechnics. Unlike KTTC, KSTC and other diploma college graduates, these untrained teachers had not received any training on pedagogy; nor could they be utilized for the teaching of related science subjects. Official MoEST statistics show that as of 2001, more than 90% of the teachers in Kenya's secondary schools were trained (Republic of Kenya, 2001). Data from the TSC however illustrates that most of the teachers available for the vocational subjects have either diploma or certificate level qualifications as Table 3.2 demonstrates. Part of the problem is that no industrial education teachers are trained at Kenya Science Teachers College (KSTC) and the Kenya Technical Teachers' College (KTTC) since the mid 1980s while the TSC has not recruited IE teachers since 1997.

Table 3.2: Qualifications of Teachers of Selected Subjects (2002)

Subject	Teacher Qualifications					
	Degree	Diploma	Certificate /other	Total	Total Qualified	% Qualified
Accounting	207 (54)	137(36)	37(10)	381	344	90%
Agriculture	614(35)	637(36)	522(29)	1,773	1,251	71%
Computer Studies	6(67)	3(33)	0(0)	9	9	(100%)
Home Science	498(90)	357(52)	97(10)	952	855	(90%)
Metalwork	1(16)	17(77)	4(18)	22	18	(82%)
Woodwork	13(9)	74(53)	52(37)	139	87	(63%)
Total	1,339	1225	712	3276	2564	(78%)

Source: Teachers Service Commission (TSC). Notes: (1) Data on other subjects is unavailable as of now; (2) Figures in brackets are percentages

The data available is for five subjects - accounting, agriculture, computer studies, home science, metalwork and woodwork. Out of 2,9161 teachers of these subjects, less than half or 1,339 (41%) have university level qualification, 1,225 or 37% diploma level qualification and a further 712 (22%) certificate qualification or below. Woodwork has the most teachers with certificate or secondary level qualifications (37%) followed by agriculture (29%) and metalwork (18%). It is not surprising that it is the industrial subjects that have the fewest university-educated teachers. Except for wood technology, which is offered at Moi University, the others are not taught in the public universities while training at KSTC has stopped for all vocational subjects except woodwork. That up to 29% of the agriculture teachers have certificate

qualifications or below is also not surprising given that agriculture teachers are mainly trained at diploma level at only one public university, Egerton University, and because of this the subject has the highest demand for teachers of all the vocational subjects. There are more schools offering agriculture (3,122) in Kenya than any other subject. It is also clear from this Table that even though computer studies has the highest percentage of qualified teachers, they are very few indeed. This is because persons qualified to teach this course are likely to find employment opportunities outside of the teaching profession. Teacher shortage is not a serious problem for vocational subjects except in agriculture, commerce and computer studies where there were 588, 442 and 121 vacancies respectively as of July 2001. In the same year, there were 20 vacancies in home science. Industrial subjects are relatively better off as only woodwork has a substantial number of vacancies (18) while there are 7 in electricity and 1 each for metalwork, building construction and power mechanics. This is the case because there are more teachers trained in these subjects than is their demand by schools. Only a negligible number of Kenya's secondary schools teach these subjects (see Table 3.4). As is evident from Table 3.3, the subjects most hit by teacher shortage are English, mathematics, kiswahili and the sciences.

Table 3.3: Secondary Schools Summary of Vacancies (2002)

Subject	Vacancies
English	908(14.5)
Mathematic	756(12.0)
Kiswahili	790(12.6)
Biology	469 (7.5)
Physics	631(10.1)
Chemistry	511 (8.2)
History	289 (4.6)
Christian Religious Education	130 (2.1)
Islamic Religious Education	28 (0.5)
Physical Education	2 (0)
Social Education & Ethics	0
Geography	263 (4.2)
Home science	59 (0.9)
Art & Design	20 (0.3)
Agriculture	442 (7.1)
Woodwork	18 (0.3)
Metalwork	1 (0)
Building Construction	1 (0)
Power Mechanics	1 (0)
Electricity	7 (0.1)
Drawing and Design	8 (0.1)
Aviation Technology	0
Computer Studies	121 (1.9)
French	51 (0.8)
German	5 (0.1)
Arabic	18 (0.3)
Music	29 (0.4)
Accounting	75 (1.2)
Commerce	588 (9.4)
Economics	27 (0.4)
Typing with Office Practice	12 (0.2)
Total number of vacancies	6258 (100)

3.4.2 Workshops, Equipment and Consumables

Except for accounting, commerce and economics courses, all the other subjects require workshops, which are well equipped with appropriate practical learning materials.

(a) *Computer studies.* The needs for this course are listed as: physical facilities which include a computer laboratory/classroom; at least one computer for every two students and one printer to every four computers; printing stationery; blank diskettes and storage for diskettes; and software appropriate for the curriculum. All computers should be IBM compatibles. These requirements are unattainable by a majority of Kenyan schools as a result of which only privileged private schools, established provincial and national schools might be in a position to offer this course to their students. Thus, the less endowed schools that opt to offer this subject largely depend on donations of usually obsolete models of computers, which are housed in poorly built computer laboratories or in a small section of a normal classroom. The relatively high cost of the equipment needed, lack of qualified teachers, maintenance technicians and electricity account for the fact that only 2% of the schools that register candidates for the KCSE offered this course in 2001. Those schools that can afford the equipment required for this

conveys information on examination performance by subject. For both the 2000 and 2001 results, performance in all vocational subjects except the business studies courses of economics and commerce, is on average better than that of all other subjects with the exception of foreign languages (Arabic, French and German), social education and ethics and history and government. Except for home science, boys perform better than girls in all vocational subjects. Economics and commerce appear to be the harder options among the vocational subjects but even for these subjects performance is generally higher than that of the compulsory subjects and the sciences.

3.3.3 Textbooks

In addition to limited infrastructure for most of these subjects, there is the problem of inadequacy and inappropriateness of the textbooks available for use by students and teachers. For some subjects such as computer studies, there are no recommended official textbooks, so the more creative teachers have to identify possible textbooks and other teaching/learning materials. While this may not be a serious problem for teachers in major urban centers, and especially Nairobi, it is a key challenge for teachers in remote rural locations. Where textbooks are available, they are often in short supply. This is less of a problem however in the high-cost and national catchment schools or in the provincial and district schools that are managed by religious organizations particularly the Catholic Church. In these schools the recommended textbook: student ratio of 1:2 is more than achieved. In the less endowed schools, this ratio can be as high as 1:6. However, even for courses for which textbooks are available, there is a serious problem with their quality. Most teachers complained about the numerous mistakes with the content and typing errors in the K.I.E recommended textbooks yet, these books are not only used by teachers and students but also by examiners. Some teachers also told us that these KIE published books often confuse students who confront teachers with facts they claim are true because they appear in a book recommended for their use by the K.I.E. There is also a serious problem with regard to the availability of reference books which is however a luxury for most secondary schools. In addition some of the textbooks available for industrial subjects are foreign published and thus not the most appropriate for the Kenyan environment. Box 3.3 below demonstrates the how lack of facilities could hamper the performance and popularity of vocational subjects.

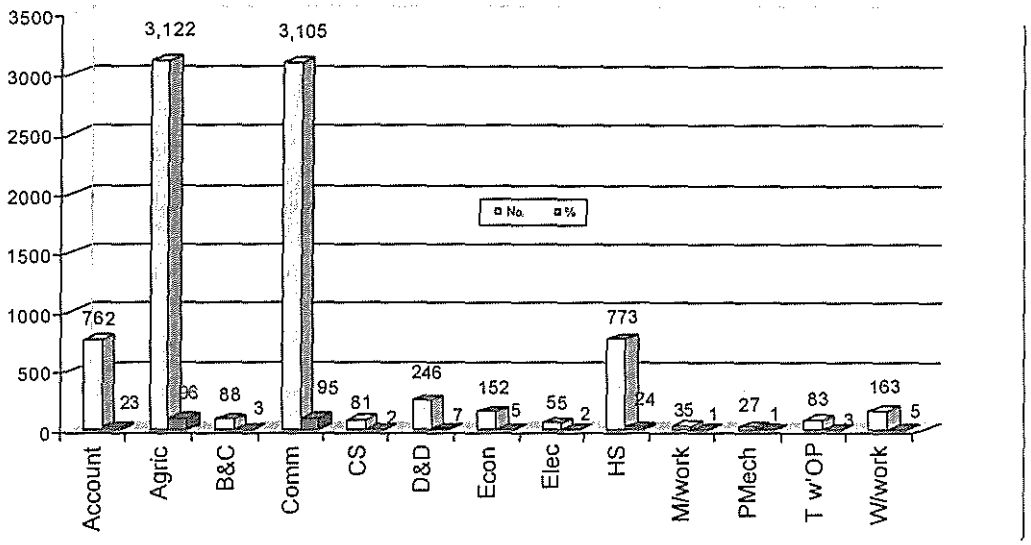
Box 3.3: The Difference that Lack of Infrastructure Makes: The Experience of Friends School, Bukembe

Friend's Secondary School, Bukembe is a mixed day and boarding *school located in Bungoma district, Western Province. The school offers woodwork as a one of the vocational subjects but has the reputation of performing dismally in this subject over the years. The main reason is the lack of basic tools, equipment and learning/teaching materials such as textbooks. Tools that are available are poorly maintained and in bad condition. Faulty consumable materials such as poor quality and defective timber and screws used for practicals contribute to poor performance. Also lacking is a fully-fledged woodwork workshop. This has affected overall performance in the subject because students do not have access and adequate exposure to requisite learning experiences for the attainment of the stated instructional objectives. The adoption of poor and unprofessional pedagogical approaches that place more emphasis on theoretical knowledge has resulted in generally incomplete coverage of the woodwork syllabus. Tuition has been selectively conducted with emphasis laid on areas where examination is likely to be set from. Through this approach, teachers have short-changed their students in terms of covering the syllabus. During the practicals, teachers explained that lack of patience and keenness during the cutting of joints, preparation of surfaces and finishing application has resulted in poor workmanship, which in turn earns students poor grades in practical examinations. Selection of students who scored low marks in the* KCPE *has further jaded their chances of performing well in the subject. Their generally low aptitude level has had a negative influence on their performance. Partly as a result of this, a majority of students have negative attitudes towards the subject; few recognize its relevance. Woodwork is viewed as a subject for academically challenged students and many students therefore do not imagine how one can study all the way to high school to study woodwork. This negative mentality towards the subject has affected performance and applicability of skills gained at school for earning a living. Since Bukembe is located in an area where it draws its students, one would expect to witness small business ventures around the school's catchments zones. However, a visit to the carpentry workshops in nearby market centers*

State led in terms of both number of candidates entered and performance in the KCSE examination in this subject.

(c)

Chart 3.1: Number of schools* offering vocational subjects (2002)



Source: Kenya National Examinations Council (KNEC) (2002)

* The total number of secondary schools is 3,272

Key:

Account = Accounting Agric = Agriculture Comm = Commerce CS = Computer Studies
D&D Drawing and Design Econ = Economics Elec = Electricity HS Home Science
M/work = Metalwork Pmech = Power Mechanics T w'OP = Typing with Office Practice
W/work Woodwork

The low enrollment in these subjects has been the trend during the last eleven years or since the introduction of the vocational subjects in the formal school curriculum as demonstrated in Table 5.1. Other schools offering and excelling in these subjects are the former industrial schools such as Nyandarua, which enrolled 17 candidates for the KCSE examination in 2001 when it was the top performing school. All the former industrial schools are adequately equipped to teach industrial courses. Box 3.2 illustrates the privileged position of Nyandarua and other such schools. Some schools offering the industrial subjects may have the basic equipment but no workshops for practical lessons. As a result, teachers have to organize a system of sharing the available workshops between a number of subjects while others who lack both workshops and basic equipment resort to teaching the subject theoretically. As of 1991 when data on the workshop situation in secondary schools were available, almost 47% of the schools offering the practical vocational subjects had no workshops.

(c) Agriculture. The main requirements for teaching agriculture course are land for farming and raising livestock, farm machinery, hand tools and seeds and plants. This is the most popular subject offered in Kenyan schools as evidenced by the fact that 96% of all schools registering candidates for the KCSE examination offered it in 2001. Commerce is a close second as 95% of the schools offered it in the same year. Apart from the fact that it is easily identifiable with most of Kenya's rural population, the popularity of agriculture has a lot to do with the fact that the amount of land required for teaching the practical aspect of the subject could be a few square meters and because there are no demands placed on schools to purchase expensive machines such as tractors and ploughs. The subject is however not particularly popular in urban centers. In fact, where urban schools register students for it, their performance in the

KCSE examination is on average poorer than that of rural schools. Thus, none of the top performing schools in this subject at the KCSE examination happened to be located in large towns such as Nairobi or Mombasa (KNEC, 2001).

Box 3.2: The Privileged Position of Nyandarua High School's Metalwork Students

Nyandarua High School is a mixed provincial boarding school situated in Nyandarua district, Central Province. The school topped countrywide in the metalwork examination in the 2001 KCSE examination. Metalwork as a technical subject is not new in the school. Long before the inception of 8-4-4 system, the subject was being taught. The school has been able to build confidence in the learners fashioned on this tradition bearing in mind that it is the only school in Nyandarua district that offers metalwork and most of the boys are serious about making use of a chance they perceive as golden. As the majority of students opine, they opt for metalwork due to their inclination to the subject having been introduced to its rudimentary skills while in primary school through art and craft in which they performed well at the Kenya Certificate of Primary Education (KCPE) and hope to do even better. Unfortunately art and craft as well as home science and agriculture are currently not examinable at the KCPE level. According to students, good performance in the subject has been driven by their career aspirations and relevance of the subject to their lives. Many aspire to be engineers noting that the country needs technically skilled manpower. As a springboard to the attainment of their goals, learners opt for metalwork. The presence of a state-of-the art workshop by the standards of most Kenyan schools has greatly boosted learners' morale. On their part, the teachers attribute their success to the spirit of cooperation espoused by the administration. It has remained awake to the needs of the subject by providing training materials despite the fact that these materials are very expensive with yearly expenditure estimated at Kenya Shillings 150,000 (US$ 1,900). Teachers always endeavor to cover the syllabus in good time especially for the theory part while great emphasis is laid on accuracy, which is vital in project work, and *which students take seriously. Apart from the industriousness of teachers and learners, in the words of one student, "the subject breaks the monotony of listening to the teachers in class because the subject entails project work which is interesting and fulfilling".*

(d) Home Science. For home science, the main requirements are a workshop, cooking equipment, sewing machines, worktops and other tables, a refrigerator (s), a sofa set (s), iron boxes and ironing boards and related equipment. A home science laboratory is almost half as expensive as a computer laboratory but much less expensive than the industrial subjects' facilities. As with these other subjects, a reliable supply of electricity is essential and thus, in addition to the cost of the equipment and inadequate supply of teachers, contribute to the fact that although this subject was introduced long before the beginning of the 8-4-4 system of education, it is offered by only 24% of the total number of schools that registered students for the KCSE examination in 2001.

(e) Typewriting with office practice. This course is also relatively demanding as any interested school has to have a typewriting workshop, at least one typewriter to two students, computers for those schools that can afford them and appropriate stationery. Where schools use electric typewriters, a reliable supply of electricity is a must. As a result, this subject is offered by only 3% of all the schools that registered students for the KCSE examination in 2001. The course is therefore the least popular in the business education cluster as it is the only one demanding expensive infrastructure. Economics is also relatively unpopular as only 5% of schools offer it. This has to do with the facts that the subject is viewed as a hard option. In fact, performance of students in this subject is one of the poorest among the optional KCSE subjects. On average performance is poorest in the sciences and other compulsory subjects, namely mathematics and English partly because of the large numbers that enroll for these compulsory subjects, poor preparation in primary education and lack of adequate qualified teachers in most schools. Table 6.1

subject however, especially the high cost private schools located in Nairobi have done quite well in the subject. In fact, because the ability to afford the required equipment and teaching resources is critical with regard to good performance in the subject, it is hardly any surprise that for the 2001 KCE computer studies examinations, 7 out of the 10 top schools happen to be situated in Nairobi and its close environs. These schools are Strathmore College, Starehe Boys' Centre, Dagoretti High School, Pangani Girls, Loreto Convent Limuru, Alliance Girls' High School and Mary Hill School. The outsiders were St. Joseph Ramogi, Precious Blood Kilungu and Friends School Kamusinga. Box 3.1 below summarizes some of the factors that enhance the popularity of computer studies at schools such as Strathmore College based on interview with teachers at this school.

Box 3.1: The Attractiveness of Computer Studies at Strathmore College

Strathmore College is a private boys'- only day school located in Nairobi. It was the overall top performing school in the KCSE examination in 2001. It has led in computer studies in the KCSE examination for the last two years. Like most top Kenyan schools, Strathmore limits the vocational subjects offered to the barest minimum. Out of a possible 15 vocational subjects, the school teaches only computer and business studies. In fact, the head teacher indicated that even those two subjects are popular among students because they improve their overall KCSE grade and not so much due to their vocational appeal. In fact the commerce teacher was surprised by our allusion to commerce as a vocational subject. Nevertheless, the computer and business studies teachers explained that there are other reasons why this subject is particularly popular with their students. One of them is the perceived occupational success of Strathmore students who have excelled in IT related careers both during and after their stint at the school. For example, out of the current class of 20 students, 7 of them do part time jobs with city computer firms. In fact, almost all the students enrolled for the course find employment immediately they graduate from the school as they await entry into the university. Some students even opt from pursuing further education preferring instead to settle for trainee positions in the ICT sector. Many of those who join the university also have opportunities for attachments with computer firms where they take up employment on graduation. The Strathmore students enrolled for the computer course are motivated by a host of other factors. Most of them have a very good background in the sciences and mathematics, have a computer to themselves at school and come from homes where they have access to computers and where computers and the IT revolution are familiar discussion points. In addition, students enrolled for the course have access to the computer laboratory as long as they wish and have a teacher who is an MIT graduate to guide them through their computer escapades both for school-related assignments and for their own creative drive.

(b) *Industrial subjects*. The requirements for these subjects are a workshop, workshop machines and hand tools. The demands vary from course to course with the most expensive to equip being workshops for power mechanics, metalwork and electricity. In the case of power mechanics, for example, some of the recommended machines that are unaffordable by most schools are single and multi-cylinder engines, compressors and drills, among others. Even for woodwork, most schools offering it lack standard equipment such as planers and circular saws. Other demanding courses, more because of the number of items that need to be purchased by schools that offer them, and not so much because of costly individual items, are woodwork, electricity and drawing and design. Woodwork was offered by 5% of all schools in 2001 while only 2% offered electricity in the same year. The least common vocational courses are metalwork and power mechanics due to the high cost of starting and maintaining them. As with computer studies, all industrial subjects require the availability of electricity. In 2001 for example, only 312, 368 and 497 candidates entered for the KCSE examination in power mechanics (refer to table 6), metalwork and electricity, respectively. Not unexpectedly Kabarak High School, a national secondary school patronized by Kenya's Head of

The location of Bukembe secondary school in the neighborhood of a number of market centers where there are various types of workshops may not necessarily be an advantage for vocational subject graduates of these schools for two main reasons. For one, the workshops are small family enterprises, which cannot afford to hire trained artisans. Proprietors would rather train their own relatives on the job. Second, students themselves generally look down upon these local workshops instead preferring to look outside their respective home locations.

4 Costs and Financing of Vocational Education

4.1 Costs of Teaching Vocational Subjects

Depending on the subject, the cost of teaching most vocational subjects is on average higher than that of teaching all science subjects which are comparable to them from the point of view of the basic teaching/learning resource needs. The main examination costs of teaching vocational subjects relate to: workshops and workshop equipment; teachers; textbooks; small class sizes; and examination of practical subjects.

4.1.1 Workshops and Workshop Equipment

All the vocational subjects with the exception of the business studies courses need workshop facilities for teaching the practical aspects of the curriculum. In almost all cases, the cost of setting these workshops up and equipping them is higher than that of similar facilities for the sciences. As Table 4.1 shows, the cost of a computer studies laboratory and a home science room is much higher than that of a science (chemistry, biology, physics) laboratory. Home science and computer laboratories are also almost twice as expensive as science laboratories to equip. However, the annual costs for running a home science room are far lower than that of other subjects. Although some industrial subjects such as power mechanics and metalwork can be quite expensive to equip, these subjects are a rarity in most Kenyan schools and thus their comparison with the more common subjects such as home science may not be justified. The same is true of computer studies. The maintenance cost of the vocational subjects' equipment is also higher than that of science equipment. In the case of home science and computer studies, cookers, refrigerators, and other electric power equipment and computers often break down partly because many students are being exposed to their use for the first time and due to electric power fluctuations. Moreover, these items of equipment call for more security and thus the additional costs of metal grills and salaries for security personnel. On the contrary, science equipment are less amenable to theft and experience longer life spans than those of home science and computer studies. Also clear from Table 4.1 is the fact that subjects which require no workshops but normal classrooms are much less expensive to teach than those that do.

Table 4.1: Estimated Costs of a Science Laboratory and Workshops (US$)

Subject	Cost of Building Workshops	Cost of Equipment (Usable for 5-10 years)	Cons-umables (Yearly)	Estimated student places (based on KSCE entries)	Estimated per student cost (5 year period)
Computer studies (private high cost, Nairobi)	20,000	25,000	2,000	17	553
Home science (public, low cost, Bungoma)	40,000	25,000	500	22	600
Industrial (woodwork)(public, Nairobi)	25,000	10,000	1,000	19	379
Science laboratory (chemistry)(public, Meru)	30,000	10,000	1,000	90	91
Standard classroom (Kiambu)	5,000	1,500	200	40	35

Source: MoEST and school level data (5 schools) (2002)
Notes: (1) 1 US$ = KES 78 as of June 2002; (2) The estimates for the computer facility is for a top of the range private school. The average cost in a public school would be about 1/2 of the cost of this high cost private Nairobi school; (3) Construction and equipment costs are on average 10% higher in the rural than urban areas; (4) a woodwork workshop is much cheaper to set up and maintain than those of other industrial subjects.

4.1.2 The Cost of Teachers

Science teachers are more expensive to employ than their counterparts in vocational subjects. In a bid to encourage science graduates to join the teaching profession, the government has introduced a monetary incentive amounting up to 30% of the graduate teachers' basic salary for science teachers and teachers of compulsory KCSE subjects such as English, Mathematics and Kiswahili. Included in this category are teachers of agriculture, typing with office practice and accounting. These privileged teachers enter the graduate teacher-salary scale three salary points above the minimum. Science teachers also have more salary raises and chances of promotion than their counterparts teaching vocational subjects. However, depending on the school in which they are teaching computer studies, teachers in private schools earn higher salaries than most science teachers. Some public schools also introduce some incentives for their computer and business education teachers through PTA contributions. Second, vocational subject teachers may on average be more expensive to train than science teachers. This is because a good number of them first enroll for a three-year diploma course in a technical institute or diploma level college followed by a two-year diploma course in education to enable them gain relevant pedagogical skills. Most science teachers on the other hand, hold either a three or four year university degree while still many others hold a three-year teaching diploma. A third factor that may make teachers of some vocational subjects more expensive to retain is the fact that on average they teach fewer classes than their science counterparts. In fact, because vocational subjects are optional for the KCSE examination, some lessons meant for these courses are allocated to other subjects for which there is more demand by students. In some schools therefore, some vocational courses teachers end up having free paid time. However, in the better-managed schools, head teachers allocate them other responsibilities outside of teaching such as management of clubs, school maintenance and student catering among others. In other cases, some of the vocational education teachers are trained to teach other subjects.

4.1.3 Cost of Books

Secondary school textbooks for most subjects cost an average of $3 - $4 each. Of the vocational subjects, only books for agriculture, commerce, and economics and to some extent those for accounting fall within this category. The cost of most vocational textbooks is raised by two main factors. First, books for virtually all these subjects with the exception of those for business studies and home science are imported. As a result, some books for industrial subjects, computer studies and typing with office practice may cost as much as $10 apiece. This is particularly the case for reference materials. Second, because of the small number of students enrolled in the vocational subjects, local book publishers show little interest in publishing vocational subject texts. Those who do, retail them more expensively than texts of the more popular subjects. Third, because of the variety of the subject matter and relatively un-established tradition with vocational subjects as well as an absence of commonly agreed upon textbooks, there tends to be more reference books recommended for the vocational subjects than is the case for comparable science subjects, which further raises the cost of teaching these subjects. Nevertheless, the small numbers of students registered for these subjects means that they have more access to the available textbooks once they have been bought. In even the less privileged schools, student: textbook ratios are usually lower (2:1) for vocational subjects compared to an average of 6:1 for other subjects particularly the compulsory core ones (English, Mathematics, Kiswahili).

4.1.4 Class Sizes

On average, class sizes of vocational subjects are smaller than those of science courses. For example, while the mainstream sciences enroll an average of at least 30 students for the KCSE examination, except for commerce and to some extent accounting, all the other vocational subjects fewer than 20 students and in some cases even fewer than five candidates. This fact is demonstrated by Table 4.2, which presents data on subject entries for the KCSE examination for the top performing schools in vocational subjects. This is because, whereas students are required to enroll for at least one science subject for the KCSE examination, all vocational subjects are optional. Second, the building of workshops and procurement of equipment has greatly contributed to curtailing the number of schools that could offer the applied vocational subjects. Whereas most established secondary schools had science laboratories built by either the government or donor organizations in the pre-cost sharing days, some established and almost all schools built after the introduction of cost-sharing find it hard to build and equip vocational subject workshops because this burden has been shifted to parents. The small numbers involved have made the government to want to remove the industrial subjects from the curriculum. The question is whether such small numbers of students merit the high investments in infrastructure and human resources. This question is now at the center of MoEST discussions related to removing vocational subjects, especially the industrial courses, from the curriculum.

Table 4.2: Students Entered for the Various Subjects in the KCSE Examination for the Top Performing Schools in Vocational Subjects (2001)

School	English	Kiswahili	Math	Biology	Physics	Chemistry	History & Government	Geography	Christian Religious education	Social Education and Ethics	French	German	Home Science	Art & D	Agriculture	Wood work
Kambandi	17 (12.3)	17 (12.3)	17 (12.3)	15 (10.9)	7 (5.1)	16 (11.6)	13 (9.4)	13 (9.4)	3 (2.2)	4 (2.9)	-	-	-	-	1 (0.7)	-
ST. Mark's Mokorogoinwa	2 1(13.4)	21 (13.4)	21 (13.4)	21 (13.4)	2 1.3)	19 (12.1)	5 (5.2)	7 (4.4)	7 (4.4)	9 (5.7)	-	-	-	-	14 (8.9)	-
Menyenya SDA	152 (12.6)	152 (12.6)	152 (12.6)	152 (12.6)	91 (7.5)	117 (9.7)	42 3.5)	85 (7.0)	27 (2.2)	10 (0.8)	-	-	25 (2.1)	-	66 (5.5)	-
Mutuma High	38 (12.5)	38 (12.5)	38 (12.5)	26 (8.6)	36 (11.8)	14 (4.6)	24 (7.9)	15 (4.9)	37 (12.2)	-	-	-	-	-	37 (12.2	-
Strathmore School	80 (13.6)	80 (13.6)	80(13.6)	54 (9.2)	80 ((13.6)	77 (13.1)	-	80 (13.6)	-	-	-	-	-	-	-	-
Precious Blood Riruta	88 (13.8)	88 (13.8)	88 (13.8)	83 (13.8)	51 (8.0)	88 (13.8)	36 (5.7)	40 (6.3)	88 (13.8)	-	-	11 (1.7)	18 (2.8)	-	3 (0.5)	-
Leitim	172 (12.5)	172 (12.5)	172 (12.5)	169 (12.3)	57 (4.1)	172 (12.5)	72 (5.2)	172 (12.5)	12 (0.9)	36 (2.6)	-	-	-	-	112 (8.1	-
Sawagongo	117 (11.3)	117 (11.3)	117 (11.3)	91 (8.8)	62 (6.0)	117 (11.3)	108 (10.4)	69 (6.7)	24 (2.3)	14 (1.4)	-	-	-	-	17 (1.6)	-
Moi High school-Kabarak	162 (12.5)	162 12.5)	162 (12.5)	160 (12.4)	138 10.7	162 (12.5)	94 (7.3)	90 (6.9)	50 3.9)	-	8 (0.6)	10 (0.8)	7 (0.5)	-	13 (1.0)	-
Nyandarua High	156 (13.6)	156 (13.6)	156 (13.6)	125 (10.9)	95 (8.8)	156 (13.6)	48 (4.8)	89 (7.8)	-	19 (1.7)	-	-	16 (1.4)	-	47 (4.1)	12 (1.0)
Kirima High	91 (12.5)	91 (12.5)	91 (12.5)	62 (8.5)	55 (7.6)	91 (12.5)	39 (5.4)	91 (12.5)	26 (3.6)	-	-	-	-	-	34 (4.7)	2 (0.3)

Table 4.2 continued

School	Metalwork	Building & Construction	Power Mechanics	Electricity	Drawing & Design	Computer Studies	Music	Accounting	Commerce	Economics	Typing with Office Practice	Total
Kambandi	-	-	-	-	-	-	-	-	15(10.9)	-	-	138
ST. Mark's Mokorogoinwa	-	-	-	-	-	-	-	1(0.6)	8(5.1)	1(0.6)	-	157
Menyenya SDA	-	8(0.7)	3(0.2)	-	-	1(0.1)	-	11(0.9)	112(9.3)	-	-	-
Mutuma High	-	-	-	-	-	-	-	-	1(0.1)	-	-	304
Strathmore School	-	-	-	-	10(1.7)	17(4.3)	-	-	30(7.7)	-	-	588
Precious Blood Riruta	-	-	-	-	-	-	6(1.0)	-	33(5.60	-	3(0.5)	636
Leitim	-	-	-	-	1(0.1)	-	1(0.2)	21(3.3)	32(5.3)	3(0.5)	-	1376
Sawagongo	-	-	-	-	8(0.8)	-	-	-	67(4.9)	8(0.6)	-	1036
Moi High school-Kabarak	-	-	9(0.7)	12(0.9)	-	-	8(0.6)	-	47(3.6)	-	-	1294
Nyandarua High	17(1.5)	-	-	-	-	-	-	75(6.5)	70(6.1)	11(1.0)	-	1148
Kirima High	-	-	-	-	-	-	3(0.6)	-	52(7.1)	-	-	728

Source: Kenya National Examinations Council data on the top performing schools in vocational subjects in 2001.

4.1.5 Cost of Examining Vocational Subjects

Wasanga and Ingolo (2001) further point to the cost of examining practical projects that is not the case for other subjects. First, practicing teachers assigned to assess several schools may stay away from their students for long time periods, yet they are being paid to teach. In practice, such teachers end up drawing two payments over the same time period. Second, are the costs related to printing and distributing relevant assessment documentation, and transportation and to paying for the assessors' professional fees when projects have to be assessed. It was not possible to get any estimates of the cost of examining vocational subjects from KNEC. Some MoEST officials and teachers have expressed their doubts as to whether these expenses are justified by the very low proportion of the marks awarded for practical projects.

4.2 Financing of Vocational Education

The financing of vocational courses is a shared burden between government and parents. Government pays for the salaries of teachers that are now accounting for upwards of 90% of the total recurrent expenditure on secondary education. Parents on their part meet the costs for buildings, equipment, books and consumables. In some cases, parents donate computers for the computer studies course and machinery and tools for some of the industrial courses. In addition to direct contributions by parents, schools have introduced a variety of levies in addition to the school fees. However, the rate of collection of both school fees and these levies is quite problematic for most schools, many of which receive less than 75% of the expected collections from students (Karani, et al, 1985). The situation has not been helped very much by the political declaration that no child should be sent home for lack of school fees as well as the placing of official limits on the amount of fees school heads can collect from parents. This situation does not augur well for the teaching of vocational subjects in two main ways. First, since a school's ability to raise funds determines the quality of the teaching/learning facilities available to it, most schools especially those in remote rural areas are bound to offer vocational education of questionable quality, if at all. As already indicated, such an education does not equip graduates of vocational education to compete effectively with their counterparts who have trained in the better endowed private institutions. Second, the goal of education for survival and self-reliance is unlikely to be realized as the skills learned by most graduates of public secondary schools are ill matched with the expectations of a fast changing and very flexible job market.

In this connection, four teachers of wood work and drawing and design from Moi Forces Academy and Bukembe High School explained that the practical content of the syllabus of the industrial subjects and the old equipment available in many schools offering vocational subjects (it is estimated that as many as 50% of these schools lack basic equipment) students are taught the most basic concepts often without any real opportunity to practice them. At Strathmore, Starehe and Kagwe Girls', computer studies teachers indicated that although there is a market for students gifted in programming, most of the others are poorly equipped for the job market because the focus of the curriculum is more on programming and in particular on "dead" computer languages such as Cobol, Pascal and Fortran. Much emphasis is also placed on DOS with little concern for what is more easily applicable in everyday life such as Internet applications. Teaching of Internet use is unaffordable by most schools offering computer studies due to the high costs associated with Internet connection. It was further explained that for most industrial subjects as well as business studies, the KIE personnel that prepares the syllabus is comprised of the "old guard" that has had few opportunities to acquaint themselves with new developments in these subjects. The situation is made even more serious by the limited professional interaction between these curriculum designers and employers as representation of employers in the KIE subject panels is limited to only one representative from the Federation of Kenya Employers (FKE) who rarely attend relevant curriculum development sessions. These views are supported by recent KIE research (KIE, 1999). According to this report, (the study team interviewed 1,362 students from 54 schools) the subjects most popular with students are English, mathematics, Kiswahili, biology, geography, physics, chemistry, history and government and

religious education in that order. These subjects were rated very highly in meeting the needs of students. The same report adds that the secondary education objective of vocational subjects, namely to "*enable the learner to choose with confidence and cope with vocational education after school*" (KIE, 1999:28) was rated as unachievable by the majority of the teachers, head teachers, lecturers of teacher training institutions and the education officers interviewed. The reasons for this are: " ... *general lack of facilities, equipment and material for practical work in schools ... practical skill subjects in the secondary cycle do not provide a strong base for vocational education because of curriculum overload ... inadequate career guidance in schools ... curriculum is too broad to allow students to be well organized in subjects of their choice ... the teaching emphasizes more on theory than practical work ... the students do not acquire adequate skills for the world of work, the subject cluster policy denies students freedom to choose subjects they are interested in ... learners have negative attitudes towards manual work ... teachers are not adequately trained and in-serviced to handle practical skills subjects ... school leavers lack capital for self-employment...* " (KIE, 1999:34). The sample from which these responses were gathered included 54 head teachers, 547 teachers and 39 education officers from 21 districts selected from all eight Kenyan provinces.

Also highlighted by this KIE report are responses from teachers regarding whether or not the secondary school curriculum meets the needs of school leavers. Teachers cited the following as the needs most important for the curriculum to meet: self-reliance and economic empowerment, moral uprightness/self-discipline, socialization, self-appreciation, intellectual growth and vocational skills in that order. However, the need that most teachers indicated is not being met is that of self-reliance/economic empowerment (53.4%), followed by the imparting of vocational skills (27.8%) (KIE, 1999:78). The report however notes that practical industrial subjects along with computer studies, mathematics and natural sciences were seen to be crucial for Kenya's industrial and technological development and relevant for student needs. Thus, the challenge is how to best address the identified problems in order to promote this goal.

Parents also pay for some specific vocational courses. This is especially the case with computer studies. The fees charged range from Kenya Shillings 2,500 (US$32) per term in high cost private schools such as Strathmore College (and some public schools) and Precious Blood Riruta, to no fees at highly subsidized institutions such as Starehe Boy's Centre. Although such fees are justified as a way for managing the running costs of the computer course, they tend to discourage most students from disadvantaged backgrounds from enrolling for this course.

5 Quantifiable Achievements

5.1 Trends in Enrollment in Vocational Subjects

Due to an unreliable system of collecting, analyzing and storing education data, it is not possible to provide accurate data on the enrollment of students in vocational subjects for all grades. In any case, as vocational subjects are optional, MoEST does not keep records of those enrolled for courses they have not decided would be their final selections. In view of this, we found records of students who register for the KCSE examination to be the best available data to use in estimating numbers of students enrolled in these subjects in the final year of secondary education. Table 5.1 gives a breakdown of students who registered for vocational subjects in the KCSE examination between 1990-2000. Data in the table shows that since 1990, more than 2 million students have done one vocational subject or another. The most popular subjects over the years have been agriculture and commerce and to a limited extent, home science. During this period, agriculture and commerce have accounted for nearly half of all the students registered for vocational subjects in the KCSE examination. Home science and accounting have also fared better than most other subjects. The popularity of agriculture and home science may have to do with the facts that:

these are some of the oldest subjects in the secondary curriculum; most students have practical experience with the main concepts being taught in them given their mostly rural peasant background and can therefore easily apply what they learn are easy to set up as schools can easily find staffing for them and because of relatively lower running costs; and because these are subjects where the pass rates in the KCSE is above average. This latter fact has been given as the reason relatively weak students choose these subjects for the KCSE examination. Commerce and accounting on the hand may appeal to students for the possibility of opening up opportunities for further professional training in areas which are among some of the most rewarding.

It is also evident from Table 5.1 that, overall, the popularity of most vocational subjects except agriculture, commerce, and accounting shows a constant trend. The number of students enrolled for the KCSE examination in vocational subjects rose from 201, 444 in 1990, the second year vocational courses were examined since the introduction of the curriculum in 1985, to 240, 242 in 2000. However, a drop was experienced in the industrial courses from where the number enrolled for the KCSE examination in these subjects dropped from 6,816 in 1990 to 6,097. Because of the insignificant numbers involved however, one cannot read too much into these data. The analysis is also somewhat complicated by the fact that, for reasons that are not easy to explain, there was a drop in enrollments of most subjects between 1993 and 1995. The reason for lessened interest especially among the industrial subjects, and typewriting with office practice, may have a lot to do with the increased costs associated with establishing and maintaining them. Of the industrial subjects, building construction appears the most popular with students, perhaps because construction is taking place in every part of Kenya, the difference being more of the degree of its prevalence. Although the number of students enrolling for computer studies, since its launching in the secondary education curriculum has been modest, the number of schools offering this course has risen from two in 1998 to 81 in 2001. The number of students registered for this course has accordingly risen from 25 in 1998 to 1,113 in 2001, which represents an increase of more than 400%. As is the case in most parts of the world, the computer revolution is being associated with some relatively high growth in career opportunities in Kenya. In addition, knowledge of computers and their languages creates a lot of other interests in young people, and for many their use tends to become addictive.

A comparison of the enrollments in vocational subjects as a proportion of enrollments for all other subjects (see Table 5.2), confirms the arguments made above. In 2001, 51%, 49%, 6% and 5% of the vocational subjects candidates who registered for the KCSE examination, were respectively entered for agriculture, commerce, home science and accounting with very limited interest in the industrial subjects. From Table 5.2, it is evident that girls who enroll for vocational subjects are more likely to be in agriculture, commerce, home science and type writing with office practice. Their representation in computer studies is also at par with that of boys. Boys however dominate in the industrial subjects. That the representation of girls in computer studies is at par with boys may on the surface point to equity of access. However, many girls may opt for computer studies in preparation for secretarial jobs where computer literacy is a compulsory requirement these days. It is a case of the subject serving to perpetuate the channeling of girls into careers presumed to be more 'feminine'

Table 5.1: Students Entered for the KCSE Vocational Subjects Examination (1990-2000)

Subject	Number Entered											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
Accounting	7,487	6,917	7,192	6,661	6,970	7,361	8,170	9,068	9,307	10,069	11,167	90,369
Agriculture	99,950	101,155	101,598	94,622	91,697	87,476	96,343	94,249	99,095	100,368	104,661	1,071,214
Building & construction	670	658	710	822	731	831	831	844	851	877	999	8,824
Commerce	75,800	79,498	88,946	69,659	72,338	71,828	81,034	83,806	96,266	97,052	104,626	920,853
Computer Studies	-	-	-	-	-	-	-	-	25	114	611	750
Drawing & Design	2,287	2,286	1,965	2,012	2,011	1,888	1,977	2,124	2,141	2,304	2,124	23,119
Electricity	631	447	503	486	509	501	591	562	641	635	612	6,618
Home Science	11,391	10,228	9,545	10,332	10,749	10,542	10,952	11,180	11,551	11,643	11,777	119,890
Metalwork	654	595	646	640	676	643	672	606	544	507	479	6,662
Power mechanics	276	261	265	265	242	289	333	319	390	373	383	3,396
Typewriting & office practice	-	-	-	1,459	1,308	1,339	1,497	1,465	1,462	1,243	1,305	11,098
Woodwork	2,298	2,105	2,133	2,353	2,211	1,905	1,840	1,741	1,648	1,555	1,500	21,289
Total	201,444	204,150	213,503	189,311	189,442	184,603	204,240	205,964	223,921	226,740	240,244	2,284,062

Source: Kenya National Examinations Council (2002)

Table 5.2: Distribution of Candidates by Gender as a Percentage of the 2001 KCSE Candidates

Subject	Candidates		% Of Candidates	
	Female	Male	Female	Male
Accounting	3,404 (3.87)	6,704 (6.47)	1.77	3.48
Agriculture	44,309(49.86)	53,181(51.30)	23.011	27.62
Building & Construction	46(0.052)	821(0.79)	0.002	0.43
Commerce	43,441 (48.88)	50,553 (48.75)	22.56	26.27
Computer studies	543 (0.61)	570 (0.55)	0.28	0.30
Drawing & design	93 (0.11)	1,74 (1.71	0.050	0.92
Economics	302 (0.34)	875 (0.84)	0.16	0.45
Electricity	16 (0.02)	481 (0.46)	0.008	0.25
Home science	10,365(11.66)	526(0.51)	5.380	0.27
Metalwork	3 (0.003)	365 (0.35)	0.001	0.19
Power mechanics	9 (0.01)	313 (0.30)	0.005	0.16
Typewriting with office Practice	970 (1.09)	42 (0.04)	0.50	0.02
Woodwork	24 (0.03)	1,277 (1.23)	0.015	0.66
Total Candidature	88,868	103,670		192,538

Source: Kenya National Examinations Council (2002)
Note: Figures in brackets represent percentages of entry out of the respective gender totals

5.2 Regional Trends in the Teaching of Vocational Subjects

Data on gender and regional trends for 2001 is shown in Table 5.3. As is clear from the Table, gender parity with regard to enrollments in vocational subjects has been achieved in Eastern and Central Provinces and is almost being attained in North Eastern and Western Provinces. Rather surprisingly, apart from private candidates, girls' representation in vocational subjects is poorest in Nairobi, followed by Nyanza, Coast and Rift Valley Provinces. While the situation of Central and Eastern provinces is not totally unexpected given the historical advantages these two provinces, along with Nyanza and Western enjoyed with regards to the growth of formal education, the case of Nairobi may be explained by the fact that most of the schools located here do not offer many of the vocational subjects that are more attractive to girls, in particular home science and agriculture. In Nairobi, one finds more courses that, on the grounds of historical and other factors, may tend to appeal more to boys, especially the industrial subjects and commerce.

With regard to regional trends, the most revealing finding is that Rift Valley has the largest number of candidates enrolled in vocational subjects. The strong showing of Central, Eastern, and Nyanza provinces is not that difficult to discern as these regions have historically held the lead in other areas of education provision. In the same vein, Coast, North Eastern and Rift Valley have always lagged behind these provinces. Rift Valley may be leading in this regard due to the political way in which vocational subjects were introduced in the school curriculum as indicated earlier in this paper and because it is also the largest province in Kenya where there are more schools than in any other region. Going along with the new curriculum as a show of solidarity with their own, in the face of much opposition from elsewhere in the country, Rift Valley schools were also favored with regard to the allocation of education and other resources. Thus, schools in this province tend to benefit from more subsidization by the state under the

excuse of redressing historical imbalances than are schools in the more economically endowed parts of Kenya. In fact, many of the model schools particularly in the area of industrial education are located in this region. Kabarak High School which is located in the Rift Valley town of Nakuru is one of these schools and has been the leader in the area of power mechanics and electricity as well as being among the top in the other vocational subjects since the introduction of these subjects in the school curriculum. In the 2001 KCSE examination, Kabarak High School held the top position in power mechanics, and electricity. In the previous year the school topped in the metalwork examination, was third best in power mechanics and fourth best in electricity.

Table 5.3: Distribution of Candidates by Province and Gender (2001)

Province	Candidates			% of total vocational	
	Female	Male	Total	Female	Male
Coast	5148 (43.5)	6,679 (56.5)	11,827	4.6	5.1
Central	26,513 (51.2)	25,270 (48.8)	51,789	23.6	19.3
Eastern	22,520 (50.0)	22,550 (50.0)	45,070	20.1	17.3
Nairobi	3,287 (38.2)	5,323 (61.8)	8,610	2.9	4.1
Rift/Valley	24,205 (43.8)	31,102 (56.2)	55,307	21.6	23.8
Western	12,151 (46.4)	14,030 (53.6)	26,181	10.8	10.7
Nyanza	17,334 (42.1)	23,887 (57.9)	41,221	15.4	18.3
North/Eastern	598 (48.7)	871 (59.3)	1,469	0.5	0.7
Private Candidates	470 (33.1)	951 (66.9)	1,421	0.4	0.7
Total Vocational	112,226	130,669	241,781	100	100

Source: Kenya National Examinations Council (2002)
Note: Figures in brackets are percentages

5.3 Teachers

The Teachers' Service Commission (TSC) is responsible for providing all public secondary schools with teachers for all subjects in the school syllabus. The number of teachers distributed to schools is however dependent on the output of the teacher training institutions. The Kenya Technical Teachers College (KTTC) is the main training institution for teachers of industrial subjects. The College runs upgrading courses for graduates of technical institutes focusing mainly on pedagogical approaches. Other diploma level colleges, in particular Kenya Science Teachers College (KSTC), Kagumo and Kisii Teachers colleges, support KTTC. Teachers for other key vocational subjects of agriculture, business education, computer studies and home science are trained at the six public universities of Kenya namely, Kenyatta, Egerton, Moi, University of Nairobi and Maseno University. Agriculture teachers are trained only at Egerton University through the diploma programme. Home science teachers are trained at Kenyatta, Egerton, Moi and Maseno. Kenya Science Teachers College (KSTC) and Moi University are the only higher education institutions training diploma level industrial education teachers. However, due to limited demand for this training, KSTC is only offering training in woodwork. KSTC trained teachers can normally teach an industrial subject and either mathematics or physics. Moi University graduates are also equipped to teach an additional subject outside the industrial ones.

It is not possible to give an accurate picture on the number of teachers available for the vocational subjects for three main reasons. First, data on teachers that is available at MoEST does not disaggregate teacher data by the subjects they teach. Second, graduate teachers are recruited on their ability to teach

more than one subject. Thus, teacher trainees at the public universities are expected to enroll for two teaching subjects in addition to the education course. Third, there are cases where graduate teachers are teaching subjects for which they have not been trained due to a shortage of teachers in these particular subjects. Nevertheless, one can make some estimates based on numbers of technical/diploma level teachers, most of who are trained to teach industrial subjects. It is however more difficult to do the same estimates for other vocational education courses since teachers of these subjects teach other subjects. Between 1990 and 1995, the number of technical/diploma teachers grew from approximately 7,000 to 10,000. By 2000, the number of this category of teachers had increased to almost 18,000. The majority of these teachers are male who comprised between 60 and 70% of the total number of this category of teachers between 1990 and 2000.

Although MoEST records (Kenya, 2001) indicate that more than 97% of the secondary school teachers are professionally qualified, there are a substantial number of unqualified teachers in the vocational subject areas as evidenced by the data presented in Table 3.2. Most of the teachers falling in this category have either a technical certificate from a technical institute or only "A" level qualification in the subjects, which they are teaching with no professional training as teachers. The situation of some inadequately trained vocational subject teachers is not helped much by the fact that most of them, as is indeed true for other subject teachers, have limited opportunities for in-service training and other skills' upgrading programmes such as training workshops. While MoEST organizes seminars for in-servicing teachers through the Provincial Directors of Education (PDEs), such seminars are rare. In the urban areas, these seminars may be held on average twice in a year. Rural teachers are however lucky if they attend one such seminar in three years. The problem is aggravated by the absence of regular advice by school inspectors. Again, while schools close to urban centers may experience visits by subject inspectors on a quarterly basis, most teachers of vocational subjects who teach in rural schools do not benefit from these advisory visits. Yet, teacher training could compensate for some of the inadequacies resulting from the severe shortage of teaching materials experienced by most schools.

6 Characteristics of Schools and Students

6.1 Schools

Given that the 8.4.4 curriculum was compulsory in all public schools, most secondary schools offer at least one vocational subject. However, the fact that these subjects are optional for examination purposes has played a big role in differentiating schools on the basis of the vocational subjects they offer to their students. There are six main distinguishing characteristics with regard to which schools offer which subjects. First, there are the top academic schools in the country. These schools, and particularly the private high-cost ones limit their vocational curriculum to the bare minimum (refer to Table 6.1). They tend to go for subjects that are likely to give them the least problems when it comes to the needed facilities, teachers and time such as business education courses and in a few cases, drawing and design. Some schools in this category also offer agriculture and home science is retained despite its relatively high demands because most of the established schools have had the basic infrastructure to teach these subjects since the days of adequate government funding to schools. Other schools include computer studies in the curriculum because of its potential in opening up opportunities for their students in further training and employment. This attraction also applies to business studies courses, particularly accounting and commerce. In other schools, students have limited opportunities to enroll in more than one vocational subject. This is for example the case at Precious Blood Riruta, and some other church sponsored schools, where the school's administration has included religious education in the list of compulsory subjects.

Table 6.1: Vocational Subjects Offered by the Top Ten Schools in the KCSE (2001)

Top schools in order of merit	Accounting	Agriculture	Building &Constructio	Commerce	Computer Studies	Drawing & Design	Economics	Electricity	Home [illegible]	Metalwork	Power mechanics	Typewriting with O.P	Woodwork
Strathmore	-	-	-	X	X	X	-	-	-	-	-	-	-
Starehe Boys	X	X	-	X	X	-	-	X	-	-	-	-	-
Precious Blood Riruta	-	X	-	X	-	-	-	-	X	-	-	X	-
Alliance High	X	X	X	X	X	X	X	X	-	-	X	X	-
Bahati Girls	X	X	-	X	X	-	X	-	X	-	-	-	-
Kianda School	-	-	-	X	X	-	-	-	X	-	-	-	-
Mangu High	X	X	-	X	-	-	-	X	-	-	X	-	-
Loreto High Limuru	-	X	-	X	X	-	X	-	X	-	-	-	-
Sacho High	X	X	-	X	-	X	-	X	X	-	-	-	X
Alliance Girls	X	X	-	X	X	-	-	-	-	-	-	X	-

Source: Kenya National Examinations Council (KNEC) (2002)

From Table 6.1 it is clear that of the top performing schools in the KCSE in 2001, none offered more that one industrial subject. Metal work was not offered in any of these schools while building and construction and woodwork were offered in one school. Electricity and drawing and design are more common as two and three schools offer them, respectively. The fact that most vocational subjects, especially the industrial ones, are not so popular among the top Kenyan public secondary schools contrasts rather sharply with the situation of the early and mid 1980's (Lauglo, 1985). There are two possible explanations for the change. First, unlike the current situation where schools were expected to finance the establishment of these courses, the industrial education schools had adequate financing from SIDA. Second, although job opportunities for school leavers were already limited by the 1980's, the situation was then much more favorable than it is now.

A second distinction can be made between urban and rural schools. Agriculture and home science, and to some extent building and construction, are more popular in the rural than urban areas for reasons to do mainly with the familiarity and practicability of these subjects for rural settings. Likewise, the industrial courses, business studies and computer studies tend to be more popular in schools located in large urban areas such as Nairobi, Mombasa, Nakuru, Kisumu, and Nyeri where there may be more, or perceived to be more, opportunities for learners who study these courses. But there is also the fact that relevant infrastructure, more significantly electricity, is more likely to be available in urban settings. For computer studies, availability of reliable telephone communication is an added incentive to schools that would like to use available computer infrastructure for Internet communication. However, hardly any schools encourage use of this facility because of the high telephone bills that go with it. Kenya has yet to liberalize the telecommunication sector enough to make Internet services affordable to most Kenyans.

Third, the sponsorship of schools does also influence what is taught there. Church sponsored schools and schools supported by international and local philanthropies such as catholic schools and Starehe Boys' Center for disadvantaged academically talented students tend to be more resourced and better managed

than most government and community supported schools. Starehe benefits from the goodwill and devotion by international and local philanthropic organizations and individuals. Not having to rely entirely on fees contributions and the support of parents, such schools find it is relatively easy to meet the costs related to teaching vocational subjects without requiring students to pay any extra fees if they register for them. For example, students of Starehe and Kagwe Girls, the former being supported by philanthropists and the latter by the Catholic Church do not pay the fees charged in other schools for computer studies. These two schools also have all the necessary equipment for the subjects which they teach. Likewise, teachers in these schools and other similar ones indicated that one of their biggest advantages over most other schools is that they never lack learning/teaching materials.

A fourth area of distinction is based on gender. Girls' schools are more likely to offer home science and typewriting with office practice. More boys' schools offer industrial subjects and business studies. Computer and some business courses, in particular commerce, are popular in both boys' and girls' schools, as the main distinguishing characteristic between schools. Table 5.2 demonstrates this fact. A fifth area of distinction is the level of establishment for given courses at a school. Much of this has to do with the availability of qualified teachers for the subjects being offered in a given school as well as the record of the school in the KCSE examination. A school that traditionally performs very well in a given subject is likely to continue offering the subject not only because it improves its overall performance in national examinations but also because such a subject becomes more attractive to students. Related to the ability of teachers is the presence of a head teacher who has a keen interest in a given subject because of their background in it. For example, the exemplary performance of Lugulu Girls High School in Bungoma in the home science subject has much to do with the schools' head teacher who has been teaching and examining this subject nationally for over twenty years. It is also the case that graduate teachers with experience have a better record than diploma level holders. Most of the teachers of vocational subjects in schools that were among the top ten performers in the KCSE examination in 2000 and 2001 are university graduates with over ten years teaching experience. Sixth, schools that excel in vocational subjects in the KCSE examination, which also results in the popularity of these subjects among students, are characterized by good administrative systems. In most of these schools, head teachers are known to be good managers and disciplinarians. They also ensure that their schools have all they equipment and consumables needed by teachers. As a result, they are able to win the cooperation of teachers and students to be more devoted to academic work. It is also in these kinds of schools that one finds collaboration between schools, parents/teachers' associations and local communities strongest.

6.2 Students

There are five main influential factors regarding the types of students who enroll for vocational subjects. One is the school one joins. Most students opting for a vocational subject have no choice but to select from the range of subjects offered in their respective schools. In addition to consideration of the interests of students, many Kenyan schools stream students into specific subject areas on the basis of their aptitude for these subjects. For example, at Strathmore School, a student interested in computer studies is also expected to be of above average aptitude in physics and mathematics. Likewise, most schools allow only those students who have outstanding grounding in mathematics to enroll for business and computer studies. In other schools, students are interviewed and tested before being allocated the vocational subjects, which they are interested in especially in cases where those interested in a subject surpass the number of available places.

Within the more competitive schools, rarely do the best students opt for many of the vocational subjects, the exception being business and computer courses. This is not withstanding the fact that some of these schools are the leaders in vocational subjects in the KCSE examination. This conclusion was reached following interviews with 15 agriculture, industrial education and home science teachers from Moi Forces Academy, Friends School Kamusinga, Lugulu Girls, Friends School Bukembe, Nyandarua High School,

Kagwe Girls, Kambandi High School and Precious Blood Riruta. In addition to these interviews, results were also analyzed KCSE results for top performing schools in 2001 in some vocational subjects, namely, agriculture (Kambandi), home science (Precious Blood, Rirutra), building and construction (Menyenya SDA), power mechanics and electricity (Kabarak High School) and woodwork (Karima Boys). This analysis demonstrates that hardly does any top students in these schools opt for the subjects in question as is shown by Table 6.2. For example, the two top students at Pangani and Menyenya SDA and who scored an overall grade of "A" and the top student at Kambandi whose average score was a B, did not enroll for any vocational subject. Of the nine top students at Nyandarua High School who scored a mean grade of A-, only one of them registered for a vocational subject (home science). Similarly, of the seven top students at Karima High School, only one enrolled for a vocational subject (agriculture). One of the three top students at Leitim enrolled for a vocational subject (agriculture). At Precious Blood, three of the nine top students (mean grade of A) registered for home science while three of the top students at Kabarak (mean grade of A) registered for electricity. Significantly, only at Kabarak and Precious Blood did some top students enroll for subjects in which their schools had the best results nationally.

The view that weaker students may tend to opt for industrial subjects is strengthened by the fact that pass rates in vocational subjects are on average higher than in other subjects (see Table 6.3). Yet, surprisingly it is these subjects that are most disadvantaged with regard to relevant teaching facilities. The teachers interviewed noted that this view is not helped much by the fact that these subjects are not compulsory for the KCSE examination. They added that many parents discourage their children from enrolling for some subjects as demonstrated shortly. This finding, on which too much emphasis need not be placed in view of the small sample of teachers interviewed, again contrasts with that of Lauglo (1985) who found that "... *the status of industrial education is quite high in the great majority of schools in terms of (a) teachers' ratings of industrial education's popularity, (b) students' and parents' attitudes to industrial education, and (c) the academic performance of those students who take industrial education as an examination subject. Other practical subjects which are taught in some industrial education schools (business subjects and agriculture also seem to hold their own in terms of attracting their share of academically able students. Thus, these practical options are not at all repositories for students who are academic rejects* ... " (1985: ii-iii). Perhaps, in addition to the possibility of the unreliability of our small sample, this situation may have to do with the fact that as optional subjects, the best students select them only as a last resort. In most Kenyan schools, the top students enroll for the KCSE examination in those subjects that they perceive would best prepare them for the most rewarding career in such fields as engineering, medicine, commerce, computer science and other less common professional careers.

In retrospect, Lauglo (1985) had every reason to wonder why failure rates in IE subjects were higher than for other subjects in the mid-80s, yet unlike the current situation, it is the very best students in top schools who enrolled for them. Have examiners become less rigorous when grading vocational subjects? According to the head of KNEC's research unit, Mr. P.M. Wasanga, the relatively high performance in some vocational subjects may have to do with the predominantly factual nature of the material being tested. A second explanation may relate to the relatively smaller numbers of students registered for the industrial subjects which makes it possible for students to have more interaction with their teachers and to have more access to the limited available teaching/learning resources.

Third, the popularity of vocational subjects in some schools has a lot to do with the immediate post-secondary school opportunities available to students. For example, in addition to other factors the popularity of accounting and computer studies at Starehe has to do with the fact that the school offers diploma and certificate courses for interested students who have completed four years of secondary education. These post-secondary courses are very popular with students, as those who qualify to enter the public university system have often to wait for over a year before starting their studies at the university. In addition, the opportunity to enroll for these post-secondary diploma and certificate courses enhances students' career and employment opportunities.

Table 6.2: Mean Scores of Top Performing Students in KCSE (2001) in Vocational Subjects (industrial education, agriculture and home science) Compared with their Performance in English, Mathematics and Physics

Top Students/Mean Score	Index #	Mean Grade	Score in English, Mathematics and Physics: English	Maths	Physics	Score in Vocational Subjects: Wood/ Work	M/work	Bldg & Const	Power ech	Electricity	Drawing/ Design	Agriculture	H/Science
Nyandarua: (7 students: Mean grade= A-)	006	A-	A-	A	A	-	-	-	-	-	-	-	-
	087	A-	B	B+	A	-	-	-	-	-	-	-	-
	100	A-	B	A	A	-	-	-	-	-	-	-	-
	101	A-	B	A	A	-	-	-	-	-	-	-	-
	107	A-	B	A	A	-	-	-	-	-	-	-	-
	108	A-	B-	A-	A-								
	137	A-	A-	B+	-	-	-	-	-	-	-	-	A-
Karima: (7 Students: Mean grade = B)	037	B	C+	B-	B	-	-	-	-	-	-	-	-
	038	B	C+	A-	A-	-	-	-	-	-	-	B-	-
	041	B	C	A-	B+	-	-	-	-	-	-	-	-
	055	B	C+	C+	B+	-	-	-	-	-	-	-	-
	056	B	C+	B+	B-	-	-	-	-	-	-	-	-
	067	B	B-	A	B	-	-	-	-	-	-	-	-
	087	B	B-	B	B-	-	-	-	-	-	-	-	-
Kambandi: (1 Student: Mean grade = B)	003	B	B-	C	C+	-	-	-	-	-	-	-	-
Pangani: (1 student: Mean grade = A)	001	A	A	A	B+	-	-	-	-	-	-	-	-
Precious Blood: (9 Students: Mean grade = A)	001	A	A	A	A-	-	-	-	-	-	-	-	-
	003	A	B+	A	A	-	-	-	-	-	-	-	-
	004	A	B+	A	A	-	-	-	-	-	-	-	-
	005	A	A-	A	A	-	-	-	-	-	-	-	A

	008	A	B+	A	A	-	-	-	-	-	-	-	-	-	-	-
	011	A	A	A	B+	-	-	-	-	-	-	-	-	-	A	-
	016	A	A-	A	A-	-	-	-	-	-	-	-	-	-	-	-
	019	A	A-	A	C+	-	-	-	-	-	-	-	-	-	A	-
	039	A	A-	A-	A	-	-	-	-	-	-	-	-	-	-	-
Moi High, Kabarak: (5 students: Mean grade = A)	001	A	A-	A	A	-	-	-	-	A	-	-	-	-	-	-
	002	A	A-	A	A	-	-	-	-	A	-	-	-	-	-	-
	004	A	A-	A	A	-	-	-	-	-	-	-	-	-	-	-
	009	A	A-	A-	A	-	-	-	-	-	-	-	-	-	-	-
	015	A	A-	A	A	-	-	-	-	A	-	-	-	-	-	-
Leitim: (3 Students: Mean grade = A-)	002	A-	B	B+	A	-	-	-	-	-	-	-	-	A-	-	-
	003	A-	B+	B+	-	-	-	-	-	-	-	-	-	-	-	-
	004	A-	B+	B	A	-	-	-	-	-	-	-	-	-	-	-
Menyenya S.D.A: (1 student: Mean grade A)	004	A	B+	A	B	-	-	-	-	-	-	-	-	-	-	-

Source: Kenya National Examinations Council (KNEC) (2002)

The home backgrounds of students and parental influence also contribute to determining which vocational subjects students register for and stick to after they have selected them. Many of the teachers interviewed indicated that there are many students who are genuinely interested in vocational subjects but who end up dropping them because of pressure from their parents. Elite parents are especially hostile to their children enrolling for these subjects with the exception of computer studies, which they associate with failure to succeed. Some of them have the colonial experience when those who enrolled for vocational subjects were mostly Africans, being trained, as they were for subordinate and menial tasks in the colonial economy. Other parents tell their children that some of the subjects being taught in school such as home science and agriculture contain basic knowledge, which one can learn outside school. Some parents even tell their daughters that they cook well enough without having gone through the home science course; others remind their sons who might be interested in home science that the subject is "*lady like*" or that it is a "*science of the house*". In mixed schools, boys also tease their peers who enroll for home science while girls make fun of their contemporaries who study industrial courses. In this connection, cultural factors also come into play. Some Kenyan communities are still not comfortable with their boys pursuing careers traditionally pursued by girls such as home science and agriculture. Such communities also discourage girls from joining the industrial courses. In the case of pastoral Kenyan communities such as the Maasai, low status is associated with craft and vocational education (Republic of Kenya, 1999). Thus masons, mechanics, builders and metalworkers are despised as outcasts with these jobs not being seen as acceptable for their children. Notes the Report of Inquiry into the Education System of Kenya (Republic of Kenya, 1999:41) "*...Submissions to the Commission by some Kenya pastoral communities expressed the very low status accorded to craft and vocational education. Masons, mechanics, builders, and metal workers are despised and treated as pariahs. The communities said that these jobs were for other communities and not for their own children. It was also pointed out that educationists themselves need to be liberated from this mentality, because many of hem design vocational education for other peoples' children instead of designing a universal system that is suitable for all the children who opt to take that career line, including their own children...*"

But there are other parents who are not attracted to vocational subjects because of their dead-end nature. According to the teachers we interviewed at Moi Forces Academy and Strathmore College, it is increasingly clear to the more informed Kenyan parents that the post-graduation success of their children has little to do with the acquisition of vocational skills in a context of a depressed economy where employment opportunities are shrinking every year. They also know that the historically prestigious professions such as medicine, engineering and law call for academic education and that this is where their children are likely to find a promising future. Ngome (1993) reached the same conclusion with regard to the negative views of parents regarding the teaching of agriculture. This is another area of difference with the IE research of the mid 1980 (Lauglo, 1985). However, this finding need not be that surprising given that almost twenty years of experimentation with vocational education as a "fall back on" route, is no longer tenable with a much more depressed economy. There are virtually no jobs for most school leavers with or without vocational skills. Matters are not made any better by the burden these subjects has placed on parents and their school-going children both in terms of the time required to cover the syllabus and the increased cost of education.

Thus, students from disadvantaged backgrounds are the majority in vocational courses. This is the case at Kambandi, Nyandarua, Precious Blood Riruta, Bukembe, Lugulu and Kamusinga, all of which are either district or provincial schools. National schools (Starehe, Moi Forces) and private ones (Strathmore) have the best students; most of who because of the competitive nature of Kenya's education system, hail from economically advantaged backgrounds. Moreover, as indicated earlier, most top schools do not offer much by way of vocational subjects for interested students. Students in these schools do not benefit much from the advice of their parents regarding which subjects are the more rewarding in terms of career opportunities. Also having not performed so well academically, due to a variety of factors, they tend to go for subjects thought to be more likely to pass in to increase their chances of passing the KCSE examination. Career guidance is also either lacking or inadequate in most schools, especially the less privileged ones (KIE, 1999). These facts, plus the limited opportunities available for further training have tended to discourage many potential students

from pursuing vocational subjects after secondary education. The popularity of vocational subjects among both students and parents is further lessened by the fact that students from the disadvantaged backgrounds may have limited access to start-up capital. Moreover, in most rural communities, the market for products of those skilled in vocational subjects is limited. The problem is intensified by the current government policy of allowing the dumping of cheap imported products into the country.

Table 6.3: KCSE Performance in all Subjects by Gender (2000 & 2001)

Subject	2000				2001			
	Girls		Boys		Girls		Boys	
	No. Sat	Mean %	No. Sat	Mean %	No. Sat	Mean %	No. Sat	Mean %
English	84,016	37.4	97,968	32.2	89,484	34.7	104,339	34.4
Kiswahili	84,009	48.9	97,963	47.9	89,486	44.7	104,339	43.3
Mathematics	84,013	13.4	97,967	18.7	89,481	15.8	104,334	21.2
Biology	49,757	30.2	59,718	33.6	85,499	29.5	91,525	34.5
Physics	11,276	29.5	28,516	32.7	16,225	22.2	38,425	26.8
Chemistry	50,442	27.7	64,883	31.8	84,534	29.4	96,862	23.4
Biological Science	32,302	19.9	30,858	22.8	10	25.2	18	23.8
History & Government	38,909	37.0	49,100	43.9	34,989	47.9	46,961	53.1
Geography	53,915	33.8	67,998	38.9	48,116	31.7	61,354	37.3
Christian Religious Education	39,739	49.5	30,048	49.8	38,339	49.2	26,961	49.4
Islamic Religious Education	1,357	56.4	2,420	59.5	1,494	42.2	2,810	46.6
Hindu Religious Education	17	46.5	14	47.5	9	35.2	8	36.1
Social Education & Ethics	22,119	44.0	26,268	46.6	23,618	53.0	25,725	55.9
Home Science	11,157	54.8	620	48.8	10,365	58.3	526	51.7
Art & Design	528	53.0	869	53.6	418	53.6	775	54.9
Agriculture	47,618	48.6	56,727	52.0	44,309	45.5	53,181	48.7
Woodwork	38	42.0	1,458	48.5	24	51.3	1,277	50.6
Metalwork	16	45.8	464	53.5	3	56.0	365	59.1
Building & Construction.	54	32.6	940	47.3	46	39.9	821	49.3
Power Mechanics	7	53.3	377	67.9	9	36.8	313	54.4
Electricity	18	58.7	595	53.5	16	52.3	481	54.9
Drawing & Design	110	36.1	2,015	48.9	93	25.5	1,774	42.2
Aviation Tech.	1	46.0	31	66.7	-	-	43	60.9
Computer Studies	318	54.2	293	61.8	543	54.4	570	57.6
French	1,326	37.8	662	40.8	1,141	43.3	716	43.9
German	280	60.3	100	56.0	241	56.9	93	60.3
Arabic	133	59.8	304	60.4	131	61.2	393	61.2
Music	1,540	50.5	1,007	50.5	1,236	50.0	818	49.5
Accounting	3,657	48.4	7,510	49.2	3,404	49.2	6,704	50.9
Commerce	48,111	39.3	56,556	42.5	43,441	36.6	50,553	39.5
Economics	431	36.4	1,271	38.7	303	38.8	868	38.8
Typing with Office Practice	1,242	46.8	74	45.6	970	54.2	42	55.9

Source: Kenya National Examinations Council (KNEC) (2002)

According to teachers of the same schools, there are however students who enroll in these subjects because of genuine interest in them. Such students tend to be more confident than average students of what they are doing in life and therefore have the discipline and motivation to enroll for the courses of their interest. This is one of the factors that come out clearly in the illustration below (Box 6.1) on why home science is so popular at Lugulu Girls High School in Bungoma and other schools nationally. Interest in the subject is among the main reasons for this schools' exemplary performance in home science in the KCSE examination.

Box 6.1 Popularity of Home Science at Lugulu Girls High School

Lugulu Girls High School is located in Bungoma district in Western Kenya. It is a government boarding school that draws most of its students from Bungoma district. At Lugulu, apart from teaching students how to utilize locally available resources, the teaching of home science places great emphasis on self-reliance. The subject area is well staffed with competent and highly qualified, committed ana hardworking teachers. Teachers view some of the problems related to teaching the subject as challenges. Among other factors, the school's sterling performance in the subject at the KCSE examination is attributed to the harmony and good working relationship that exists and permeates the members of Lugulu community, namely the administration, teachers and students. A focused ana understanding administration ensures that all the required learning materials for the practicals are never in short supply. In addition, it has recognized and ensured that home science as a subject, requires more time allocation. On the other hand, the school owes success in the subject to the studious, disciplined students with a willingness to learn and be corrected. Students admit that their teachers who encourage them to work hard often give them valuable pieces of advice. This has aroused great interest among students who derive a lot of pleasure from learning the subject. Students cherish the practical sessions, which they say, promote opportunities for creativity and innovation; for example, in cookery when it comes to preparing unfamiliar dishes recipes. *In addition, students view practicals as a welcome break from the monotony and boredom that characterizes normal classroom sessions. Students are motivated to work hard cognizant of the fact that, the applicability of the skills acquired and knowledge gained is life long and has a direct bearing on their lives. For example, one could become self-reliant in business ventures by employing skills and knowledge gained in areas such as sewing, cookery, tailoring and dressmaking. Aware that home science can open promising opportunities for the best students, many of them are keen and hardworking. Moreover, students have a positive attitude towards the subject and their teachers. They view it as a science and they take time to do serious reading and remedial work.*

The positive status of home science at Lugulu Girls' corresponds to the case at Precious Blood Riruta in Nairobi. According to their teachers, home science students of this school value the subject because it prepares them for all the aspects of life at home including improved practices in hygiene and nutrition. The subject is also valued because some of the items made during the practical sessions such as soft furnishings and cakes have some commercial value to the extent that students continue to make them during the vacation and after completing secondary school. The teachers revealed that a number of students are making a living out of this skill and a few have taken over related business from their retired parents. This revelation is supported by a KIE report (1990), which summarizes findings from students interviewed in 1990 on the same score. Students indicated that they liked home science because the subject "*... teaches on the day to day activities, ... is beneficial in life after school ... enables one to be creative and learn things that are done practically ... has many careers ... involves general knowledge*". Likewise, the MoEST inspector of schools for home science added that home science students have a better chance of being admitted to a variety of post-secondary training opportunities especially the hospitality courses at medical and hotel training schools and for the education degree course for those keen on specializing in home economics.

7. Assessment Methods and Learning Outcomes

7.1 Assessment Methods

There are three main levels of assessing mastery of vocational skills, namely: the school; the collaborative project between the school and the KNEC; and the final national KCSE examination (Wasanga and Ingolo, 2001; K.I.E, 1995).

7.1.1 School Level Evaluation

All schools offering vocational courses are expected to use a variety of assessment methods to gauge their students' mastery of vocational curriculum content. The most common ones are class tests, assignments, practicals and end of term examinations. Some schools also organize provincial and district level assessment collaboratively with other schools, using the same measures. The intention is to measure their performance against that of other schools as well as to evaluate their respective levels of preparedness for the national examinations. For courses that are meant to teach practical and problem-solving skills, continuous assessments at the school level are critical. However, although teachers and MoEST officials all agree on this fact, school level continuous assessment tests are yet to form part of the final school leaving examination grade. This is because the validity and reliability of these tests would be difficult to guarantee. The matter is made even more complicated by the fact that both the examiners and the examined would be operating at varying levels of competence and under different circumstances. An additional handicap is that given the fact that competition for post-secondary opportunities is national as opposed to regional, micro-level evaluations may be difficult to make acceptable across the board. Nevertheless, some schools such as Strathmore and Moi Forces Academy in Nairobi reported that they find continuous assessment tests very valuable in getting students to master manageable portions of knowledge content and that the system improves the management of available time. Another advantage is that students are less threatened by examinations in one or two topics than they are by termly, end of year examinations and even more so, the KCSE examination which is administered at the end of four years. Moreover, the use of continuous assessment tests by teachers makes them more confident of their students' mastery of specific topics before evaluating them on more advanced ones.

Another evaluation technique used at the school level is the administration of competitions within the class, across different classes, in the whole school and with other schools. The Nairobi interschool competition - the Nairobi Provincial Art, Home Science, Industrial and Creative Arts Competition (NAPAHICA) - is one such competitive arrangement of the Nairobi schools. Such competitions are some of the best available mechanism for evaluating mastery of vocational skills for they give students the freedom to innovate and show their individual creative skills related to what they have learned at school.

7.1.2 The Practical Subject Application

Students registered in vocational subjects for the KCSE examination are required to do a practical project individually or in groups. Teachers are required to guide their students in the identification and conduct of their practical project, which accounts for 10% of the final KCSE grade for specific vocational subjects. The KNEC contracts subject experts who set and moderate these projects. These subject experts develop broad projects for each vocational subject showing the abilities that need to be assessed and prepare marking guides teachers are to use for assessing their students (Wasanga and Ingolo, 2001). The KNEC on its part then provides a timetable and instructions on how the project should be conducted, the materials needed and a marking scheme. There are two main levels of assessing these projects; the end of term practical assessment and the project coursework assessment. What makes this a collaborative venture between the schools and the KNEC is that the latter appoints, trains and commissions external assessors who share the duties of assessing the two types of projects.

The effective assessment of the practical projects has been hampered by a number of factors (Wasanga and Ingolo, 2001). First, teachers complain about the fairness and reliability of the external assessors' method of using a sample of students' scores to arrive at the final project grades for all the other students. Teachers argue that, as they know their students best, their grades should be the final ones used by the KNEC complaining that external assessors are often arbitrary on their assessments, which are based on one test. The KNEC has however pointed to issues of validity and reliability of the scores awarded by both the teachers and assessors as the reason for sticking with this system. But this KNEC-recommended system has also been found unreliable because of: inflation of scores; awarding of fake marks; and failure of the assessors in using the objective criteria recommended by the Council for the evaluations as well as the required frequency of school visits. Wasanga and Ingolo (2001:14) who are senior officers at the KNEC describe how in the 2000 project examinations *"...one head teacher forced one of his teachers to give fake marks to a candidate who did not even attempt the agriculture project at all...another head teacher employed a teacher to do the project for his daughter..."* In such cases, the Council cancels the results of the affected candidates and disciplines the concerned teachers. Reliability and validity of these tests is further undermined by the fact that what is measured may not be comparable across schools, as schools have different facilities and teachers of varying professional and academic qualifications. Finally, the often-inaccurate transcription and recording of relevant project information by teachers, external assessors and council staff is a further cause for questioning the objectivity of these practical tests. In addition to cases of missing practical marks, inaccuracies relate to the wrong coding of subjects, interchanging of marks and omission of some candidates' examination identification numbers, among other errors. These shortcomings notwithstanding, both teachers and KNEC staff appreciate the value of these project evaluations as perhaps the most effective way available at present and note that what is needed is to identify ways of innovatively coping with the challenges currently being posed by the way it is being administered.

7.1.3 The KCSE National Examination

The major component of the secondary school leaving examination (KCSE) is the final one administered by the KNEC for students at the end of their fourth year of secondary education. Among other things, this examination is meant to evaluate the extent to which students have internalized positive attitudes towards practical work, vocational training and self-employment. Students taking the KCSE examination are therefore expected to have had a broad based education. They are tested in a minimum of seven subjects. This examination has been blamed for being one of the biggest obstacles to the learning of vocational skills. First, of the seven subjects candidates are examined in, none of the vocational subjects is compulsory, all of them being electives. The compulsory subjects are English, Kiswahili, Mathematics; at least two social science subjects; and either one applied or cultural subject. The applied subjects from which students may choose one applied subject are: home science, art and design, agriculture, woodwork, building construction, power mechanics, electricity, drawing and design, aviation technology, computer studies, accounting, commerce, economics and typewriting with office practice. Because most schools nationally are ill equipped for many of these subjects, the majority of the students who elect a subject from this group tend to go for one of the three most established ones in most schools, which are agriculture, home science and economics. Thus many of the applied subjects do not have to be chosen, meaning that there is no real mechanism for ensuring that most students enroll for vocational subjects. As a result, most parents are not keen to buy books for these specific subjects or to construct and equip workshops.

A second way in which the KCSE works against the spirit of a vocationalized curriculum is that in the absence of adequate physical infrastructure and equipment, the focus is more on theory with little stress on practical aspects of the curriculum. In a sense, this situation has encouraged teachers to also focus more on the theory part of the syllabus. More serious however is the fact that much of the theoretical content of the KCSE examination rarely tests students' capacity for interpretation but instead tests their ability to memorize factual material. Although this weakness was also highlighted by the IE research of the 1980's (Lauglo, 1985), it seams like no serious efforts have been made to rectify the situation. This forces teachers of vocational subjects to make every attempt to cover the whole secondary school syllabus. Teachers complain

that as a result, most questions are graded out of quarter or half points because too many of them have to be asked in examinations of most vocational subjects to ensure that the whole syllabus is tested.

Third, as with other practical examinations, the KCSE examination does not take account of disparities in school facilities or environments. The latter point is particularly critical because one of the objectives of the practical curriculum is to orient students to their everyday experiences. Fourth, the very spirit in which national examinations are conducted and schools evaluated by government, parents and the community defeats the goal of promoting creativity or problem – solving abilities in students. This is because teachers focus their attention on drilling their students to excel in examinations, as they are aware that society, parents and even government judges them on the basis of how many of their students excel in national examinations. The matter is not made any better by the KNEC system of ranking schools as well as their students on the basis of performance in the KCSE examination. At the more general level, KNEC has been blamed for showing little value in students' mastery of communication skills. Examiners of all subjects are known not to check on grammatical mistakes when they grade papers, their main concern being mastery of factual knowledge and not how it is relayed. Yet, improved communication is one of the goals of the 8-4-4 system of education.

7.2 Learning Outcomes

As indicated in the previous section, the teachers interviewed were categorical about what parents wanted their children to pursue, namely further education in professional careers. It was also shown how much schools, especially the top ones value teaching of some specific vocational subjects insofar as they improve overall performance of the school in the KCSE examination and that most students take these courses to improve their overall grade. This finding is in agreement with that of Narman and Lauglo (1985) regarding the occupational expectations of students enrolled for IE courses. Both found that students taking these courses aspired to higher education although they showed a preference for work of a technical or practical kind. More significant, however is their finding that students with greater exposure to IE possess no advantage over others in finding employment and that even those who found jobs were not employed in IE-related areas. Needless to stress, the situation could only have gotten worse not only because the quality of vocational education may have declined but more importantly because jobs are even harder to come by now.

This is however not the case with computer studies and even accounting particularly for students in the top Kenyan schools. At Strathmore and Starehe, teachers indicated that most computer studies' graduates find employment even while at school. As for accounting, the top students are able to register for professional examinations during, and immediately after completing their secondary education. In the case of both Starehe and Strathmore, their top accounting students can register for diploma courses even before their KCSE results are out. But as with the IE research of the 1980s, the current study's limited conversations with teachers and MoEST officials pointed to the fact that students who take vocational subjects find them of some value in their daily lives. For example, home science is credited with improved hygiene and nutritional status while some industrial courses such as woodwork and building construction are valued for imparting skills related to homemaking and choice of good construction materials and furniture. According to a 1990 KIE report students enrolled for woodwork like it because it is promotes the possibility of "... *self reliance ... making their own furniture and as a hobby during leisure time ... skills in handling tools, materials and finishes correctly and safely ...to select good furniture and reject bad ones* ..." (KIE, 1990: 256) This report does not give any students impressions on the other industrial subjects.

Moreover, good performance in the vocational subjects improves a student's chances of enrolling for specific degree programmes. Business studies courses are considered for those likely to enroll for the commerce degree. The computer studies course is useful for those who like to study computer science. Home science is a necessity for those who like to pursue a bachelor of education degree in home economics. Type writing with office practice counts for selection to the bachelor of education course in secretarial studies. Electricity

is considered for those keen on electrical engineering, and metalwork and power mechanics are useful for those interested in other branches of engineering. Drawing and design are valuable for students keen on pursuing architecture related degree programmes as is building construction and woodwork. Finally, a high score in agriculture places students who like to do a bachelors degree in agriculture at an advantage. In addition to being useful for entry into these degree programmes, all these subjects add points for specific subject clusters in which potential degree applicants have to obtain a minimum total score as well as for the minimum average grade for consideration to join universities, especially the public ones.

8 Main Problems Encountered in Implementation and Lessons Learned

8.1 The Original Purpose and Objectives of Vocationalization

Although very well intentioned in its quest for broadening the horizons of learners, vocationalization of the Kenyan secondary school curriculum was designed and introduced without an adequate analysis and appreciation of the problems it sought to address, chief among them being the youth unemployment crisis. By blaming education for this crisis, education was made a victim for a problem it is incapable of resolving. Besides, the conceptualization of this curriculum placed limited emphasis on the role of education in imparting functional survival skills, but instead on excellence in academic subject matter. Thus even the computer syllabus, which was introduced in 1997, does not have this focus as one of its objectives. Vocationalization of the curriculum was an ambitious project that was largely unattainable.

Given that the majority of Kenya's secondary school leavers are unlikely to secure any form of employment or further education, a more realistic and worthwhile vocational (functional) curriculum may be that which focuses on the imparting of skills that promote self-development and learners' sustainability at home and in their respective communities. This may call for generalized basic and short duration course(s) taken by all students throughout their four years of secondary education. Among other skills, the coverage of such a curriculum may include communication skills, basic knowledge of health, family life, nutrition, subsistence agriculture, entrepreneurial skills, environmental, social studies, civic and religious education, construction, repair and maintenance skills, and information technology. The main lesson from this experience is that educational reform focusing on vocationalization needs to be informed by a professional understanding of the causes of unemployment and of the experience of countries where vocationalization has succeeded in achieving some of its set targets. A second lesson is that, after such a system has been put in place, there is need for regular reviews to ensure that it is both feasible and responsive to changing times. Despite its widespread criticism, there is really nothing intrinsically wrong with the system; the problem is with its unplanned for and very ambitious objectives.

8.2 Planning for Implementation and Implementation Experiences

Planning for implementation of the vocationalization curriculum left much to be desired. The process was characterized by lack of consultation with relevant stakeholder groups as a result of which it was intensely opposed even before it was launched. As a matter of fact, the changes that are taking place within the 8-4-4 system in general, and the vocational curriculum in particular, and which are mainly targeting removal of vocational subjects from the curriculum is a result a public disagreement. A KIE report (1995: 64-68) points to how the media coverage in Kenya had been "... *indicative of a very critical perception of the education system commonly referred to as 8-4-4 ...It appeared that the criticism was centered more on the structure since members of the public could not have had the chance to critically examine the curriculum itself. The only reference to the curriculum seemed to have been the alleged overloading which parents especially have alleged is seen through the work habits of pupils or after school ... there was generally a negative attitude towards the curriculum, expressed by all respondents from primary teachers' colleges, tertiary education institutions, Kenya National Examinations Council and the Kenya National Union of Teachers* ..." The

reasons for opposition included the wide scope of the syllabus, inadequate preparation before initiation and lack of facilities and time to realize the syllabus objectives. In fact, a main reason for the reduction of the teaching subjects at the secondary level from 35 to 14 and the removal of the industrial subjects and computer studies emanates from the publics' submissions to the 1998 commission of inquiry into the Kenya's education system whose report now appears to have received official recognition. The same public, the report adds, would have been more understanding if it had been involved in relevant decision-making. Second, the recommended changes were not preceded by appropriate reform in the wider socio-economic and political contexts. Also regrettable was the failure to involve external stakeholders especially those in industry and business who are the main consumers of educational products. This section of society would have been particularly relevant with regard to the design of a curriculum that is responsive to changing market needs. A fourth weakness of the planning stage was the failure to take into account the human and physical resources required for successful implementation of the new system well in advance. Planning for the implementation of this experiment was a clear case of management through crisis. Although efforts were made with regard to some crash training programmes, their adequacy and quality were questionable. Third, planning for this system was very much an after thought as it was tied to the implementation of a much smaller project, that of the establishment of a second university.

There are five main lessons here. First, any educational reform of this magnitude is unlikely to succeed without a broad based consultative process. In the short run, parents, teachers and other immediate stakeholder groups may merely go along with a political decree, but their cooperation cannot be forced. In this connection, major curriculum designs need to involve more than the political establishment and top civil servants who are often limited in terms of exposure and experience. Consumers of education products, parents, and teachers should have the opportunity to input into a system that is sure to impact upon them in a variety of ways and that can benefit greatly from their support. More important is the involvement of professional researchers and education experts, especially those not in total agreement with the political establishment as their divergent opinions may help in bringing about some balance regarding any proposed reforms. Second, among other measures, extra-education reform needs to be put in place with a view to targeting the conditions that are likely to improve demand for vocational skills. These may include protecting the local economy from being a dumping ground for cheap imported products and creating an enabling environment for business, both formal and informal. Third, popularity of vocational education is also likely to be enhanced by the establishment of mechanisms that make it possible for students to more easily move into middle level colleges and the university supported by some kind of national qualification framework. Fourth, such a project needs to be planned for on its own and not as an appendage to a less significant project and with enough time to ensure that essential implementation inputs are in place. Finally, introduction of vocationalization would have been more successful if it was phased in depending on the availability of key human and physical implementation resources.

8.3 Syllabi and Input Requirements

The main weaknesses of the vocational education syllabus relate to its ambitious objectives and content, overlaps in coverage across subjects, poor sequencing of topics and the inclusion of material that is either too difficult or too simple; all of which have to do with poor planning before implementation and limited opportunities to pilot and evaluate the system. The stated objectives and content may also prove unattainable because the required resources for their implementation are inadequate or absent altogether as is the case with most industrial subjects. There are additional problems related to unfamiliarity of the content of the syllabus given the rural and economically disadvantaged backgrounds of most of Kenya's secondary school populations. The curriculum has also been blamed for not relating science and vocational education more closely. As things stand now, science subjects and vocational subjects are grouped differently for purposes of selection of areas of specialization by students. Finally, very few schools use external resources for teaching.

The need for a thorough review of the curriculum has been noted, although much of what needs to be done may have been accomplished with the removal of most vocational education subjects from the syllabus. The aim should be to design one that is feasible to implement in the face of available resources. Thus, schools should not be required to teach what they do not have the capability to teach, otherwise concerted efforts need to be made to ensure that they have the required facilities to make it possible to implement the chosen curriculum. Second, the objectives and proposed coverage of any vocational course needs to closely relate to the context in which it has to be implemented in order to be more attractive to learners. Third, regular in-service teacher training can go some way in improving their ability to teach the remaining vocational subjects and to imparting newly emerging ideas and practices. Fourth, the number of courses and content within each of the subjects that continue to be on offer should be manageable. Fifth, given that resources are likely to be limited however few the subjects on offer, teachers should be encouraged to improvise teaching/learning materials and methods where possible. Thus to the extent possible, teachers need to use as much locally familiar examples with a view to making the best use of locally available teaching/learning materials. Also vital is the need to build closer links between the teaching of vocational subjects and that of science subjects because a firm grounding in science is likely to support learning of most vocational subjects. Finally, opportunities for using professionals and representatives of industry as guest speakers in schools and of exploiting the potential provided by trade and agricultural shows and student internship programmes can go along way in enhancing the relevance and quality of education offered through vocational subjects.

8.4 Financing and Costs of Vocational Education

Overall, most vocational courses are more expensive to teach than the sciences and other academic subjects. Higher costs are due to the building and equipping of workshops, the cost of training and retaining some subject teachers, more expensive books and smaller class sizes. The government meets the costs of teachers' salaries while parents pay for the construction and equipping of workshops, procurement of teaching/learning materials and for the recurrent costs of teaching the various courses. There is thus little contribution by external stakeholders or from school based income-generating projects. Second, available resources are not always put to the best use.

In view of the fact that vocational education is more expensive to teach than academic subjects, the decision by the government to transfer the teaching of vocational courses, especially those falling under industrial education, to the better equipped and more specialized technical institutions seems an appropriate one. Ordinary secondary schools are just not adequately prepared for this kind of training and most Kenyan parents have not been able to put any more resources in them particularly given the uncertainties of the benefits that are likely to result from such investment. Other than transferring most courses to specialized institutions, an alternative may be to consolidate teaching of these subjects in a selected and well-equipped district, provincial and national secondary schools.

A second lesson relates to the need to lure the private sector to support the remaining vocational aspects of secondary educational programs (agriculture, business studies, home science). Private sector support could be in the form of scholarships, awards for the best students and teachers, internships and research programmes and provision of teaching/learning materials. However, this can only be possible if the relevant organizations see a clear benefit with such support. To court such support therefore, schools need to work out a strategy that demonstrates clear benefits to the sponsoring companies. Third, measures need to be taken to enhance the capacity of schools offering vocational subjects to make better use of the available resources including physical infrastructure and teachers. Teachers could be better utilized during the three months of vacations by having them do grading of end of term examinations and organizing remedial classes for weaker students during these breaks for which they get paid.

8.5 Quantifiable Achievements

More than 2,000,000 students have done at least one vocational subject since the introduction of these subjects in the school curriculum. The majority of these students have been enrolled in agriculture, business studies and home science. The popularity of these courses has to do with a number of factors, chief among them being the ease of setting and maintaining them and the assumed market value of some of the business courses. Overall student performance in the national secondary selection examination is high for vocational subjects. The industrial courses are the least common, mainly because of the costs associated with setting and maintaining them. Although computer studies is also relatively expensive, its popularity has been growing although not significantly, mainly because of the economic opportunities associated with knowledge of computers. Overall, participation of boys and girls is almost at par. Boys are more into industrial education than girls. Girls are also not as well represented among the student body entered for the vocational subjects particularly in Nairobi mainly because more of the courses popular with boys are taught here. Of the eight Kenyan regions, Rift Valley has more students enrolled in vocational subjects, perhaps due to factors related to political patronage that may also influence the extent of government support of schools in this region and its large size. Although more than 90% of all Kenya's secondary school teachers have relevant academic and professional training, all industrial courses are characterized by the presence of teachers who have only technical certificates or just 'A' level secondary education. Moreover, most teachers of vocational subjects, as indeed is true of those of other subjects, have limited opportunities for on-the-job training or for professional advice by subject inspectors.

Despite that fact that under the changed circumstances, it may be worthwhile to concentrate limited resources and effort on strengthening the more popular and easily manageable vocational subjects, namely agriculture, business studies and home science, the removal of computer studies may be ill informed in this day and age and it is hoped that schools that are able to can still offer it as an option to interested students. Second, although issues of gender and regional imbalance may not be that prominent especially with the removal of IE courses from the syllabus, there are concerns on the under-representation of boys in home science and of the unpopularity of this course compared to others like business education and agriculture. This gender barrier is more likely to be broken if measures are taken to show that even boys can excel and need home science as much as girls. However, teachers and parents have to do their bit to support their children and students enroll and remain in vocational subjects irrespective of their gender and the courses they choose to study.

8.6 Schools and Students

Six main factors distinguish between schools that offer vocational subjects and those that do not. First, top national and private schools mostly opt for subjects which are easy to set up and maintain. IE courses are therefore quite uncommon in such schools. Second, some subjects in particular agriculture and home science tend to be more common in rural schools while IE subjects are more commonly found in urban centres. Third, high cost private schools, church sponsored schools and those benefiting from philanthropic organizations and individuals tend to be more resourced than government maintained ones. Fourth, girls' schools tend to be the ones offering home science and typewriting with office practice while industrial education is more common in boys' schools. Also important is the level of establishment of given courses; where they are more established, schools tend to stick by them. Finally, as with other subjects, good school management contributes to the teaching and retention of vocational courses, as would be expected to be true of other courses.

With regard to students, five main factors determine which students enroll for vocational courses and for which ones. First, most students' choice is limited by what is taught in the schools which they attend. Within the schools, teachers develop sets of criteria for allocating students to the available courses. Second, in most schools vocational subjects are more common among average or below average students and more unpopular

with the top students. Some of these subjects are perceived as soft options as evidenced by the better performance in these subjects compared to the compulsory ones (English, maths, sciences) in national selection examinations. A third influential factor is a positive perception regarding availability of employment opportunities as with business and computer studies. A fourth factor is the home backgrounds of the students and in particular the influence exerted by their parents. Some parents are particularly against their children enrolling in home science partly due to traditional cultural practices. Other parents disapprove of vocational subjects because they do not view them as the best preparation for a successful professional career. Finally, there are some students who are attracted to vocational courses due to genuine interest in them and the economic benefits they see as likely to result from skills imparted through these courses. Such students are less likely to be influenced negatively against enrolling in their chosen vocational subjects.

Beginning 2003, most Kenyan schools will be offering more or less the same vocational subjects with the removal of the industrial education subjects from the syllabus, a factor that will result in some level of equity among schools. What is more urgent therefore is to deal with the rural/urban and gender divides. If these differences are to be effectively addressed, MoEST needs to take a concerted effort to ensure that all schools have requisite human and physical resources for efficient implementation of the remaining vocational courses in all schools. The handicap of limitation of the necessary financial resources no longer applies as most of what is left for vocational subjects, except home science, requires more or less the same level of investments necessary as most academic subjects. Given the value of home science in the lives of both girls and boys, it is for this subject to be also introduced in most boys' schools. In addition to encouraging students to enroll in this course, however, the learning process needs to be redesigned to highlight the value of the functional aspect of this and other vocational subjects for both boys and girls. Second, to enable interested students have a choice of at least one vocational subject, MoEST should take measures aimed at ensuring that some schools do not introduce their own compulsory subjects, as with the religious ones that force students to enroll for Christian or Islamic education as this only limits the options available to students among the vocational subjects. To support those students who are more interested in vocational subjects, it may be necessary to introduce incentives for the best performers. One such incentive would be to retain the current system whereby performance in these subjects is seen to be useful with regard to entry into post-secondary school courses. Third, given that good school management contributes to the popularity of vocational subjects, there is need for MoEST to mount relevant courses for the improvement of the management skills of head teachers and teachers of specific vocational subjects. Interest in vocational subjects is also likely to be promoted if the courses offered in secondary school are also taught throughout the primary cycle. Finally, given that the teaching of most vocational subjects is dependent on the level of parental support, schools should be encouraged to forge stronger partnerships with parents and local communities in order to gain their support in efforts related to the establishment and maintenance of vocational courses.

8.7 Assessment Methods and Learning Outcomes

Mastery of vocational skills is assessed at three levels, namely: internal school assessment; the practical projects; and the final secondary school leaving national examinations, the KCSE. The KCSE examination accounts for 90% of the student's final grade, the remaining 10% being accounted for by the practical project. Although there is general agreement on the value of school level continuous assessments, inability to guarantee their validity and reliability has meant that they cannot be used towards a student's final grade. Issues of validity and reliability are also of much concern with regard to the practical project. Although not of any certification value, some schools use other evaluation techniques such as competitions within classes and schools and among schools. The main objective of the final KCSE examination is to gauge the extent to which students have internalized positive attitudes towards practical work, vocational training and self-employment. Students who perform well in this national examination target university education and other post-secondary training opportunities. Schools and students thus place much emphasis on good performance in vocational subjects for good grades. In any case, exemplary performance in these subjects does not necessarily place one at any advantage with regard to employment of any kind, unless one happens to be a

top student in business and computer studies and in a top school. For the best students, however, the university and a variety of other training opportunities are within reach. In fact, good performance in specific vocational courses has a direct bearing on the degree courses a student may enroll in. Finally, although not necessarily the principal objective for registering in these courses, students value them for the skills they pick up which they hope to apply in their daily lives.

Having said this, it needs to be pointed out that the examination orientation of the curriculum and the examination system itself contradict some of the key objectives of vocationalization especially as they relate to the promotion of problem solving abilities and creativity in performing actual and out of school assignments. The current examination system also tends to test more of theoretical aspects of learned skills partly as a response to a situation whereby schools have limited facilities to make teaching of practical aspects of the curriculum effective. The examination system has further been blamed for glorifying excellence in examinations through its system of ranking schools and students. This puts a lot of pressure on teachers, students and parents to excel in what is tested and not what is functionally relevant.

In the absence of a more objective system for sorting out the beneficiaries of limited opportunities, the national examination system may be around for a while. However, it could be made more supportive of the goals of vocationalization. One way this could be done is through attempts to test more practical knowledge than is presently the case. Second, there is a need to orient the examination system to testing more of general knowledge skills and analytical ability. Third, more weight needs to be given to continuous assessments and other school level testing systems if a system for making them more objective can be worked out. Fourth, criteria for judging the worth of any school may need to include non-academic considerations such as excellence in sports, drama, and community service in order to encourage schools to stress the value of non-academic qualifications. Within schools, inter-school, inter-district and national school competitions and exhibitions of vocational educational products can go some way in generating more interest in the retained vocational subjects. Finally, the system of career guidance needs to be strengthened in order to better prepare students for available out-of-school opportunities.

9 Some Concluding Remarks

The heavy criticism of the 8-4-4 system has culminated in the removal of most vocational subjects from the secondary school curriculum. This has come as a relief to parents who found it difficult to meet the demands of many vocational curriculum courses, particularly the industrial ones. Likewise, most head teachers will not find the exclusion of those courses a major loss as they were non-existent in most schools, were popular with a small proportion of students and were expensive to maintain where they had been introduced. Although the removal of computer studies is regrettable given the growing role of computer technology in everyday life, only a few privileged schools can mount and retain the course. However, even for those schools that teach the computer studies course, it's withdrawal may be justified because: few schools in the country have access to electricity; only a few schools can afford computers; not many teachers are computer literate, even the few that are, may not be competent in teaching the subject; and because its teaching introduces and widens inequality between rural and urban schools/regions.

Nevertheless, the wholesale withdrawal of industrial education courses, typewriting with office practice and computer studies from even those schools that are well equipped to teach them is a somewhat unfortunate development. Those schools that have what it takes to offer the subjects should probably have the option of teaching them. To ensure equity of access to such schools, MoEST may designate at least one school in each district and province and a few national schools to offer these subjects. This may be one way of promoting cost-efficiency in their teaching if students who have an interest in them could be encouraged to join such schools. Cost-efficiency could also be promoted by de-emphasizing sophisticated and expensive to maintain equipment in preference for simpler ones such as hand tools. Likewise, the computer course could focus on

the teaching of more practical skills such as word processing, simple analytical skills and the use of computers in local and international communication.

Along the same lines of teaching simple functional skills and aware that vocational education is not the panacea to unemployment, is the need to review the curriculum with a view of introducing other types of functional survival skills in the form of short courses or one general knowledge course resembling the general paper of the former 'A' level system. Among the skills that could be taught under this course may be communication, simple analytical skills, home and health related knowledge, basic business and agricultural skills, knowledge on environmental awareness, civic education, and democratic values and basic repair and maintenance. This set of knowledge, as well as basic computer skills could be made a compulsory subject in all schools. Its examination could focus more on measuring ability to apply relevant skills rather than on their memorization.

The retention of computer studies and industrial education courses in at least some schools is justifiable on five fronts. First, these courses complement the teaching of others courses, especially the sciences. Second, they have the potential to enhance internalization of valuable technological skills that are handy for a country targeting full industrialization by 2020. Third, there are students who are genuinely interested in these subjects who need the opportunity to exploit their full potential in these areas. Fourth, and has noted above, the computer revolution is having impact on all aspects of everyday life and individuals and communities risk serious marginalization if they choose not to improve their understanding and exploitation of the this technology. Finally, the heavy investment by government and parents in computer studies and industrial education courses should not be allowed to go to waste.

The introduction and implementation of most of the vocational subjects in Kenyan schools implies the need for widespread consultation before the mounting of any new courses, such as what is being suggested in this paper. Perhaps even more important is the need to appreciate that, even such basic functional skills as are being proposed here are more likely to be usable in the context of a favorable economic and political climate particularly one that promotes employment opportunities at the domestic and other levels.

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