

**TRENDS AND CAUSES OF WASTAGE IN TECHNICAL AND
VOCATIONAL EDUCATION AND TRAINING (TVET)
INSTITUTIONS IN KENYA: A SURVEY OF TVET INSTITUTIONS IN
RIFT VALLEY PROVINCE OF KENYA**

BY

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STUDIES**

**SCHOOL OF EDUCATION
MOI UNIVERSITY**

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DECLARATION

DECLARATION BY THE CANDIDATE

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DEDICATION

This thesis is dedicated to my father Abraham Cheruiyot (Posthumous); my mother Hellen Cheruiyot; my wife Margaret Lelei; my children; my brothers and lastly my sisters. Through their support, pace setting and encouragement, I have reached this height on the academic ladder.

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ABSTRACT

The study was designed to establish the trend and the causes of wastage in Technical and Vocational Education and Training Institutions in Rift Valley Province within the period 2002 to 2005. Government reports reveal examination failure as a phenomenon of Technical and Vocational Education and Training institutions and yet resource allocation was on the rise. This provoked an investigation to determine the trend and causes of wastage in the institutions. The study hypothesised that there existed no relationship between wastage and the purported causes of wastage. The study adopted the production function model to examine the input-output relationship of the Ordinary Diploma cycle of the institutions under investigation. The research design chosen for the study is survey research. Stratified and purposive sampling techniques were employed to select Rift Valley Province, one National Polytechnic, one Institute of Science and Technology and four Technical Training Institutes for the study. Simple random sampling was used to select Ordinary Diploma cycle and student-repeaters for the study. Research instruments comprised of questionnaires and institutions documents. Data was analyzed using descriptive statistics and regression analysis. Respondents included Principals, Heads of Department and student repeaters. The study revealed that most students repeated (40.90%) as required by Technical and Vocational Education and Training authority after performing poorly in examinations. The main reason for dropping out is inability of parent/guardian to pay fees (33.33%). Generally, wastage was on a rising trend and was higher for males than for females. The study recommended more emphasis to be put on practical/projects components in Technical and Vocational Education and Training evaluation. Also, Constituency Development Fund and Higher Education Loans Board should set aside more funds to aid students from less endowed economic backgrounds.

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ABBREVIATIONS AND ACRONYMS

8–4–4	- The education system in Kenya; eight years of primary, four of Secondary education and four of university education.
CDF	- Constituency Development Funds
CPE	- Certificate of Primary Education
ESAURP	- Eastern and Southern Africa Universities Research Programme
FPE	- Free Primary Education
HELB	- Higher Education Loans Board
HND	- Higher National Diploma
HOD	- Head of Department
IBE	- International Bureau of Education
IT	- Institute of Technology
KCPE	- Kenya Certificate of Primary Education
KNEC	- Kenya National Examination Council
MOEST	- Ministry Of Education Science and Technology
NP	- National Polytechnic
TVET	- Technical and Vocational Education and Training
TVE	- Technical & Vocational Education
TTI	- Technical Training Institute
UNESCO	- United Nations Education Scientific and Cultural Organization
UNICEF	- United Nations International Children’s Education Fund
WCEFA	- World Conference on Education for All

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

This Chapter presents the background of the study, the statement of the problem, purpose of the study, assumptions, research objectives, and research questions, significance of the study, theoretical framework and operational definition of terms.

1.2 Background to the problem

In the 1950s the conventional wisdom gleaned from economic growth models was that differences in income levels and growth between countries could best be explained by differing stocks of physical capital. This work was pioneered by Robert Solow (cited in ESAURP, 1993). This result was quickly challenged on the grounds that differing levels and rates of growth in income could be better explained by differences in human capital which is in turn largely influenced by education (Schultz et al (1971), cited in Psacharopoulos and Woodhall, (1985).

Recent work such as the important contribution of Lucas (1988) have shown that, not only can human capital explain the differences between countries, but also, that there can exist discontinuities in the development process where those countries that reach a critical mass in terms of human capital take off on a high growth path whilst those that do not, trudge a path that sees them continue at subsistence level (ESAURP, 1993).

Human capital is acquired in many different ways, but it is largely acquired through formal education. Studies have shown that labour productivity is dependent on the level of education and/or training acquired by an individual (ESAURP, 1993).

The technical and vocational education is receiving special emphasis in both developed and developing countries. This shift of focus from a mainly academic to an increasingly technical and vocational biased curriculum is accounted for by the major reasons; lack of skilled manpower for economic development and technological advancement and rising unemployment among products of the traditional education system (UNESCO, 1978).

It is argued that education policy in Africa in the last several decades has favoured curriculum change towards practical or vocational subjects on the above account. In Kenya this policy started to emerge in the mid sixties leading to the launching of the 8-4-4 system in 1985 with the objective of increasing the scope of vocational subjects in the school system at all levels (Sifuna, 1990). The role of TVET in furnishing skills required to improve productivity, raise income levels and improve access to employment opportunities has been widely recognized (Bennell, 1999).

In an excellent synthesis of twelve case studies based on both French and English speaking nations in Africa, Kerre (1995) observed that most countries in Africa generally support the general objectives of vocational and technical education as follows; to provide alongside general education, knowledge and skills in technical and vocational manpower requirements in agriculture, business, industry and other technical service. This is in agreement with the assertions of Sessional Paper No 2 of 1996 on industrial transformation to the year 2020, that “the transformation required in Kenya will not come about as a result of direct public investments and action alone. Government role will be to provide an enabling policy, environment, investing in human resource development and basic welfare, and when necessary guarding against human exploitation and environmental degradation.” Sessional Paper No. 1 of 2005

clearly states that a breakthrough in industrialisation can only be achieved through technology and that Kenya should give prominence to technical education at all sub – sectors. Out of the realization education contributes to sustainable development; Kenya has recognized it as a priority area of development intervention as is reflected in policy documents. The government of Kenya has developed key policy documents over the last ten years; Poverty Reductions strategy Plan (PRSP) of September 2002 and its successor the Economic Recovery Strategy Programme (ERSP) of 2003, and the Vision 2030 of 2008; they all emphasize the importance of education in development.

The prominence given to technical education by the government is evidenced by increased budgetary allocations on re-current expenditure as shown by Table 1;

**Table 1: Government recurrent expenditure on education in the financial period
2002/2003 – 2005/2006**

Table 1: Recurrent expenditure on education Ksh million

	2002/03	2004/05	2005/06
RECURRENT EXPENDITURE			
General Administration and planning	49,051.57	55,776.74	59,140.80
Pre-primary Education	5.22	5.51	25.66
Primary education	3,321.65	5,966.52	6,583.42
Secondary Education	667.88	945.42	938.79
Technical education	889.94	1,171.40	1,546.55
Teacher Education	144.29	192.83	210.41
Special Education	121.39	175.13	209.77
Polytechnic Education	342.73	466.01	1538.2
Higher Education	6,795.74	7,470.08	9,735.25
Miscellaneous	217.4	240.9	311.06
TOTAL	61,557.81	72,410.54	80,239.91

Source; Economic Survey 2007

Table 1 shows the priority given to education sub-sectors by the government in terms of expenditure. From the table it can be seen that apart from general administration and planning, technical and polytechnic education ranks third on the recurrent expenditure after Higher and primary education. The trend of recurrent expenditure on this sub-sector of education was generally rising showing the prominence of this sub sector of education.

During 2002/03 Financial year, overall student enrolment in Technical Training Institutes decreased slightly from 32,750 in 2002 to 32,718 in 2003. Enrolment in other technical institutions dropped by 2% from 18,991 in 2002 to 18,611 in 2003, (Economic Survey 2003). The decline in enrolment could have been caused by existence of wastage.

Though total enrolment in public TVET Institutions in Kenya increased to over 79,000 in 2003, female students enrolment contributed 44% of the total. There also existed serious gender disparities in terms of overall enrolment in science and technology related professions. Majority of female students (52.4%) were enrolled in business studies related causes compared to less than 50% in engineering programmes. Overall enrolment in the traditional engineering and building construction courses was dwindling very fast while enrolment in business/commercial oriented courses was growing steadily (Economic Survey, 2003).

The Commission of Inquiry into the education system was informed that the failure rate of students has been alarmingly high especially at the Kenya Polytechnic (Republic of Kenya, 1998). A review of examination results from 1997 to 1999 reveal

that, except for the artisan courses which have achieved a high percentage pass, the craft courses have maintained an average pass mark for 1997 but declined in 1998. From Table 2 it can be seen that the success rates have been fluctuating for all the courses of TVET. One can also deduce that the rate of wastage increased especially from 1998 to 1999 (see table 2). Performance in Diploma courses has been alarmingly poor while that in the business and commercial courses is poor and has been on the decline. This puts doubt on the efficiency of TVET institutions to justify resource allocation.

Table 2: Success rates in percentage

	1997	1998	1999
All artisan courses	81.63	95.65	90.70
All craft courses	55.04	37.00	51.80
All Diploma courses	35.77	45.06	24.78
KATC and CPA	44.11	44.42	33.50

Source: Ministry of Education, Science and Technology.

From the foregoing, it can be observed that success rates have been declining or fluctuating with the diploma courses registering the lowest success rate of 24.78% in 1999. By proxy the failure rates have been on the increase where the diploma courses registered the highest failure rate of 75.22% in 1999. The fluctuating performance in diploma courses further necessitated an investigation to determine the trend of wastage and therefore recommend policy interventions for the future.

As Psacharopoulos (1982) remarked, ‘since the cost of vocational education is often much higher than general education, this may lead to lower rates of return, as observed in several developing countries’. Consequently, there is need to utilize resources efficiently to make the system profitable. Every investment proposal must therefore be evaluated with great care to determine its internal and external efficiency, its effects on distribution of educational opportunities and the implications for equity and its possible impact on other sectors (Psacharopoulos and Woodhall 1985).

National Development plan 2002 – 2008 clearly states, ‘Despite major strides in education and training, a number of challenges still persist; high cost of education and training; inequity in access; high wastage rates; problems of relevance and quality; under – enrolment in key post school courses for developing the labour force for industrialization (Republic of Kenya, 1998).

Sessional Paper No. 1 of 2005 highlights the same challenges facing TVET institutions; mismatch between skills learned and skills demand from industry due to inflexible curriculum; inadequately trained teachers; weak quality assurance mechanisms due to lack of effective inspection and supervision; inadequate, old and outdated equipment and physical facilities; and examination failure. Overall management of TVET institutions is spread across 10 ministries. This makes co – ordination of their activities and maintenance of training standards difficult as the supervision of most of these institutions is left to individual ministries and private sector that often lack capacity to assure quality and high standards of training (Republic of Kenya, 2005).

The lack of effective coordination of training policies and the disproportionate production of skilled personnel across the entire economy resulted in; mismanagement of scarce resources; duplication of efforts; conflict of jurisdiction; under – utilisation of available training facilities; wasteful and unnecessary competition; and costly and irrelevant training programmes (Republic of Kenya, 2005).

Kenya is faced with scarce resources and at the same time concern with reducing the recurrent expenditure on formal education (Republic of Kenya, 1988). There is an urgent need to reduce educational wastage in order to improve efficiency in technical institutions as a strategy for reducing educational recurrent expenditure. This scenario called for a study that aims at establishing the trends and causes of wastage in TVET institutions.

1.3 Statement of the problem

Though the government realises the fact that education is a fundamental strategy for human resource development, it is apparent that TVET institutions experience inefficiency problems largely due to under – enrolment in engineering or technical courses, high failure rates in examination and attrition in the system (Republic of Kenya, 1998). Consequently, the government's goal of achieving efficient utilization of the limited resources could hardly be achieved. In the absence of data, on the trend and causes of wastage in TVET, it was necessary to undertake such a study.

Existence of wastage shows that the input – output relationship in the institutions is poor as shown on Table 2 on success rates. On the output side a smaller number of graduates than projected may be produced and against a higher cost. On the input

side, human resources (instructors) shall be under – utilized and students time is wasted in attending college yet he/she dropout of the system. Repetition reduces the intake capacity of a grade thus preventing other students from joining TVET institutions. When students dropout prematurely they should have wasted time and funds committed in their fees. It may not be clear what causes wastage in TVET institutions in various geographical regions of the country, but the phenomenon might have a bearing to institutional factors (internal factors) and socio – economic factors (external factors), (Psacharopoulos and Woodhall, 1985). There was need therefore to carry out a study to establish the trend and causes of TVET institutions wastage in Rift Valley Province of Kenya.

1.4 Purpose of the study

The purpose of this study was to identify the trend and causes of wastage in TVET institutions in Rift Valley Province. This was provoked by the report that failure rate (Table 2) is a serious phenomenon in TVET institutions in Kenya.

1.5 Objectives of the study

The objectives of the study included:

- i) To examine TVET institutions repeaters by grade and sex
- ii) To examine TVET institutions dropouts by grade and sex
- iii) To determine the cohort wastage by sex
- iv) To determine the trend of wastage in TVET institutions from 2002 to 2005
- v) To find out the major causes of educational wastage in TVET institutions

1.6 Research questions

The main research question to guide the study was; what is the trend and causes of wastage in TVET institutions in the Rift valley?

In addition, the study will seek answers to the following subsidiary questions concerning TVET students in Rift valley:

- i) What are the students' repeater rates by sex and grade?
- ii) What are the students' dropout rates by sex and grade?
- iii) What are the cohort wastage rates by sex and total?
- iv) What Is the trend of repetition and dropping out by sex?
- v) What are the main causes of repetition and dropout?

1.7 Hypotheses of the study

The following hypotheses were tested

- i) There is no significant relationship between failure of parent/ guardian to pay fees and the number of repeaters.
- ii) There is no significant relationship between poor performance in examinations and the number of repeaters.
- iii) There is no significant relationship between inadequate teaching resources and the number of repeaters.
- iv) There is no significant relationship between inability of parent/guardian to pay fees and the number of dropouts.
- v) There is no significant relationship between poor examination performance and the number of dropouts.
- vi) There is no significant relationship between inadequate teaching resources and the number of drop-outs.

1.8 Significance of the study

The significance of the study lies in the fact that the problem of the educational wastage exists, is still persistent and is of great concern in our education system. In particular, the findings of this study will be useful to: Policy makers in the planning of resource allocation with less wastage, Scholars as reference material and a source of data for training of instructors, TVET administrators in designing policies on reducing wastage and dissemination of information, parents and the community who contribute educational resources which are being wasted, donor agencies as a source of information on internal efficiency of educational projects which they are interested in assisting and it will provide timely database to the government as it endeavours to implement Sessional Paper No 1 of 2005, by highlighting the main causes of wastage.

1.9 Scope and limitations of the study

The subject of efficiency is wide and cannot be covered exhaustively in a single study. It comprises distinct aspects of internal and external efficiency. The study focused on some aspects of internal efficiency (dropout and repetition). TVET institutions are spread into many parts of the country making it difficult to take all of them for study. The researcher sampled out institutions in one province (Rift Valley) out of the eight provinces.

Given that the time for carrying out the study was short (one year), the researcher randomly and purposively took a sample of one National Polytechnic, four TTIs and one Institute of Science and Technology. The researcher then randomly sampled and studied educational wastage within the progression of Ordinary Diploma students. This was limited in that there are students of Higher National Diploma, Craft and Artisan courses.

1.10 Assumptions of the study

This study took into account the following assumptions:

- i. That respondents will give honest and sincere information to enable the researcher determine the trend of wastage and identify its main causes.
- ii. That inter-institutional transfers were negligible, to enable the researcher to determine student repeaters and dropouts.

1.11 Theoretical framework

This study was based on the production function model. In it a measure of internal efficiency in the educational system is that which can be expressed as a relationship between the quantity of inputs and the quantity of outputs. The relationship between inputs and outputs can be represented by an education production function. This can symbolically be represented as:

$$Q = f(L, K)$$

This is a production function in which the quantity of output (Q) is a function of the amount of labour (L) and capital (K) utilized. Taking the school to be a production firm and the educational system to be an industry, the school output, that is, successful graduates will be a function of school inputs. Inputs include resources per student expenditure.

Various factors act in combination to determine whether a student (input) will finish the school cycle (graduate), repeat a grade within the cycle or even dropout before completing the cycle. Those who repeat and / or dropout constitute educational wastage. Therefore a wastage production model can be expressed as a relationship between wastage (repeater and/or dropout) and the factors that determine wastage.

This can symbolically be represented as:

$$W = f(X_1, X_2, X_3, \dots X_k)$$

Where;

W = quantity of wastage

$X_1, X_2, X_3, \dots X_k$ are factors that cause wastage in
educational institutions

This study attempted to find out what these factors are and the significance of each factor as contributor to wastage in TVET institutions.

Further, a linear model of the form

$$W = a + bx_1 + cx_2 + cx_3 + \dots + Zx_k + e$$

Where:

W = dependent variable (wastage)

a = is a constant

b,c,... Z = coefficient estimates

X_1 to x_k and e = independent variables

was used for regression analysis. This linear model was adopted from earlier studies which successfully utilized its abilities to discriminate among many variables. This enabled major causes of wastage to be singled out. The major assumption underlying the use of this model is, that the study is homogenous and representative of the population; and that multicollinearity among the causes of wastage is negligible. The theory also assumes that the difference in quantities and qualities of school inputs are responsible for the variations in educational outcomes.

The study hypothesised that some of the variables identified in other studies (mainly in primary and secondary education) were not significant in causing wastage at TVET

level of education. These variables include; failure of parent to pay fees, poor performance in examinations and inadequate teaching resources.

1.12 OPERATIONAL DEFINITION OF TERMS

In this study, the key terms are defined as follows:

Artisan Is a skilled person with a thorough knowledge of techniques which are needed to do a job with efficiency in a specific trade.

Cohort A group of students who enrol in the first grade / stage of a specific TVET cycle at the same time.

Cohort wastage Students who started grade one but cannot be accounted for at the last grade.

Craftsman This is a skilled person in a specific trade who has the ability to do a practical job or work at a high level of efficiency. He/she possess more relevant scientific and technological knowledge than the artisan to enable him/her to perform at higher level of efficiency.

Diploma cycle A period of study in TVET which takes a duration of three years for one to graduate.

Dropout Refers to a student who withdraws from TVET institution before the completion of the full cycle

Efficiency Refers to whether the education system is able to achieve its internally set objectives. In this study the usage of the word is therefore restricted to repetition and dropout.

Entrepreneurship education Is education which seeks to provide students with knowledge, skills and motivation to encourage entrepreneurial success in a variety of settings.

Grade / stage Refers to a standard or year of study within a TVET institution.

Grade Dropout Rate Enrolment in the previous grade minus survivors, minus repeaters divided by the enrolment in the previous grade in the previous year.

Grade wastage Refers to those students who cannot be accounted for in a subsequent grade and/or those who repeat the same grade in a subsequent year.

Graduate rate Number of students who graduate divided by the number of students in the final grade.

Industrial education A general form of education about industry that imparts knowledge and skills on and attitudes towards the processes of industry.

Industrialization The development of a culture of production; the development of constructive process of producing all consumer and producer goods in an economy, making use of the entire technological environment of that economy.

Industry Any system of processing consumer and producer goods within an economy.

Repeater Refers to a student who spends more than one year in a particular grade doing the same work as in the previous year.

Survivor A student who successfully moves from a previous grade in a previous year to a subsequent grade in a subsequent year.

Technical education A range of programs that impart skills, knowledge and attitudes to individuals preparing to take middle level professional positions in the world of work particularly in engineering and scientific disciplines.

Technician A person who has the ability to perform a wide range of skilled and analytical tasks at a high level of competence .He/she is required to interpret, design and supervise other employees below him/her.

Technological Development The development of human knowledge and ability to manipulate and tap the natural environment and adopt it for peoples benefits. The

progressive perfection of human efforts and expertise to fabricate, implement and produce consumer goods that make life more convenient for the people.

Technologist A person who has the ability to perform a wide range of assigned tasks at a high level of competence. He/she has the ability to design systems. The technologist possesses a high level of educational training in science and technology. He/she is essentially a manager in the work set up.

Technology The total environment enabling people to fabricate implements and consumer goods to make life more convenient for them. It is the ability to manipulate and tap the natural environment and adopt it for the convenience of people.

Trend of wastage Refers to whether the wastage rates have been increasing, decreasing or constant.

Vocational education Those programmes that impart specific occupational skills and knowledge required in the world of work particularly in engineering and scientific discipline. Vocational education programs are generally composed of more practical skills than technical education programs which are more analytical.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Literature of educational wastage is large and varied touching mainly on primary schools; researchers have not written much on wastage in Technical and Vocational Education and Training Institutions. The review of related literature for the present study was based on available general information. Specifically, the review considered the following aspects: - Measurement of efficiency and general information, studies done outside Africa, studies done in selected African countries and studies done in Kenya together with government policy documents.

2.1 Measurement of efficiency and general information

Educational output is difficult to measure and is affected by so many factors that some have questioned the criteria of measuring and analysing the internal efficiency of education. Efficiency and productivity are inappropriate concepts to apply to education as a whole (Vaisey et al 1972). Others argue that non – school factors such as family background or motivation can influence educational achievement to such a great extent that they may swamp the effect of school inputs (Psacharopoulos and Woodhall, 1985, P. 206).

For many purposes, measuring output by the number of students who successfully complete a course provides a good first approximation. Comparing this with input measured by the number of pupil – years may be enough to indicate that high rate of dropout and repetition are connected with very low efficiency. This is judged simply by the length of time needed to produce one qualified school leaver. Certainly, one way to improve the internal efficiency of education in developing countries would be

to reduce dropout and repetition as well as improving quantity (output), (Psacharopoulos and Woodhall, 1985, P. 207).

From the extensive research on dropout and repetition that has been carried out by UNESCO 1982, it is evident that the problem of dropout and repetition of grades is serious throughout the developing world. The researcher believed that TVET institutions were not spared from these problems.

Dropout and repetition appear to be most common among students from a low socio – economic background and are more prevalent in rural than in urban areas and among females than among males. Causes include poverty, which may give rise to illness, malnutrition and absenteeism; the high opportunity cost of schooling for poor families; cultural factors, which affect girls in particular; inappropriate curriculum and examinations, which are often exclusively academic and designed to prepare a minority of pupils for upper secondary and higher education; badly trained teachers, lack of textbooks and materials; overcrowded schools and a shortage of secondary school place, which leads to repetition at the primary level. Dropout and repetition have been identified as the principal cause of internal inefficiency in most developing countries (Psacharopoulos and Woodhall, 1985).

Educational resources are scarce and if they are not utilized in the most efficient manner, then educational objectives may not be realised (at institution or society levels). The social costs of misallocation are high both at the individual and the societal level and every effort should be made to ensure such losses are minimised. The basic indicators required to measure the internal efficiency of an education

system are promotion, repetition and dropout rates (Psacharopoulos & Woodhall, 1985).

The following are some of steps that could be taken to improve the flow of pupils through primary and secondary schools in many developing countries; introduce automatic or semi – automatic promotion between grades, change examination procedures or reduce the number of examination taken, improve the quality of the curricular and make it more relevant to pupils' interest and surroundings, improve basic teaching equipment, improve teacher training so that empirical learning will replace memorization and rote learning, strengthen pedagogical research as an instrument for improving educational efficiency and change financing policy that may be affecting dropout.

Though these factors are stated with particular reference to primary and/or secondary schools, the researcher believed that they could also be applicable to Technical and Vocational Education and Training (TVET) Institutions.

2.2 Studies done outside Africa on Educational Wastage

A considerable amount of research has been done on the phenomenon of school wastage throughout the world. At present, many studies are being done for the purpose of evaluating the internal efficiency of education systems. Planners are aware that intake capacity and successful completion in any education system are directly related to retention power. The inter-relationship of these factors and their combined sequence determine the dynamics of most systems and play a key role in the precise unit cost of each successful school completer, whether this is expressed in economic or non- economic terms, (Psacharopoulos and Woodhall, 1985).

The skills development is important for economic growth, poverty alleviation, youth and women's empowerment and social inclusion. Nevertheless, the role of TVET is absent to a large extent in most policy documents. This gap is particularly 'puzzling'; Governments and donor countries consistently emphasize the need for concerted efforts to build the human assets of the poor. Yet TVET is accorded limited importance in donor financing schemes and discussions since the late 80s' (Bennell, 1999).

Several countries; developed and developing, such as Italy, Brazil, China, Sweden and Japan have given more recognition to TVET through adequate funding. As a result, students get exposed to vocational training and to a culture of scientific investigation and application at an early stage. In Europe, at least 50% of the students in upper secondary education pursue some form of technical or vocational education. In china, India and South East Asia the figure is 35-40 percent, whereas in Africa it is less than 20 percent. Therefore wastage due to limited finances would be felt more in developing than developed countries.

Several International Bureau of Education (IBE) and United Nations Education Scientific and Cultural Organization (UNESCO) documents which highlight aspects of relevant literature conclude that non- school variables, particularly the opportunity cost of students' time and unavailability of schools are more important factors influencing dropouts than are such school variables as teacher quality and class size (UNESCO, 1972a, 1972b et al). Nonetheless, such school quality variables as teacher education and experience do make a difference in some studies (Psacharopoulos and woodhall, 1985).

Other studies conducted elsewhere which shed some light on the phenomenon of school wastage include that of Levin (1976) in Western Europe. The social class of a family was found to influence the academic achievement of children; inadequate incomes among lower class families hindered the provision of tuition fees, school books and other material inputs necessary to ensure good performance or continuation in school. Further, Levin's study found that lower class families had lower aspirations for their children than upper class families.

In Nicaragua, Jamison and McNally (1975) study found attendance rates of pupils to change with the farming calendar, whereby low attendance rates corresponded to high farm activities while in India drop outs and non- dropouts were found to differ in their school attendance rates (Sharma and Sapra, 1971). Other studies done in India concluded that about 40% of all the dropouts in India rural districts belong to the scheduled and backward castes (UNICEF, 1970). UNICEF'S study also found that parents or guardians of the dropouts were either illiterate or had not gone beyond the primary level of education.

UNESCO (1972a) carried out a survey on the flow of pupils in a number of developing countries. In India the study revealed that the trend of repetition in the school system was decreasing in all grades. However, in the primary stage the rate of decrease was lower than in the middle stage. Further, dropout rates were found to be increasing in all grades and stages.

In Colombia, the participation of girls at primary school level represented an almost constant proportion, about 50 percent of the total enrolment. Further, this survey revealed that the rates of repetition, promotion and dropout were also very similar for

boys and girls when considered as one unit, and for girls only. The analysis of actual pupil's flow during the period under review indicated that pupils' promotion rates were improving. But in the first two grades repetition represented between 27 and 23 percent while dropout was between 27 and 22 percent. (Benell, 1999)

Several studies by Haddad (1979) have suggested that there is no educational advantage to be derived from making low achievers repeat grades. Such a finding has been supported by a recent World Conference on Education for All (WCEFA) when it asserted:

If repetition resulted in increased achievement, it could be considered a pedagogically useful mechanism. However the evidence shows that the achievement gains from repetition are minor, rarely cost-effective and often promote lower self-esteem and an increasing propensity to dropout. (WCEFA, 1990b; p. 51, cited in Ngware 1994).

The above conference advocated repetition to be prevented through improved instruction and in class remediation. The study felt that these remedial measures were less expensive than accepting repetition as an unavoidable part of the school process.

Some countries have placed emphasis on vocational education for fairly a long period. For example, Indonesia, Israel, Japan, South Korea, Papua, New Guinea, Thailand, and Turkey had maintained the enrolment in secondary education at above 10% level during the last three decades. In Israel the enrolments formed more than 50% in upper secondary level for a long time. On the other side, countries like Bangladesh, India, Myanmar, Pakistan, Malaysia, Kuwait and Saudi Arabia have never accorded a high place to vocational education. Negative attitudes to manual work on one side, and the less diversified economic structure on the other, are the demand side factors responsible for the low level of enrolment in vocational education in South Asian

countries. Only a few countries, for example, China, Iraq, Jordan and Syria, have made special efforts to expand vocational education rapidly. China stands as a special case that had made significant improvement in vocational education since 1970-71; it is also note worthy to note that it also experienced very rapid economic growth during this period.

All the countries, which progressed well in vocational education, could not maintain consistently high levels of enrolment in vocational education. For example, in Korea the enrolments in vocational education as a proportion of total enrolments in secondary education declined from 44% in 1995 to 20% in 1996-97; in Indonesia it declined from 22% in 1970-71 to 13% in 1996-97, in Mongolia from 11% to 6%, in Hong Kong from 6% to 3%, in Lao from 14% to 3% and in the United Arab Emirates (UAE) from 10% to 1%. On the whole, of the 28 countries considered, eighteen countries have experienced decline in the relative size of vocational education over the years, and only ten countries registered improvement.

The enrolments in vocational education as a proportion of enrolments in senior secondary levels are indeed high in quite a few countries of the region on which data are available. Such proportions are around 40% in Indonesia, Thailand, Korea and Israel. Corresponding ratios, however, exceed 70% in Czech Republic and Australia, 60% in Belgium, Germany, Italy, Netherlands, Switzerland, and 50% in France, Denmark and Finland (OECD, 2000,p. 146). Thus on the whole, vocational education in the Asian region is less developed than in Europe and other countries of the Organization for Economic Co-operation and Development (OECD).

Why several countries have made remarkable progress in vocational education and many others could not? This depends upon social, economic and political factors, which also mutually interact with each other. First, the social factors - social attitudes to vocational education are not encouraging in many Asian countries. Negative attitudes to manual work severely dampen the demand for vocational education. Further, TVET is conceived as a system of education for the poor, and for the educationally backward sections that are not eligible for admission into higher education. Low prestige attached to vocational education and its inherent inequities are somewhat a common phenomenon in many countries including, India, Indonesia, Philippines and Sri Lanka and to some extent in Korea and Taiwan. This suspicion that curricula provide “a second-class education and track some individuals-lower caste, racial minorities and women-away from academic education and access to jobs of the highest pay and status” (Grubb, 1985, p.529) became quite strong over the years. Some public policies of ill-treatment of vocational education in educational planning and resource allocation contributed to strengthening this belief. As a result, vocational education in countries like India did not take off on a sound footing. This has driven off middle and high income families out of TVET.

Secondly, enrolments in vocational education and level of economic development are related. Demand for vocational education seemed to exist in industrially developing societies, with growth and diversification of industrial structure. As psacharopoulos and Loxley (1985, p.228) observed, the lower the overall level of a country's development, the weaker the case for introducing vocational curriculum and diversifying it. But it is these countries the need for vocational education is felt. Emphasis on diversified industrial production emphasises the need for labour force with vocational skills. Much growth in vocational education took place in countries

like Korea during early industrialization processes, when employment opportunities could increase. So vocational education becomes more popular in regions where jobs can be guaranteed. This goes a long way to boost enrolment and retention at TVET.. When the economies move from reliance on its agricultural and manufacturing sectors and in favour of service sector, the demand for TVET may indeed decline. A review of the experience of the East Asian countries led Mundle (1998, p.664) just to conclude the same: enrolments in vocational education in the region have been substantial until a threshold level of gross national product (GNP) per capita (say about \$ 8000) was reached; thereafter the share of vocational education in senior secondary education seemed to have declined.

Vocational education programmes are costly and the meagre, dwindling educational budgets in several developing countries do not allow provision of sufficient resources for vocational education. Several developing countries, more particularly countries in South Asia have invested very little on vocational education. In the mid 1990s, Bangladesh invested 8.4% of the total public expenditure on education in vocational and technical education, India and Nepal 4.4% and Pakistan 2.6% (Haq and Haq, 1998, p.170). The current levels of public expenditures on vocational education are not particularly high even in East Asian countries. Only 5.7% of the total education (current) budget goes to vocational education in Korea, 4.5% in Singapore, and about 3% in China and Hong Kong. In Taiwan, however, it is somewhat high, 8.2% in 1995 (Tilak, 2001). On the whole, these figures are very low compared to the figures in developed countries. Many OECD countries spend 11-18% of the total educational expenditures on vocational education. After all, “poor and inadequate investments cannot produce higher returns” (Tilak, 1988a). This scenario may constraint enrolment if TVET is to be privately financed.

It is obligatory for the companies in Korea to finance public vocational and training programmes (Lijima and Tachiki, 1994). Enterprise-based training is the most important form of TVET in Japan. This goes a long way in boosting enrolment and enhancing retention in TVET institutions.

Besides the scarcity of public resources, governments also face confusion on the efficacy of TVET programmes, which deter them from making required investments in TVET. Available evidence on rates of returns to education in countries does not indicate any advantage vocational education will provide compared to general education. For example, Chung (1995,p. 177) reported 12 studies showing higher returns to vocational education than to general secondary education and 10 studies otherwise; and 5 studies that yielded no clear results. Nevertheless, no conclusive evidence exists on the economic superiority of vocational education over general education (Tilak, 1988 a,b et al). By the late 1980s, the World Bank policies took a low turn on vocational education and strongly favoured investing away from TVET (World Bank, 1995). World Bank's investment in TVET came down to a meagre 3% of the total education lending by 1996 (Bennell and Segerstrom, 1998, p. 271).

From the review of Asian experience, a few important lessons can drawn for the development of TVET in developing countries.

- i) TVET is important for economic growth. But the relationship is not linear. So each country has to decide the extent of TVET that has to be developed, depending upon the level of development and demand for skills.

- ii) Since both general and specific human capital contribute to economic growth, a balance has to be struck between size of general education and vocational education.
- iii) As specific human capital development can take place both in formal schools and also in the firm-based institutions, it may be important to examine which vocational and technical skills are to be provided in schools and which in the training institutions and enterprise-based organizations.
- iv) As vocational education is necessarily expensive, the government should make adequate allocation of resources for vocational education, poor investments cannot yield attractive returns.
- v) Vocational education should not promote inequalities within the educational system. This requires provision of good quality vocational education and training, comparable, if not superior to, general secondary education that would avoid suspicions on the part of the people on the intentions of the government in providing TVET.
- vi) The government has to take a dominant role in promoting TVET. Private sector may not be able to provide good quality TVET.
- vii) Issues relating to TVET are not just curriculum questions, nor are they just economic. They are intricately linked with social, cultural, historical, economic, technical, and political parameters.

2.4 Studies Done In Selected African Countries

Researchers and International organizations have carried out studies on school wastage in some parts of Africa. For, example, the World Bank in 1988 reported that the major challenges currently facing educational development in Africa are threefold;

- i) Explosive population growth;
- ii) Stagnation of enrolments
- iii) Erosion of educational quality.

Consequently, the problem of accessibility to educational opportunity is expected to persist at varying degrees, in many African countries (W.B 1988.UNESCO 1988, Valarine 1988).

Regarding technical and vocational education, the World Bank is in advocacy of general education as the main component of the secondary and post – secondary curriculum and job – specific or occupational training as a preserve for post – school institutions.

In Morocco, the UNESCO survey indicated that repetition rates were significant in all grades and more so in grades 5, where the trend was increasing. The survey on the other hand, revealed that dropout rate was only pronounced in the first grade, where it tended to decrease. In addition, UNESCO over the years has consistently advocated for technical and vocational education and training as an important pathway for empowering youth and adults to participate in the world of work and employment (UNESCO,1988).

It is generally recognized that formal education is an expensive enterprise and more so in recent years. Consequently, only those who are able or willing to pay for it have a better chance of future success. Inability to pay for educational services and facilities has tended to marginalise children from low income families as indicated in a study on the impact of the economic crisis on vulnerable groups in Sierra Leone in 1988(IBE, 1990). This study revealed that basic items such as food and health care,

ranked highest in priority needs while education featured at the bottom of the hierarchy (WCEFA, 1990a). The study found that school attendance was irregular and there existed high incidence of vagrancy and lack of control in what was referred to as underprivileged schools while in privileged schools attendance was regular and that all pupils were aware of the school goals and maintained strict discipline. The study concluded that poor parental educational background and low socio-economic status hardly make it possible for parents to provide the type of assistance both physical and intellectual necessary for children's educational welfare and growth. The argument being put forward here by this study is that illiterate and semi-illiterate parents are less likely to be able to supervise their children's school work and to provide the supportive basic materials than their educationally-endowed counterparts (IBE, 1990, cited in Ngware 1994).

Brynnner (1975) has contended that as children proceed through the educational system, those from the poorest background become increasingly alienated from it. This kind of alienation could probably be interpreted as marginalisation in the notion of moving away from the mainstream of educational services and opportunities. Such marginalization within the school system is likely to proceed from poor achievement to academic failure and ultimate dropout.

A 1988 study (anonymous) on street boys in Freetown, Sierra Leone, highlighted various factors as contributing to children's opting out or being forced out of their family home and implicitly out of school(cited in IBE, 1990). Such factors included absence of state policy on compulsory schooling for children, rural – urban migration, broken families, political strategies that encourage hooliganism among the youth, low wages and unemployment among parents and the negative influence of the media on

children causing the most vulnerable among them to adopt socially deviant behaviour (indulgence in drugs, crime and sexual promiscuity) compatible with street culture (Cited in IBE, 1990).

In Botswana, Kann and Mugabe (1988), and Kann, et al, (1989) established that girls participation in primary schooling was higher than that of boys. This was attributed to the cattle-herding tendencies of school boys. The findings of these studies revealed that pregnancy was the most single significant factor explaining dropout among the girls. The studies further revealed that the overall dropout rate was low in Botswana (1.9% in 1987). This was attributed to abolition of school fees in primary schools in 1980 (Republic of Botswana, 1989). Repetition rates were found to be insignificant in all grades except for grade seven where pupils repeated the last grade of primary school hoping to improve their academic results and obtain admission to secondary education (Kann, et al., 1989). The study associated low repetition rates with automatic promotion which is practised by the Botswana school system.

Duncan (1988) revealed that in Botswana secondary school, more girls than boys dropped out. In the junior secondary level, 16 to 19 per cent of girls dropped out in 1987 as compared to 6 to 8 per cent of boys. The study by Duncan further revealed that 75% of girls drop out because of pregnancy while 20% of the boys drop out because of lack of interest in school.

Lamines (1983) study in Mali revealed four major causes of primary school dropout: low socio-economic level of parents or the tutors; low socio –cultural level of the parents or the tutors; poor pedagogical conditions in which the pupils learnt; and the disturbed psychological environment of the child's family.

In Zambia, studies have shown that half of the students who enrol in secondary school do not complete the terminal year within the specified duration (Eshiwani, et al., 1987). It was further found that the largest number of repeaters came from the grade that students write terminal examinations; this was also true for drop outs. Although dropout rate differed with regions, the study revealed that it was highest at the end of junior secondary that is grade ten.

In Ghana, girls from the Upper West Region flock down South at their teenage to work as porters in markets to contribute to their own trousseau. On the other hand, pregnancy is also given as one of the primary reasons for dropout (Sutherland-Addy and others 1995; Dorsey, 1996).

Research in lowland Eritrea showed that boys and girls often started schools at eight or nine years old because of dangers on the long trip to school. However, girls were taken out of school at ten or eleven years because they were considered to be of marriageable age and would soon need to contribute to their new households (Kane, 2004).

In Malawi, the introduction of free primary education in 1994 created an increased demand for the provision of secondary education. The gender gap remains significant at Secondary level with an enrolment of 15% for girls for a gross enrolment ratio of 17%, as compared to an average of 34.6% and 43.1% respectively for the African region. This represents some of the lowest enrolment ratios in Africa. Moreover, the gains of increased primary school access have been somewhat diminished by the fact that a significant number of those enrolled in primary education repeat or dropout of the system. It is estimated that out of every 100 children entering primary school, only

46 complete standard 8. Overall repetition at the primary level is 25%, making the attainment of the Millennium Development Goals (MDG) of universal primary completion difficult. Malawi finds itself confronted to three interrelated major gender issues: providing adequate access to schooling, addressing equity in terms of access and ensuring quality of the education system (Kane, 2004). To address the gender equity issue and close the enrolment gender gap in secondary schools, Malawi had made secondary education free for girls. At secondary level, the average dropout rate is 12% every year. The dropout rate among girls is 16% and among boys 10%, indicating a significantly higher number of girls drop out at secondary level, undermining the MDG of eliminating gender disparity in secondary education.

In Tanzania, Mbilinyi's (1984) study on access to primary school found regional and locational effects to be of less significance than the sex of the child, family background, and the traditional social structure and stratification among peasants and traders in rural areas. Another study conducted by Mbunda (1983) in a rural district of Tanzania revealed that, in all the primary school classes more girls dropped out than boys (55.5% and 44.5% respectively) except in standard six where the rates seemed to level. Mbunda's study revealed that pregnancy and employment were important factors explaining the high dropout rate for girls.

The World Conference on Education for All (1990c) concluded that war and civil strife have a negative impact on participation rates in school. According to the conference, education becomes a secondary issue in a life and death situation that then characterized such countries as Mozambique, Lebanon, the Israel occupied territories, Kampuchea, Somalia, Angola and former Yugoslavia where years of tension, violence and war inflicted cruel injuries on children (WCEFA, 1990c).

The conference saw a missed opportunity to schooling and permanent damage to tens of thousands of children when it asserted:

“If death has not taken its toll, the horrors of war have caused almost irreparable damage to the child’s thinking and distorted all perception of normal life” (p.2).

In his study for the developing world, Simmons (1985:49) states that variable costs of education are causes of wastage thus:

Children of the rural poor, unlike most upper and middle income bracket children, have responsibilities beyond doing well in school. They have errands to run, animals to tend and siblings to look after. By the time boys and girls attain age twelve or so, they must do the work of adults. The costs of education both direct and variable costs are often too great for the poor to afford and opt dropping out of school.

It is generally conceded that efforts aimed at providing effective vocational and technical education and training in Africa (as in some other developing countries) have not succeeded. Kerre and Kwende (1995) explained that the absence of professionally trained TVE experts limits the effectiveness of TVE initiatives in developing countries of Africa. Kerre and Kwende (1995) provided a list of the major challenges facing the development of technical and vocational education in Africa; the needs for political stability ; the low status for vocational and technical education; changing needs of societies; the shortage of teachers; lack of accessibility by handicapped, the poor, girls and women; and lack of co-operation with enterprises (Kerre, 1995).

2.5 Studies Done In Kenya

Over the past years, a number of studies on the phenomenon of school wastage in Kenya has been undertaken both at the national and local level (for example, Nkinyangi 1980 and Rono 1990 respectively). It was established that economic causes (having to do with school fees) were not the main factors determining premature school withdrawal, but rather the faults (structure of the school administration and the structure of the curriculum) in the educational system (Briggs, 1973). Such faults in the education system lead many parents and students to conclude that primary schooling offers little of value.

Waka (1980) noted that illness and lack of medical care might lead to dropout after frequent absenteeism followed by poor performance. In some instances children leave school when they find their hopes and aspiration are disappointed. Parents may withdraw their children from school when they find that education received does not meet needs of their daily life.

Studies done in seven municipalities, Kajiado, Kakamega, Nakuru and other districts provide valuable insights into what appears to be one of the most vital factors determining school holding power, that is, the cost of education. All the studies reported inability to pay school funds as the major cause of dropout (Eshiwani, 1987; Nguru, 1980; Nkinyangi, 1980). These studies further revealed that in case of girls, pregnancy and early marriages reinforced financial factors to increase the number of girls who dropout.

Abolition of school fees in the late seventies in primary school was found to have a disillusioning effect (theoretically free education but in practice, pupils and parents

were required to pay development funds) on parents and greatly contributed to dropouts (Nguru, 1980; Nkinyangi, 1980). These studies concurred that most of the dropouts came from poor socio-economic backgrounds; dropout rates were alarmingly high (20-40%) while repetition rates were considerably low (below 10%) and that wastage differed with the region as well as the school under study. Apart from Nguru's study, the others found that more girls than boys dropped out of school. Further, distance from school and illness did not seem to explain the alarmingly high dropout rates in any of these studies.

Ponsi (1988) looked at the sex and birth order selectively in enrolment in primary schools of arid and semi arid districts. The study found that girls were under – enrolled due to the attitude widely held by the nomadic pastoralists parents, that resources are wasted when educating a girl who will marry and thus her educational gain would not benefit her birth family. It also revealed that the first born boys were under- represented in primary school enrolment. The study referred to this as the Kepyoin (first) phenomenon. The explanation behind the Kepyoin phenomenon is best captured by words of an elder from one of the arid districts:

Of course the Kepyoin (or 'best' which is often synonymous of tekwe, 'first') are for the care of cattle. We send to school the children who are not Kepyoin (cited in ponsi, 1988; p.14).

Therefore, in the arid areas, the vulnerable pupils are boys who are first born and girls in upper primary. Other relevant literature can be found in findings of case studies of administrative divisions and districts. The study of pupils' performance at lower primary in Machakos district revealed that teacher's professional qualifications and experience, and class size had an effect on pupils' academic performance (Mutua, 1979). Mutua's study further found that pupils in smaller classes acquire more

learning relatively to those in larger classes. This suggests that small class size would decrease the number of repeaters expected to repeat due to poor academic performance.

In Nandi district, exogenous factors were found to be more important in explaining primary school dropout cases, with repeated repetition leading to age increment among girls who ultimately get pregnant and marry off (Kirui, 1982). This study also revealed that more boys dropped out at the lower primary school than girls. This was also found to be true for the overall data. At the secondary level dropouts were found to come from low socio- economic backgrounds and that school category, type and quality, gender differentials, degree of value placement on education by the parents, and the students degree of aspiration were found to be significant variables differentiating dropouts from non- dropouts (Rono,1990).

A study in Nairobi secondary schools revealed that dropout was the major cause of enrolment loss, and that both exogenous and endogenous factors were important in explaining enrolment loss (Ciano, 1982). In Kiambu, which neighbours Nairobi, a study of primary schools show that in overall, grade dropout rates was higher for girls (76%) than for boys (40%) (Gitau, 1985). An analysis of the flow of pupils in Gitau's study indicated that the dropout problem was more pronounced in lower primary than in upper primary with an exception of standard seven, and that the dropout rates differed with the regions, with urban areas having relatively lower rates.

Studies focusing on girl's participation in primary schools in Meru district and Maasai land showed that the problem of girls' dropout is alarming. The study by Ncebere (1987) in Meru, indicated that three quarters of the girls enrolled in standard one in

1979 did not finish the primary cycle in time. This could probably be due to repetition, transfer to other schools or abandoning school all together. Ncebere's study associated high dropout rates among girls to exogenous factors beyond the school's control while repetition among girls was explained by poor performance in internal examinations. The study on Maasai girls revealed that educational level of parents, parental occupation, and older family member's level of education and occupation were significant variables explaining poor participation rates for Maasai girls in primary schools (Chege, 1983).

A study of Kisii district primary schools revealed the existence of educational interruptions which corresponded to socio- economic background of the pupil in particular seasons, that is, cultivation, planting and harvesting. School attendances by pupils from families with low income was found to be poor during market days and cash –crop picking seasons (Michieka, 1983). This poor attendance was used to explain poor academic performance in internal examinations among pupils from poor families and the teachers had to recommend repetition. Michieka's study also found that majority of the unemployed villagers were ex- students who dropped out from primary schools before completion.

Other valuable relevant literature is to be found in the daily newspapers. In Muranga district it has been reported that top students in the K C P E may fail to join form one due to their parents inability to pay school fees (Daily Nation, 1993). The inability to pay school fees was associated with the drought which hit the district in 1992. Cases of primary school wastage are reported to range from between 30% to 47% in 1992, with a dropout rate of over 58% for the girls in the 1984 standard one cohort (UNICEF, 1993). UNICEF highlights pregnancy and early marriages as the important

variables explaining the high dropout rate among girls. For boy's socio- cultural practices and inability to pay non- tuition fees were said to be the dominant factors responsible for dropout.

The Standard and Daily Nation Newspapers have also reported extreme cases of repetition in some parts of Kenya. It is generally recognised that teachers all over Kenya are under pressure from the public to do their best in helping pupils to excel in national examinations. There exists a craze among teachers to have their schools appear among the top 100 schools in K.C.P.E nationally or to feature in the district top ten lists. These factors have been documented by local newspapers as being associated with repetition or 'elimination' of the weak candidates in a process that teachers call 'thinning' (Janak, 1991). 'Thinning' as practised in Migori in South Nyanza district, refers to a process where students are made to repeat after failing an elimination test sat by those proceeding to class eight in preceding year. For instance, in one of the primary schools in Migori town, 101 candidates enrolled for K.C.P.E in 1990 while in 1989, class seven had 223 pupils who were preparing to proceed to standard eight in 1990 (Janak, 1991). In an article titled 'the dark side of the glory seekers' the local media observes:

Repetition is an old phenomenon in schools which of late has become the con game used by schools and districts to fool the world they are performing well in national examinations. Some private schools use the trick to justify high fees and still attract more students by giving the wrong impression that they do well in national examinations (Muya, 1991; p.20).

The above observation clearly indicates that the phenomenon of dropout and repetition is highly complex.

Consequent upon the analysis of the World Bank and UNESCO policy reports and other reports given above, the following observation may be made:

Educational development in Africa is currently faced by many challenges. However, for our present study we consider three to be crucial:

- i) Demographic trends
- ii) Repetition, dropout and failure in exams
- iii) Cost of financing of public education and training.

These factors have direct implications to efficiency/wastage, which is the main concern of this study.

In its assessment of the curriculum, the Kenya Education Commission noted that little more than lip service was paid to training in the practical skills, citing lack of workshops or Art- rooms in most secondary schools as evidence. In apparent reference to society's negative attitudes to pre- vocational education, the commission noted:

It is a damaging error to suppose that the manual skills are appropriate only to workmen and are no concern of the school certificate boy or girl, for it is not without significance that, in developing countries, a large proportion of the scientists are competent craft men in their own right (Republic of Kenya, 1964, p.81).

The Commission clearly emphasized the need for pre- vocational education and went ahead to suggest that it be made compulsory rather than an option, especially to students pursuing scientific courses (Republic of Kenya, 1964).

On education and training, the commission argued that no precise line could be drawn between the two since they played a complementary role to each other. Further, it recommended the establishment of systematic industrial training schemes as a

substitute for the hitherto haphazard and unsatisfactory methods of picking up skills at the bench. Thus the commission was in advocacy of the formalised technical and vocational training. To achieve this goal, greater co-operation between the government and industry was emphasized (Republic of Kenya, 1964).

The commission also urged universities to give explicit recognition to City and Guilds Ordinary Certificates and Diplomas as alternative university entry qualifications, in order to establish the polytechnic as a recognised channel of entry through its technician courses (Republic of Kenya, 1984).

Clearly, this was an attempt to increase transition rates and expand career advancement for technicians. However, the commission also recommended a cautious and selective expansion of further technical colleges based strictly on projected demand as may be revealed by periodical manpower surveys, arguing that expansion of facilities, and numbers of students involved would result in skilled unemployment and could even be politically dangerous.

We may draw three conclusions from this report. Firstly, the commission clearly indicated that there were problems of career mobility especially within the technical profession. Particularly, the transition from lower technical qualifications obtained at the polytechnic to higher professional qualifications at the university was lacking. Secondly, the Commission was in favour of formal technical and vocational training tailored along systematic industrial schemes as opposed to unplanned or informal ways of picking up skills. Thirdly, the general importance of technical and vocational education and training, both within schools and other post- school establishments was stressed.

The second major official evaluation of the Kenya system of education was carried out by the National Committee on Educational Objectives and Policies, which was appointed in 1975 and submitted its report in 1976.

The committee raised various issues, one of the crucial one being the mismatch between the actual jobs and skills required on the labour market and the type of attitudes and skills prevalent among the school leavers. As a means of redressing this mismatch, the committee recommended the inclusion of pre- vocational craft-oriented skill, including small-scale business techniques, in order to encourage self-confidence, creative ability and evaluating capacity (Republic of Kenya, 1976 p.18). At the primary level, the committee recommended reforms of both the structure and content. Regarding the structure, the committee suggested that the duration of primary education be extended from 7 to 9 years. This, the committee argued, ‘will enable primary school leavers to be more mature and would rationalize the [then] current extensive practice of repeating one or two years before a child offered to sit the CPE’ (Republic of Kenya, 1976, p. 52). Further, greater diversification through the increased teaching of pre- vocational subjects was recommended. In view of the above discussion, we may partially conclude here that: The committee extensively analysed unemployment problems among school leavers; recommended various structural and policy measures; and highlighted the issue of the apparent lack of transition among graduates of technical secondary schools.

The Presidential Working Party on the Establishment of a second University in Kenya (1981) carried out the third major review of the educational system in Kenya. Among its terms of reference were; to recommend a philosophical framework, concept and objectives within which the university could best serve the interest of Kenya society;

to examine the relationship of the proposed university with the university of Nairobi and other post – secondary institutions, so as to ensure that the proposed university would play a complementary role to these other institutions; and to recommend ways in which the proposed university could play a role in programmes of continuing education in the country (Republic of Kenya, 1981, p. ix). In its deliberations, however, the party reviewed extensively the entire education and training system at all levels, with special emphasis on post – secondary level.

Regarding the national polytechnics, the party deplored the practice of restricting student's admission to employer sponsorship. Hence it recommended that “admission policies be liberalized to allow other students not specifically attached to employers to take advantage of those training opportunities” (Republic of Kenya 1981). The working party also noted that, need existed for the harmonisation of curricula, examination and certification in Harambee Institutes of Technology.

Since the proposed university was to have a technological orientation, one would have expected the working party to give some specific recommendations regarding transition of graduates from polytechnics to the university. Instead, the party only called for a general harmonisation and co-ordination as stated above.

In respect, therefore, the party did not adequately deal with prospects of career advancement of technical graduates entering the professional ladder at lower levels. It is expected that the working party should have highlighted issues of transition and wastage at different levels of technical education and training.

In conclusion, this review of reports has identified the following common features, which the researcher consider important to the present study;

- i) They all stressed the importance of technical and vocational education and training at all levels of education system;
- ii) They all pointed out, either explicitly or implicitly that there were problems of vertical transition among technical graduates.
- iii) They all called for greater harmonization and co-ordination of higher education and training in Kenya, ideally for efficiency reasons.

In another study, Sifuna (1982) analysed the technical secondary school leavers and employment opportunities in Kenya. The major purpose of the study was “to examine the rationale of the government’s heavy investment in the expansion and formalisation of technical secondary education as a way of combating the problem of school-leaver unemployment” (Sifuna, 1982 p.128) A significant finding was that 43.1% of the sampled students aspired to become engineers, 20.1% did not intend to pursue a technical career, while only 29.5% aspired to become artisans. It was also found out that multinational companies were reluctant to employ technical secondary school graduates for they considered them relatively expensive. Further, technical secondary school graduates were found to face unemployment problems largely similar to those from academic schools.

For the present study, perhaps the most important observation from Sifuna’s study is the finding that most students from technical schools were “keenly interested in opportunities for further training and prestigious occupations that afford mobility” (Sifuna, 1982). This study clearly established the inspirational orientation of technical students. However, it does not attempt to compare the level of aspiration between artisans, craftsmen, technicians and engineers. In addition, the study would be more complete if the aspiration levels are compared further with attainment of graduates

and possible challenges addressed. Thus further investigation needs to be done in order to answer the question: could apparent lack of educational mobility among artisans, craftsmen and technicians attributed to their low aspiration for further training? Or could there be barriers due to inefficiency in the system?

D' Souza (1976) identified lack of terminal qualifications of marketable value among technical secondary school-leavers, lack of efficient co-ordination among various types of technical institutes and unemployment of technical graduates as some of the major problems facing technical education in Kenya. This study would have been more complete if it specified the deficiencies in the education system and in skills attainment.

A study by Ngware (1994) on school wastage concludes that primary schools in Laikipia West were inefficient. However it was not clear as to whether it was repetition or dropout which contributed greatly to the wastage. The study also reports that a higher wastage rate occurred in upper primary than lower primary and that on the whole, wastage occurred more among girls than boys. From the study, the trend of wastage for boys, girls and overall was found to be on the increase but declined later due to government policies barring repetition practices.

On trends of wastage in education in Kenya, Eshiwani (1990) indicated that 30% to 47% of primary school children who enrol in class one at the same year leave school prematurely (cited in Ngware, 1994). Owiye's study (2005) indicates that the trend of wastage increased from lower primary school to upper primary school.

The findings of the study revealed that poor examination results was the major cause of repetition while truancy and preparation for K.C.P.E were also found to be

significant variables explaining repetition. Most of the decisions to repeat were made by teachers and /or head teachers.

The findings of the study further revealed that socio- economic background of a pupil was the major determinant of dropout from school prematurely. School funds were found to affect both boys and girls, while pregnancy and marriage reinforced the effects of educational costs on dropouts among girls.

Another study by Ngware (2002) observed that participation of girls in both formal and informal technical training (non-business) courses is below 20% (Ngware, Wekesa and Wasike, 1999). Total enrolment by institution for the period under study ranged from 915 in Mathenge Technical Institute to 5228 in Rift Valley Institute of Science and Technology. In the same period, only two institutions (Mathenge and Kaimosi) recorded a higher female enrolment (58.4% and 56.3% respectively) than that of males. It was noted that the two institutions had among lowest total enrolments (915 and 1176, respectively). For the rest of the institutions in the sample, females took about one-third of the training places. The difference between male and female participation was tested to establish whether it was real or by chance using a chi-square. The results of the test showed that a chi-square statistic (20.838) was statistically significant at $\alpha=0.001$ for 4 df. This meant that participation in technical training is not independent of gender. From these findings it was confirmed that for all years under consideration, female enrolment in technical training institutions range from 30% to about 35%. The rest of the training places were taken by their male counterparts. This confirms that technical training institutions in Kenya are male dominated.

Subject failure and consequent repetition in technical training was evident. This was more common with end of course examinations taken by final-year trainees (third years). It was revealed that students who failed in at least one trade practice paper in the examinations, made private arrangements to repeat the third (final) year of study and/or re-sit for the entire examination: otherwise the candidate was referred in the failed papers. As a result, failure rates in the sample institutions could be used as a proxy for repeaters rates. Male failure rates in external examinations ranged between 14% and 30% while that of females were between 6% and 8%. This suggested that more males than females failed in their final examinations. As such more males than females repeated grades.

For all the years under consideration, female graduation rates were higher (69%) than those of males (46%). However, in absolute terms, more males than females graduated. This variation can be explained by the over-representation of males in technical training institutions. The study also shows that the combined (male and female) graduation rate was 51%. This suggests that almost half (49%) of the trainees in technical training institutions do not graduate (at least in first attempt).

Wastage in terms of dropping out was a common phenomenon in technical training institutions. It was observed that between years 1 and 2, female dropout rates ranged between 14% and 27% while those of males were between 17 % and 26%. Between years 2 and 3, the range for females was between 17% and 24% while that of males was between 16% and 22%. The observed dropout rates were high given the amount of material and human resources invested in technical training institutions that risked being under utilised.

A closer look at the dropout phenomenon shows there existed a pattern that could be associated with gender. As students proceeded from the first year of study to the second, female drop-out rates were higher than males in only one out of four cases. This suggested that males have a higher probability of dropping out in the early stages of training than females. On the other hand, females' dropout rates were higher than males' in three out of four cases between years 2 and 3. This suggested that more females tended to drop out in later stages of training.

Analysis of cohort wastage for the 1993/94 and 1994/95 year 1 cohorts indicated that almost a third (33% and 34% for 1993/94 and 1994/95 cohorts, respectively) of the technical training institutions' trainees do not finish their training. These are relatively high cohort wastage rates that portray technical training institutions in Kenya as internally inefficient.

The results of the chi-square test showed that cohort wastage rates for males and females differed significantly at $\alpha=0.05$. It would seem from absolute values that more males dropped out from the cohorts than females. However, in terms of percentages, the female cohort wastage rates were higher (36% on average) than those of males (33%). Since percentages are more reliable indicators of representation than absolute values, a higher proportion of female dropped out from the cohorts. The study suggested that there existed inequalities in terms of retention power of technical training institutions along gender lines in favour of males. From the study a large proportion (52%) of trainees dropout due to financial problems. Indiscipline among trainees ranked as the second (15%) cause of dropping out. The main cause of repetition was failure in examination.

Despite the wealth of information we have on technical education and training, it is evident that little study has been carried out to examine the trend and causes of wastage on the various routes available from lower levels of technical education to the status of full professional engineer. This study will therefore be a contribution towards filling that gap.

2.6 Summary of Reviewed Literature

Factors such as socio-economic status, examination performance and gender have been reported to play a role in causing wastage in education. Such disparities are further widened by differences in the quality of teachers, educational facilities and other inputs among schools serving different localities and social groups.

Many of the studies attempted to find out the causes of wastage as well as evaluating the efficiency of the education system. Most of the studies failed to explore exhaustively the trend of wastage. The study by Ngware (1994) went ahead to establish the trend of school wastage thus providing a basis for predicting wastage phenomenon in the future. However these were mainly confined to wastage phenomenon in the context of primary and secondary education only. It was the feeling of the researcher that a study on the trend and causes of wastage could be done in Technical Training Institutions (TVET Institutions) being one of the next higher level of education after secondary. The study by Ngware (2002) on wastage in TVET did not also adequately dwell on the trend and causes of wastage. Further, reports on education indicate a high rate of examination failure in TVET institutions.

The studies reviewed indicated that both exogenous and endogenous factors act to reinforce each other in determining school wastage. However, in some cases only one group of the factors were found to be significant in explaining school wastage. The

study intended to establish whether the same factors or any others are important in explaining wastage in TVET Institutions.

Most of the studies like those done in Nandi, Kisii, Kiambu and Meru districts relied heavily in descriptive statistics when justifying the factors influencing school wastage. The study done in Laikipia West utilised multiple regression methods to establish the significance of a factor and the magnitude of the contribution of the independent variables to the dependent variable. This study utilised descriptive statistics and regression analysis to establish the significance of each cause of wastage in TVET Institutions.

Other studies particularly those carried out in Kenya, indicate that official government reports on school wastage are inaccurate and unreliable (Nkinyagi, 1980, Psacharopoulos and Woodhall, 1985). Such studies continue to assert that government explanations on the causes of wastage (look after cattle, assist in family farm work, help in the house) are mere assumptions which have not been verified (Nkinyangi, 1980). There was need, therefore to carry out an empirical study to explore the magnitude of repetition and dropout in the case of Rift valley. The study examined data on flow of diploma students on regular programme in TVET Institutions over the period 2002- 2005. Information on the causes of wastage was subjected to regression statistical methods in order to verify that the established causes were the real causes of wastage but not mere assumptions.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter covers the description of the research design and methodology used in carrying out the present study. It also outlines the area of study, target population, sample size and sampling procedures, data collection instruments and procedures and the techniques employed to analyse the data.

3.1 Research Design

The research design chosen for this study is survey research. 'A survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables' (Gay, 1983). A survey research therefore requires the collection of quantifiable information from the sample. It could be descriptive or exploratory and uses questionnaires and interviews in order to determine the opinions, attitudes, preferences of groups of people of interest to the researcher. This design was chosen for the study for the reason that, the study intended to get information from principals, HODs and Student -repeaters on the causes of wastage in TVET institutions. The study also explored the trend of wastage in the said institutions.

3.2 The area of study

The study was carried out in the Rift Valley Province of Kenya. The TVET institutions in the Rift Valley formed the target population of the study. The institutions of study are situated mainly in the northern parts.

Given 8 (eight) administrative provinces in Kenya, the possibility of selecting any one of them is one out of eight. Therefore the decision to choose Rift Valley Province

among the 8 administrative provinces in Kenya would not minimize the importance of other regions in the country as advocated for by Taro (1970) who stated that:

From the central limit theorem, under certain conditions, the sum of independent random variables is asymptotically normal thus the sum will approach a normal distribution as the number of random variables (N) that are summed becomes large. Similarly in a population of size N the probability of choosing any one sample will be one out of N and this means that the chances of choosing any sample will be equally likely and each of these samples will tend to normality (Taro 1970 cited in Nafukho, 1991;P.41)

Thus choosing Rift Valley among other administrative regions would yield valuable results compared to any other region according to this theorem.

Rift Valley is a densely populated area with relatively high agricultural potential except in a few districts. The main crop grown in the area is maize for which the region is often regarded as the granary of the country. The other crops grown are wheat, potatoes, beans, pyrethrum and tea. Pastoralism is practised in the other parts to the far north and northwest. Dairy farming is also well established in the region. The other animals reared include cattle, sheep, goats, donkeys and camels. Majority of the people own medium to small-scale farms while a few own huge tracks of land. The farms are owned either individually or through co-operative movements (settlement schemes), or companies formed earlier to purchase land from former white settlers (white highlands). Other economic activities include retail and wholesale business and catering services. Eldoret in Uasin Gishu District is the largest town (municipality) in the northern parts, therefore the main nucleus of commercial activities.

Though much of the region is of high agricultural potential, extensive portions are poorly served by infrastructure and other social services. The growth of suburbs in major towns has attracted a number of people who are less endowed economically. It

is also common to find a number of squatter families in gazetted forest and road reserves. The socio-economic profile on average is therefore that of relatively poor people. Most of the youths are found engaging in economic activities similar to those of their parents. The youth who own bicycles often engage in milk purchase in rural areas then transport to the nearby urban centres for hawking. While another significant number engage in transportation of people and their wares (*boda boda*). However, majority of the unemployed youth loiter or idle in small trading centres scattered across the region; these serve as indication that they could have failed to access educational institutions or could have dropped out of the same institutions.

The conclusion above gives more reason why Rift Valley was chosen for the study. It is an area settled by people of different socio-economic origin and rendering it important to investigate the phenomenon of educational wastage at TVET level of education.

3.3 Target population

There is one National Polytechnic, five Technical Training Institutes (TTIs) and one Institute of Science and Technology (IT) in the area. There are also Youth Polytechnics and privately owned TVET institutions in the area but for the purpose of this study, the first three categories were targeted for study since they have diploma students on whose flow rates the study focused.

There were 3927 repeaters in the system of the sampled institutions within the study period (Provincial Director of Education Office, 2006). This refers to diploma students only for whose cycle was sampled for the study. The targeted respondents comprised 7 Principals, 30 Heads of Department and 3927 student repeaters.

3.4 Sample size and sampling procedures

Rift Valley Province was taken for the study out of eight provinces in the country. Purposive sampling was adopted in choosing Rift valley province since it has National Polytechnic, Technical Training Institutes and Institute of Science and Technology. The three categories of institutions offered ordinary Diploma courses; this cycle was settled on for study through simple random sampling. Stratified sampling was utilized to split institutions in NP, TTIs and IT, then through purposive sampling one NP, one IT and four TTIs were taken for study.

There were six principals and thirty HODs, through purposive sampling, the study took all the principals and HODs as respondents. A thirty percent sample of repeaters (1188) was picked as respondents through simple random sampling. Barley (1987:95) observed that in cases where the entire population may number only six or seven, a 100% sample is desirable (Barley 1987, cited in Ruto 2003).

Table 3 Target population and sample size

Institutions/Respondents	Population	Sample	Percentage
National polytechnic	1	1	100
Technical Training Institutes	5	4	80
Institute of Science and Technology	1	1	100
Principals	7	6	80
Heads of Department	30	30	100
Student repeaters	3927	1188	30.25

3.5 Instruments of data collection

In collecting the required data for the study, the following instruments were used; primary instruments comprising of questionnaires for students repeaters, HODs and principals and secondary instruments comprising of admission records, monthly returns and students progress records.

3.5.1 Questionnaires

Student repeaters' questionnaire was designed to obtain information on gender of repeaters, student's socio-economic background, reasons for repetition and proposed measures to curb repetition. Principal's questionnaire mainly sought information on their highest level of education, experience, college enrolment, cost of Diploma course, number of repeaters and dropout's, number of graduates, causes of repetition and dropout and proposed measures to curb wastage.

HODs questionnaire was designed to seek information on their highest level of education, experience, access to in-service training, availability of basic instructional resources, reasons for repetition and dropout and proposed measures to be put in place to reduce wastage.

The questionnaires for each group were developed on the basis of objectives of the study and from the literature reviewed. The questionnaires consisted of closed and open – ended questions. They were drawn in such a way that answers to the research questions could be obtained easily. Close ended questions were more than open ended items. This is because close ended questions are easier to administer and analyze. The open – ended items were meant to enable the respondent some freedom to give in-depth information. Questionnaires have the advantage of quaranteeing confidentiality

or anonymity. However respondents may sometimes misinterpret the questions. Though interviews provide in depth data it is more expensive to conduct.

3.5.2 Document analysis

College admission records were scrutinized to provide more information on actual enrolment on courses offered and the years of entry and exit for students. Monthly returns were vital in providing information on resource deficits per institution especially the human resource. Student progress records helped in checking the progression of students along the cycle.

3.5.3 Validity of the research instruments

To determine the validity of the instruments, a piloting of the questionnaires was carried out in two Technical Training Institutes in the neighbouring Western Province. Revision of questionnaires was then done. Validity of an instrument is demonstrated when an instrument is seen to be “asking the right question framed in the least ambiguous way” in other words, validity answers the question “are my findings true?” (Kerlinger, 1983, cited in Kosgei 2001). To test validity of the instruments used in this study, the instruments were also available to selected experienced researchers from the Department of Educational Management and Policy Studies and that of Curriculum Instruction and Educational Media, Moi University. These researchers guided and advised the researcher accordingly in improving the instruments before commencement of actual data collection.

3.5.4 Reliability of the research instruments

Reliability refers to the consistency that an instrument demonstrates when applied repeatedly under similar conditions (Kerlinger, 1983). Reliability of the questionnaires

was arrived at by determining the Cronbatch Alpha Coefficient. This coefficient lies between zero and one, an instrument is reliable if this coefficient is +0.5 and above. For this study, the coefficients were 0.64, 0.78 and 0.85 for student repeaters, HODs and principals questionnaires respectively. These were considered a large enough measure to declare the instruments reliable (Kerlinger, 1983).

3.6 Administrative procedures

Before conducting the research in the province the researcher had to seek authorization from the relevant authorities at the Ministry of Education. The researcher was issued with a permit and letter of introduction authorizing him to conduct research in Rift Valley Province.

3.7 Data collection procedures

Data for the study was collected between the months of December 2006 and September 2007. After seeking and obtaining authority from the Ministry of Education Science and Technology to conduct the study, the researcher visited the selected institutions personally. Upon which, he sought authority from the principals to administer questionnaires to the respective respondents. Assistance from HODs and class representatives were sought from time to time in the cause of the exercise. Respondents were assured of confidentiality of responses and that their responses were purely for academic purposes.

Once the questionnaires had been responded to, the researcher collected them personally. This was intended to reduce the questionnaire return failure which is common whenever respondents are asked to return them to the researcher. Six questionnaires administered to principals and thirty administered to HODs were duly

filled and returned to the researcher. For student repeaters, 1190 questionnaires were administered out of which 1188 were filled and returned to the researcher

3.8 Methods of data analysis

Data was analysed based on the research objectives and questions. Data was analysed using descriptive statistics and regression analysis. All completed questionnaires were examined by the researcher; the information contained in them was tabulated in frequency tables and percentages. The data to be used for computer inputs was converted into percentages, averages and ratios to allow the execution of computer programmes. Only in some few cases were absolute figures used. Regression equations were estimated in linear forms to determine the coefficients of the variables and their significance. To determine the best regression equation (prediction equation) the stepwise method for fitting a regression model of the form;

$$W = a + bx_1 + Cx_2 + \dots + Zx_k + e$$

was used.

Where,

X_1, X_2, X_k – are coefficient estimates

e – error term

The choice of the linear model was arrived at after consideration of the results it produced when used by earlier studies. Such results have been widely accepted and adopted. Hence the linear model was found to be the most appropriate among other models that could have been adopted to estimate the variability explained by the independent variables. The SPSS (Statistical Package for Social Sciences) was used in analysing data.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.0 Introduction

This chapter consists of data presentation, analysis of data and interpretation of research findings. The first section presents background of student repeaters, HODs, principals and TVET institutions. The second section presents data on the flow of students. This section shows the enrolment patterns of males and females, the flow rates as students move up the Diploma cycle of TVET institutions and the trend of wastage. The third section deals with the reasons for repetition and dropout according to the three categories of respondents and the last section shows results of regression analysis which indicates the causes of wastage in TVET and their significance in the sampled institutions.

4.1 Background information

This section presents the data on the background of student-repeaters, HODs, principals and the sampled institutions. The background of dropouts is mainly in the form of the reasons for their dropping out, which are given in the last part of this chapter.

4.1.1 Courses enrolled in by the sampled repeaters

This subsection gives information on the courses for which the sampled repeaters came from.

Table 4: Course enrolled, gender and percentage of student repeaters**N= 1188**

Course Enrolled in Diploma	Gender			Percentage of course repeaters to total number of repeaters
	Male	Female	Total	
Mechanical Engineering	54	-	54	4.55
Electrical Engineering	198	-	198	16.67
Civil Engineering	36	-	36	3.03
Automotive Engineering	36	-	36	3.03
General Agriculture	72	-	72	6.06
Pharmacy	36	-	36	3.03
Textile	-	18	18	1.52
Applied Science	90	90	180	15.15
Information Technology	126	36	162	13.64
Medical Laboratory	36	36	72	6.06
Science Laboratory	18	54	72	6.06
Accountancy	90	108	198	16.67
Marketing	-	18	18	1.52
Secretarial	-	36	36	3.03
	792	396	1188	100

From Table 4, it can be observed that majority (33.34%) of the repeaters who responded to the item came from Accountancy and Electrical Engineering Courses. A small proportion (4.56%) came from secretarial, Textiles and Marketing Courses. Generally, apart from Accountancy, most of the repeaters who responded to this item

came from Engineering, Applied Sciences and Information Technology related courses. This can be interpreted to mean that Engineering, Science and Information Technology courses contributed more to wastage in form of repetition.

4.1.2 Education level of fathers of repeaters from responses of student repeaters

This sub section gives information on the highest level of education of the fathers of repeaters

Table 5: Education level of the father and number of repeaters

N= 1188

Level of Education	Number of Repeaters	Percentage
No formal education	378	31.82
Primary Education	198	16.67
Secondary Education	234	19.69
Post Secondary Training	162	13.64
University	180	15.15
Other (adult education etc)	36	3.03
Total	1188	100

From Table 5 it can be observed that majority (31.82%) of repeaters who responded to this item came from families where fathers had no formal education while 20.00% came from families where fathers had secondary education. This seems to suggest that for most repeaters (51.82%) their fathers had at most secondary education. Further, the data indicates that only 13.64% and 15.15% of the fathers of repeaters who responded to this item had utmost post secondary training and had university

education respectively. A very small proportion (3.03%) of the repeaters indicated that their fathers had some 'other' form of education, for example adult education.

This can be interpreted to mean that parents without formal education and those who had gone through primary education could not encourage or motivate their children to do well at TVET, thus perform poorly and end up repeating grades (Ngware, 1994).

4.1.3 Education level of mothers of repeaters from the responses of student repeaters

In this sub section information on the highest level of education of mothers of repeaters is given.

Table 6: Education Level of the mother and number of repeaters

N= 1188

Level of Education	Number of Repeaters	Percentage
No formal education	288	24.24
Primary Education	306	25.76
Secondary Education	252	21.21
Post Secondary Training	216	18.18
University	72	6.06
Other (adult education etc)	54	4.55
Total	1188	100

From Table 6, it can be observed that majority of the mothers of repeaters who responded to this item have primary education (25, 76%). This means that 50% of the mothers of repeaters who responded to this item did not have formal and had primary education. Further, from Table 6, the proportion of repeaters whose mothers had post-

secondary, university and ‘others’ (adult education) level of education were small (18.18%, 6.06% and 4.55% respectively).

From Table 6, one can deduce that repeaters of institutions in the sample came from homes where most of the fathers (69.83%) did not have formal education and/or had primary and secondary education while most of the mothers (71.21%) were without formal education or had at most secondary education. As noted earlier, such parents may lack the capability of encouraging or motivating their children to do well in TVET institutions. Their children will end up performing poorly in exams leading to high rates of repetition.

4.1.4 Occupations of the persons who meet college expenses for repeaters from the responses of student repeaters

In this subsection, occupations of the persons who fund college education for the repeaters is given.

Table 7: Occupation of the person who meets the college expenses for repeater

N = 1188

Occupation	Number of repeaters	Percentage
Farmers	540	45.45
Civil Servant	342	31.67
Large Scale business operator	54	5.00
Small Scale business Operator	162	15.00
Other (Casual labourers, typists, messengers, herdsman)	90	8.33
Total	1188	100

Table 7 shows the occupation of the person who meets the educational expenses for the repeaters. From the Table 7, it can be observed that majority (63.33%) of the repeaters who responded to this item belonged to families that can be described as low income background social groups. Of those who responded to this item a smaller proportion (36.67%) belong to what can be described as the medium income background social groups. This means that most of the repeaters came from low income social groups, suggesting that they might fail sometimes in meeting college expenses, absent from college and hence perform poorly, necessitating repetition (Owiye, 2004)

4.1.5 Persons who made the decision for the repeaters to repeat

In this sub section, persons who made decision for repeaters to repeat grades is given

Table 8: Persons who made decision for the repeater to repeat

N= 1188

Decision to repeat	Number of repeaters	Percentage
TVET authority	486	40.90
Parent/ Guardian	372	28.79
Self	360	30.30
Other	0	0
Total	1188	100

Table 8 indicates that majority of the repeaters (40.90%) were required to repeat by TVET authority. Another significant proportion (30.30%) decided to repeat by themselves. The decision taken by parents/guardians accounted for a relatively lower proportion (28.79%).

This would suggest that students of TVET Institutions are self driven in improvement of their academic performance probably to secure job placement. Also like elsewhere in other levels of education (chapter two), college authority are concerned or are under pressure from the public to produce quality school output as measured by both internal and external examinations. Hence they have a major say on who should repeat a given grade.

4.1.6 Age and Gender of Heads of Department

This section presents the age brackets of HODs and their gender.

Table 9: Age and Gender of Heads of Department

N = 30

Age in years	Sex		Total	Percentage
	Male	Female		
Between 30-34	2	0	2	6.67
Between 35-39	10	0	10	33.33
Between 40-44	14	2	16	53.33
Over 45	2	0	2	6.67
Total	28	2	30	100.0

From Table 9 it can be observed that majority of the Heads of Departments (53.33%) are aged between 40 to 49 years. However, a relatively small proportion (6.67%) is aged over 50 years. Gender disparity can also be observed in that only two out of the thirty Heads of Department who responded to this item are female.

This tends to confirm gender disparities in access and management of TVET institutions as highlighted in the Gender Policy in Education article (Republic of Kenya, 2007).

4.1.7 Level of Education of Heads of department

This section presents information on the highest level of education of Heads of Department.

Table 10: Level of education of Heads of Department

N = 30

Level of Training	Number of Heads of Department	Percentage
Diploma	2	6.67
Higher Diploma	8	26.67
Degree	16	53.33
Others (masters)	4	13.33
Total	30	100.0

From Table 10 it can be observed that majority (53.33%) of the Heads of Department who responded to the item on Heads of Department qualification, were university degree graduates. Ideally this is acceptable, but efforts should be made by the government to ensure that lecturers who prepare Diploma students should be above Diploma in their qualifications. The implication is that the higher the level of education of HODs and other lecturers, the more likely is the rate of wastage to be low.

4.1.8 Number of years as HOD

Experience of HODs in terms of number of years of service as HOD is presented below,

Table 11: Number of years as Head of Department

N=30

Number of years as Head of Department	Number of Heads of Departments	Percentages
Less than 3	16	53.33
3 to 6	10	33.33
7 to 9	4	13.33
More than 10	-	-
Total	30	100

The Table 11 shows that the majority (53.33%) of Heads of Department had less than three years of experience. Less than half (46.66%) of Heads of Departments had more than three but less than ten years of experience. This means that majority of the Heads of Department in the TVET institutions were less experienced. This may consequently impact negatively on their performance leading to high wastage rates.

4.1.9 Length of stay by HODs since the last in-service training

Information relating to the length of stay by HODs since having the last in-service training is given.

Table 12: Length of stay since the last in-service training**N = 30**

Length of stay since last in-service training	Number of Heads of Department	Percentage
Less than 2	20	66.67
3 to 5	4	13.33
6 to 10	4	13.33
Over 10	2	6.67
Total	30	100

Table 12 shows that most (66.67%) of Heads of Department were in-serviced 6 to 10 years ago. While a smaller proportion (33.33%) had it at least two years and in between the last 3 to 5 years. These poses a challenge to the TVET institutions to increase opportunities of in-service training to their staff. This would enhance their performance and keep them abreast with changing technological trend. The implication is that wastage shall be reduced.

4.9.10 Frequency of consultation with education officials by HODs

The data on the frequency of consultation by HODs with education officials is presented below.

Table 13: Frequency of consultation with education officials by HODs

N=30

Frequency of consultation with education officials.	Number of HOD	Percentages
Often	2	6.67
Sometimes	15	50.00
Rarely	5	16.67
Never	8	26.67
Total	30	100

Table 13 Shows that majority (50%) of the Heads of Department sometimes or often get the chance to discuss with education officials matters related to education. However, another significant proportion (26.67%) have never or have rarely had a chance to discuss with education officials. Such an interaction needs to be promoted for effective performance by HODs, thus reduce chances of education wastage.

4.1.11 Gender of principals

All the six principals (100%) from the sampled institutions were male. This shows that there exists extreme Gender disparity in the management of TVET training. This has got negative implications in that female students may lack role-models in this field of education and may end up performing poorly (getting wasted)

4.1.12 Level of education of the principals

All the six principals (100%) indicated that they had masters degree. This implies that they were capable of managing the TVET institutions for better performance and lower wastage. They also indicated that they all had more than five years of

experience as principals, which is also considered satisfactory for effective performance.

4.1.13 Frequency of access to management training by principals

In this sub-section the frequency of access to management training by principals is given.

Table 14: Frequency of access to management training by principals

N=6

Responses	Frequencies	Percentage
Often	-	-
Sometimes	6	100.0
Rarely	-	-
Never	-	-
Total	6	100.0

All the six principals indicated that they sometimes access management training. Though this is satisfactory, the Ministry should increase the frequency to management training by principals. This will enable them remain abreast with the changing training and educational matters. This might go along way in adding value to educational output and reduction of education wastage.

4.1.14 TVET institutions instructional resource supply and enrolment pattern

This sub-section presents information on adequacy of basic instructional resources, fees charged per stage and to completion of courses and total enrolment.

Table 15: HODs responses on adequacy of the basic resources**N= 30**

Resource	Adequate	Inadequate
Workshop	15 (50%)	15 (50%)
Machines / tools	13 (43.33%)	17 (56.67%)
Laboratories	13 (43.33%)	17 (56.67%)
Textbooks	14 (46.67%)	16 (53.33%)
Library	17 (56.67%)	13 (43.33%)
Technician	12 (40%)	18 (60%)
Field trips	11 (36.67%)	19 (63.33%)
Lecturers	17 (56.67%)	13 (43.33%)
Lecture Halls	14 (46.67%)	16 (53.33%)

The HODs stated that the listed resources are used frequently, yet Table 15 shows that equipment, tools, workshops, textbooks, technician services, field trips and lecture halls were inadequate. Inadequacy of basic resources implies that the instructional programmes are affected negatively and may lead to high levels of wastage.

Table 16: The TVET institutions, fees charged per year / stage and to completion of Diploma courses

N = 6

Institution	Stage I	Stage II	Stage III	Total Fees to Completion
A	41,600	41,600	41,600	124,800
B	68,025	73,305	73,305	214,635
C	42,649	42,649	42,649	127,947
D	41,600	41,600	41,600	124,800
E	41,600	41,600	41,600	124,800
F	41,600	41,600	41,600	124,800

From Table 16 above, it can be observed that most of the TVET institutions charged over kshs.120, 000 fees per course completed except for one which charges over Kshs.200, 000 per course completed. These amounts are ideally not affordable to many households whose income is low, as stated elsewhere in this thesis. It therefore implies that some of the students may drop out due to inability to meet college obligations.

Table 17: TVET institutions enrolment by sex and grade over the period 2002 - 2005

Years	GRADES		
	1	2	3
2002	M- 1940 F- 1205 Total -3145	M- 1255 F- 1505 Total -2760	M- 1100 F-805 Total -1905
2003	M- 2660 F- 2460 Total -5120	M- 1915 F-1050 Total -2965	M- 1150 F-1400 Total -2550
2004	M- 2660 F-2490 Total -5090	M- 1915 F-1940 Total -3855	M- 1565 F-955 Total -2520
2005	M- 3795 F-3605 Total -7400	M- 2180 F- 2095 Total -4175	M- 1700 F-1735 Total -3435

Key ↘ - progression of cohorts from grade 1 to 3

M - Males

F - Females

Table 17 shows that males enrolment superseded females enrolment in stage one for the entire period of study. However, in stages two and three, none of the sexes superseded the other in terms of enrolment. Generally, males enrolment superseded females enrolment for the much of the period of study. A critical look at the

progression of students from grade one to two and finally to three shows that there is enrolment loss possibly due to wastage. Enrolment loss shall be treated later on the part on the flow of students.

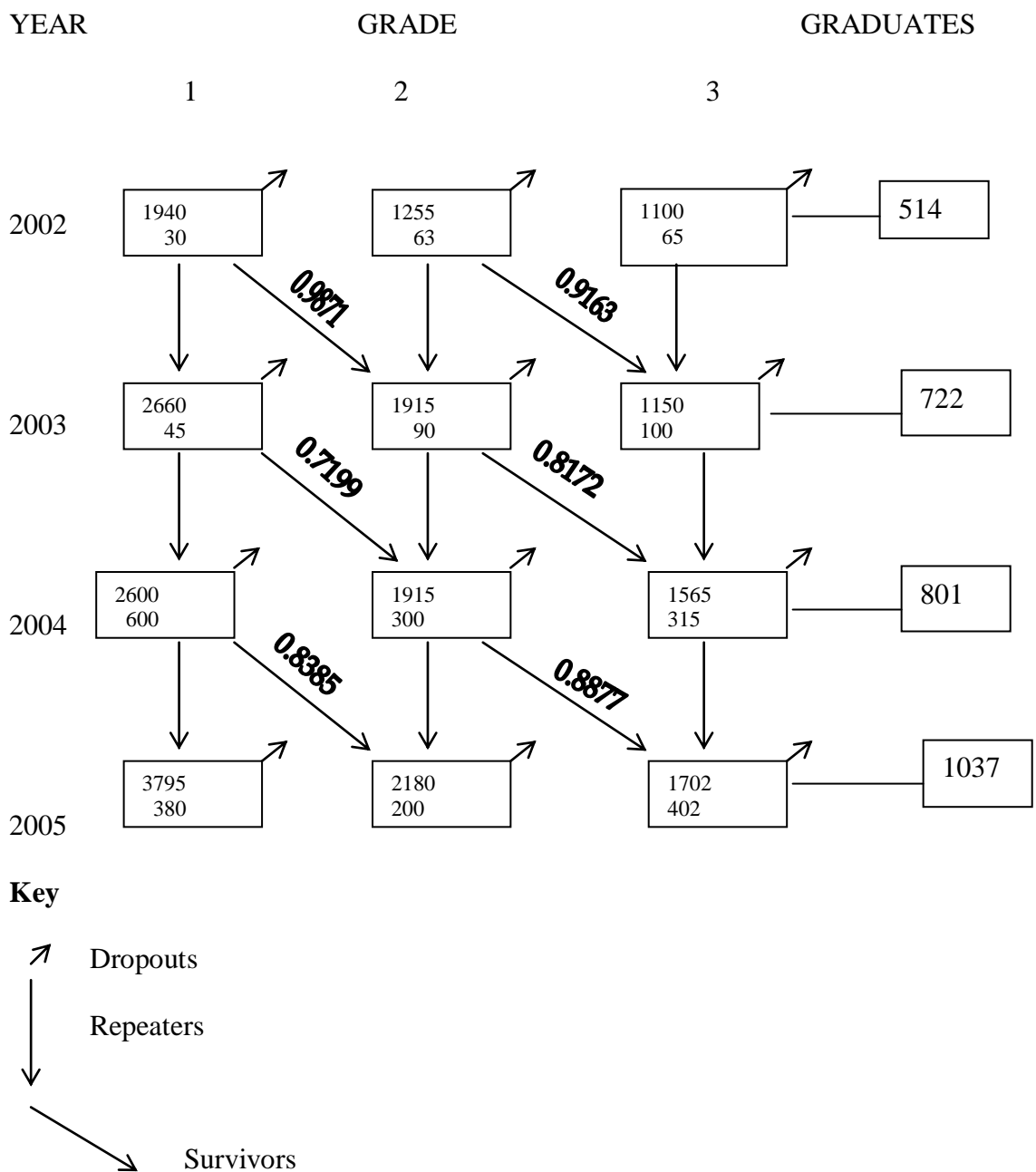
4.2 Enrolment patterns of males and females and their flow rates.

This section presents the enrolment data of males and females by grades, repeater rates per grade and sex, dropout rates per grade and sex, cohort wastage rates per sex and the trend of wastage.

4.2.1 Flow rates of male students

This sub section presents the flow rates of male students (Repetition, dropout and promotion)

Figure 1: chart showing flow rates of male students between 2002 and 2005



From the flow diagram (fig. 1), the following grade repeater rates can be computed for male students

Table 18: Grade repeater rates for males

YEAR	Grade repeater rates %		
	1	2	3
2002	-	-	-
2003	2.32	7.17	9.09
2004	22.56	15.67	27.39
2005	14.62	10.44	25.69

From Table 18 above it can be observed that repeater rates for males was lowest in grade I in 2003 (2.32%) and highest in grade 3 in 2004 (27.39%). Generally it can be seen that grade repeater rates were lower in grade I and higher in grade 3, the terminal year of the Diploma cycle. A possible explanation to this is that students repeat grade 3 after failing in KNEC exams which are terminal.

Figure 2: Graph showing trend of repetition for males

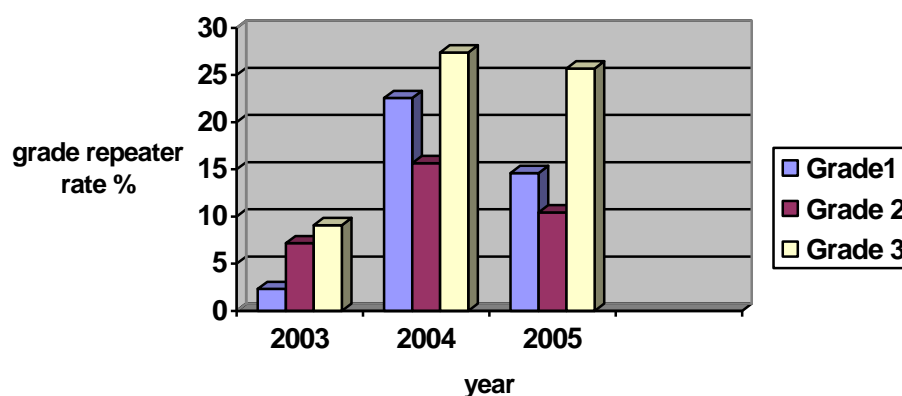


Figure 2 above was developed from Table 18 to show the trend of grade repetition for males. The trend of grade repetition for males is such that it rose in all grades from 2003 to 2004 and dropped slightly in all grades from 2004 to 2005.

Table 19: Dropout rates for males

Years	Grade dropout rates %	
	Between 1 and 2	Between 2 and 3
2002	-	-
2003	3.61	9.16
2004	16.73	19.06
2005	9.23	21.78

From Table 19, it can be observed that dropout rates for males was lowest between grade 1 and 2 in 2003 and highest between grade 2 and 3 in the year 2005. Generally, grade dropout rate for males were lower between grade 1 and 2 and higher between grade 2 and 3.

Figure 3: Graph Showing trend of grade dropout for males

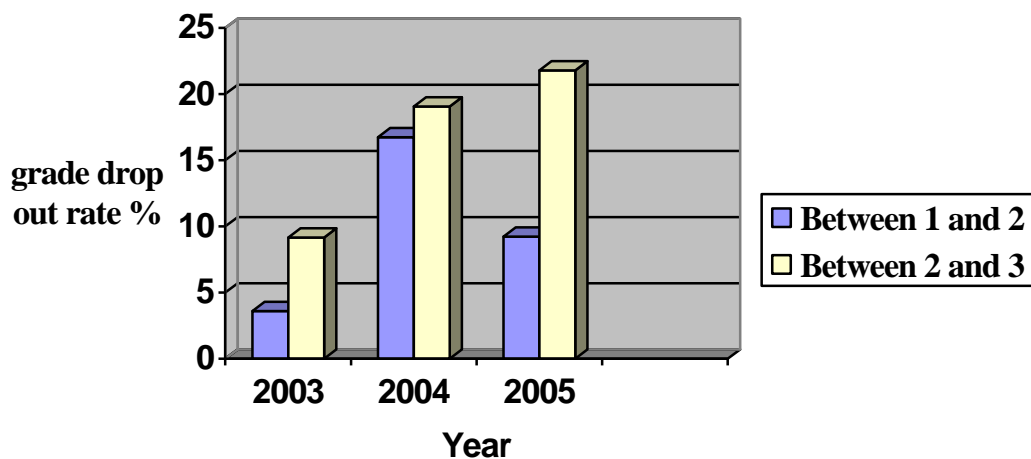
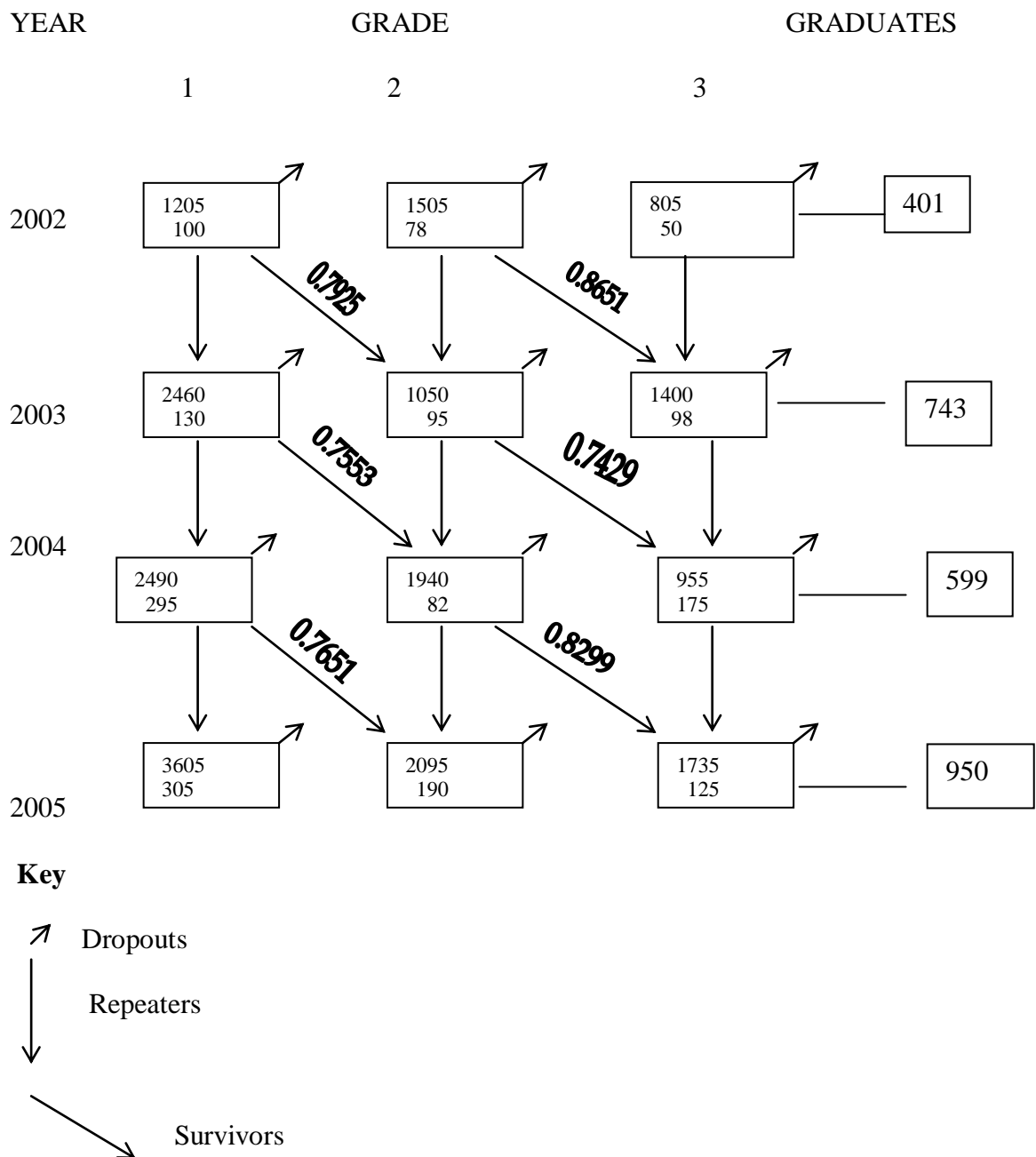


Figure 3 above was developed from Table 19 to show the trend of grade dropout for males. The trend of grade dropout for males is that it rose steadily between 2003 and 2004 between grade 1 and 2 then declined from 2004 to 2005 within the same grade. However, grade dropout rates for males rose steadily from 2003 to 2005 between grade 2 and 3.

4.2.2 Flow rates of female students

This section presents the flow rates of female students (Repetition dropout and promotion)

Figure 4: Chart showing flow rates of female students between 2002 and 2005

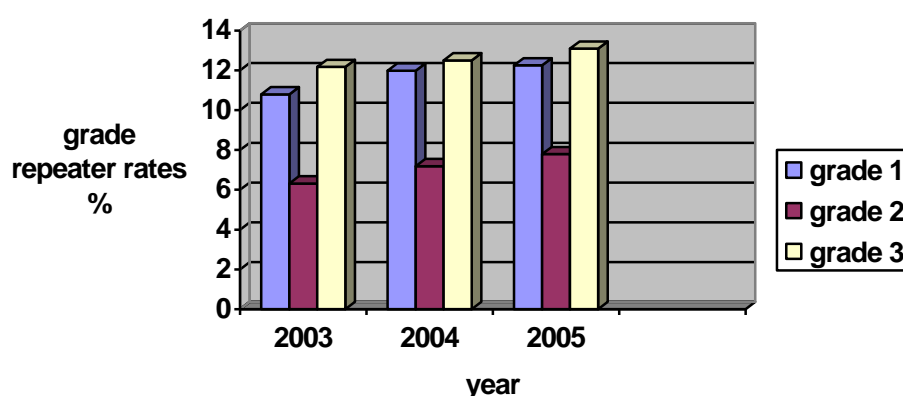


From the flow diagram above the following repeater rates can be computed for female students.

Table 20: Grade repeater rates for females

YEAR	Grade repeater rates %		
	1	2	3
2002	—	—	—
2003	10.79	6.31	12.17
2004	11.99	7.18	12.50
2005	12.25	7.79	13.09

From Table 20 above it can be observed that grade repeater rates for females was lowest is grade 2 in the year 2003 (6.31%) and highest in grade 3 in 2005 (13.09%). Generally, for the period of study, grade repeater rates for females were higher in grade 1 and 3 and lower in grade 2. This suggests that in the first year female students repeat possibly due to poor academic performance. In grade three students repeat possibly due to poor performance in KNEC exams which are terminal.

Figure 5: Graph showing trend of grade repetition for females

Figure

e 5 above was developed from Table 20 to show the trend of grade repetition for females. The trend of grade repetition for females is that it rose steadily though by a

small margin from 2003 to 2005 for all the grades. Generally, for the period of study, grade repeater rates for males were higher than for females. A possible explanation to the scenario is that most repeaters came from Science and Engineering courses which were dominated by males in terms of enrolment.

Table 21: Shows dropout rates for females

Years	Grade dropout rates %	
	Between 1 and 2	Between 2 and 3
2002	-	-
2003	9.96	7.18
2004	12.48	17.90
2005	11.24	7.22

Table 21 shows that grade dropout rate for females was lowest between 1 and 2 in 2005 (7.92%) and highest between grades 2 and 3 in the year 2004 (12.48%). A possible explanation is that female' students who fail to do well in exams drop out prematurely at the later stages of the courses.

Figure 6: Trend of grade dropout for females

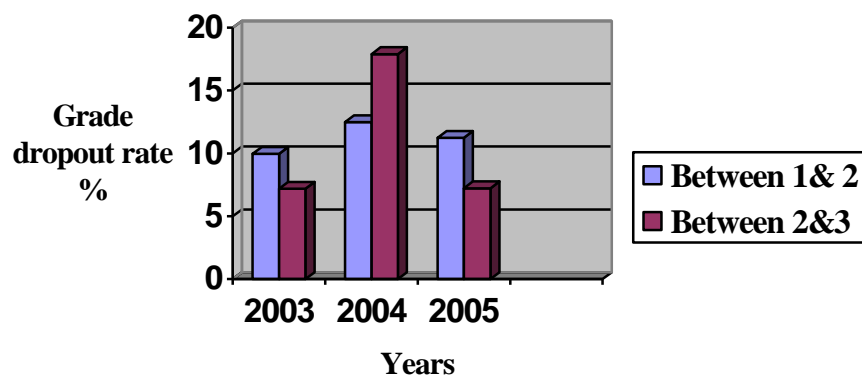


Figure 6 above was developed from Table 21 to show the trend of grade dropout for females that rose sharply from 2003 to 2004 before dropping slightly from 2004 to

2005 between grade 1 and 2. Grade dropout rate though lower (in 2003 and 2005) between grades 2 and 3 followed the same trend as that of between grade 1 and 2.

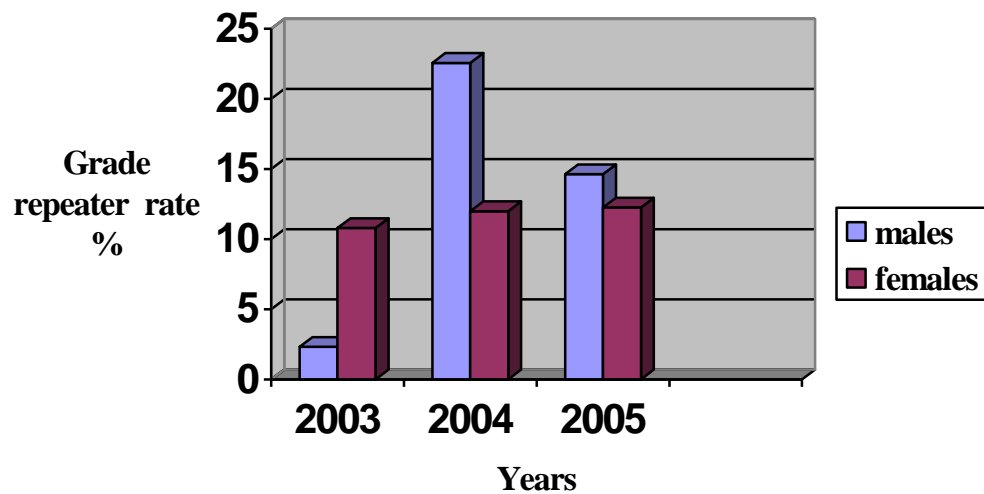
4.2.3 Comparative analysis of trends of repetition and dropout for males and females

This section gives comparison of trends of repetition and dropout for males and females.

4.2.3.1 Comparison of trend of grade repetition for males and females

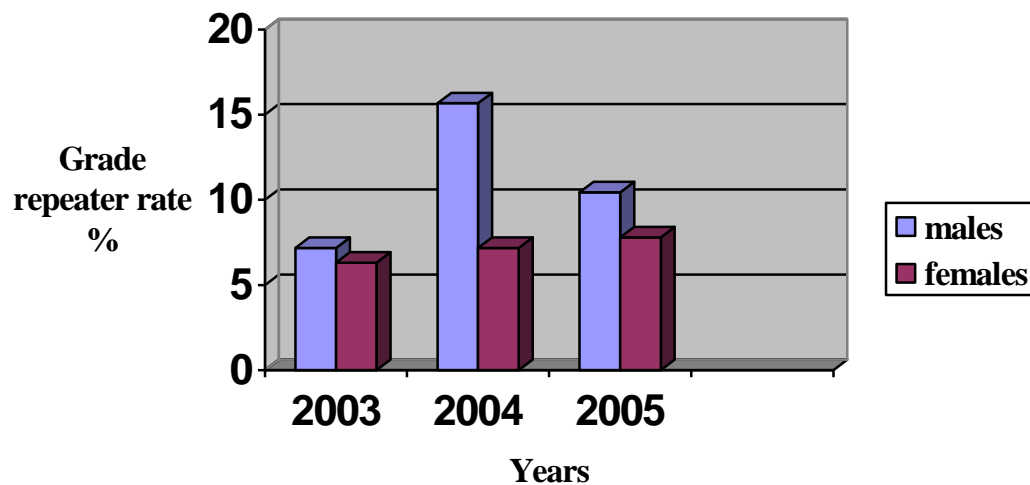
Figures 7, 8 and 9 give comparative analysis of the trend of repetition for males and females in stage I

Figure 7: Comparison of trend of repetition for males and females in stage 1



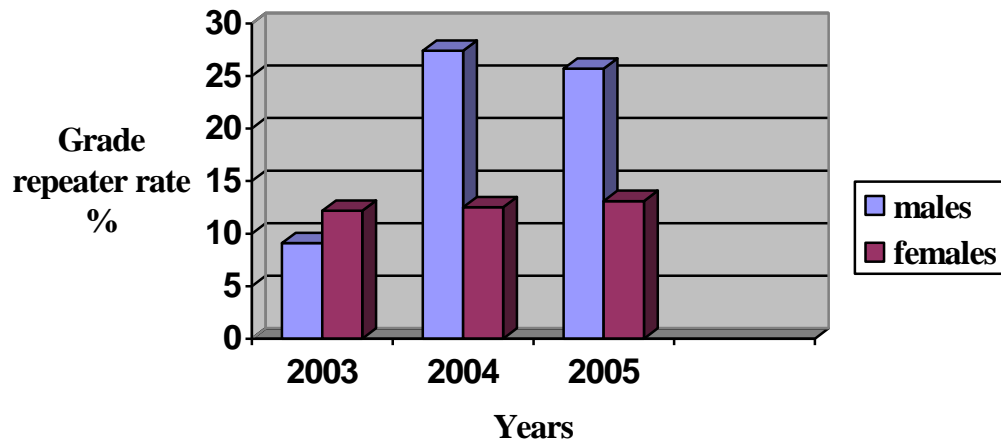
Whereas in grade 1 repeater rates for males rose sharply between 2003 and 2004 before declining slightly from 2004 to 2005, that of females rose steadily over the period for the same grade. However, except in the year 2003, repeater rates were higher for males than females

Figure 8: Comparison of trend of repetition for males and females in stage 2



In grade 2, grade repeater rates for males and females followed the same trend as in grade 1. But grade repeater rates were higher for males than females through the study period as it were in grade 1.

Figure 9: Comparison of trend of repetition for males and females in stage 3

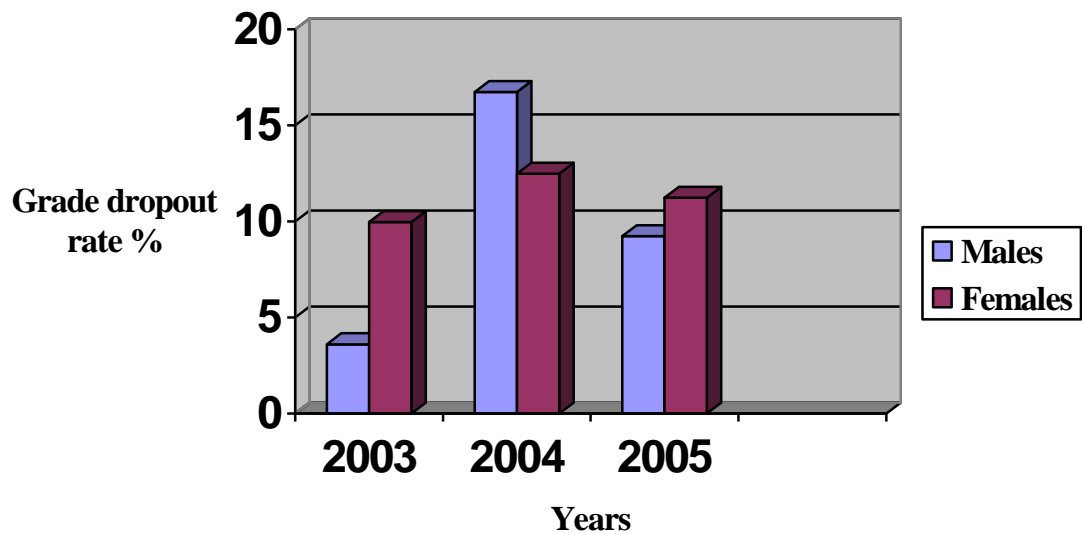


Grade repeater rates for males and females in grade 3 followed the same trend as in grade 1 and 2. However, except in the year 2003, repeater rates were still higher for males than for females. Generally, grade repeater rates were higher for males than for females for the period under investigation (2002-2005). This was explained mainly by the fact that repetition was common in male dominated courses like Engineering and Information Technology.

4.2.3.2 Comparison of trend of grade dropout for males and females

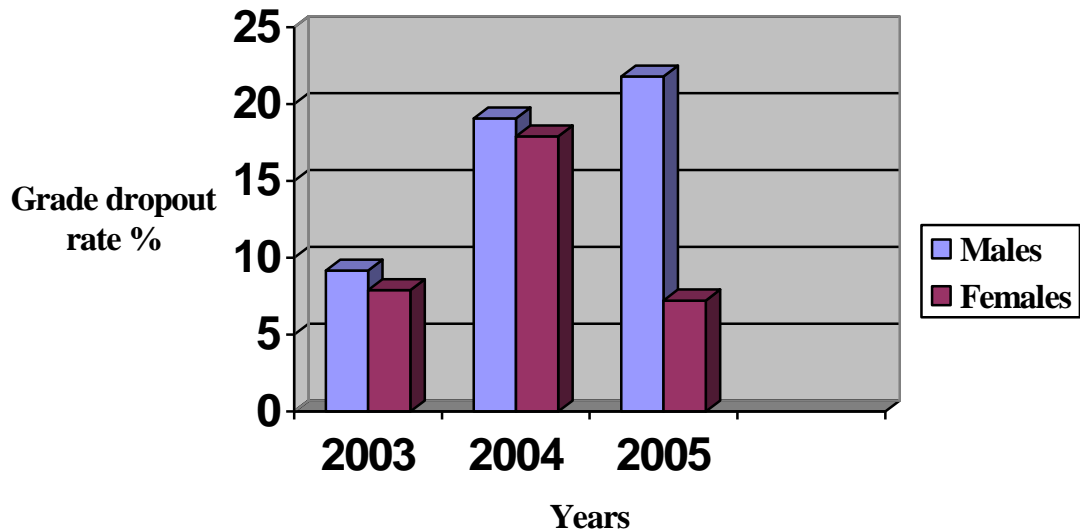
Figure 10 and 11 below gives comparative analysis of the trend of dropout for males and females

Figure 10: Comparison of trend of dropout for males and females between stage 1 and 2



Dropout rates for males and females between grade 1 and 2 followed the same trend of a sharp rise between the year 2003 to 2004 then by a sharp decline between 2004 and 2005. In 2003 and 2005 females dropout rate was higher than for males, whereas in 2004 males dropout rate was higher than for females in between grades 1 and 2.

Figure 11: Comparison of trend of dropout for males and females between stage 2 and 3



Dropout rates for males rose steadily between grade 2 and 3 over the study period. However, that of females rose from 2003 to 2004 before declining from 2004 to 2005. It can also be observed that dropout rate among the males was higher than among the females between grade 2 and 3 over the study period. Generally, grade dropout rates were higher for males than for females for the period under investigation. The main reason for this trend is that most males repeated grades to a point where some dropout of the system.

4.2.4 Cohort wastage analysis

This section presents the cohort wastage rates by sex and total

Table 22: cohort wastage rates by sex and total for grade I cohorts of 2002 and 2003

Years	Cohort wastage rates %		
	Males	Females	Total
2002	35.57	35.52	35.45
2003	51.20	34.55	43.20

From cohort analysis, it can also be observed that cohort wastage rates were higher for males than females for the entire study period, the highest rate being 51.20% for the 2003 grade 1 cohort. As noted earlier repetition rates were higher for males who were mainly enrolled in Science and Engineering courses. The high Cohort Wastage Rates for males implies that some male students repeat grades to a point where they opt out of the cycle. The cohort wastage rates for the total (males and females) were also high with the 2003 grade 1 cohort registering the highest rate of 43.20%.

Generally for the study period, cohort wastage rates were rising for males and for the totals (males and females). However, cohort wastage rates for females registered a slight drop over 2002 to 2003. The reasons behind this could not be established easily by the study.

Graduation rates for both males and females were also calculated on the basis of the data collected. It was found to be 48.03% in 2002, 57.45% for 2003, 55.55% for 2004 and 57.85% in 2005. The conclusion here is that the system is inefficient. Ideally, an

efficient system is one that graduate at least 70% and above of its enrolled students (inputs) within the desired duration (Ngware, 2002).

Oral interview with principals of the institutions revealed that most students failed in their terminal exams which are offered by KNEC. Therefore, the system losses most of the students at the exit point without the requisite diploma qualifications.

4.3 Causes of wastage according to student repeaters, HODs and principals

This section presents data on the causes of dropout and repetition as given by student repeaters, HODs and principals.

Table 23: Causes of repetition according to student repeaters, HODs and principals

Causes of repetition	According to student repeaters		According to HODs		According to principals	
	N=1188	%	N=30	%	N=6	%
Parents/guardians failure to pay fees	306	25.76	7	23.33	2	33.33
Poor performance in examination	486	40.91	8	26.67	2	33.33
To facilitate changeover to another course	234	19.70	6	20.00	-	-
Inadequate teaching and learning resource	54	4.55	5	16.67	1	16.67
Others (exam cheating, refusal of leave, high cut-off mark (50%), illness, pregnancy)	108	9.09	4	13.33	1	16.67
Total	1188	100	30	100	6	100

From Table 23, the main reason for repetition according to student repeaters is poor performance in examinations (40.91%) as measured by internal and external exams. Parent's failure to pay fees in time also contributes significantly to repetition (25.76%). Whenever parents /guardians delay in settling fees, student's attendance of college is disrupted leading to failure in exams and consequently necessitating repetition.

According to HODs, the main reason for students repetition of grades is poor performance in examination. This tends to concur with the students' responses and even those of the college principals. The implication of this scenario is that the root causes of examination failure should be addressed in order to put repetition on check.

Table 24: Causes of dropout according to HODs and principals

Causes of dropout	According to HODs		According to principals	
	N=30	%	N=6	%
Inability of Parent/guardian to pay fees	8	26.67	2	33.33
Bad behaviour/conduct	7	23.33	1	16.67
To help parents/guardians in housework/shamba	3	10.00	-	-
Poor academic performance	6	20.00	2	33.33
Inadequate teaching and learning resources	4	13.33	-	-
Others (Marriage, employment, failure to cope up)	2	6.61	1	16.67
Total	30	100	6	100

The main reasons for students dropping out of college according to HODs and principals is inability of parents to pay fees (26.67% and 33.33% respectively). But for HODs bad behaviour among students reinforced inability of parents to pay fees in causing dropout. For principals, poor academic performance also emerged as leading cause of dropping out (33.33%)

4.4 Causes of wastage as shown by regression analysis results

Apart from the descriptive statistics of the different variables in the previous sections of this chapter, regression analysis on the expected causes of wastage was done. This helped to show the extent and significance of each independent variable under investigation. Regression was also found necessary to reinforce the results of the descriptive analysis of data. Regression analysis was done by fitting the various expected causes of repetition and dropout onto repetition and drop out functions respectively.

4.4.1 Regression Results on Repetition Data from Student- Repeaters

Information collected from student- repeaters on the expected causes of repetition was analyzed using the model:

$$R = f(X_1, X_2, X_3, X_4, X_5, e)$$

Where,

R = wastage (number of repeaters).

X_1 , = failure of parent to pay fees.

X_2 , = poor examination performance.

X_3 , = inadequate teaching resources.

X_4 , = to change over to another course

X_5 , = others (exam cheating, refusal of leave, illness, pregnancy)

e = error term

Regression statistical technique was utilized to determine the coefficient estimates of the repetition function. In Table 25 the regression results from the repetition function estimated are given. The estimated coefficients for the different independent variables and their contribution to the overall coefficient of determination (R^2) are given on the table. The t - statistics are shown on the last column.

Table 25: Regression results for students from linear repetition function of TVET institutions in Rift Valley

N= 6

Independent variables	Coefficient estimate	t- statistics	Significance
X ₁	0.575	1.007	0.318
X ₂	0.730	1.348	0.183
X ₃	0.238	0.486	0.629
X ₄	0.223	0.490	0.626
X ₅	0.137	0.235	0.815
Constant	1.716		

Dependent variable R= number of repeaters.

$$R^2 = 0.6415$$

$$F\text{- Ratio} = 100.8$$

$$D_f = 6 \text{ and } 26$$

Significance at 0.05 significance level for a two tailed test

The results given in Table 25 can also be presented in the form of an equation as follows;

Equation 1: Representations of linear repetition function in TVET institutions as from the responses of student repeaters.

$$R = 1.716 + 0.575X_1 + 0.730X_2 + 0.238X_3 + 0.223X_4 + 0.137X_5 + e$$

(1.007) (1.348) (0.486) (0.490) (0.235)

Table 25 reveals that on the overall, independent variables in equation 1 accounted for 64.15% of the variability in the number of repeaters in the TVET institutions. The unexplained variations in the number of repeaters (R) was low and may be accounted for by errors in data collection, deficiencies of the variables used or causal factors not included in the model, (Nafukho 1991, Ngware 1994, Ngala 1996, Kosgei 2001)

Table 25 shows that the major determinants of repetition are failure of parent/guardian to pay fees (X_1), poor academic performance (X_2) (measured by internal and external exams), inadequate teaching resources (X_3) and to change over to another course (X_4). They had positive coefficients (0.575, 0.730, 0.238 and 0.223 respectively) while the variable others (X_5) seem to be less significant.

The outcomes given in Table 25 show that one percent increase in cases of parents/guardians who are not able to pay fees, raise the number of repeaters by 0.575 percent, a one percent increase in the number of students who fail exams, raised the number of repeaters by 0.730 percent, a one percent increase in cases of institutions with inadequate teaching and learning resources raised repetition by 0.238 percent while a one percent increase in the number of students who wished to change over to another course raised the number of repeaters by 0.223 percent.

Apart from the four major causes of repetition given above, the other variable which caused repetition on a smaller scale was 'others' (exam cheating, refusal of leave,

illness and pregnancy).The variables, exam cheating, refusal of leave, illness and pregnancy could not meet the significance level when taken individually but had a positive coefficient of 0.137 when taken as unity.

4.4.2 Regression Results on Repetition Data from –HODS

Information collected from HODS on the expected causes of repetition was analyzed using the same model as in previous sections;

$$R = f(X_1, X_2, X_3, X_4, X_5, e)$$

Where,

R = wastage (number of repeaters)

X_1 , = failure of parent to pay fees

X_2 , = poor examination performance

X_3 , = inadequate teaching resources

X_4 , = to change over to another course

X_5 , = others (exam cheating, refusal of leave, illness, pregnancy)

e = error term

Table 26 presents the regression results from the linear repetition function. The estimated coefficients for the various independent variables as well as their contribution to the overall coefficient of determination (R^2) are given on the table. The t-statistics are also presented as in the previous section

Table 26: Regression results for HODS from linear repetition function of TVET institutions in Rift Valley

N= 6

Independent variables	Coefficient estimate	t-statistic	Significance
X ₁	0.397	0.450	0.882
X ₂	1.290	1.410	0.409
X ₃	0.673	0.875	0.497
X ₄	0.577	0.8	0.431
Constant	3.847		

Dependent variable R= number of repeaters.

$$R^2 = 0.796$$

$$F\text{- Ratio} = 0.731$$

$$DF = 4 \text{ and } 25$$

Significance of 0.05 significance level for a two- tailed test.

The results given in Table 26 can also be presented in the form of an equation as follows;

Equation II; representation of linear repetition function in TVET institutions as from the responses of HODs.

$$R = 3.847 + 0.397 X_1 + 1.290 X_2 + 0.673X_3 + 0.577 X_5 + e$$

(0.964) (1.410) (0.875) (0.800)

Table 26 shows that on the overall, independent variables in equation II accounted for 79.6 % of the variability in the number of repeaters in the TVET institutions. The unexplained variation in the number of repeaters (R) was very low and may be accounted for by errors in data collection , deficiencies of the variables used or causal factors not included in the model (as cited elsewhere in this thesis).

Table 26 shows that the major determinants of repetition according to HODS are poor academic performance (measured by internal and external exams) (X_2), failure of parent guardian to pay fees in time(X_1), change over to another course (X_4) and inadequate teaching resources (X_3). These independent variables had positive and significant coefficients, which are 1.290, 0.397, 0.577 and 0.673 respectively. However, the variables exam cheating and refusal of leave by the employer were insignificant when taken individually.

The output given in Table 26 shows that a one percent increase in the number of students who were expected to perform poorly in exams raised the number of repeaters by 1.290%, a one percent increase in the number of parents/guardians who failed to pay fees in time raised the number of repeaters by 0.397%, a one percent increase in the number of cases of institutions with inadequate teaching resources raised the number of repeaters by 0.673% and yet a one percent increase in the number of students who changed to a different course raised the number of repeaters by 0.577 percent.

4.4.3 Regression Results on Repetition Data from Principals

Information collected from college principals on the expected causes of repetition was analyzed using the same model as in the previous sections

$$R = f(X_1, X_2, X_3, X_4, X_5, e)$$

Where,

R = wastage (number of repeaters)

X_1 , = failure of parent to pay fees

X_2 , = poor examination performance

X_3 , = inadequate teaching resources

X_4 , = to change over to another course

X_5 , = others (exam cheating, refusal of leave, illness, pregnancy)

e = error term

Table 27 presents the regression results from a linear repetition function. The estimated coefficients for the various independent variables as well as their contributions to the overall co-efficient of determination (R^2) are given in the same table. The t-statistics are shown in the last column as previously.

Table 27: Regression results for principals from linear repetition function of TVET institutions in Rift Valley.

N=6

Independent variables	Coefficient estimate	t-statistics	significance
X ₁	4.250	4.389	0.143
X ₂	1.500	1.732	0.333
X ₃	0.750	0.775	0.580
X ₄	1.000	1.414	0.392
Constant	2.291		

Dependent variable R=number of repeaters

$$R^2 = 0.894$$

$$F\text{-ratio} = 6.694$$

$$D.F = 4 \text{ and } 1$$

Significance at 0.05 significance level for a two- tailed test

The results given in table 27 can also be presented in the form of an equation as follows;

Equation III; representation of linear repetition function in TVET

$$R = 2.291 + 4.250X_1 + 1.500X_2 + 0.750X_3 + 1.000X_4 + e$$

$$(4.389) \quad (1.732) \quad (0.775) \quad (1.414)$$

Table 27 shows that on the overall, independent variables in equation III accounted for 89.4% of the variability in the number of repeaters in the TVET institutions. This is according to the opinion of college principals. The unexplained variation in the number of repeaters(R) was very low and may be accounted for by errors in data collection, deficiencies of the variables used or causal factors not included in the model (as cited in the previous section of this thesis)

Table 27 shows that the major determinants of repetition according to college principals are failure of parent to pay fees on time (X_1), poor academic performance (measured by internal and external exams (X_2), inadequate teaching and learning resources (X_3) and other factors (marriage) (X_4). These predictors had positive and significant coefficients.

From the outcome given in table 27 a one percent increase in the number of parents who were not able to pay fees on time, raised the number of repeaters by 4.250 percent, a one percent increase in the number of students who performed poorly in

examinations led to a rise in the number of repeaters by 1.500 percent, a one percent increase in the number of institutions with inadequate teaching and learning resources led to an increase in the number of repeaters by 0.750 percent while a one percent increase in the number of students who get married raised the number of repeaters by 1.000 percent.

4.4.4 Regression results on dropouts – data from HODS

Data from HODS to predict the cause of dropping out was analyzed using a similar model as in the other sections, that is

$$D = f(X_1, X_2, X_3, X_4, X_5, X_6, e)$$

Where,

D = Number of dropouts

X_1 = Inability of parent/guardian to pay fees

X_2 = Poor academic performance

X_3 = Inadequate teaching resources

X_4 = Opportunity cost of students time

X_5 = Bad conduct (truancy)

X_6 = others (exam cheating, employment)

e = error term

Table 28 presents the regression result from the linear dropout function. The estimated coefficients for various independent variables to predict dropout as well as their contribution to the overall coefficient of determination (R^2) are given on the table. The t- statistics are presented on the last column of the table.

Table 28: Regression results from linear dropout function of TVET institutions in Rift Valley (Data from HODs) N = 30

Independent variables	Coefficient estimate	t – statistic	Significance
X ₁	0.555	0.583	0.565
X ₂	0.870	0.692	0.495
X ₃	1.086	1.029	0.313
X ₄	0.071	0.060	0.953
X ₅	0.209	0.952	0.350
X ₆	0.060	0.226	0.823
Constant	3.527		

Dependent variable D = Number of dropouts

$$R^2 = 0.874$$

$$F - \text{Ratio} = 0.694$$

$$Df = 6 \text{ and } 26$$

Significance at 0.05 significance level for a two-tailed test.

The data given in Table 28 can also presented in form of an equation as shown below

Equation IV; Representation of linear dropout function in TVET institutions in Rift Valley as from the responses of college HODS

$$D = 3.527 + 0.555 X_1 + 0.870 X_2 + 1.086 X_3 + 0.071 X_4 + 0.209 X_5 + 0.060 X_6 + e$$

(0.582) (0.692) (1.029) (0.060) (0.952) (0.226)

From Table 28 it can be observed that most of the independent variables have positive and significant coefficients. However, the coefficients of the variables inability of parent/guardian to pay fees (X_1), poor academic performance (X_2) and inadequate teaching resources (X_3) were higher that is, 0.555, 0.870 and 1.086 respectively. The three independent variables were therefore of higher significance in causing variability of the dependent variable (Dropout)

The variable exam cheating, refusal of leave and illness did not meet significance level taken individually. However, when taken as a unit they had a positive coefficient of 0.060 which is still low. The results given in Table 28 shows that a one percent increased in the number of parents/guardians who were not able to pay fees increased the number of drop outs by 0.555 percent; a one percent increase in the number of students who performed poorly in exams raised the number of dropouts by 0.870 percent while a one percent increase in institutions faced with inadequate teaching resources raised the number of drop outs by 1.086 percent.

On the overall independent variables in equation IV accounted for 87.4% of the variability in the number of dropouts in the TVET institutions. The unexplained variation in the number of dropouts (x_1) was low and may be accounted for by error in data collection, deficiencies of the variables used or causal factors not included in the model.

4.4.5 Regression results on dropouts - data from college principals.

Data collected from college principals to predict the causes of students dropping out from the TVET institutions was also analyzed using the same model as in the other sections, that is

$$D = f(X_1, X_2, X_3, X_4, X_5, X_6, e)$$

Where,

D = Wastage (Number of dropouts)

X_1 = Inability of parent/guardian to pay fees

X_2 = Poor academic performance

X_3 = Inadequate teaching resources

X_4 = Opportunity cost of students time

X_5 = Bad conduct/behaviour (truancy)

X_6 = Others (employment)

e = error term.

Table 29 presents the regression results from the linear dropout function. The estimated coefficients for various independent variables used to predict dropout as well as their contribution to the overall coefficient of determination (R^2) is given on the table. The t – statistics are presented on the last column of the table.

Table 29: Regression results from linear dropout function of TVET institutions in Rift Valley (Data from principals)

N=6

Independent Variables	Coefficient estimate	t- statistics	Significance
X ₁	1.555	2.000	0.454
X ₂	1.500	3.000	0.374
X ₃	0.955	1.056	0.580
X ₄	0.653	0.422	0.572
X ₅	0.436	0.892	0.500
X ₆	1.000	1.362	0.432
Constant	10.000		

$$R^2 = 0.920$$

$$F\text{-Ratio} = 1.938$$

$$Df = (4, 1)$$

Significance at 0.05 significance level for a two-tailed test.

The data given in Table 29 can also be presented in form of an equation as shown below

Equation V: Representation of linear dropout function in TVET institutions in Rift Valley as from the responses of college principals.

$$D = 10.000 + 1.555 X_1 + 1.500 X_2 + 0.955 X_3 + 0.436 X_5 + e$$

(2.000) (3.000) (1.056) (0.892)

From Table 29 it can be observed that the independent variables which met the level of significance had positive coefficients. The variable opportunity cost of students' time (X₄) was not significant in causing dropouts according to the opinion of

principals, hence was not produced in the model. The variable others (employment) (X_6) was significant in predicting the number of dropouts and had a positive coefficient of 1.000

The results given in Table 29 show that a one percent increase in the number of parents who were not able to pay fees led to a rise in the number of dropouts by 1.555 percent, a one percent increase in the number of students likely to perform poorly in academic work led to a rise in the number of dropouts by 1.500 percent and a one percent increase in the number of institution with inadequate teaching facilities led to a 0.955 percent increase in the number of dropouts.

From the opinion of principals, the main predictors of dropout are inability of parent/guardian to pay fees (X_1), poor academic performance (X_2) and inadequate teaching resources (X_3). On the overall independent variables in equation V accounted for 92.0 percent of the variability in the number of dropouts (D) in the TVET institutions. The unexplained variation was very low and may have been due to error in data collection, deficiencies of the variables used or causal factors not included the linear dropout function.

Table 30: Measures to be put in place to reduce dropout

Measures to reduce dropout	According to HODs		According to principals	
	N=30	%	N=6	%
Examination requirements should be clarified at all stages by TVET institutions and KNEC	8	26.67	1	16.67
Increase practical components as opposed to theoretical concepts in teaching and testing policy	4	13.33	1	16.67
Improve on conditions of existing equipment and avail more resources to meet the needs of teaching and learning	2	6.67	-	-
Government and other well wishers to aid students from poor families	9	30.00	2	33.33
Avail/strengthen guiding and counselling for TVET students	7	23.33	2	33.33

Table 31: Measures to be put in place to reduce repetition

Measure to reduce repetition	According to student repeaters		According to HODs		According to principals	
	N=1188	%	N=30	%	N=6	%
Government and other well wishers to aid students from poor families	361	30.39	7	23.33	2	33.33
Guiding and counselling at an early stage to clarify on requirements of different courses offered at TVET	49	4.12	9	30.00	2	33.33
Examination requirements should be clearly communicated at all stages by TVET institutions and KNEC	439	36.95	8	26.67	1	16.67
Increase practical components as opposed to theoretical concepts in teaching and testing policy	297	25.00	6	20.00	1	16.67

4.5 Hypotheses testing

This part of the chapter draws a brief attention to the hypotheses that were stated in chapter one. The t-test of regression coefficient was used to test hypotheses since its result and that of correlation coefficient are the same algebraically (Kosgei 2001).

The procedures followed were;-

- i) Determine the null and alternative hypotheses
 $H_0: a_0 = 0$: null hypothesis
 $H_A: a_0 \neq 0$: alternative hypothesis
- ii) Choosing the desired level of significance. In this study, the level of significance was 0.05.
- iii) Defining the degrees of freedom, hence defining the critical region, acceptance and the rejection regions.

The t-test was used to examine whether each independent variable helped to predict the dependent variable at 0.05 level of significance. In this study, a two-tailed t-test was chosen.

To reject or accept the null hypothesis depend on the following rules;-

- a) If the computed value of t was equal to or exceeded the critical value of t , then the null hypothesis was rejected.
- b) Conversely, if the computed value of t was less than the critical value of t , the null hypothesis was accepted

Table 32: Hypothesis testing for various estimated coefficients

Dependent variable = wastage (number of repeaters)

Independent variable	Co-efficient Estimate*	t- ratio **	Remarks
Failure of parent to pay fees	4.250	4.389	Reject
Poor examination performance	1.500	1.732	Reject
Inadequate teaching resources	0.750	0.775	Reject

* Critical values

** Computed value of t

- i) There was no relationship between failure of parent to pay fees and the number of repeaters.

$H_0: P = 0$, and $H_A: P \neq 0$

The calculated value $t_p = 4.389$

Since $t_p = 4.389$ is greater than 4.250, the critical value of t , then we reject the null hypothesis. This means that there existed a direct and significant relationship between failure of parents/ guardian to pay fees and the number of students who repeated grades. Therefore, failure of parent's to pay fees is a significant predictor of wastage (repetition)

ii) There was no relationship between poor performance in examinations and the number of repeaters.

$$H_0 = 0: Q = 0, \text{ and } H_A: Q \neq 0$$

$$\text{The calculated } t_q = 1.732$$

Therefore, since $t_q = 1.732$ is greater than 1.500, the critical value of t , then we reject the null hypothesis. This means that there existed a direct and significant relationship between poor performance in examination and the number of repeaters. Therefore, poor performance in examination is a significant predictor of wastage (repetition).

iii) There was no relationship between inadequate teaching resources and the number of repeaters.

$$H_0: R = 0, \text{ and } H_A: R \neq 0$$

$$\text{The calculated } t_r = 0.775$$

Therefore, since $t_r = 0.775$ is greater than 0.750, the critical value of t , then we reject the null hypotheses. This means that there existed a direct and significant relationship between inadequate teaching resources and the number of repeaters. Therefore inadequacy of teaching resources is a significant predictor of wastage (repetition)

Table 33: Hypothesis testing for various estimated coefficients

Dependent variable = Wastage (number of dropouts)

Independent variable	Coefficient estimate *	t-ratio **	Remarks
Inability of parent/guardian to pay fees	1.555	2.000	Reject
Poor examination performance	1.500	3.000	Reject
Inadequate teaching resources	0.955	1.056	Reject

* Critical value

** Computed values of t

- i) There was no relationship between inability of parent/guardian to pay fees and the number of dropouts

$$H_0 = 0: T = 0, \text{ and } H_A: T \neq 0$$

The calculated $t_t = 2.000$

Since $t_t=2.000$ is greater than 1.555 the critical value of t then we reject the null hypothesis. This means that there existed direct and significant relationship between inability of parent to pay fees and the number of dropouts. Therefore inability of parent to pay fees is a significant predictor of wastage (dropout)

- ii) There existed no relationship between poor examination performance and the number of dropouts

$$H_0: U = 0, \text{ and } H_A: U \neq 0$$

The calculate $t_u=3.000$

Given that $t_u=3.000$ is greater than 1.500 the critical value of t then we reject the null hypothesis. This means that there existed a direct and significant relationship between

poor performance in examinations and the number of dropouts. Therefore poor performance in examination is a significant predictor of wastage (dropout).

- iii) There was no relationship between inadequate teaching resources and the number of dropouts

$$H_0: V = 0, \text{ and } H_A: V \neq 0$$

$$\text{The calculate } t_v = 1.056$$

Given that the $t_v = 1.056$ is greater than 0.955, the critical value of t then we reject the null hypothesis. This means that there existed an inverse relationship between availability of teaching and learning resources and the number of dropouts. Therefore, inadequacy of teaching and learning resource is a significant predictor of wastage (dropout).

The results of the tested hypotheses above revealed that the main determinants of wastage (repetition) are failure of parent/guardians to pay fees, poor examination performance, and inadequate teaching resources. This is true because the independent variables had significant relationship with the dependent variable (repetition). In addition, the main determinants of wastage (dropout) are inability of parent/guardian to pay fees, poor academic performance and inadequate teaching resources. These independent variables had significant relationship with the dependent variable wastage (dropout).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter gives a short account of previous chapters in the study with all keynotes in concluding the research findings. The final part of this chapter presents a number of recommendations for reducing wastage in the operations of TVET institutions as well as highlights on areas related to the study that need further research.

5.1 Summary of Research Findings

The present study was designed to establish the trend in and causes of educational wastage (repetition and dropout) in TVET institutions in Rift Valley. The study also aimed at making recommendations of potential measures to be put in place to reduce such wastage.

Chapter one presents the background to the problem, statement of the problem, purpose of the study, objectives of the study, research questions, hypotheses of the study, significance of the study, scope and limitations of the study, main assumptions of the study, theoretical framework and operational definition of terms.

In chapter two the following areas are covered: measurement of efficiency and its general information is highlighted, related studies done outside Africa, related studies done in selected African countries, studies done in Kenyan together with related issues found in government policy documents. A summary of reviewed literature is also given at the end of the chapter.

Chapter three gives information on the area of study, target population, sample size and sampling procedures, instruments of data collection, administrative procedures, data collection procedures and methods of data analysis.

Chapter four presents the background of the respondents to the research instruments as well as that of the sampled TVET institutions. In addition it gives information on enrolment patterns of male and female students and their flow rates, repetition rates for males and its trend, repetition rates for female and its trend, dropout rates for males and its trend, dropout rates for females and its trend, comparative analysis of repetition and dropout among males and females, cohort wastage rates for males and its trend, cohort wastage rate for females and its trend, overall cohort wastage rates and its trend, causes of wastage and the possible remedies to the problem of educational wastage in TVET institutions . In summary the following are the findings of the study:-

Looking at Table 18 and 20 on repetition rates, it can be seen that TVET institutions are not efficient. From the available data it can be observed that repetition occurs at the various stages of the Diploma cycle of TVET. Generally, more repetition occur in grade 1 and 3 among both males and females but the rates were higher for males than for females for the period of study. For the study period, repetition rates ranged from 2.32% to 27.39% for males and from 6.31% to 13.09% for females. These findings concur with those of Ngware (2002) that higher repetition occurred among males than females in final grades of TVET. However, the highest repetition rates were 30% and 8% for males and females respectively in Ngware's study.

The main causes of repetition as shown by Table 23,25,26 and 27 and the equations I to III showing regression results are poor performance in examination (measured by internal and external examination) and parents/guardians failure to pay fees. Students repeated especially grade 3 in order to improve on their performance in KNEC examinations. These findings concur with those of primary schools in Migori and Laikipia West (Michieka, 1983; Janak, 1991; Ngware, 1994). The study by Michieka (1983) in Kisii District concluded, pupils repeated due to poor performance in examination owing to long absenteeism. Also, high repetition in grade 7 was to facilitate better performance in KCPE in Laikipia West (Ngware, 1994). The decision to repeat in the primary cycle (cited elsewhere in chapter two) was taken by teachers, also that of TVET was mainly taken by TVET authority (HODs, Lecturers and Principals). This is revealed in Table 8 which shows that a significant majority (40.90%) of the decision to repeat was made by TVET authority

The high rate of repetition for males was explained by the findings that Science and Engineering courses recorded dismal performance in examinations and yet more males enrolled in it. The findings were therefore lopsided to the side of males. The trend of repetition was generally rising for both sexes for the entire study period. Reasons behind this trend could not be immediately established. This trend was mainly attributed to alarming rates of examination failure.

Tables 19 and 21 on dropout rates show that students dropout between all the grades. However, more males than females dropout between grades with the highest dropout rates recorded in 2004 and 2005 (19.06% and 21.78% respectively) between grades 2 and 3. The study (Ngware, 2002) on gender participation in TVET observed that

dropout rates between grades 1 and 2 for males and females were 26% and 27 %,and 22% and 24% between grades 2 and 3. whereas more males than females dropped out in the later stages of training for the current study, more females than males dropped out for Ngware's study (2002).As noted earlier, there has been a tendency for more males to enrol in Engineering courses which contributed more to wastage.

In particular, the dropout rates for males and females were caused mainly by the inability of parent/guardian to pay fees (33.33%) and poor academic performance (33.33%). The high rate of dropout for male students (21.78%) was mainly due to poor performance in exams which necessitated repetition and subsequently dropout. A significant number of female students (17.90%) also dropout at the terminal grade after failing in KNEC exams. This tends to concur with the findings of Eshiwani's study (1987) that inability of parents to pay school funds was a major cause of school dropout.

Grade dropout rate for males rose between 2003 and 2004 in grades 1 and 2 (from 3.61% to 16.73%) before declining from 2004 to 2005 (from 16.73% to 9.23%) within the same grades. The dropout rates for males rose steadily from 2003 to 2005 between grades 2 and 3 (9.16%, 19.06% and 21.78%). The reason for this trend was explained by the high rates of examination failure especially in grade 3.

Grade dropout for females rose sharply from 2003 to 2004 (from 9.96% to 12.48%) before declining slightly from 2004 to 2005 (from 12.48% to 11.24%) between grade 1 and 2. Grade dropout rate between grade 2 and 3 also rose sharply in 2003 to 2004 (from 7.18% to 17.90%) then declined drastically in 2004 to 2005 (from 17.90% to

7.22%). Generally, grade dropout rates were rising for males and fluctuating for females within the study period (as shown by figures 3 and 6).

From the study, cohort wastage rates were also high for the study period. The 2002 grade 1 cohort had cohort wastage rate of 35.57%, 35.52% and 35.45% (for males, females and totals respectively).

The 2003 grade 1 cohort had cohort wastage rates of 51.20%, 35.52% and 43.20% (for males, females and totals respectively). These rates were found to be quite high and were on an upward trend. For the 1992/1993 and 1994/1995 (Ngware, 2002) grade 1 cohorts the rates of cohort wastage for males and females stood at 33% and 36% respectively. Cohort wastage was therefore higher for males (51.20%) than females (35.52%) in this study but higher for females (36%) than males (33%) in Ngware's study (2002). The low graduation rates (slightly over 50%) is an indication that the institutions loss most of the students at the final grade. This was explained by high failure rates in KNEC exams. The main reasons for this trend are poor performance especially in KNEC exams and the inability of parents/guardians to pay fees. On the overall the trend of wastage in TVET was rising and needed interventions to check it.

The attitude towards Technical and vocational education and training in most developing countries is negative. In developed countries, the attitude is positive since students get exposed to vocational training, scientific investigation, and application at an early age. In addition, TVET has received limited importance in terms of policy attention and financing (both internal and external) in developing countries. In the

developed countries more attention has been given to TVET. As such educational wastage would be higher for developing than developed countries (OECD, 2000).

5.2 Conclusion

From the objectives of the study given in chapter one, and from the empirical results in Chapter four, the following concluding remarks can be made.

The study found that the trend of total enrolment of the TVET institutions in Rift Valley was rising. But enrolment along the cohorts was on decline depicting existence of wastage. This implies that the said institutions in conjunction with the Ministry of Science and Technology ought to increase the educational resources so as to keep pace with increasing demand. For example Table 15 reveals that the supply of workshops, machines, laboratories, Textbooks, Technician services, Field trips and lecture halls was inadequate. It can therefore be concluded that if the overall enrolment trend continues to rise, the already inadequate facilities shall be overstretched leading to inefficiency (wastage). There is therefore need to reduce educational wastage (repetition and dropout) for the net effect will be improved utilization of the available educational resources. The Government should also upgrade the existing facilities and provide new ones in the TVET institutions.

It can also be concluded from the preceding findings that the causes of wastage are examination oriented and also relate to students' socio-economic background for example, absenteeism due to fees defaults made students to perform poorly both in internal and external exams. Ultimately, students would have to repeat a grade. If a student fails in exams the second and probably the third time, such a student would eventually dropout of college (this was common especially in grade 3). Most students

from low socio economic backgrounds also dropped out due to inability of parent/guardian to pay fees. Majority of the repeaters (31.83%) came from homes where fathers did not have formal education while another significant number (24.24%) came from homes where mothers had primary education. From the data on parental level of education it appears that most of the parents were not capable of encouraging their children to pursue higher education or to work for better results.

To alleviate the problem of repetition and dropout, measures such as government assistance of students from low socio-economic background and blending of written exams with oral and practical exams are proposed. Provision of more learning facilities and strengthening of guiding and counselling services need also to be adapted in TVET institutions.

From the cohort analysis wastage rates were found to be high (ranging from 23.49% to 51.20% for the separate sexes and from 23.73% to 43.20% for the total enrolment). Males had higher cohort wastage rates than females. It implies that slightly more than half of the students of those institutions complete their diploma cycle in the expected duration of time (three years). Most of the students dropout after failing KNEC exams in grade 3. Generally, the trend of wastage was rising calling for prompt interventions for example measures having to do with improvement in examination performance and financial assistance to the needy have to be put in place to alleviate the problem of wastage.

The overall conclusion is that TVET institutions in the Rift Valley fail to achieve their internally set objectives. This tends to pose a lot of challenge to the need for technical manpower to push the country to industrialization by 2020. Mungai (1995) had

proposed a 1:5:30 ratio for professionals, technicians and artisans (Republic of Kenya 1998). If the situation of wastage is not checked, unemployment would also widen as industrialists would be reluctant to employ those who dropout without attaining the requisites of Diploma certification.

On the whole independent variables in the study accounted for over 70% of the variability of the dependant variable.

5.3 Recommendations

From the research study, the following recommendations are made;

- i) Peer Guidance and counselling should be strengthened so that the problem of truancy and negative attitude towards certain courses is minimised. Such counselling should be broad based to involve college administration, parent / guardian and the students. Counselling should be well integrated with strict rules on alcoholism which was reported to be the route course of truancy, thus repetition and dropout.
- ii) TVET training should restructure its internal and external mode of evaluation. Practical oriented and project components should be emphasized rather than the conventional methods which comprise mainly of written exams. This should be observed mainly in the Technical courses where wastage is reportedly high. An unbiased mode of evaluation is that where the cognitive skills, psycho-motor skills and affective skills of the candidate are tested (Ngware, 1994, Pg 120). If such evaluation procedures are observed a student/candidate who performs poorly in one skill will stand a chance of excelling in the other skills. This will have net

effect of reducing repetition due to poor performance in examinations, especially for the male students.

- iii) It is imperative that the fee paid in TVET institutions is prohibitive to most households who are mainly farmers or small scale traders (Table 7). Most of the students reportedly repeat/dropout due to delayed fees payments. This study recommends that the government through HELB and CDF should set aside funds to aid students from less endowed economic backgrounds. This will have the net effect of reducing dropouts due to inability of parents to pay fees.
- iv) There is need for the Ministry of Science and Technology to design policies which allow for certification of students at the end of every grade. A diploma student would for example join the job market at the end of grade 1 or 2, and may even proceed to complete his / her diploma later in life.

5.4 Suggestions for further research

A number of other important issues could not be addressed by this study due to its scope. The following areas are therefore recommended for further research;

- i) This study dwelled mainly on internal efficiency (repetition and dropout) of TVET institutions. A study should be conducted on the external efficiency of these institutions. Such a study will help to trace the dropouts and establish what happens to TVET dropouts when they exit prematurely.
- ii) This study looked at the flow of students on the Diploma cycle. A study that will go beyond this should be conducted. Such a study should look at the flow of students on Artisan, Craft and H.N.D cycles. It should then

make a comparison to establish the cycle which records the highest wastage in an effort to address the problem of wastage.

- iii) A study should be conducted that will investigate whether there is any academic achievement to be gained by making a student to repeat a grade in TVET institutions. The outcome of such a study would help to justify the need for repetition of failures or automatic promotion between grades.
- iv) A study should also be conducted to compare the levels of wastage between Technical courses and the non-technical courses. Such a study would help policy makers to focus on the areas of need in terms of policy making and policy remediation.

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APPENDIX I: STUDENTS HOME BACKGROUND AND CAUSES OF WASTAGE

QUESTIONNAIRE

INTRODUCTION

This questionnaire seeks information for purely academic purposes. The purpose of this study is to determine the extent to which Technical Training Institutions in Rift Valley are internally efficient, as measured by repetition and dropout rates. It will further identify the causes of repetition and dropout and suggest possible solutions to the problem.

INSTRUCTIONS TO RESPONDENTS:

Please respond to the questions by ticking [] or filling in appropriately in the spaces provided.

Your responses will be kept strictly confidential.

1. Home district

2. Name of institution

3. Course enrolled in..... department

4. Sex: Male [] Female []

5. Your age in years:

(i) Between 15-19 []

(ii) Between 20-29 []

(iii) Between 30-34 []

(iv) Over 34 years []

6. In which stage are you? One [] Two [] Three []

7. In which year did you join stage one?

8. Who funds your education? Parent [] Guardian [] Other (Specify)

.....

9. What is the major occupation of the person named in question 8 above?

Farmer [] Civil servant [] Large scale business operator [] Small scale business operator [] other (Specify)

.....

10. What is the highest level of education reached by your father?

- (i) No formal education [] (ii) Primary education [] (iii)Secondary education []
 (iv) Post-secondary training [] (v) University education [] (vi)Other (Specify)

.....

11. What is the highest level of education reached by your mother?

- (i) No formal education [] (ii) Primary education [] (iii)Secondary education []
 (iv) Post-secondary training [] (v) University education []
 Other (Specify)

.....

12.a) We have listed reasons why students repeat grades/stages. In the table below write the number of times and reasons why you repeated a grade. In the reasons column, put down the number which stands for the reasons why you repeated that grade/stage. Reasons for repeating grades;

- i. Parents/Guardian could not pay fees on time.
- ii. Examination performance was poor.
- iii. Personal reasons like illness, pregnancy etc leading to long absence from college.
- iv. To facilitate changeover to a different course from the one originally enrolled in.

YEAR/STAGE	TIMES REPEATED	REASONS
I		
II		
III		

b) If you repeated because of reasons other than the ones given in a), specify them here

.....

c) Who made the final decisions for you to repeat?

- i. Self []
- ii. Parent/Guardian []
- iii. TI VET authority []
- iv. Other (Specify).....

13. What measures can be put in place in order to reduce on repetition and dropout rates?

- i)
- ii).....
- iii).....
- iv).....

Thank you, for taking your time to respond to these items.

APPENDIX II: HEADS OF DEPARTMENT QUESTIONNAIRE ON THE CAUSES OF WASTAGE

INTRODUCTION

This questionnaire seeks information for purely academic purposes. The purpose of this study is to determine the extent to which Technical Training Institutions in Rift Valley are internally efficient, as measured by repetition and dropout rates. It will further identify the causes of repetition and dropout and suggest possible solutions to the problem.

INSTRUCTIONS TO THE RESPONDENTS

Please respond to the questions by ticking [] or by filling in appropriately in the spaces provided. Your responses will be kept strictly confidential.

1. Name of institution.....department.....
.....

2. Sex: Male [] Female []

3. Your age in years:

(i) Between 20—29 [] (ii) Between 30-39 [] (iii) Between 40-49 [] (iv) Over 50 []

4. Please indicate how much formal training you have had. Tick only your highest qualification

(i) Diploma [] (ii) Higher Diploma [] (iii) Degree []

(iv) Other (Specify) [].....

5. (a) How many years have you been H.O.D?

(i) Less than 3 years [] (ii) 3 to 6 years [] (iii) 7 to 9 years []

(iv) More than 10 years []

b) How many years of in-service teacher training have you had?

(i) Less than 2 years [] (ii) 3 to 5 years [] (iii) 6 to 10 years [] (iv) Over 10 years []

c) How often do you have the opportunity to discuss with local or central authority (education officers, inspectors e.t.c) matters related to your work?

(i) Often [] (ii) Sometimes [] (iii) Rarely [] (iv) Never []

6. Please show the number of students in your department for each of the following stages and years:

STAGE	YEAR	ENROLMENT
I	2003
II	2004
III	2005

7. (a) Indicate how often you use the following resources in your instruction. Tick only one box for each type of resource.

	Resource	Regularly	Sometimes	Rarely	Never	1 or 2
i.	Workshop					
ii.	Machines/tools					
iii.	Laboratories					
iv.	Textbooks					
v.	Library					
vi.	Technician					
vii.	Field trips for previous projects					
viii.	Lecturers					
ix.	Classrooms/lectures halls					

b).How do you rate adequacy of the facilities/resources in a) above? Fill in “1” for adequate and “2” for inadequate in the last columns of the table in a) above.

8. Do you consider these reasons important in explaining why students from your department sometimes repeat a stage/year?

a) Parents/guardians failure to pay fees on time.

1. Yes []

2.No []

b) Poor academic performance.

1. Yes []

2. No []

c) Long absence from college due to personal reasons like illness, pregnancy etc

1. Yes []

2.No []

d). Inadequate teaching resources

1. Yes []

2.No []

9. Do you consider the following reasons important in explaining why students from your department sometimes dropout of college?

a) Inability of parent/guardian to pay fees.

- 1. Yes []
- 2.No []

b) Bad behaviour (Specify)

- 1. Yes []
- 2.No []

c) Opportunity cost of student time for example; help parent/guardian in the shamba and/or housework.

- 1. Yes []
- 2.No []

d) Poor academic performance.

- 1. Yes []
- 2. No []

e) Inadequate teaching resources.

- 1. Yes []
- 2. No []

10. Which other factors make students to repeat grades and/or dropout of this institution?

Causes of repetition

Causes of dropping out

- i)
- ii)
- iii)
- iv)

11. (a) How do your institution attempt to reduce the number of student repeaters and dropouts?

Measures for reducing repetition

Measures for reducing dropout

- i)
- ii)
- iii)
- iv)

b) Which other measures should be put in place to reduce repetition and dropout problems?

.....

.....

Thank you, for taking your time to respond to these items.

b) How frequent do you access management training?

(i) Often [] (ii) Sometimes [] (iii) Rarely [] (iv) Never []

6. How many lecturers and students did you have in the following years?

Year	No. of lecturers present	No. of students
2002		
2003		
2004		
2005		

7. For each of the Diploma courses offered in this institution, state the amount of fees charged at each stage and the total fees to its completion.

COURSES	FEES CHARGED PER STAGE			TOTAL FEES (SHS) TO COMPLETION
	(SHS)			
NAME	STAGE I	STAGE II	STAGE III	

8. What is the average qualification of lecturers in this institution?

(i) Diploma [] (ii) Higher Diploma [] (iii) Degree []

(iv) Other (Specify).....

9. Fill the table below with the help of college enrolment records for the period 2002-2005

YEAR	STAGE I		STAGE II		STAGE III		GRADUATES		
2002	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
	E			E					
	R			R					
	D			D					
2003	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
	E			E					
	R			R					
	D			D					
2004	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
	E			E					
	R			R					
	D			D					
2005	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
	E			E					
	R			R					
	D			D					

LEGEND

E - Enrolment

R - Repeaters

D - Dropouts

M - Males

F - Females

10. Do you consider these reasons important in explaining why students from this institution sometimes repeat a stage and / or dropout of the institution? State the most appropriate cause

REASON	CAUSES REPETITION	CAUSES DROPOUT
Inability of parents/guardian to pay fees		
Bad behaviour (truancy)		
Opportunity cost of student time for example; help parents/guardian in the shamba and/ or housework poor academic performance		
Inadequate teaching resources		

11. Suggest possible measures to be put in place to reduce repetition and dropout rates in the institution.

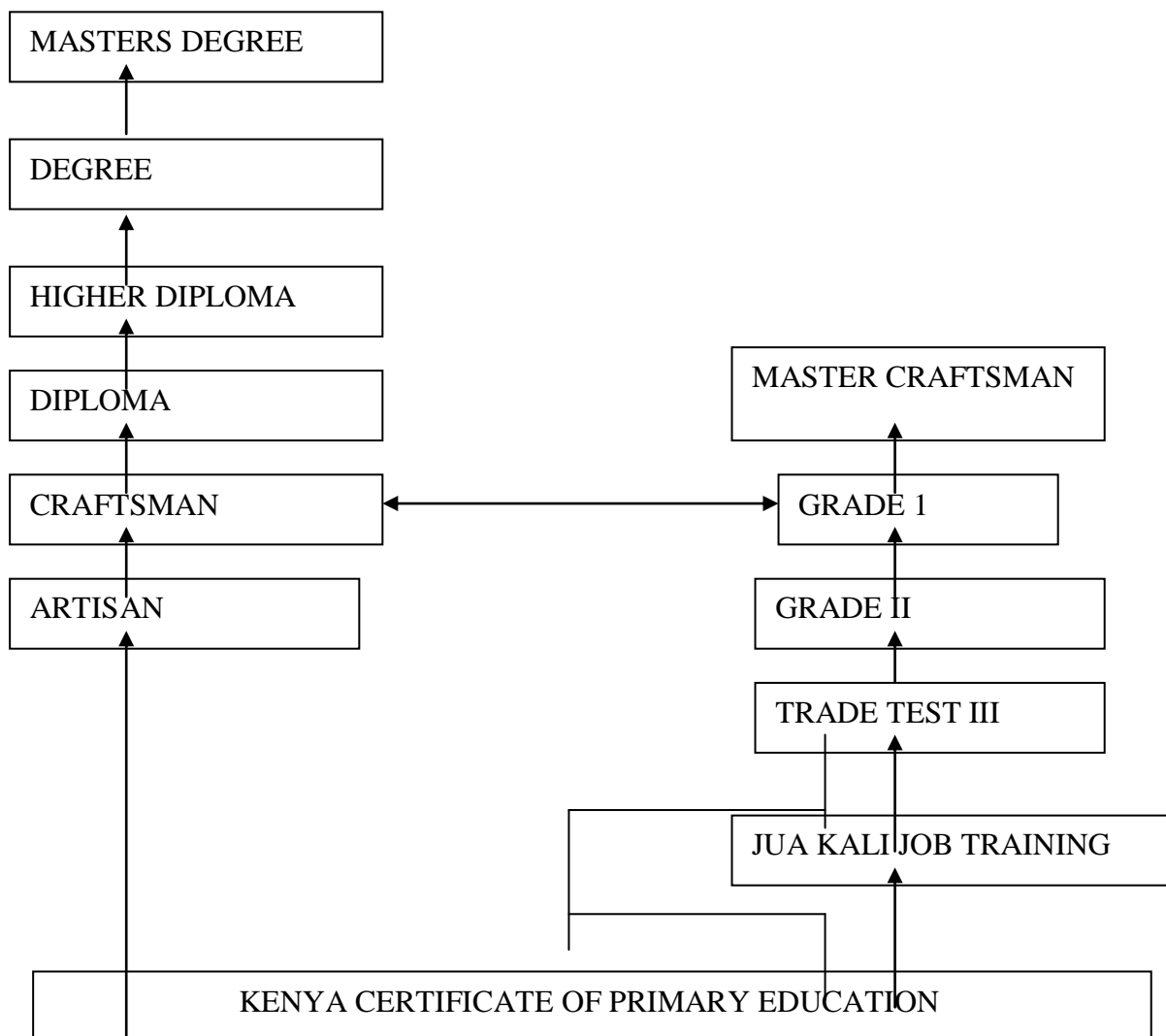
Measures for Repetition

Measures for Dropping out

- i)
- ii)
- iii)
- iv)
- v)
- vi)

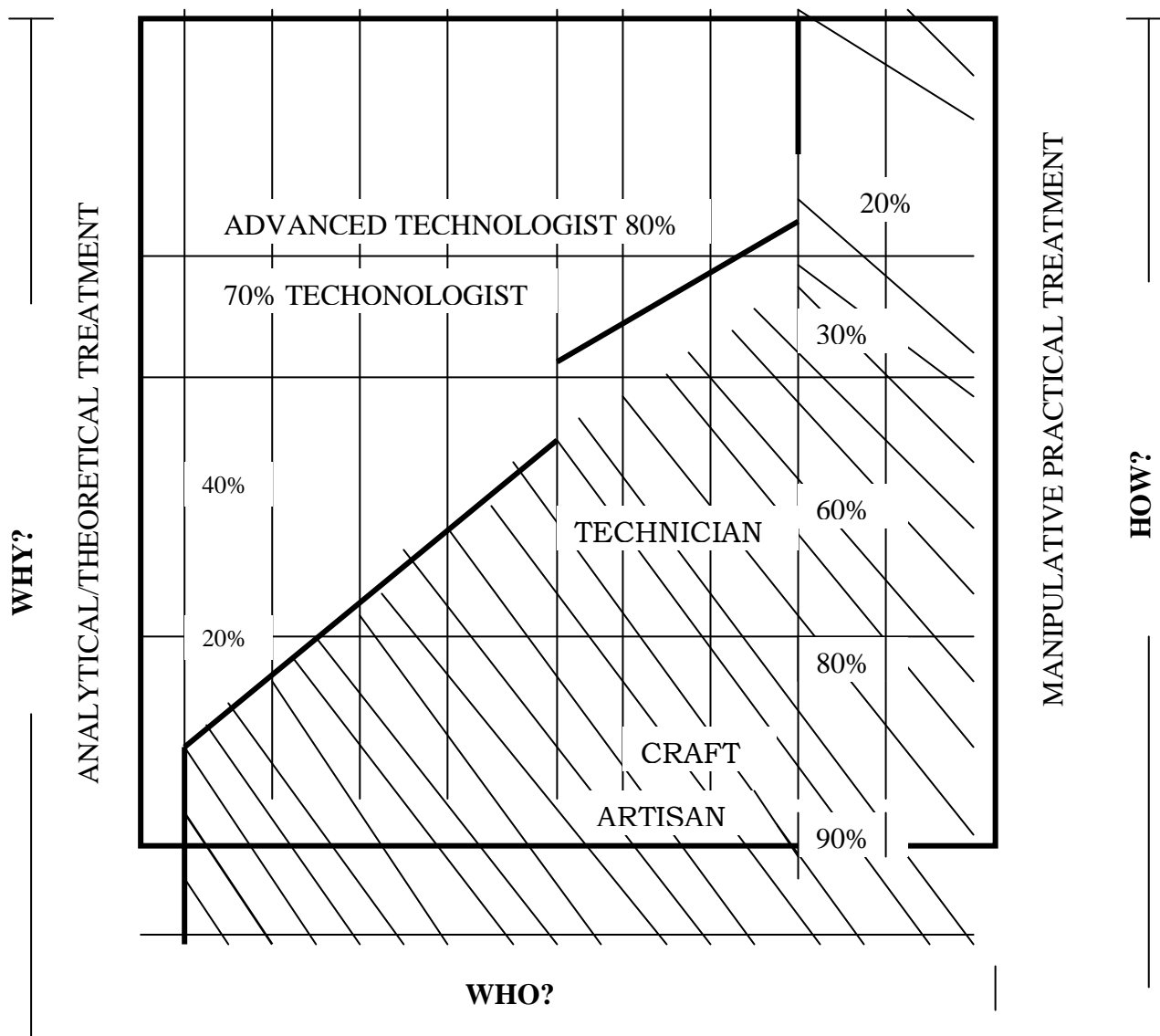
Thank you for taking your time to respond to these items.

**Appendix: IV: TECHNICAL AND VOCATIONAL TRAINING
CERTIFICATE LEVELS**



Source: - Kenya Institute of Education

APPENDIX V: MANPOWER TRAINING SYSTEMS, ANALYTICAL AND MANIPULATIVE SKILLS TIME ALLOCATION




Source:- Kenya Institute of Education


WHO?

Source: - Kenya Institute of Education

Figure**Shows**

- i) Harmonization, rationalization and linkages in the training programme.
- ii) The depth of theoretical/practical treatment in each programme

iii)  Analytical/theoretical treatment

iv)  Manipulative practical treatment

Appendix VI: Student enrolment by gender in Technical institutions 2002-2006

number

	2002		2003		2004		2005		2006	
INSTITUTION	Male	female	Male	female	Male	female	Male	female	Male	female
National polytechnics										
Kenya Polytechnic	8,119	4,834	7,738	4,863	6,386	3,499	6,410	3,549	6,405	3,329
Mombasa polytechnic	3,149	1,401	2,647	1,390	2,778	2,436	3,111	2,631	3,265	2,710
Kisumu polytechnic	947	410	937	421	1,124	476	1,349	619	1,410	710
Eldoret polytechnic	1,527	660	1,523	684	1,675	752	1,759	820	1,834	832
Total	13,742	7,305	12,845	7,358	11,963	7,163	12,629	7,619	12,914	7,581
Other TVET institutions										
Technical training institutes	5,547	4,539	7,436	5,648	9,653	8,350	9,846	8,684	9,925	8,731
Institutes of Technology	4,898	4,007	4,799	3,927	4,715	3,755	4,904	3,943	4,961	4,104
Total	10,445	8,546	12,235	9,575	14,368	12,105	14,750	12,627	14,886	12,835
Youth polytechnics	5,975	12,624	7,171	13,255	8,605	13,918	8,691	14,196	8,741	14,210
TOTAL	30,162	28,875	32,251	30,188	34,936	33,186	36,070	34,442	36,541	34,626
GRAND TOTAL	58,637		62,439		68,122		70,512		71,167	

Source: - Economic survey 2007

APPENDIX VII: Formula for cohort wastage rate

$$\text{Cohort Wastage Rate} = \frac{N_t^k - \{N_{t+3}^{k+3} - R_{t+4}^{k+3}\}}{N_t^k}$$

Cohort wastage Rate (**CWR**) for males in the year 2002 was calculated as follows

$$\begin{aligned} \text{Cohort wastage rate} &= \frac{N_1^{2002} - (N_3^{2004} - R_3^{2004})}{N_1^{2002}} \\ &= \frac{1940 - (1565 - 315)}{1940} \\ &= \frac{690}{1940} \\ &= 35.57\% \end{aligned}$$

Formula for Grade Repeater Rate

$$\text{Grade Repeater Rate} = \frac{R_t^{k+1}}{N_t^k}$$

Grade repeater Rate (**GRR**) for females in stage 3 year 2004 was computed as follows;

$$\begin{aligned} \mathbf{GRR}_3^{2004} &= \frac{R_3^{2005}}{N_3^{2004}} \\ &= \frac{175}{1400} \\ &= 12.50\% \end{aligned}$$

Formula for Grade Drop-out Rate

$$\text{Grade Drop-out Rate} = \frac{N_t^k - (N_{t+1}^{k+1} - R_{t+2}^{k+1}) - R_{t+1}^k}{N_t^k}$$

Grade Dropout Rate (GDR) for males in stage 2 years 2004 was computed as follows

$$\begin{aligned} \text{GDR}_2^{2004} &= \frac{N_1^{2003} - (N_2^{2004} - R_2^{2004}) - R_1^{2004}}{N_1^{2003}} \\ &= \frac{2660 - (1915 - 300) - 600}{2660} \\ &= \frac{445}{2660} \\ &= 16.73\% \end{aligned}$$

Grade Dropout Rate (GDR) for females in stage 3 year 2004 was computed as follows

$$\begin{aligned} \text{GDR}_3^{2004} &= \frac{N_{t+1}^{k+1} - (N_{t+2}^{k+2} - R_{t+2}^{k+2}) - R_{t+2}^{k+1}}{N_t^k} \\ &= \frac{1050 - (955 - 175) - 82}{1050} \\ &= \frac{182}{1050} \\ &= 17.90\% \end{aligned}$$

Formula for Graduation Rate

$$GR = \frac{G_{t+3}^{k+3}}{N_{t+3}^{k+3}}$$

Graduation Rate for males and females in the year 2004 was calculated as follows

$$\begin{aligned} GR_3^{2004} &= \frac{G_3^{2004}}{N_3^{2004}} \\ &= \frac{1400}{2520} \\ &= 55.56\% \end{aligned}$$

The formula expressed in this section were adopted from UNESCO office of statistics (1972A)

In all the formulae;

N= number enrolment in a grade

K= previous grade

T= previous year

R= number of repeaters

D= number of dropout

Appendix VIII: Constituency Level Poverty Incidence – Rift Valley

Appendix IX: Research Authorization Documents