FACTORS AFFECTING THE PARTICIPATION OF GIRLS IN TECHNICAL SUBJECTS: THE CASE OF DAVID KAUNDA AND HILLCREST NATIONAL TECHNICAL HIGH SCHOOLS

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Declaration

I, Stephen Ziwa, do hereby declare that this piece of work is my own, and that all the work of other persons have been duly acknowledged, and that this work has not been previously presented at this university and indeed any other university for similar purposes.

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Approval

This dissertation presented by Stephen Ziwa is approved as fulfilling part of the Requirements for the award of the degree of Master of Education in Educational Administration by the University of Zambia.

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Abstract

In Zambia, currently, there are only two National technical high schools (Grades 10 to 12) in which girls are enrolled. However, it has been observed that there are very few girls participating in technical subjects in the two schools in spite of their status.

The concern has been expressed about girls in technical subjects who are very few. The incentives provided to the National technical high schools by the government to support technical subjects do not seem to be making any significant improvement in the participation of girls.

This study was set out to find out the factors that affect the participation of girls in technical subjects at David Kaunda and Hillcrest National Technical High Schools.

The data were collected through questionnaires and interviews. They key informants included: pupils who study technical subjects, teachers of technical subjects, school administrators, and the officials from the Ministry of Education.

The findings from the study showed that peer pressure, intimidation of girls by boys, poor attitude by the girls and negative family advice were critical contributing factors to very few girls participating in technical subjects. The results also generally indicated that

other factors such as lack of motivation by teachers, non-availability of study materials, and poor study strategy by the girls contributed to very few girls in technical subjects. These factors were however not significant.

In view of the research findings, the recommendations were made, inter alia, that school administrators should continue to advocate for the building of technical secondary schools and send female teachers of technical subjects to those schools; train more female teachers in this area; make technical subjects compulsory; and provide better incentives for technical subject graduates as well as to provide institutional framework for the disinterested absorption of female graduates in technical jobs. The challenge is that girls require to be sensitized early in their education life span so that they understand that technical subjects and technical jobs are not only for boys and men but for girls and women as well.

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CHAPTER ONE

INTRODUCTION

1.1 Background

This chapter presents the background of the study, statement of the problem, objectives of the study, research questions, significance of the study, limitations of the study, delimitations of the study and definition of terms.

No country can develop without the teaching of science, mathematics and technical subjects and their application in various fields that promote human life. With this realisation in mind and especially with the ever dwindling levels of unemployment world wide, it becomes imperative that the education that is being provided should encompass subjects that will lead to self-employment when pupils leave school.

Governments in many parts of Africa, Zambia included, are aware of the benefits of educating females. Torto (2006) states that it is generally believed that the education of females has a profound effect on the development of any nation as the lack of it has been linked to low birth weight, high fertility rates, poor sanitation and high illiteracy rates, low life expectancy, poor family nutrition and poor health and high mortality rates in children. The socio-economic importance of educating females can thus not be over emphasised. It is therefore important that nations engage their people in science and science related subjects in order to achieve very high levels of economic development. Hamilton (1982) observes that, "The involvement of a people in science and science- related fields is often employed as an index of the particular country's level of progress." In the modern world, science and technology have been identified as being critically important for personal and national development and advancement. However, there are remarkable disparities in both participation and achievement in technology between males and females with males being over-represented. Achola (1983) and Munachonga (1988) show great disparities between males and females in educational, training and employment opportunities. They have also shown in their studies that females are under – represented in science - related fields because society and the (females) themselves feel they cannot venture into the male – dominated fields of science and technology. In supporting Achola and Munachonga, Mbulwe (1996) states that, "These disparities have been attested in Zambia as well as in other countries". For Zambia, the disparities will be seen in the evidence from the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA, 2006).

In Zambia, efforts to raise the education of females have been made by successful governments, international organisations and Non-Governmental Organisations (NGOs). The Ministry of

Education (MOE: 1996) policy is clear about the need for science, practical and technological subjects to be taught from basic school level. It states, "Pupils in Grade 8 and 9 will take a practical or technical subject and a scientific or technological subject." The policy as it stands is inclusive of gender; it is therefore non-segregative. However, there is still gender disparity in education. Girls still have low access to education and low participation in Metal Work, Wood Work and Technical Drawing which is also called Geometrical and Mechanical Drawing (GMD).

The experience in the schools in Zambia is that girls are still grossly under- represented at all levels of the education system. Most girls are found in study areas generally believed to be for women. The situation is worse at technical high school level, where most female pupils are found in fields of study traditionally perceived to be for *kitchen operators* (females).The traditional disciplines for girls include Arts and Crafts, Music, Typing, Religious Education, Geography, Commerce, History and Home Management.

Ngau (2006) argues that women form half of the world's population. She further states that in Kenya women and girls form 52% of the population. In 1992 Eileen Byrne argued in favour of equal participation of women in education and the labour force. She further stated that "God put 51% of the brains of the world into female skulls, and to be used" (Farago, 1992). In view of these statistics, all well meaning citizens in various countries of the world must ensure that half of humanity has an opportunity of contributing to technological and national development. Besides their numerical significance, women form an important cornerstone in the structure of any nation. The health, both physical and psychological, of their families is the responsibility of mothers.

There are however very few girls enrolled at both David Kaunda and Hillcrest National Technical High Schools in technical subjects. Specifically there were 334 pupils enrolled in 2006 in technical subjects at David Kaunda. Out of this number of pupils, only 20 girls participated in technical subjects broken down as follows: five took Metal Work and 15 participated in Wood Work which represented 5.98% of the pupils who participated in technical subjects. While in 2007, 294 pupils participated in technical subjects at the same school. The breakdown of this figure by subject was: Metal Work 103 and Wood Work 191. Out of this figure only 19 girls participated in technical subjects at David Kaunda representing 6.46%.

A similar enrolment pattern existed at Hillcrest National Technical High School. There were 311 pupils enrolled in technical subjects in 2006. Coincidentally, only 20 girls participated in technical subjects at this school; the same number as at David Kaunda. The break down for Hillcrest was: 12 girls participated in Metal Work and eight pursued studies in Wood Work; representing 6.43% of the

pupils who participated in technical subjects. In 2007, Hillcrest enrolled 335 pupils in technical subjects. Out of this figure, 22 girls participated in technical subjects representing 6.56%. There were nine girls who participated in Metal Work and 13 who pursued Wood Work in the course of the year under discussion. In both schools, Geometrical and Mechanical Drawing was compulsory for *those taking Metal Work or Wood Work.*

This study, therefore, seeks to establish the factors that affect the participation of girls in Metal Work and Wood Work.

1.2. Statement of the Problem

The number of girls participating in Metal Work and Wood Work at David Kaunda and Hillcrest National Technical High Schools is very low. The average enrolment at the two schools in technical subjects is 6.2%. The study seeks to find out why. In a question form the problem could be stated as follows: Why are there very few girls participating in technical subjects in the National Technical High Schools?

1.3. Purpose of the Study

The purpose of the study was to establish the factors that affected the participation of girls in technical subjects at the two National Technical High schools.

1.4. Objectives of the Study

The study was undertaken in order to:

1. establish the number of girls who had participated in technical subjects for the previous five years at David Kaunda and Hillcrest National Technical High Schools;
2. establish the technical subjects which the girls had participated in;
3. establish the factors that had affected the participation of girls in technical subjects; and
4. find out the views of school and education managers about the participation of girls in technical subjects.

1.5. Research Questions

1. How many girls have participated in technical subjects at David Kaunda and Hillcrest in the last five years?
2. Which technical subjects are the girls participating in?
3. What are the factors affecting the participation of girls in technical

subjects?

4. What are the views of the school and Education Managers about the participation of girls in technical subjects?

1.6 Significance of the Study

The findings of the study adds to the body of knowledge about the factors affecting the participation of girls in Metal Work and Wood Work so that the subjects are made popular and also that the girls who are already involved in technical subjects may become role models for the other girls to be encouraged to participate in the subjects.

1.7 Limitation of the Study

Inadequate funding contributed to limiting the study to only two schools. The sponsor was not able to provide funds beyond what was released.

1.8 Delimitations of the Study

The study focuses on the only two National Technical High Schools where girls have been enrolled. David Kaunda in Lusaka Province and Hillcrest in Southern Province. The National High Schools are the only two schools that enrolled the best pupils from all the nine provinces during the National selection. The other technical schools only enrolled pupils from within the province they were situated in. They conducted their provincial selection from the remaining pupils that were left out during the National selection. In terms of equipment, the National schools were better equipped. A teacher of technical subjects at David Kaunda pointed out that, *Part of the African Development Bank (ADB) II loan restocked the wood and metal workshops in the National high schools with new equipment made in China and Taiwan.*

The restocking of the workshops was one intervention used by the government in order for the schools to attract more girls to participate in the technical subjects. The third dimension was that the National High Schools were requested to enrol girls for a period of three years as a precondition which was laid by the ADB II loan. Not long after the ADB II loan was disbursed to the National High Schools, some technical high schools like Kambule Technical High School in Mongu, Western Province joined in enrolling girls into technical subjects. This was a local initiative and supported by the Ministry of Education. The Head teacher, Chizongwe Technical High School agreed with the three differences above and added, *The other difference is that David Kaunda and Hillcrest National Technical High schools get more funding than the other technical high schools.*

As a result of the considerations made above, the study had to be restricted to David Kaunda and Hillcrest National Technical High Schools.

1.9 Definition of Terms

- National Technical High School refers to a high school which enrols pupils both from within the region where it is located and from outside. At such a school, emphasis is on teaching technical subjects, English, mathematics, and science subjects.
- Technical subjects refer to Geometrical and Technical Drawing, Metal Work and Wood Work.
- GMD- refers exclusively to Technical Drawing.

CHAPTER TWO

LITERATURE REVIEW

Chapter 2 focuses on the literature reviewed. This chapter provides a review of the relevant and related literature to the problem under discussion. The review will begin with what has been done internationally and later move on to what has already been done within Zambia.

Haynie (1999, 2003) conducted studies in gender issues in technology education in the United States of America. His interest was to find out if women had been accepted into the technology education professions. He found a situation which showed that women had not been accepted. The view is supported by Sanders (2001) who noted that despite some gains in diversity, "technology education is still being taught by middle-aged white men". Haynie (ibid), for his part, asks the question: Why? The assumption is that if the subject is mainly taught by men, the girls tend to think it belongs to the "masculine category" and are not willing to choose to study the subject. However, there has been a remarkable change in the number of girls choosing technology education in the USA since industrial arts was abolished and technology education introduced. Nearly half (46.2%) of middle-school technology students in 1999 were female, Sanders (ibid). The fact that girls do not choose technical subjects can be explained by the myth of men's and women's jobs.

Some countries have long embraced technology education dating back to the seventeenth century. Finnish technology education dates back to 1866 when craft education was accepted to be one of the compulsory subjects in the school curriculum. Uno Cygnaeus, founder of Finnish general education, considered "technological" contents an important part of crafts education. Cygnaeus emphasized dexterity, design and aesthetics but also consideration, innovation and creativity (quoted in Kantola, 1997).

Handcraft teaching and technology teaching have seldom been compared in research literature. Comparisons are mainly made between Technology, Science and Mathematics. The reason for this is obviously that, for instance, in England and the United States handicraft education has developed into technology education. According to Alamaki (1999), technology education has evolved from craft education in many countries. He also argues that, because technology education is still in the evolution process, many approaches from crafting to applied science are being used in technology. Jarvinen (2004a and 2004b) claims that technology education cannot be monopolized by either craft or science education because it involves Mathematics, Science, Arts, Handicrafts and genuine innovative problem solving.

Kantola (1997) and Parrika (1998) define technology as an umbrella concept for handicraft education. Antilla (1993), Peltonen (1988) and Suojanen (1993), on the contrary, regard handicraft education as an umbrella concept for technology education. Alamaki (1999), explains that 'kasityo' (craft or handicraft) is the official name and overall term for a subject group that consists of the school subjects 'tekninen tyo' (technical work) and 'tekstiilityo' (textile work). "Kasityo in the Finnish education context has no direct English equivalent but implies a combination of crafts, design and technology education" (ibid.1999). He also notes that the contents and processes of the Finnish 'tekninen tyo' correspond to the international view of technology education.

In the United Kingdom, it was not until the 1970s that changes in society became so marked that they brought inescapable pressure upon those responsible for the pattern of education to develop a new philosophy with regard to the education of future generations. One of the main thrusts of those taking an interest in education at this time was towards the need for pupils irrespective of gender to possess a greater understanding and awareness of technology, its future implications, its potential, and its exploitation. Therefore, it is not surprising that technical subjects were among the curriculum areas to be scrutinized nationally by government. There was also considerable agreement among Her Majesty's Inspectorate (HMI), industrialists, the Design Council, educationists and forward thinking teachers that the aspect of technical education be accessible for all pupils.

It was at this time that changes to this area of the curriculum at last became apparent (Hargreaves, 1984). The name of the subject also changed. Instead of being called Woodwork, Metalwork, Engineering Practice, etc., there was a merger of the more resistant materials into Craft, Design and Technology (Breckon & Prest: 1983). The content of the courses changed too (Kimbell:1980, 1983). No longer were pupils taught only craft skills; they were also encouraged to design whatever they made (Harahan, 1978). At the same time, access to the subject in lower secondary schools (ages 11-14) was improved. Pupils of all ability were scheduled to participate in the new courses (Kimbell: 1976, 1982). In many instances, these courses were organized into modules which pupils took on a rotational basis. The courses were nicknamed "roundabouts" or "circuses." As well as allowing pupils to experience as wide a variety of materials and skills as the school could provide, these courses forced girls to have access to 'boys' subjects and boys to have access to 'girls' subjects. It was hoped that this would have the effect of encouraging more girls to study technological subjects at the option stage when pupils were allowed to choose between subjects.

A similar situation prevails in Zambia where girls are being encouraged to study technology subjects in basic schools with the view that they will continue to study those subjects in high school. As can be seen in the policy on education in Zambia, the government wishes to promote technical subjects

without segregation on the basis of gender. However, the participation of girls in technical subjects is still very low. Why should the situation be so in Zambia, when near parity in access to education between female and male pupils in some areas such as Western Europe, North America and Japan has been achieved? (UN, 1995). Further, Tilak (1993) points out that females in some of the Great Tiger Nations of East Asia both outnumber males and perform as well as males in schools.

Researchers have widely accepted that to date the regions that are yet to achieve equality of access to education between males and females are Sub-Saharan Africa, North Africa and South India. As observed by Tilak (1993), available research evidence clearly shows that the more girls we have in our technical schools, the more will be their participation in technical subjects.

If the Zambian government implemented such plans, she would positively increase the access of girls' participation in technical subjects. She would then quickly achieve a similar situation like that prevailing in the Great Tiger Nations of East Asia. Also, Zambia would soon begin to realise much economic progress in the country. The more reason therefore that the government should seriously embark on this programme of educating more girls in technical subjects.

The situation in Zambia is that the girls still favour the traditional subjects of restricting themselves to the kitchen by taking fields such as art subjects. Their movement from these subjects to the more mind provoking and challenging ones is lamentably slow. Clegy and Duncan (1985) and Wheldon and Smith (1987) in a study they conducted in Botswana and Swaziland revealed that girls favoured art subjects more than science subjects. Although this study was conducted many years ago, the situation about the participation of girls in technical subjects had not changed much.

The division of labour which led to the males spending less time and the females spending much of their time in the kitchen is historical. During the pre-industrial era, in developed countries, women took care of homes, cooking, nursing, making clothes and tended the domestic animals. Men, in turn, made sledges, furniture, hunted and worked on the fields. This is similar to what used to happen in Zambia during those times. After the advent of the industrial era, men went to work in the factories while women remained at home to take care of cooking, nursing, cleaning, washing, and mending men's clothes. What entrenched these thoughts in Zambia was that the mission and colonial schools reinforced traditional patriarchal ideas and male domination. Such thoughts got so deep rooted in the world that it became very difficult to change that pattern of life. In some developed countries, positive efforts of levelling the playing field for females and males to participate fairly in all spheres of life have been made. The efforts have yielded tangible results. However, there is still a lot of resistance from many parts of the world including the sub-Saharan areas. What these areas have

failed to appreciate is that we no longer live in either an agricultural or industrial era, but in an information or technological era where women are no longer working at home but outside the home.

For purposes of emphasing the point, the domestic economy has been found to have very little educative transfer value. In Britain, for instance, (as well as in countries which follow such a system) schooling in technical subject area has unintentional discrimination which is evident in the cross time tabling of the domestic economy for girls. This in practice is mostly cookery and needlework from which girls get very little educative transfer value. On the other hand there are handicrafts comprising woodwork, metalwork and technical drawing for boys. Bryne (1979) observes that, "The educative value of the two areas of study is not equivalent: cookery has very little educative transfer value and is mainly skills based with a low conceptual element". Except for the rare few who study catering and tailoring, the domestic economy has very little relevance to the world of work and is not properly technical education. Needlework is taught largely as a domestic skill (mainly dressmaking and home furnishing) in a home - based context. Their place in the curriculum derives historically from an earlier desire to teach basic maternity and domestic instincts to girls. The continued emphasis on this area of study for girls only in high school called "Home Economics" is one of the most influential educational conditioning factors which persuade both boys and girls that domestic responsibility and dual adult role is a woman's problem not a man's. It has a deep relevance to the emancipation of non – working women.

However, socio-cultural barriers in Africa have also given rise to the misconception about the role of women in development. Our traditional societies placed the human worth of female children below that of male children. For example, among the Kikuyu of Central Kenya, the birth of a girl is greeted with four *ululations* while that of a boy receives five, points out Ngau (2006). She further argued that among the Luo of Western Kenya, the drums boom three times to announce the birth of a girl and four times to announce the birth of a boy. This places the position of females below that of males right from birth.

While it is true that females are generally under enrolled in Kenya's school system, the problem is more pronounced when it comes to technical training. Here, females are not only extremely under represented, but the few who are admitted tend to be offered a narrow curriculum focussing on the traditional *feminine* courses such as Home Economics, Typing, Food Processing, and Tailoring rather than the pure science and technology courses leading to business management and modern technological occupations, argues Ngau (ibid). Thus, the skills they are offered tend to prepare them for social roles of motherhood and homemaking rather than towards economic productivity and leadership.

In Kenya, comparing female participation in technical training with their participation in the formal education system, the progress of women in science and technology is dismal. Ngau (1991) confirms this disparity and says that at the primary school level, female enrolment in Kenya is almost at par with that of males, about 48.8 per cent. At the secondary school level, female enrolment declines slightly to about 42.8 per cent (Ngau:1991).

In 1990, out of a total enrolment of 24,153 in technical training institutes, 15,534 were boys and 8,619 or 35.7 per cent were girls (Mburugu: 1992). At the university level, female enrolment was just about 22 per cent. According to Hughes and Mweria (1989), between 1976 and 1987, women never constituted more than 15 per cent of the total Bachelor of Science enrolment, nor more than 4 per cent of the Engineering enrolment at the University of Nairobi.

In order for females to keep in consonance with their overall national development, there is an urgent need to prepare, encourage and attract more females in science and technology-based occupations so that they can play an effective role in the socio-economic and technological advancement of our society.

One may ask what the main differentiating factor is? One may also quickly answer: the levels of advancement! Therefore, the most cardinal development tasks for Africans, and particularly for Zambian women, is overcoming the scientific and technological lag, which stems from diverse factors in our traditional, colonial and post-colonial cultural legacies. The whole of Zambian society has to work together towards both individual and social and economic development by educating women in technical subjects.

The technical craft subjects conversely and unquestionably have a major educative value in their own right. Regardless of whether boys later become welders or craftsmen; woodwork, metalwork and technical drawing have several foundation and transfer values not characteristic of the "Domestic Economy". They reinforce spatial development and numerical concepts, involving mensuration and spatial relationships from the outset - the very areas in which girls are alleged to be innately weaker than boys and in which girls therefore need early reinforcement not further deprivation, (Byrne, 1979: 40). Therefore, the involvement of girls in technical subjects will provide them with the ability to judge distances and acquire a better understanding of where things are in relation to other things from a very early age.

The Vice – Chancellor of the University of Swaziland and president of the Third World Academy of Women in Science in 1999 had three convictions that increasingly shaped her own paradigm through out her academic training and subsequent experience in the world of science and university administration. She had the conviction that women were well able to hold their own in the "man's world" of science and technology and that they had a unique dimension to lend to the scientific enterprise. Secondly, she was convinced that great potential was being lost by failure to encourage more women to enter the world of scientific exploration and technology. Thirdly, she was convinced that subsequent generations would judge us, the scientific and technological community, on our inability to use science to benefit the poorest, most disadvantaged sectors of society (http://www.nature.com).

The views expressed by Makkubu above deserve recognition when we consider the participation of girls in this research. Her views should make all those involved in technology and science education to consider afresh the role of women in the technological and scientific enterprise, to think it out again from the beginning. The world requires to secure an entirely new value and significance for women which can only be achieved if women are allowed to have a say in determining what that value should be.

It is therefore imperative that more and more access for girls to participate in technical subjects be enhanced. Having heard about the benefits of educating girls in technical subjects from 15 respected scholars so far cited, it is time for all those involved in education planning to carry out serious and focussed sensitisation of the female gender. This should be done at all levels so that the situation may change in the technical schools and colleges. In this way the country will have a better future and focussed development.

Society should therefore give a good listening ear to the opinions of the disadvantaged then only will society be able to serve the interests of humanity as a whole. An equitable partnership of men and women technologists and scientists can surely achieve this goal.

The available literature review at the national level begins with the Ministry of Education acknowledging the importance of technical education in high schools. In the Ministry of Education (MOE) policy document, Educating Our Future, (1996), the government states that,

> When the appropriate programmes have been created, certain schools will become specialist schools for technology, practical areas, business and commercial studies, and the creative arts. The first schools to be affected in this way will be the existing secondary

> technical schools, for which more unambiguously technical programmes will be developed....These specialist schools will draw their intake from within the regions where they are located or, if appropriate, from across the country, in accordance with pupil ability and interest.

In spite of the government of the Republic of Zambia showing a lot of commitment to the education of pupils in technical subjects, the response from the girl child has not been very encouraging. Coupled with this situation, there has not been much research done in the country on gender equality in technology education and in general education schools in order for the girls to feel greatly encouraged.

Arguably, there could be some girls in technology subjects who have the ability to participate in such subjects but are inhibited by some factors. The role of parents and guardians is therefore critical in influencing the participation of girls in technical subjects. Mbulwe (1993) argues that the role of parents in the formation of attitudes to the students of science did not favour girls to study science. This position reinforces and to some extent lies at the root of the generally held belief that certain subjects belong to a man's field and are too difficult for girls.

There is also the sexist division of labour in the home which is significant in the children's perception of their gender roles. To make matters worse, parents often make comments that seem to be simple and innocent but which, because of their gender stereotyping, have a great impact on the children's personalities. For instance, parents tell their sons not to cry like girls do, not to perform as poorly as girls do and not to enrol in what are labelled as girls' subjects. On the other hand, girls are expected to be humble, not to behave aggressively like boys, not to involve themselves in heavy physical work, or not to enrol in hard subjects that are 'fit' for boys.

A similar picture like that which was found in the study conducted in Swaziland and Botswana by Clegy and Duncan (1985) and Wheldon and Smith (1987) had been discovered in Malawi and Zambia. The Zambian girls who were covered in the study by Shifferaw (1982) showed more interest in Homecraft than in science which they perceived was more useful to boys than to them. Could these perceptions by girls also apply to technical subjects?

During the period that the girls were growing, the parents by their comments made the girls to internalise their gender roles and they came to accept and believed that males were superior and females inferior in all aspects of life. Therefore girls tended to have a more negative life-image that

led to less positive and almost negative attitude to the perceived boys' subjects (refer to Ngau, 2006). The differential expectations of parents were higher for the boys than for the girls. These higher expectations on boys played a large part in building the girls' perception to 'hard' subjects.

There was another dimension that should have been recognized and this was that there was no uniformity in the subjects offered in the schools in Zambia. This dimension prevailed because the MOE policy allowed schools to offer any of the approved subjects in the general curriculum. The availability of facilities, learning materials and qualified teachers tended to disadvantage rural schools in that they generally lacked teachers and facilities. As such the subjects offered in rural schools might be limited unlike the case for their counterparts in urban schools who tend to have an abundance of teachers and learning facilities (Kelly, 1991).

To augment Kelly's view in terms of policy, Emmanuel (1982:52) argues that,

> Students do not sign on at a technical school in order to help the country import a certain technology. One chooses one's speciality and one's school as a function of a sliding scale of remuneration already in force in the labour market. Young women tend to flock toward social sciences rather than in chemistry or electronics, it is not because they have a congenital preference for rhetoric, but rather because there is an administrative apparatus which absorbs those skills, whereas there is no outlet for them either in chemistry or electronics. No indirect encouragement can induce someone to set out to learn or to specialise in a particular form of know-how, if the corresponding outlets for it do not exist. It is the jobs offered by the enterprises that are seen to be working and whose potential can be assessed that bring forward candidates,women trainees included, to take up the appropriate form of training....

Emmanuel's observation warns policy – makers that providing incentives for example through the award of scholarships alone may not be enough in itself. An administrative apparatus must exist which puts guarantees on the availability of outlets; that is appropriate jobs for graduates who become sufficiently motivated to pursue studies in technology fields.

Discrimination of roles and subjects of study between boys and girls is seemingly one problematic area which suggests and confirms the gender differences. The schooling system plays a significant role in maintaining gender differences, which results in girls being short-changed in the education

system. A gender – biased teaching style has become very apparent: a study conducted by the American Association of University Women (1992) revealed that teachers tend to focus more attention on boys, directing more encouragement to them, while girls are often overlooked in class. Teachers often see a difference in potential between boys and girls, especially in technical areas - in problem situations where students appear stumped, adults and teachers tend to rescue girls by giving them either easy clues or blatantly giving them the answer. With boys, however, the general practice is to force them to figure it out themselves. Research shows that this kind of "help" undermines girls' confidence in their abilities. Other areas where girls are short-changed within school are: in schooling systems which practice curricular differences between the sexes, single sex education systems and where school orientation is towards long – term employment. Apart from these issues, girls within the school system also experience certain other emotional effects.

On 22nd August, 2007, the Project Director at the Zambia Education Projects Implementation Unit was visited by a researcher. The Director was kind enough to provide information on some of the reasons that made the government to embark on building a girls' technical secondary school. He explained that after realising that there was less participation of girls in technical subjects in the existing technical schools, the government decided to seek help from the African Development Bank (ADB) II to help in the project. The ADB set a pre-condition in order for the funding to be accessed. The condition was that the government of the Republic of Zambia through the Ministry of Education needed to show commitment to expand some technical high schools to make room to include girls. After the government had included girls at David Kaunda and Hillcrest National Technical High Schools for three years in a roll from 1994, the precondition to access funding as set by ADB was met. MOE (1999), The Proposal for the Establishment of a Technical Secondary School for Girls in Zambia indicated that, " It is understood that enrolment of girls at these schools was part of the conditionality of the ADB Education II loan".

Excitement by the girls followed when the first girls were integrated with boys in the two high schools. As a positive indicator of the excitement, the enrolment figures for girls rose slightly as a result but only to drop in 2005 and later (refer to Table 5 and 6).

The data obtained from TEVETA had been used here to show how under represented the girls were in technical subjects and also confirms the notion by the male gender that girls participate more in the subjects that are perceived to be for the weaker ones. The large enrolment and participation of the females in the 'weaker' subjects also confirms that they (females) agree to a large extent that they can mainly be enrolled in those subjects that are seen to be suitable for them.

Much of this scenario obtains today in technical high schools where the number of girls participating in Metalwork and Woodwork subjects is much lower than the number of girls participating in the traditional ones.

In order to increase on the participation of girls in technical subjects, the government alluded to four difficulties which the girls faced in the existing technical high schools. The difficulties were that firstly the number of girls admitted to both schools was still very small compared to that of boys. Some classes had only one girl against 39 boys. This could not be said to be girl-friendly atmosphere.

Secondly, the hostels in which the girls slept were not conducive for their proper stay because of the serious water shortages at the schools; the girls were usually forced to go and fetch water from elsewhere for use in their ablutions.

Thirdly, the hostels the girls lived in were originally designed for boys and therefore lacked some basic facilities for girls for example incinerators.

Fourthly, the feeling on the ground was that it would in fact have been cheaper to build new technical schools for girls rather than redesigning the boys' schools that were existing (MOE: 1999).

During the three year period, 1994 to 1997, the MOE in consultation with the two schools involved realised that the facilities available at David Kaunda and Hillcrest required to be redesigned as the existing ones had, in the first instance, not been designed to be girl-friendly. It was also realised that redesigning the existing facilities was expensive therefore building a new school for the girls was a better option because of the large sums of money required to redesign the existing structures.

The other reason advanced by the ZEPIU – Project Director was that of intimidation of girls by boys. The boys felt that their environment had been infiltrated by the girls. This intimidation made the girls to feel insecure because the boys considered them as intruders and they (girls) themselves also considered themselves as such in what was initially a boys' institution.

The proposal to build a technical high school for girls was submitted to the OPEC FUND FOR INTERNATIONAL DEVELOPMENT in Vienna, Austria in January, 1999. The construction of the school was at the time estimated to cost US $ 6.5 million but to date the school has not been constructed. The construction costs should have gone up three times because in 2007 it was 18 years after the idea to construct was mooted. The beauraucracy in government had led to the status quo.

David Kaunda National Technical High School conducted a survey on Academic Performance of their pupils with the help of the 2003 Grade 12 pupils. The survey which was commissioned by the Board Secretary in 2003 and concluded in 2005 was related to what we were investigating. Reverend Happy Mulwe, the School Guidance and Counselling Officer, was the main investigating officer. The survey was conducted at a time when there was a growing need for the school to produce good quality results that would be recognised not only nationally but also internationally. The survey by the school was conducted to find out the factors that contributed to the poor academic performance of pupils since the inclusion of girls in the school.

The focus of the study referred to above was to unearth useful, objective and disinterested information that would have a practical bearing on the school in particular and the nation in general. This reason was central because the school as a national one, needed to inculcate into its graduates those values which both the academic and social outputs of the learning process needed to reflect national character.

A Survey on Academic Performance of pupils at David Kaunda National Technical High School Board, (2003) revealed the factors that were identified in the survey as contributing to poor pupil performance were:

The most important reason advanced for poor performance of pupils was lack of motivation from the teachers that represented 25% of the number of respondents. The second most important reason given was that of insufficient study materials and this represented 17% whereas the third most important reason at 16% was due to a number of reasons that included limited interaction with teachers, competition, poor diet, strike actions, and peer pressure.

The reasons for poor performance that were teacher-related were: no motivation and seriousness for example discouraging remarks and tests always produced discouraging results. Missing lessons by teachers; in short laziness, and concentration on extra-lessons; poor delivery by teachers; low commitment from teachers and low interest in pupil progression. It was further observed that there was an insufficient supply of teachers. These contributed 43% of the responses given.

Pupil-related reasons were: poor time management by pupils; and personal problems for example health, low concentration and these contributed a total of 16%.The rest of the causes were either insufficient study materials and failure to avail them to the pupils or poor or change of environment from their former school which accounted for 25% of the responses obtained.

Further related review: A Situational Analysis at the Provincial Level of Girl Child Education in Zambia by Kelly M.J, with Msango H.J, and Subulwa C.M (1999) a number of factors affecting the primary school participation and performance of girls were identified. Some of these factors related to the school and the education system. The responsibility for addressing these remained with the education authorities be they education officials, teachers, professional officers or managers.

Five significant factors were identified at the provincial level in the environment of the home and community as the factors that impinged on the education of girls. These were less traceable and were mainly rooted in customary practices, beliefs and practices. They were however seen to be of immense importance.

The factors were identified inter alia:

a. **School Location.**

That was long walking distances to schools. By the time the girls arrived in the school, they were too tired to concentrate on school work. The girls were less well able than boys to negotiate physical hazards. For example, swollen rivers, or dangerous escarpment paths which they might encounter on the way to school. In addition, parents weighed up the value of the time the girl spend walking to school against the work-load she could have undertaken if the same time were spent at home; and parents were concerned lest girls who took the same long route to and from school every day had been sexually molested.

b. School Infrastructure

In the majority of cases, the school facilities and infrastructure did little to attract girls to attend, and frequently they did much to dissuade them. The following were found to have been the special concerns: inadequate sanitation facilities and insufficient supply of clean water characterized many schools; a large proportion of the schools in rural areas were little more than temporary, makeshift, unsafe and uninviting structures. Many schools which had more permanent structures were dilapidated and decrepit. Classrooms were typically bare,

with neither a teacher's table nor a chair, an unusable chalkboard, and no wall-displays; and there were few or no desks, requiring girls either to learn when seated on the floor or when crowded into desks with other pupils.

c. Quality of Schooling

The other major concern that was identified was that the levels of real learning achievement were low, indicating that the quality of schooling was poor. Parents were prepared to make many sacrifices to send their children to school, girls as much as boys, provided the quality was adequate. They would not do so if the quality was poor. In addition to poor facilities and learning resources, the following factors were highlighted as : too much time was spent on manual work and there were too few hours spent on actual learning time; essential textbooks and readers were in such short supply that an entire class very seldom had access to the appropriate book during a class session; and because of lack of orientation, teachers frequently did not use the books and other learning resources that might have been available.

d. The Curriculum

Many questions were raised particularly about the relevance, effectiveness and gender-bias. Girls who had passed through the traditional period of seclusion and initiation had their minds turned towards marriage and not towards what was being taught at the time in school. Teaching was mostly through English, a language that few of them encountered outside the school setting. Schools did not teach life-skills or practical subjects in a practical way. The girls experienced grinding demoralization at failure either to succeed or to relate what went on in school with life at home and in the community. There were many illustrations that were still being used in schools which portrayed women and girls as being in subordinate, unchallenging, 'helpless' roles, whereas they portrayed men and boys as leaders, 'kung fu's, brave, adventuresome. Essentially, they slighted girls and women while exalting men and boys. Further, the standard teaching methodology focussed on passive acquisition of knowledge from the teacher instead of active learning and finding out for oneself. The girl

found little scope for the organizational, caring dispositions she used so extensively in the home, but remained a spectator and virtual outsider to what was going on in class. Teaching was directed principally towards memorization of knowledge that would help in passing the examinations, but less towards the personal incorporation of standing values and attitudes.

e. The School Culture

Two aspects of this multi-faceted factor tended to predominate.

Firstly, the school culture did not manifest gender-neutrality. This was shown in the way that the distribution of school chores tended to replicate the gender-based distribution of house hold chores. The leadership positions and challenging tasks were assigned mostly to boys. There were stereotyped reactions made to pupils' class contributions. For example, a boy's mistake was taken as his own while a mistake by a girl was said to be typical of all girls. Boys commanded the greater share of the teacher's attention. Further, a girl's contribution might be treated with neglect or ridicule, while that of a boy received courtesy, attention and praise. The actual teaching was directed more to the needs of boys with insufficient attention being paid to the girls and yet what was important for the girls was that special attention and affection. In addition, teachers and school authorities showed strong expectations that girls will adopt a submissive, docile attitude. The teachers, boys, and many girls themselves, have low expectations that girls can produce good academic work, especially in mathematics and science; and certain subjects are traditionally regarded as easy and suitable for girls, others as difficult and suitable for boys.

Neither Kelly nor the School Board dealt with technical subjects for girls in particular. They attempted other general areas like performance in Science and Mathematics. Specifically girls studying technical subjects is unique in this study.

Could the factors above be consistent with the ones that this research wishes to establish? The answer is to be found in Chapter Four.

Summary of the Literature Reviewed

The literature review has shown that parents play a critical role in inculcating the right perceptions which form the spring board to strengthen the desire of the girls to enter and remain in the 'hard' subjects like wood work and metal work.

Parents should in the front line of encouraging girls to move out of the traditional subjects and get into the technical ones so that as they learn these subjects, they can at the same time acquire better educative value from the subjects. In Britain, it was observed by Bryne that the educative value of the two areas of study namely cookery and handicrafts was not equivalent. Girls got very little educative transfer value and that their education in cookery and needlework was mainly skills based with a low conceptual element and the subjects were taught largely as domestic skills in a home-based context.

The Ministry of Education policy document, Educating Our Future (1996) under scores the importance of educating it's 'future' in technology subjects. Hence, the government's desire to create specialist schools in the existing technical ones. The catchment area for these specialist schools would be the regions where they would be located or they would have to enrol pupils from across the country. It is government's hope that by creating such schools the country may achieve near parity in access to education between females and males. Such a situation would bring us closer to the one prevailing in the Great Tiger Nations of East Asia where females in some instances outnumber males and perform as well as males in schools even in the perceived 'difficult' subjects.

There have been other factors that could account for the low participation of girls in technical subjects. As for school infrastructure, there had been a remarkable improvement in the two National Technical High Schools. Boreholes had been sunk to ensure a constant supply of water. There had also been a reasonable amount of work done in the schools to improve the structures in the schools.

Quality of schooling was a factor recognised in the review as contributing to low participation of girls. This factor is one that was prevailing even in the two high schools in this study. Since the ADB II funding there had not been any further support coming in to help the schools. Hence, a good number of learning resources initially supplied to the schools had either been worn out or completely used up. Government funding which was used to sustain the operations of the schools was inadequate and often the funds were either disbursed late or a whole quarter was not funded. Even

the local collections of funds were so insufficient that most of the money collected from the parents on a cost sharing basis went towards buying food for the pupils.

The curriculum as a factor for the low participation of girls required to be pupil-centred with a bias towards the girl child. Focus should mainly be on subjects that would be useful to the pupils after their span of life in school.

The stereotyping of the girls so much prevalent in the school culture is an extremely negative factor in the education of girls. Issues of fair treatment of girls in terms of their abilities should be recognised and embraced by schools as being important factors that could greatly impact on the participation and performance of girls. Generic comments that border on discouraging girls should be abolished at all the levels of the education system especially from kindergarten to high school levels. In this way, the girls will have been prepared to take up the challenge of engaging in male dominated fields at a higher level like college or university. At this level, they will have been more mature and will have gone through almost all the hazards of taking on their new challenge.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

Chapter 3 provides an in-depth look into the research methodology used in the study. Included in this chapter are: research design, study population, sample size, sampling procedure, research instruments, data collection, and data analysis.

3.1 Research Design

The study used the survey approach to collect data. A survey is an examination of opinions, behaviour made by asking people questions, Cambridge International Dictionary of English (2000). Survey research involves gathering evidence relating to current conditions, (Ghosh, 1992; Leedy & Ormrod, 2001). The term 'survey' represents a broad category of techniques that use questioning as a strategy to elicit information (Merriam and Simpson, 1995). The survey design was preferred because the study involved asking the respondents for information using questionnaires and interviews. Zikmund (2000), defines survey as a research technique in which information is gathered from a sample of people by use of data collection technique based on communication with representative sample of individuals.

Both qualitative and quantitative methods of collecting data and analysing the data were used. The information derived from the respondents was taken into consideration. The concept of blending methods was based on the recognition that any method used on its own has limitations and biases that could be reduced by employing multiple approaches (Creswell, 2003).

3.2 Study Population

The study population comprised all the girls in grade 10, 11 and 12 at David Kaunda and Hillcrest National Technical High Schools who participated in technical subjects. The population also consisted of the head teachers, deputy head teachers, all the teachers of technical subjects in both schools and at least one selected education manager at the National headquarters of the Ministry of Education (MOE). Zikmund (2000) defines study population as a specific, complete group relevant to the research project. Hence, the study population for this study was arrived at by getting the total number of girls in the tenth, eleventh, and twelfth grades at both David Kaunda and Hillcrest National Technical High Schools. The head teachers, deputy head teachers, and the teachers of technical drawing in the two schools were part of the study population. The study also brought on board a standards officer at the MOE. The study population consisted of 58 participants. These were broken down as follows:

Table 1. Study Population for Head, Deputy teachers, teachers of technical subjects, education administrators and pupils in Grade 10, 11 and 12

School	Number of heads, deputies, teachers and administrators			Number of girls		
				10	11	12
	Head	Deputy	Teachers			
David Kaunda	1	1	8	5	9	5
Hillcrest	1	1	4	8	5	9
Administrator	7	-	-	-	-	-

3.3 Sample Size

The sample size consisted of all the 41 girls. These were all girls who participated in technical subjects in grade 10, 11 and 12 at David Kaunda and Hillcrest. The sample also included two head teachers, two deputy head teachers, all teachers of technical subjects who taught one of the three components of technical subjects and seven selected MOE officials. These were purposively selected as: one education administrator who was a standards officer and a specialist in technical subjects based at the Ministry of Education headquarters; the two Provincial Education Officers, the two Principal Education Standards Officers one from each affected province, and the District Education Board Secretary for Livingstone in Southern province. Also captured in the sample size was the District Education Board Secretary for Lusaka District.

3.4 Sampling Procedure

The purposive sampling technique was used to select the 41 girl-participants at both schools. The same sampling technique was used to select the head teachers, their deputies and the designated teachers. The education administrator at the headquarters was selected using the same purposive sampling technique. Zikmund (2000) defined purposive sampling as a non- probability sampling technique in which the researcher selects the sample based upon the researcher's judgement about some appropriate characteristics required of the sample members. Furthermore, Saunders (2003) states that purposive sampling enables the researcher to use his/her judgement to select cases that will best enable the researcher to answer the research questions and to meet the objectives. The respondents that were selected had the knowledge and experience to be able to answer the research questions and meet the objectives of the research.

3.5 Research Instruments

Primary data was collected using structured questionnaires for the girls and interview guides for the head teachers, deputy head teachers and education administrators (see Appendices i, ii and iii).
A tape recorder was also used with the permission of the interviewees to tape the discussions as the researcher proceeded with the interviews involving head teachers, deputy head teachers, teachers and the education administrators. As a research technique, an interview is a conversation carried out with the definite purpose of obtaining certain information by means of the spoken word (Sidhu, 2005). This means that an interview is a two-way method which permits an exchange of ideas and information. It is unique in that it involves the collection of data through direct verbal interaction between the interviewee and the interviewer. It requires the actual physical proximity of two or more persons and generally that all the normal channels of communication be open to them.

3.5.1 Validity of Data

To ensure internal validity and reliability of the data, the researcher collected data using multiple sources, that is, through questionnaires and guided interviews. Mathison (1988) observes that using multiple sources of data to confirm the emerging findings is one strategy to ensure internal validity. The internal validity of a research study is the extent to which its design and the data it yields allow the researcher to draw accurate conclusions (Leedy and Ormrod, 2001). To ensure external validity, literature review was used in constructing the questions to the respondents. Leedy and Ormrod (2001) define external validity of a research study as the extent to which its results apply to situations beyond the study itself.

3.6 Data Collection

The data was collected in the second term of the 2007 school year. The period was from May 7 to August 3, 2007. Before proceeding to go and collect data, the researcher had to seek permission from both the District Education Board Secretary for Lusaka and Livingstone to visit the schools (refer to Appendix iv and v). The researcher visited the schools to make prior arrangements for the questionnaires and interviews to be conducted in their schools. The research participants were given a general idea of what the study was about. The study used the following data collection techniques:-

3.6.1 Administration of questionnaires to the pupils

Structured questionnaires (refer to Appendix i) were administered to the girls to obtain information on the factors that they considered were affecting their participation in technical subjects. The girls responded to the items in the questionnaire in the presence of the researcher and they were assured of the confidentiality of their responses.

3.6.2 Procedure of interview guide for heads, deputy heads, teachers and administrators

The interviews were conducted in the office of the head teacher for David Kaunda in circular style. For Hillcrest the discussions were held in the Technical Drawing Room in circular formation. The teachers of technical subjects were part of the discussions in both schools. The education administrators were followed to their offices.

3.6.3 Procedure of Guided Interviews

The groups began by introducing themselves and indicated the technical subjects that they were teaching at the school. In the Guided interviews, the researcher read out the questions, one after another and the respondents made contributions which were recorded on paper. A cassette recorder was also used to help in ensuring the accuracy and reliability of the data that was being generated. The respondents had no objection to the use of the cassette recorder

3.7 Data Analysis

Quantitative data was analysed using descriptive statistics in order to generate frequencies and percentages. This involved quantifying the data that was collected, drawing tables and graphs using computers. The Statistical Package for Social Science (SPSS) was used to analyse data quantitatively. While qualitative data was analysed using Constant Comparative Technique. Description of emerging themes, concepts and issues were derived from analysing the content. The Constant Comparative technique was used to organise the views into categories.

The next chapter presents the research findings.

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.0 Overview

Chapter 3 has outlined the methodology that was used in the collection of data. The data was derived from pupils, teachers of technical subjects, head teachers, deputy head teachers as well as officials working at different levels of the MOE. This chapter provides the research findings on the factors affecting the participation of girls in technical subjects. Tabulations of tables are provided wherever appropriate. The chapter is in the following order: The first part is the presentation of data from the pupils through questionnaires. This is followed by the presentation of the data from teachers of technical subjects. The next findings are from the head teachers and deputy head teachers. The data obtained from the District Education Board Secretaries, Provincial Education Officers, and the officials from MOE headquarters will be presented in that order. All the findings are based on the objectives of the study.

There were 684 pupils enrolled at David Kaunda National Technical High School in 2007. The break down of the enrolment figures by Grade were: Grade 10- 245; Grade 11- 217; and Grade 12- 222. Out of this number only19 girls participated in technical subjects representing 2.8% of total school enrolment. Hillcrest National Technical High School had enrolled 677 pupils out of which 22 girls participated in technical subjects representing 3.2% of total school enrolment. The break down of the enrolment figures were: Grade 10- 209; Grade 11- 218; and Grade 12- 222.

In 2007 David Kaunda had 156 girls from overall enrolment of 684 pupils while Hillcrest had 178 girls from overall enrolment of 678 pupils. The total number of pupils enrolled in the two schools was 1,362 against 41 girls who participated in technical subjects. This ratio is 1: 33. At David Kaunda 137 girls participated in Social Science subjects representing 20% of the total enrolment where as at Hillcrest156 girls participated in Social Science subjects representing 23% of the total enrolment.

4.1 Findings from the Pupils

The questionnaires completed by 40 pupils were processed. One girl was absent at David Kaunda due to illness.

4.1.1 The Grades they were in

There were 10 girls doing Grade 10, 15 girls were in Grade 11 and 16 were in Grade 12.

4.1.2 The Technical Subjects the Girls were studying.

Pupils were asked to indicate which subjects they participated in. There were 23 girls who studied Woodwork and 17 participated in Metalwork.

4.1.3 Who Encouraged the Girls to study the Subject that they chose?

Table 2 below shows the various sections of people who encouraged the girls to participate in technical subjects. In this table, the percentages have been calculated basing on the number of respondents for each variable and the total number of girls who responded in the study.

Table 2: Showing who encouraged the girls to study the subjects they chose

	F	%
Friend	8	20
Teacher	12	30
Parent/Guardian	20	50
Own Interest	35	87.5
Fellow Students	6	15
Brother	4	10
Sister	2	5
Cousin	2	5
Just found myself in such a class	4	10
The deputy head forced me into the Technical class	2	5
Previous School Influence	4	10

The findings were that eight (8) girls were encouraged by friends representing 12% of respondents while 12 were encouraged by teachers representing 30%. Twenty girls were encouraged to study technical subjects by parents or guardians and represented 50% whereas 35 girls took up technical subjects out of their own interest and desire to do so; this represented 87.5% of the respondents and was the highest single finding. There were six (6) girls encouraged by fellow students representing 15%; four (4) girls were encouraged by their brothers while two girls were encouraged by their sisters representing 10% and 5% respectively. Two girls also indicated that they were encouraged by their cousins and this represented 5% of the respondents. There were four (4) girls who revealed that they just found themselves in a technical class and proceeded with the lessons without much thought. Such girls represented 10% of the respondents. Two (2) girls pointed out that they were forced into a

technical class by the Deputy Head teacher and the other four (4) girls opted to study technical subjects because of their previous school experience where they started learning the basics of GMD and Woodwork. The last two findings represented 10% and 5% in each case.

4.1.4 Factors that hinder participation of Girls in Technical subjects

Under this variable the following were the findings from the study whose percentages have been calculated on the respondents to the relevant finding.

Table 3: Showing factors that hinder participation of girls in technical subjects

Factor	Yes	%	No	%
1. Non availability of school materials	15	39.5	23	60.5
2. Poor strategy by girls	17	45.9	20	54.1
3. Peer Pressure	27	72.9	10	27.1
4. Poor attitude by girls	29	78.4	8	21.6
5. Negative family advice	25	67.6	12	32.4
6. Inadequate advice by teachers	20	51.3	19	48.7
7. Intimidation by boys	27	69.2	12	30.8
8. Time consuming	10	25	30	75
9. Girls were weak	9	22.5	31	77.5
10. Girls to study house related subjects	9	22.5	31	77.5
11. Technical subjects meant for boys	7	17.5	33	82.5

Regarding the findings on factors that hinder the participation of girls in technical subjects, the girls identified two kinds of factors during the study.

There were 29 girls who agreed that they had poor attitude towards technical subjects while 8 girls refuted this factor, representing 78.4% and 21.6% respectively. As for peer pressure there were 27 girls who considered this to have been a contributing factor while 10 did not agree with this. The two figures represent 72.9% and 27.1%. Intimidation of the girls by the boys was identified as one of the significant factors that made few girls to participate in technical subjects. Twenty-seven girls agreed with this while 12 did not agree representing 69.2% and 30.85% for each finding. The factor of inadequate advice from the teachers registered 20 girls which was 51.3% against 19 girls who did not agree representing 48.7% of the findings. As for poor study strategy by the girls, 17 agreed with

this factor representing 45.9% while 20 did not agree with this factor representing 54.1%. Non-availability of study materials recorded 15 girls who were in agreement while 23 girls disputed this factor. The two findings represent 39.5% and 60.5% of the respondents.

The question of any other factors not covered among the suggested answers was raised to the girls. In answering this question, the girls identified four other factors such as: technical subjects were time consuming. Ten girls acknowledged this finding representing 25% of the total respondents while 30 respondents disputed this factor representing 75%. There were nine girls representing 22.5% who indicated that some parents thought that girls were weak. There were also nine girls representing 22.5% who pointed to the fact that some people thought that girls should study house related subjects. In both findings 31 girls representing 77.5% did not agree with this factor as contributing to low participation of girls in technical subjects. There were seven girls representing 17.5% who pointed to the fact that other people believed that technical subjects were meant for boys while 33 girls disputed this representing 82.5%.

4.1.5 The subjects they participated in

Table 4: Showing the subjects the girls participated in

	Frequency	Percentage
Metalwork	18	45
Woodwork	22	55
GMD	40	100.0

Pupils were asked to indicate which subjects they participated in. Out of the 19 girls at David Kaunda, 14 girls studied Woodwork and four were in Metalwork. .While the 22 girls at Hillcrest National Technical High School were broken down as Woodwork 10 and Metalwork 12. The participation of the girls in Woodwork was found to be 22 girls while in Metalwork there were 18 girls recorded representing 55% and 45% respectively. This difference shows that there were more girls who participated in woodwork than in metalwork suggesting that although working with metalwork is considered cleaner, the girls prefer woodwork which is regarded as being easier to handle.

4.2.0 Findings from Teachers of Technical Subjects

As stated earlier, in addition to the questionnaire for pupils, the other main method of collecting data was through interviews. Guided interviews were held with the teachers of technical subjects. Tape recordings were used only as a way of ensuring the accuracy and reliability of the responses.

4.2.1 What are the factors contributing to low participation by girls in technical subjects ?

Regarding the factors that contributed to low participation by girls, the teachers had this to say. Most schools did not offer the subjects at Basic school level due to lack of machinery and equipment. They also indicated that there was a general belief by parents and the girls themselves that technical subjects were for boys. Further, the subjects were not popular to girls because some teachers did not use teaching methods that were girl-friendly hence making technical subjects seem like subjects for boys.

Another factor that was identified was that there were very few schools in the country at the Basic school level offering technical subjects. At the same time there were more pupils taking non-technical subjects for both gender.

Lack of encouragement by schools to girls to take up technical subjects was also identified as a factor that led to low participation. School teachers did not put in place deliberate interventions to encourage the girl-child to take technical subjects.

Other factors identified as contributing to low participation were that; girls were to be frequently encouraged by rewarding them often when participating in technical subjects to keep them motivated. There were also no tours organised to building and construction industries for pupils; and the earlier constructed technical secondary schools were male rather than female friendly.

4.3.0 Findings from School administrators

4.3.1 Findings

The findings from the school administrators were consistent with those of the teachers. That is, there were 24 girls enrolled in Woodwork and 16 in Metalwork. The available figures in the office confirmed that all the 40 girls participated in Geometrical and Mechanical Drawing. Therefore, there were more girls participating in Woodwork than in Metal work.

4.3.2 Why are there more girls in one technical subject and less in the other?

Regarding why there were more girls in Woodwork than in Metalwork, all the school administrators that is two head teachers and two deputy head teachers acknowledged that comparatively there were fewer schools that offered Metalwork than Woodwork in Basic schools. They also alluded to the fact that the tools for Woodwork were much more available and cheaper than those for Metalwork. The school administrators also indicated that Metalwork was more difficult to be studied by the girls than Woodwork. The school administrators further pointed out that the equipment for technical subjects was well beyond the purchasing power of schools; and that very few of the girls who studied technical subjects in the Basic school got to the Grade 10 selection cut off point for entry into high school; hence the girls could not enter high school to enable them continue studying technical subjects.

4.3.3 How many girls have participated in technical subjects in the last five years in your school?

The total enrolment figure for girls who participated in technical subjects at the two National High Schools from 2002 to 2007 was 419 girls.

4.3.3.1 Table 5: Showing the participation pattern for girls in technical subjects at David Kaunda between 2002 to 2006

Year	Grade 10	Grade 11	Grade 12
2002	12	8	8
2003	15	12	8
2004	20	14	10
2005	15	15	14
2006	8	10	10
Totals	70	59	50

Grand Total enrolment from 2002 to 2006 for David Kaunda was 179 girls.

David Kaunda National Technical High School had the following participation pattern from 2002 to 2006. There were 12 Grade 10 girls, 8 in Grade 11 and 8 girls in Grade 12 in 2002. While there were 15 girls in Grade 10; 12 in Grade 11; and eight in Grade 12 in the year 2003. The break down for 2004 was: Grade 10 – 20 girls; Grade 11 – 14; and in Grade 12 – 10 girls. The total for the year 2004 was 44 girls. The year 2005 recorded Grade 10 – 15; Grade 11 – 15; and Grade 12 – 14 girls' who participated in technical subjects giving us 44 girls in the year. The girls that participated in

technical subjects in 2006 were eight in Grade 10; ten in Grade 11; and 10 in Grade 12 giving us 28 for the year. There were five girls in Grade 10; nine girls in Grade 11; and five in Grade 12 accounting for 19 in 2007.

At David Kaunda National Technical High School 179 girls participated in technical subjects from 2002 to 2006.

4.3.3.2 Table 6: Showing the participation pattern for girls in technical subjects at Hillcrest between 2002 and 2006

Year	Grade 10	Grade 11	Grade 12
2002	6	17	12
2003	22	6	16
2004	15	22	6
2005	10	14	22
2006	7	10	14
Totals	60	69	70

At Hillcrest National Technical High School, there were 35 girls who participated in technical subjects in 2002 distributed by grade as: Grade 10- 6; Grade 11- 17; and Grade 12- 12. The following year, 2003 there were 44 girls distributed as: 22 in Grade 10; 06 in Grade 11, and 16 in Grade 12.The year 2004 had the following enrolment for girls in technical subjects: 15 in Grade 10; 22 in Grade 11 and 06 in Grade 12 giving the total of 43 as the number of girls who participated in technical subjects. The enrolment of girls in 2005 was not much different to that of the previous year as 46 girls were enrolled with the following break down: Grade 10- 10; Grade 11-14 girls; and Grade 12- 22 girls. In 2006, the enrolment of girls in technical subjects went down by 15 girls compared to 2005 giving us the enrolment of 31. There were 7 girls in Grade 10; 10 in Grade 11; and 14 girls in Grade 12. There was a significant drop in enrolment figures for girls at Hillcrest in 2006. Hillcrest National Technical High School enrolled 199 girls who participated in technical subjects from 2002 to 2006.

4.3.4 What are the factors contributing to low participation by girls in technical subjects?

Regarding the factors that contributed to low participation by girls, the school administrators had this to say. Most schools did not offer the subjects at Basic school level due to lack of machinery and

equipment. They also indicated that there was a general belief by parents and the girls themselves that technical subjects were for boys, even at the lower levels. As a result, the girls developed poor attitude which contributed greatly to the low participation in technical subjects. To make matters worse, the subjects were not popular to girls because even teachers made them seem to be subjects for boys. These findings were revealed by responses such as the one provided by the Deputy Head teacher for David Kaunda,

> *The subjects are not popular at lower levels because even teachers make them seem to be boys-only-subjects while girls are encouraged to take Home Economics or HomeManagement.*

Another factor that was identified was that there were very few schools in the country at the Basic school level offering technical subjects. At the same time there were more pupils taking non-technical subjects for both gender. One respondent said, *"The lack of technical basic schools contributes to the low participation of girls in technical subjects at high school level."* Many such statements were made by the respondents. Most of the respondents gave examples of the developed world like Europe where there was equal participation of girls and boys in technical subjects.

Lack of encouragement by schools to girls to take up technical subjects was also identified as a factor that led to low participation. School administrators did not put in place deliberate interventions to encourage the girl-child to take technical subjects.

Other factors identified as contributing to low participation were that: lack of frequent rewards for the girls and the lack of good meaningful rewards for that matter was a contributing factor.

The administrators also pointed out in the study that the Technical Secondary Schools that had been constructed a long time ago were male rather than female friendly, hence discouraging the girls.

4.3.5 Recommendations

Regarding recommendations, the school administrators recommended that the government should build basic schools to cater for technical subjects as the first intervention. Secondly, the government must expand enrolment in teacher training to include more females who would in turn become role models for the girls who would wish to participate in technical subjects. Thirdly, there ought to be a re-injection of capital in schools that offered technical subjects. Further, the girls ought to be

rewarded soundly in order keep them motivated. The administrators also recommended improving on the number of tours to industries in order to improve participation of girls in technical subjects.

4.4.0 Findings from the Ministry of Education Managers

4.4.1 Distribution by Gender

One of the females in Lusaka was the Provincial Education Officer and the District Education Board Secretary for Lusaka District was also female. The Principal Education Standards Officer for Southern Province was female too. The Provincial Education Officer for Southern Province was male. Also the Principal Education Standards Officer for Lusaka Province was male as well as the District Education Board Secretary for Livingstone District. This finding signifies that there was parity of gender in the study.

4.4.2 Which technical subjects are offered in National Technical High Schools?

Regarding which technical subjects were offered in National Technical High Schools, all the respondents acknowledged that Geometrical and Mechanical Drawing, Woodwork and Metalwork were offered at the two schools.

4.4.3 Which of the above subjects is most popular amongst the girls?

All the respondents acknowledged that Geometrical and Mechanical Drawing was the most popular because the subject was a compulsory one for the pupils who opted for either Woodwork or Metalwork.

4.4.4 Why is this subject most popular?

The Ministry of Education managers attributed the popularity of Geometrical and Mechanical Drawing because it was compulsory and also that most girls found the drawing part easier than Woodwork and Metalwork. Further, the views of the officials were that Woodwork was more popular than Metalwork because it seemed easier to work with and it was also easier to understand. For instance, the Provincial Education Officer for Southern Province said,

> *Generally, woodwork concepts seem to be easily understood by most girls. In addition, girls find it easy to work with wood because it is less involving compared to metal*

4.4.5 Are you satisfied with the participation of girls in technical subjects?

All the education managers said that they were not satisfied with the participation of girls in technical subjects.

4.4.6 What are the factors for the low participation of girls in technical subjects?

One District Education Board Secretary in particular acknowledged that this scenario was attributed to the tendency by most girls to shun technical subjects because they found them difficult and that the girls were insufficiently represented. The District Education Board Secretary for Lusaka, who was female, had this reason to offer:

> *Because society perceives these subjects to be boys' subjects and there are very few feeder (Basic) schools involving girls in these subjects.*

Regarding the factors which they thought were responsible for the under representation of girls in technical subjects, the education managers indicated that society still perceived technical subjects to be for boys. They also said that girls lacked basic knowledge about technical subjects from Basic schools. The other factor was that the education system tended to favour boys in technical subjects. The under- representation was also attributed to cultural factors. On cultural factors, one respondent said,

> *Girls are discouraged to associate with boys and girls are always reminded that they should not talk or behave like boys otherwise they would not get married.*

4.4.7 What measures has the Ministry of Education put in place in order to popularize technical subjects amongst the girls?

The Principal Education Standards Officer in charge of College Education Boards also acting as the Chief Education Standards Officer at the Ministry of Education headquarters is a trained teacher of Woodwork, Metalwork and GMD. He revealed that the government through the Ministry of Education had plans to build two technical schools for girls. He had this to contribute:

> *For your information the government plans to build two technical high schools for girls, one in Ndola and the other one in Kapiri Mposhi to help boost the participation of girls in technical subjects.*

In October, 2007 the President announced that the government was going to build 12 new technical high schools across the country in the next five years. President Mwanawasa said:

> *Government's intention was to build 125 new primary schools,88 new high schools and 12 technical high schools in the next five years.*

4.4.8 Is there any policy by the MOE regarding the participation of girls in technical subjects?

The education managers indicated that the policy was there which stipulated that pupils would be encouraged to study subjects of their choice irrespective of gender.

4.4.9 What is the policy?

Regarding prevalence of policy by the government on the participation of girls in technical subjects, one respondent had this to say:

> *There is definitely policy in place to support girls participation in technical subjects. Specifically, Ministry of Education, 1996 policy document: Educating Our Future clearly stipulates that pupils will be encouraged to study subjects of their choice irrespective of gender.*

4.4.10 Recommendations

Some of the recommendations made by the education administrators were that all key stakeholders in the provision of technical subjects ought to get involved in encouraging the girls to take up the subjects. The girls were also to be engaged in activities encouraging them to take up technical subjects right from the time they entered technical schools so that they could be aware that technical subjects and technical jobs were not only meant for boys and men but for girls and women too. Another recommendation that was made by education managers was that technical subjects were to be made compulsory at Basic school level. Further, the education managers recommended that the enrolment at the National Technical High Schools should be 75% students for technical subjects and 25% non-technical ones.

Regarding the Grade 10 selection cut off point, it was recommended that the girls who did not reach the cut off point for the national schools and yet had qualified to Grade 10 and had passed in technical subjects should be allowed into the national schools.

4.5.0 Summary of the Findings

The following were the notable findings of this study on the factors which hinder the participation of girls in technical subjects. Poor attitude towards technical subjects; peer pressure; and intimidation of the girls by the boys were identified as factors that made few girls to participate in technical

subjects. Some factors such as inadequate advice from the teachers; poor study strategy by the girls; and non-availability of study materials were also identified.

4.5.1 The Girls

The girls were asked to identify any other factors which were not covered by the questions that had been raised to them. The girls identified four other factors such as: technical subjects were time consuming; some parents thought that girls were weak; some people thought that girls should study house related subjects; and other people believed that technical subjects were meant for boys.

4.5.2 The Teachers

The teachers alluded to the following factors. The first was that most schools did not offer technical subjects at Basic school level due to lack of machinery and equipment. The second factor was that there was a general belief by parents and the girls themselves that technical subjects were for boys. Thirdly, some teachers did not use teaching methods that were girl-friendly, and fourthly there were very few schools in the country at the Basic school level offering technical subjects.

4.5.3 The School Administrators

The school administrators agreed to a large extent with the factors that were identified by the teachers. Regarding the factors that contributed to low participation by girls, the school administrators pointed out that most schools did not offer the subjects at Basic school level due to lack of machinery and equipment. There was a general belief by parents that technical subjects were for boys. Teachers made technical subjects seem to be subjects for boys. Other factors that were identified were that there were very few schools in the country at the Basic school level offering technical subjects; there were more pupils taking non-technical subjects for both gender; and lack of encouragement by schools to girls to take up technical subjects as school administrators did not put in place deliberate interventions to encourage the girl-child to take technical subjects. Further factors were that there were no visits to industries for pupils to see how technical subjects were being applied practically, and that the technical secondary schools that were constructed a long time ago were male rather than female friendly.

4.5.4 The MOE officials had the following factors to contribute

The MOE officials pointed out that the scenario was attributed to the tendency by most girls to shun technical subjects because they found them difficult; the girls were insufficiently represented at the lower levels; society perceived these subjects to be boys' subjects; and there were very few feeder (Basic) schools involving girls in these subjects. Other factors included that the girls lacked basic

knowledge about technical subjects from Basic schools; the education system tended to favour boys in technical subjects. There were also cultural factors such as that a woman with big muscles would not easily get married. Further factors pointed to the MOE policy on its part which had also not been too helpful to change the negative perceptions by girls to participate in technical subjects. This was because the policy allowed the schools to offer any of the approved subjects in the general curriculum and hence led to a lack of uniformity in the subjects offered by the schools. The MOE officials pointed out such factors as the general lack of facilities, learning materials and qualified teachers which disadvantaged some schools especially the rural ones as well as basic schools; expanding enrolment in teacher training colleges in the field of technical subjects to include more females who would in turn become role models for the girls who would participate in technical subjects. The other factor identified by the MOE officials was that the girls should be engaged in positive activities about technical subjects right from the time they entered technical schools so that they could be aware that technical subjects and technical jobs were not only meant for boys and men but for girls and women too.

The next chapter will discuss the findings of the study.

CHAPTER FIVE
DISCUSSION OF THE FINDINGS

5.0 Introduction

Chapter four has presented the research findings. This chapter discusses the findings of the study. All the research questions have been addressed in this chapter. Although the size of the sample for this study was small, the analysis of this study confirmed some findings reported by various researchers. The chapter discusses the findings under the headings drawn from the objectives of the research.

5.1 The number of Girls who had participated in Technical subjects for the previous five years at David Kaunda and Hillcrest National Technical High Schools.

The study addressed the question of the number of girls that had participated in technical subjects the previous five years. The total enrolment figure for girls who participated in technical subjects at the two National High Schools from 2002 to 2006 was 378 girls.

From the school administrators' responses, it was evident that at David Kaunda National Technical High School 179 girls had participated in technical subjects from 2002 to 2006. It was also clear that between 2002 and 2003 there had been an improvement in enrolment figures for girls participating in technical subjects. There were Grade 10 - 12; Grade 11 – 8 and Grade 12 – 8 while there were 15 in Grade 10; 12 in Grade 11; and eight in Grade 12 in the year, 2003. There was an increase of 9 girls participating in technical subjects in 2004 from 2003. The break down for 2004 was: Grade 10 – 20; Grade 11 – 14; and in Grade 12 – 10 girls. The total for the year was 44. The year 2005 recorded levels of girls' participation in technical subjects as: Grade 10 – 15; Grade 11 – 15; and Grade 12 – 14 giving us the total of 44 girls in the year. The girls that participated in technical subjects in 2006 were eight in Grade 10; ten in Grade 11; and ten in Grade 12 giving us the total of 28 for the year. There was a big drop in enrolment figures for girls at Hillcrest in 2006 (refer to Table 6).

The findings were consistent with the picture that was earlier given to us in the figures obtained from the Technical Education, Vocational and Entrepreneurship Training Authority (2006) that portrayed males as dominating in technology and craft areas. This position was also supported by studies conducted by Siame et al, (1988) and MOE, (1995) who reported that there were more females in secretarial courses than in the technical ones in Trades Training Institutes in Zambia.

The low participation of girls in technical subjects did not agree with studies conducted elsewhere. For example near parity in access to education between female and male pupils in some areas such as Western Europe, North America and Japan had been achieved (UN, 1995). Further Tilak (1993) pointed out that females in some of the Great Tiger Nations of East Asia both outnumbered males and performed as well as males in schools. The issue of access is critical as larger participation for girls could only be achieved by having more girls to select from. This assertion is also supported by the education administrators who advocated for the building of girls' technical schools to encourage participation from a very early age.

5.2 The Factors that affected the participation of Girls in Technical subjects.

From the survey, the researcher wanted to know the factors that had contributed to the low participation of girls in technical subjects.

The major finding of the study was that poor attitude by girls towards technical subjects made the girls not to pursue technical subjects. Out of the study population for pupils, 29 girls alluded to poor attitude as the reason for not taking technical subjects. Peer pressure discouraging the girls not to participate in technical subjects was given as one of the second most important reasons along with intimidation of the girls by the boys. In a Survey conducted by David Kaunda National Technical High School on Academic Performance of Pupils (2003), peer pressure was the second most important reason given for the poor academic performance of girls. Among other factors sighted by the study were negative family advice, inadequate motivation by the boys, poor study strategy by the girls and non-availability of study materials. The findings of the study were consistent to a large extent with those identified in the survey conducted by David Kaunda Technical High School. Such factors as insufficient study materials, limited interaction with teachers, competition between boys and girls, among others contributed to the poor academic performance by pupils.

Negative family advice was yet another contributing factor to the low participation of girls in technical subjects. There were 25 girls who alluded to this factor. According to the girls, some family members argued that technical subjects were time consuming and some people thought that girls were too weak to handle the subjects. Others believed that girls were meant to do house work related subjects which some studies disputed because such subjects had little value. Bryne (1979) observes that, "The educative value of the two areas of study is not equivalent: cookery has very little educative transfer value and is mainly skills based with a low conceptual element". However, there is irrefutable evidence that the French cooking is the best in the world because they have taken cookery more seriously than the English but I do not subscribe to this view.

The study found that 20 respondents representing 51.3% had inadequate advice by teachers while 19 representing 48.7% indicated that they did not received adequate advice from the teachers to encourage them to study technical subjects. This factor was almost at par between those who were encouraged by the teachers and those who were not because the difference of 2.6% is quite small.

The findings revealed that there had been a wrong perception which had been passed on to the girls that technical subjects were for boys. This strengthened the widely held belief that girls were meant to do house work related subjects and that technical subjects were time consuming. Some people further concluded, wrongly though, that girls were weak and could not participate in such subjects. The findings were consistent with what was observed in a study conducted by the American Association of University Women (1992) which revealed that teachers tended to focus more attention on boys, directing more encouragement to them, while girls were often overlooked in class. Teachers often saw a difference in potential between boys and girls, especially in technical areas (http://www.aauw.org/research/girls_education/gg.cfm).

5.3 Views of School Administrators and Education Managers about the participation of Girls in Technical subjects.

Regarding factors which they thought were responsible for the under representation of girls in technical subjects, the education managers indicated that the factors were that society still perceived technical subjects to be for boys. They also indicated that girls lacked basic knowledge about technical subjects from Basic schools. Further they argued that the education system tended to favour boys in technical subjects. The under-representation of girls was attributed to cultural factors like initiation ceremonies which tended to lure girls to go into marriage soon after. Kelly (1999) confirms this position,

> *Girls who had passed through the traditional period of seclusion and initiation had their minds turned towards marriage and not towards what was being taught at the time in school*

These findings confirm what a number of studies which include Hynie (1999, 2003); Kelly, Msango and Subulwa (1999); MOE (1999); Ngau (2006); Sanders (2001) have confirmed Makkubu's (1999) conviction that great potential was being lost by failure to encourage more women to enter the world of scientific exploration and technology (http://www.nature.com). Some respondents attributed the low representation to the Grade 10 selection cut off point. One respondent said that there were many girls who did not qualify to enter the national schools by virtue of not reaching the cut off point and yet they had qualified to Grade 10 and passed in technical subjects in other schools. This made the

number of girls admitted to both schools to remain very small compared to that of boys. MOE (1999) states, *Some classes had only one girl against 39 boys. This could not be said to be girl-friendly atmosphere.*

Low enrolment of girls was therefore identified as yet another factor that contributed to the under-representation of girls. Hence, the fact still remained that making facilities to be girl-friendly in order to encourage more girls to participate in technical subjects was greatly needed.

The next chapter concludes the findings of the research and makes recommendations based on the findings.

CHAPTER SIX
CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This research was set out to find out the factors that affected the participation of girls in technical subjects in the only two National Technical High Schools. This chapter concludes the study and also makes recommendations based on the major findings of the study.

6.1 Conclusion

Through the assessment of the responses from the pupils, the responses from the teachers of technical subjects, the views of the head teachers, deputy head teachers and the Ministry of Education officials about the factors that affected the participation of girls in technical subjects, the following were the major findings from the survey.

The study revealed that the poor attitude of the girls themselves towards participating in technical subjects accounted for the main the reason why the girls were discouraged from participating in technical subjects (refer to Table 3). This is a serious revelation as it means that more sensitisation of girls in this regard is required urgently.

The results of the quantitative data revealed that there was parity in the intimidation of girls by boys with the peer pressure received from their school mates. These two factors greatly contributed to the poor participation of girls in technical subjects.

The study revealed further that other factors also contributed to very few girls participating in technical subjects. The factors mentioned included inter alia; lack of motivation by teachers meaning that the teachers were not role models enough for the pupils to see the value of technical subjects through them. The study also revealed non-availability of study materials, and poor study strategy by the girls.

6.2 Recommendations

Based on the findings and the conclusion discussed above, the following recommendations were made.

6.2.1 Recommendations to the school administrators

The major findings of the study were that poor attitude by the girls themselves contributed much to few girls participating in technical subjects, and that peer pressure, intimidation of girls by boys, and

negative family advice also contributed significantly to very few girls participating in technical subjects.

The recommendation to the school administrators is that they should continue prodding the Ministry of Education for better funding of their technical subjects. Such funding should go towards improving the technical workshops in order to raise morale among the pupils especially the girls. They should also be actively involved in advocating for the building of basic schools to cater for technical subjects as a major intervention.

The school administrators should also make sure that the pupils in technical subjects are provided with the opportunity to visit industries so that they can relate the importance of technical subjects with what they would be able to see.

The recommendation to the teachers of technical subjects is that they should avoid the negative stereotyping that is characteristic of schools and encourage girls to actively participate in the subjects. Teachers should pay particular attention to the concerns of the girls as they pursue their studies in technical subjects. To achieve this, there is need to re-train the teachers of technical subjects during the holidays. Teachers could also be trained through Continuous Professional Development (CPD) programmes at school level at weekends. The teacher's college curriculum should be redesigned to include new methods of handling girls in technical subjects.

6.2.2 Recommendation to the Ministry of Education

From the findings, two respondents revealed the desire of the government to expand enrolment in teacher training to include more females who would in turn become role models for the girls who would participate in technical subjects.

The recommendation in this regard is that the government should implement this innovation without much delay by reserving 30% places for female applicants and the remaining 70% would be open for competition by both gender. All key stakeholders in the provision of technical subjects ought to get involved in the campaigning among girls to take up the subjects. The girls should be engaged in positive sensitisation right from the time they enter technical schools so that they could be aware that technical subjects and technical jobs were not only meant for boys and men but for girls and women too. To do this, more females would have to be trained under a deliberate programme and the graduates would have to be posted to the technical schools with girls in order that there would be more female teachers than males in the schools from whom the girls could learn technical subjects.

From the views adduced from the respondents, the government also ought to re-inject capital in schools that offer technical subjects. Further, technical schools should be divided equally with the non-technical ones within the districts. All the technical schools would then require to be refurbished before embarking on such an ambitious programme and insist there after that technical subjects should be made compulsory in the technical schools at Basic school level. This recommendation is consistent with the one that was made by the teachers. It is important to consider further that the enrolment at the two National Technical High Schools should be 75% for technical subjects and 25% non-technical ones. A clear policy in the provision of compulsory technical education will make a difference in my view.

6.2.3 Recommendations for Further Research

This study was limited to the two National Technical High Schools of Zambia, and it was further limited to the pupils and teachers of technical subjects in the two schools. Hence, there was need to scale out the study to other technical high schools in the seven provinces.

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APPENDIX I

Appendix i Survey on Factors Affecting participation of girls in Technical Subjects

Questionnaire for Pupils (Girls)

Dear Respondent,

This questionnaire is a research instrument for academic use. It is meant to find out the **factors** that affect the participation of girls in technical subjects. The findings may help to popularise the subjects amongst the girls. **Please note that all the responses shall be treated in the strictest confidence.**

The Researcher will greatly appreciate your honest responses

Please tick (√) and write brief answers wherever applicable

A. Personal Details

1. Age.....

2. What Grade are you in?

Grade 10. ☐ **Grade 11.** ☐ **Grade 12** ☐

3. Which technical subject are you studying?

MW		WW		TD	

4. Did you study the subject above at your last school? Yes ☐ No ☐

5. Who encouraged you to study the subject that you chose?

Friend	
Teacher	
Parent/Guardian	
Own Interest	

Any other.....

.....

6. What are some of the factors that hinder the participation of many girls in technical subjects?

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

7. Do you think the following issues contribute to low participation by girls in technical subjects?

Factor	Yes	No
1. Non availability of study materials 2. Poor study strategy by the girls		
3. Peer pressure		
4. Poor attitude by girls 5. Negative family advice		
6 Inadequate motivation by the teachers		
7. Intimidation by the boys		

Any other.....
.....
.....
.....
.....
.....

Thank you very much for your honest answers

APPENDIX II

Appendix ii *Survey on Participation of Girls in Technical Subjects*

Interview Guide for Head teachers, Deputy Head teachers and Teachers

It has been noticed from preliminary investigations that there are very few girls participating in Technical subjects. This interview seeks to find out the factors that are contributing to the low participation.

1. How many girls are currently enrolled in the school?
2. How many of these girls participate in technical subjects?
3. Which technical subjects do they participate in?
4. Which of the mentioned subject(s) do more girls participate in?
5. Provide me with figures of the girls per subject which they participate in?
6. Why are there more girls in one technical subject and less in the other(s)?
7. How many girls have participated in technical subjects in the last five years in your school?
8. What are the factors contributing to low participation by girls in technical subjects?
9. What do you recommend should be done to popularize the participation of girls in technical subjects?

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APPENDIX III

INTERVIEW GUIDE FOR EDUCATION ADMINISTRATORS

Dear Respondent,

This questionnaire is a research instrument for academic purposes only. It is meant to find out the **factors** that affect the participation of girls in technical subjects. The findings may help to popularize the subjects amongst the girls. **Please note that all the responses shall be treated in the strictest confidence.**

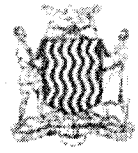
The Researcher will appreciate your honest responses.

1. Gender:
2. Position in the organization :
3. Which technical subjects are offered in the National Technical High schools?
4. Which of the above subjects is most popular amongst the girls?
5. Why is this subject most popular?
6. Are you satisfied with the participation of girls in technical subjects
7. What are the factors for the low participation of girls in technical subjects?
8. What measures has the Ministry of Education put in place in order to popularize technical subjects amongst the girls?
9. Is there any policy by the MOE regarding the participation of girls in technical subjects?
10. If the answer above is 'yes', what is the policy?
11. What further recommendations would you make to ensure that technical subjects become popular subjects amongst the girls?

Thank you for your cooperation

APPENDIX IV

All correspondence should be addressed
to the District Education Board Secretary
Tel: 240250 / 246249
E-mail: debslk@yahoo.co.uk



In reply please quote No.

REPUBLIC OF ZAMBIA
MINISTRY OF EDUCATION

TS/10048

DISTRICT EDUCATION BAORD SECRETARY
P. O. BOX 50297
LUSAKA

9th May 2007

The Headteacher
David Kaunda Technical High School
LUSAKA

RE: FIELD WORK FOR M A (EDUCATION ADMINISTRATION) STUDENT: MR. S. ZIWA

The above named is a post – graduate student at the University of Zambia-School of Education. He is pursuing a Masters Programme in Education Administration which has a field work component which he has to complete.

He has been granted permission to conduct research at your school.

Kindly welcome him and give him maximum support.

P. C. Sinukunda (Mrs.)
DISTRICT EDUCATTION BOARD SECRETARY
LUSAKA DISTRICT

APPENDIX V

All correspondence should be addressed to the District Education Officer
Telephone : 03 - 321421
Telefax : 03 - 322464

In reply please quote:

REPUBLIC OF ZAMBIA

MINISTRY OF EDUCATION

OFFICE OF THE DISTRICT EDUCATION BOARD SECRETARY,
P.O. BOX 60270,
LIVINGSTONE.

28TH MAY 2007

The Headteacher,
HILLCREST HIGH SCHOOL,
LIVINGSTONE.

SUBJECT: FIELD WORK FOR MA – MR.S. ZIWA (STUDENT)

Refer to the subject captioned above.

The above named would like to conduct field work for his MA in Education Administration at your institution.

Kindly allow him and provide him with necessary information accordingly.

Hamenja D
PLANNING OFFICER,
FOR/DISTRCTT EDUCATION BOARD SECREATRY,
LIVINGSTONE DISTRICT.

APPENDIX VI

Students Enrolment Numbers by Year, Gender and Training Programme

Programme	2001		2002		2003		2004		2005		2006	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Business Studies	3,685	3,535	3,997	3,059	4,383	4,635	5,024	4,675	5,391	5,012	5830	5412
Secretarial Studies	0	1,548	1	1,698	1	1,556	1	1,580	0	1803	2	1625
Hotel and Tourism	230	316	319	1,098	376	1,155	543	1,235	675	1550	875	1980
Media and Applied Arts	613	737	613	1,043	702	1,585	766	1,574	809	1587	920	1627
Paramedical	150	52	162	71	168	84	180	97	120	130	140	154
Aviation	30	15	48	13	52	10	54	8	100	30	114	52
Craft	2,516	286	3,542	453	4,356	558	5,572	567	6,182	698	6422	829
Advanced Certificate/Diploma	2,191	126	2,366	230	2,192	271	3,571	342	3,604	543	3644	702
Technologist	154	3	144	4	289	7	344	13	350	9	420	9
TOTAL	9,698 (59%)	6,852 (41%)	11,283 (57%)	8,565 (43%)	12,439 (56%)	9,782 (43%)	16,455 (62%)	10,104 (38%)	17,131 (61%)	11,172 (39%)	19,116 (59.3%)	13,475 (40.7%)
	16,550		19,848		22,221		26,559		28,303		32,591	

APPENDIX VII

LIST OF HEAD TEACHER, DEPUTY HEAD TEACHER AND TEACHERS INTERVIEWED AT DAVID KAUNDA NATIONAL TECHNICAL HIGH SCHOOL

1.	Mr. Christopher Mvula	Head teacher
2.	Mr. Lloyd Yamboto	Deputy Head teacher
3.	Mr. Mathew Banda	Teacher-Metalwork
4.	Mr. Phillip Tembo	Teacher-Metalwork
5.	Mr. Mupenda Chama	Teacher- Metalwork
6.	Mr. January Mkandawire	Teacher- Metalwork
7.	Mr. Joshua Nsalamo	Teacher- Woodwork
8.	Mr. Apton Sitali	Teacher- Woodwork
9.	Mr. Harold Tonga	Teacher- Teacher of Woodwork and Head of Department
10.	Mr. Joseph Ngulube	Teacher-Woodwork

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APPENDIX VIII

LIST OF HEAD TEACHER, DEPUTY HEAD TEACHER AND TEACHERS INTERVIEWED AT HILLCREST NATIONAL TECHNICAL HIGH SCHOOL

1.	Mr. Leonard Nkhata	Head teacher
2.	Mr. Amos Makasa	Deputy Head teacher
3.	Mr. Paul R. Nhkoma	Teacher- Metalwork
4.	Mr. Brian Bweupe	Teacher- Metalwork and Head of Department
5.	Mr. Joe Chali	Teacher- Woodwork
6.	Ms. Grace Taulu	Teacher- Woodwork