

environment in which a child was brought up could pre-dispose him or her to a particular career. Mostert, Keyter and Scott (1999) in a study at the University of Namibia found that though students received more information about careers from teachers than any other source, however, the majority of the students reported that either one or both of their parents, had the greatest influence on their choice of field of study. However, in the case of my respondents, the parents' or guardians' egalitarian principles could only have encouraged the students to attain tertiary education and not what field to study.

The issue of self-image in terms of potential performance in Natural Sciences among the students (in Education and Humanities) in the sample was examined. The students in Education and Humanities were asked if they felt that they would have performed far better if they were in Natural Sciences. The percentage distributions of responses are presented in table 13.

Table 13: Percentage Distribution of Responses of Students in Education and Humanities on whether they could have Performed Better in Natural Sciences (Source: Field Data).

CATEGORY/RESPONSE	GENDER		TOTAL
	MALE	FEMALE	
Yes	18.8	7.9	26.7
No	15.1	16.7	31.8
Not applicable	18.4	15.5	34.0
Not stated	2.5	5.0	7.5
<b>TOTALS</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

The figures in the table indicate that more respondents, (31.8%), felt that they would not have performed better in Natural Sciences than they were doing in Education and

Humanities. The percentage difference between female respondents (16.7%) and males (15.1%) in this category was small. However, more male respondents (18.8%) than females (7.8%) said that they would have performed better in Natural Sciences. The difference in perception between the females and males could be attributed to some females' view that sciences are a domain for males. Eccles (1986 cited in Duru-Bellat 1995) argues that girls believe that they are less competent in sciences, and perceive scientific professions as being difficult for them and masculine. But our results indicate a small difference between males and females that felt that they would not perform well in Natural Sciences. This therefore, lends credence to the earlier factor that the majority of respondents chose their present schools out of personal interest. The high percentage of non-applicable 34% is due to a large number of respondents from Natural Sciences who were not supposed to answer this question.

All the students were asked whether they felt girls were capable of performing better or as well as the males in science fields (see table 14).

Table 14: Percentage Distribution of Responses on whether Females can Perform Better or as Well as Males in Science - based Programmes (Source: Field Data).

RESPONSE	GENDER		TOTALS
	MALE	FEMALE	
Yes	34.5	38.7	73.2
No	19.3	5.5	24.8
Not stated	1.0	2.0	3.0
<b>TOTALS</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

The majority of the respondents (73.2%) were of the view that female students can perform as well as their male counterparts if not better in science subjects. Of those who responded in the affirmative there were more female respondents, (38.7%), than males, (34.5%). The percentage of male respondents that felt that female students could not perform better than them in science fields was 19.3%. Only 5.5% the female respondents said that female students could not perform better or as well as the males. The overwhelming affirmation (73.2 %) by the respondents that females are capable of performing better or on an equal basis with the males could be an indication of the changing gender perception of females' capability. This changing perception could be attributed to the respondents' experiences, which Kelly (1994) referred to as levelling off in performance at the University of Zambia where gender disparities in performances are reduced.

#### **4.2.2 Segregated Secondary School Curriculum and Pedagogic Practices**

Data from selected secondary schools revealed that the schools did not have uniform curricula. That is, apart from English and Mathematics the other subjects varied from school to school. The subjects that were available in all the four secondary schools were English, Literature in English, Religious Education, History, Geography, Mathematics, Physics, Chemistry, Biology, Science, Commerce, Art and French. At Kamwala Secondary School, Music, Metal Work, Geometric Drawing (GMD), Principles of Accounts and Food & Nutrition were also available. Kabulonga girls were additionally offered Home Economics, Principles of Accounts, Additional Mathematics and Agricultural Sciences. At Munali, Principles of Accounts, Geometric Drawing, Bemba and Agricultural Sciences were the additional subjects.

*The lack of uniformity in the subjects offered is due to the Ministry of Education policy, which allows schools to introduce or offer any of the approved subjects in the general curriculum (MOE, 1996). The availability of facilities, learning materials and qualified teachers determines what subjects are offered in respective schools. This policy tends to disadvantage rural schools in that they generally lack teachers and facilities. As such, the subjects offered to pupils in rural schools may be limited unlike the case for their counterparts in urban schools who tend to have an abundance of teachers and learning facilities (Kelly 1991).*

Furthermore, not all the pupils take all the subjects available at a particular school. At senior level the classes are divided into Science and Arts categories. The subjects offered in these classes tend to differ apart from the core or compulsory subjects namely: English, Mathematics, and a Science. All the four secondary schools in the study had Science and Arts classes. Science classes are those that predominantly offer pure sciences and some art- based subjects while arts classes offer physical sciences and a wider choice of art- based subjects. The performance of the pupils in the junior school leaving examination is used to determine which class one can get into. Special consideration is given to English, Mathematics and Science. The situation in terms of number of Arts and Science classes in the schools under study was as shown in table 15:

Table 15: Total Number of Arts and Science classes in the Four Schools under Study:

SCHOOL	ARTS	SCIENCE
Kabulonga Girls	3	2
Kamwala Secondary	3	1
Munali Secondary	6	3
Roma Girls	2	1

The table indicates that at these schools art classes were in the majority. This could possibly be due to what was stated in the foregoing about availability of teachers, particularly science teachers. Kelly (1991) argues that limited facilities required for effective learning of sciences in schools and scarcity of qualified science teachers affects the number of science classes made available in schools.

Considering that there are few pure science classes available in three of the schools shown above, fewer pupils are placed into them. More pupils take physical sciences, which is mainly offered in art classes. In co-educational schools, of those put in pure science classes, females are in the minority. In terms of optional subjects, females take Food and Nutrition, Fashion and Fabrics, while males are offered technical subjects such as Metal Work. At Munali Secondary School, no female was taking Geometric Drawing in the 1996 Grade 12 class. At Kamwala Secondary School, one class offers Food and Nutrition, Metal Work and Geometric Drawing as options. Both Roma Girls and Kabulonga Girls do not offer technical subjects. Milimo (1995) made similar observations about the differential

curricula in Zambian Secondary Schools. She noted that practical subjects tended to be the preserve of males while females took home oriented and "feminine" subjects such as Homecraft, Typing and Office Practice. This situation, which encourages differential curricula, in certain subjects, could orient males and females into different career expectations and training at higher education level. Mulopo (1988:44) on this point argues that, "streaming practices encourage girls and boys to take subjects related to their future sex roles." The result is perpetuation of women's under-representation in certain subject areas and careers.

Another issue is that, though females have been allowed into technical schools problems of access, retention and full participation in all science subjects have persisted (Sachingongu, 2000). It is interesting to note that despite the positive action of introducing A-levels in selected government schools in Zambia the approved curricula is different for females and males. For instance, at Kabulonga Girls they have been given an art-based curriculum, while male single sex schools and technical schools offer science-based curricula. This development shows females' continued disadvantage in terms of subjects offered especially if one wanted to pursue science and technology fields at tertiary level.

Given the situation in the foregoing, the students at the University of Zambia were asked whether the subject combination they had at secondary school affected their choice of field of study. The percentage distribution of their responses is tabulated on the next page.

Table 16: Percentage Distribution of Respondents' Gender and Effect of Subject Combination on Choice of Field of Study (Source: Field Data).

RESPONSE	GENDER		TOTALS
	MALE	FEMALE	
Yes	10.5	3.8	<b>14.3</b>
No	44.1	39.9	<b>84.0</b>
Not stated	—	.8	<b>.8</b>
Not applicable	.4	.4	<b>.8</b>
<b>TOTAL</b>	<b>55.0</b>	<b>45.0</b>	<b>100.0</b>

Figures in the table indicate that the majority of respondents (84%) felt that the subjects they were taking at secondary school did not hinder them from applying into fields of their choice. The difference between male and female respondents of the 84% who answered in the negative was minimal; males comprised 44.1% while females' constituted 39.9%. Those who felt they were hindered by their subject combination were only 14.3%. More male respondents (10.5%) than females' (3.8) were in this group. However, it must be noted that from these results it cannot conclusively be said that subjects taken at secondary level do not hinder students from studying science at tertiary level. Additionally, as explained earlier secondary schools offer different subjects according to the type of school and ownership of the same. It would therefore be impractical for an arts oriented school leaver to enter a science stream and vice versa. Mutukwa et al (1995) and Milimo (1995) in their respective studies on gender and education in Zambia argue that the subjects being offered in secondary schools particularly to females tend to limit the students' entry into certain fields

of study and consequently certain careers. We could also argue that the non-interference of subject combination on the majority of our respondents, especially the females, could mean that they were applying into fields considered to be appropriate for them.

Linked to the issues of curriculum and subject combinations are the pedagogic practices in secondary schools. Strides have been made in removing the stereotypes in learning materials. Observations made in the study revealed that school textbooks are now more balanced in the portrayal of women. This is a positive sign that will help in levelling the learning platform. The learners, especially females, who may have felt marginalised in the textbooks, can now claim ownership of the learning process.

#### **4.2.3 Performance of Respondents in Grade Twelve School Leavers' Examination**

The students at the University of Zambia were asked to state how they performed in the Grade Twelve Examinations. A comparison was made of their performance in art and science based subjects. The performance of students/respondents in Grade Twelve School Leavers' Examination in arts and science subjects is shown in table 17.

Table 17: Performance of Respondents in Arts and Science Subjects  
in the Grade 12 School Leaver's Examination (Source: Field Data).

RESPONSE	ART			SCIENCE		
	MALE	FEMALE	TOTALS	MALE	FEMALE	TOTAL
Good	27.6	29.7	57.3	39.3	30.5	69.9
Fair	6.7	5.4	12.1	11.3	12.1	23.4
Bad	1.3	-	1.3	1.3	0.4	1.7
Very Bad	0.4	-	0.4	-	-	-
Not applicable	18.8	10.1	28.9	2.9	2.1	5.0
<b>TOTALS</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

From the table, we can see that more male respondents (39.3%) said their performance was good in the sciences than did the females (30.5%). In the art-based subjects, more female respondents (29.7%) said their performance was good compared to the males' (27.6%). As observed earlier, the situation in secondary schools regarding the Grade Twelve Examinations is that of gender disparities in performance between males and females. As stated in the foregoing, Kelly (1994) made similar observations in a countrywide study in Zambia. Girls, especially from co-educational schools, under-perform particularly in science based subjects. In art-based subjects, their performance is good. He argues that the under performance of girls is not due to low cognitive ability but the lack of a supportive cultural and social environment which can make them actualize their inherent potential. This supportive environment is one that comprised reduced teacher biases in teaching, and improved societal and parental attitudes to girls' education. Studies on teacher-pupil

interaction have revealed that teachers tend to send different signals to male and female pupils on the value of Mathematics and Science (Sinyangwe and Chilangwa 1995; Morgade and Bonder, 1995, and Duru-Bellat, 1995). Teachers encourage males to work harder in these subjects while females are “silently” told that they do not really need these subjects for their future roles. Such attitudes affect the performance of either sex. However, the extent to which teachers' actions affected the respondents' performance in the Grade Twelve Examinations was not investigated in this study.

In Argentina, Morgade and Bonder (1995) observed that students favoured subjects that the school placed more value on. Among the students, males and females valued subjects differently. Mathematics and Natural Sciences were more popular among the males while Spanish and Human Sciences were popular among the females. In Zambia, Mbulwe (1993) made similar observations in a study on secondary school pupils' attitudes and achievement in Mathematics and Science. She found that the attitude of male and female pupils towards Science and Mathematics were different. Males had more positive attitudes to science than females. As such, performance in these subjects was different for the males and females, with the males performing better than the females.

This argument put by Mbulwe (1993) is in line with Banister's' (1993) argument mentioned earlier that girls and boys learn mathematics and sciences differently and for different future use. Girls are said to learn mathematics for aesthetic reasons; while boys learn the same for instrumental purposes. The argument of this and other researchers is that assessment/examinations take the boys' view, giving boys an advantage over girls. Therefore, even though cognitively boys and girls may be equal, their performance is made unequal by those who assess what and how much they learn. The arts on the other hand, are

learned precisely for the understanding and appreciation purposes, hence the reason why girls excel in them. In single sex female schools, where sex-role stereotyping is reduced, girls perform better than their counterparts in co-educational schools in Mathematics and Science (Kelly, 1994).

The students in the sample were asked if their performance in the School Certificate examination had a bearing on their choice of school at the University of Zambia. In response, 42.6% of the male and 34.2% of the female respondents agreed that their performance in the Grade Twelve examination determined their choice. Only 11.8% males and 11.4% females said no to this. It was expected that the examination results should affect the choice the school leavers make because these results are what the University of Zambia puts into consideration when admitting students. Sanyal et al (1976) found that the career expectations of secondary school leavers in Zambia were fluid because they changed according to ones' performance in the final examination. This does not seem to be case for the students in this study as most students said they chose their present field of study out of personal interest.

#### **4.2.4 Career Guidance and Counselling**

The students in the sample said that they received career guidance while at secondary school. The majority of the respondents (82.4%) received career guidance while at secondary school. Only 17.2% said they did not receive any career guidance. Those who got guidance said they got it from the head teachers, careers and guidance teachers and other teachers in the schools. The distribution by gender of those that received and did not receive career guidance at secondary school is shown in table 18.

Table 18: Percentage by Gender of Those Who Received and did not Receive Career Guidance at Secondary School (Source: Field Data).

RESPONSE	GENDER		TOTALS
	MALE	FEMALE	
Yes	46.0	36.4	<b>82.4</b>
No	8.8	8.4	<b>17.2</b>
Not applicable	-	0.4	<b>0.4</b>
<b>TOTALS</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

From the table we can see that more male respondents got career guidance than the female respondents did. The high teacher to male interaction in most schools particularly in co-educational schools could be the contributing factor to more males receiving career guidance (Sinyangwe and Chilangwa, 1995). This applies to males seeking further guidance outside organised talks in the classroom. Mutukwa et al (1995) and Mwansa (1995) in their respective studies on girl child education found that some schools lacked careers and guidance teachers. In such schools it was the girls that were mostly disadvantaged. This disadvantage as because boys tend to claim more time from teachers in class and outside. Mwansa's study was at primary school level where career guidance is virtually non-existent. In fact he recommends that a policy be put in place to start career guidance as early as possible preferably at upper primary.

When asked whether the career guidance was helpful, 68.6% answered in the affirmative while 13.4 said no and 18% did not respond. The students were asked to rank how the guidance they received had influenced their choice of field of study. Their responses are shown in table 19.

Table 19 Percentage Distribution of Perception of Usefulness of Information of Career Guidance on Students' Choice of Field of Study (Source: Field Data).

RESPONSE	GENDER		TOTALS
	MALE	FEMALE	
Very Much	20.5	9.2	<b>29.7</b>
A Little	18.0	20.5	<b>38.5</b>
Not at All	5.4	5.4	<b>10.9</b>
Non Applicable	10.9	10.0	<b>20.9</b>
<b>TOTALS</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

More male respondents than the female respondents said that the career guidance had some influence on their choice of field of study. This could have been so, since more males received career guidance than did the females. The number of female respondents who said the career guidance had little influence on their choice was slightly more than that of males. The reason for this may be because fewer females received guidance anyway. Siame et al (1998) argues that males are given better prospects than females by educational institutions, school curricula and career guidance counsellors. These institutions tend to reinforce societal gender patterns, which favour males more than females on the whole.

The students also received advice on which school to apply to from peers and relatives. The percentage distribution of who gave the respondents the most advice is presented in table 20.

Table20: Percentage Distribution of Peers' and Relatives' Advice to Students on Choice of Field of Study (Source: Field Data).

CATEGORY OF RESPONSE	GENDER		TOTALS
	MALE	FEMALE	
Brothers and Sister	11.0	13.0	<b>24.3</b>
Friends at Secondary School	11.7	6.3	<b>18.0</b>
Friends at the University	20.1	11.3	<b>31.4</b>
Family Friends	0.8	0.8	<b>1.6</b>
Uncle/Aunt	2.1	0.4	<b>2.5</b>
None of the above	5.4	6.3	<b>11.7</b>
No Response	5.4	6.1	<b>11.5</b>
<b>TOTAL</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

From the table we can see that more respondents (31.4%) received advice from friends already studying at the University of Zambia. Those who received advice from brothers and sisters were second, (24.3%). The advice from family friends and uncles or aunts was negligible, at 1.6% and 2.5%, respectively. Percentage differences were observed between male respondents and females in terms of source of advice. There was a small difference between female respondents (13.0%) and males (11.3%) that said they received advice from brothers and sisters. The situation was different with regards to advice from friends at University where more male respondents 20.1% benefited than females 11.3%.

The impact of the advice students received was assessed. The respondents were asked to rank the effect of the advice on their choice. Their responses are shown in table 21.

Table 21: Percentage Distribution of Responses on Effect of Advice on the Students' Choice of Field of Study (Source: Field Data).

RESPONSE	GENDER		TOTALS
	MALE	FEMALE	
Very Much	7.9	5.0	13.0
A Little	26.8	25.9	52.7
Not at All	10.5	5.9	16.3
Non Applicable	7.5	6.7	14.2
No Response	2.1	1.7	3.8
<b>TOTALS</b>	<b>54.8</b>	<b>45.2</b>	<b>100.0</b>

The figures in the table above indicate that the majority of the respondents 52.7%, (26.8% male and 25.9% female) felt that the advice they received had a little effect on them. Only a small percentage, (13%), said that the advice affected them very much, that is, the advice received had a bearing on their final choice. The percentage of those who said the advice received had no bearing at all on their choice was 16.3%. The voices of peers and relatives therefore have some measure of influence on the students' choice for field of study. However, the extent to which this advice encouraged females into taking art-based fields at the University did not come out in the study, though these peers at University could have acted as role models for the respondents. A further argument is that given the high failure and attrition rate in the school of Natural Sciences (UNZA Strategic Plan, 1993) and the sizeable number of respondents, who received advice from their peers at UNZA, it is possible that prospective applicants into the School of Natural Sciences were discouraged from applying there by these peers.

The students were asked if they wanted to change from their present field of study to a different one. The majority of the respondents, (71.1%), of whom 40.1% were male and 31.0% female expressed satisfaction with their present fields of study or faculties. They did not even wish to change from their school into another at the end of their first year. Those who wished to change constituted 24.7% (13.4% male, 11.35 % female). About 4.2% did not respond. The high number of those who do not wish to change could be due to the fact that the majority of students had, as stated earlier, chosen their present fields or intended fields of specialisation out of personal interest. As such the need to change did not arise.

#### **4.2.5 Under-representation of Females**

From the secondary schools in the sample it was observed that there was a lower female enrolment rate in schools than for males. As discussed earlier, it was further observed that in co-educational schools the number of female pupils taking pure sciences was lower than that of males. At Munali Secondary School, there were a total of 160 pupils in 3 Grade Twelve science classes in 1998. Of these pupils, 101 were males while only 59 were females. This imbalance could have reduced the number of females venturing into science and technology at tertiary level. In 1997, 84 Grade Twelve pupils at Kabulonga Girls took pure science subjects, while 132 took physical sciences. At Roma in the same year only 39 Grade Twelve girls were taking pure sciences.

The above situation in secondary schools was reflected at the University of Zambia. The distribution of respondents in terms of the type of class they were in while at secondary school was that, 51.9% were in the Arts while 48.1% were in Science classes. The difference in percentage could be because in most secondary schools in Zambia there are more arts classes than pure science ones. An example of this can be seen from the secondary

schools in this study where all the four schools had more arts classes than pure Science classes as discussed in an earlier section. Of the 48.1% in science classes, females constituted 20.5% while males made up 27.6%. This difference is indicative of the presence of more males than females in secondary schools. In the single sex girls' schools in our sample, most of the girls are found in art- based classes. The percentage of females in arts classes was 24.7% while that of males was 27.2%. The gap in the arts was smaller than that in sciences.

Though females are under-represented in the foundation stages of the education system, this alone cannot account for their low participation in science programmes. What the under-representation does is to reduce the number of females available to compete for places into tertiary institutions. Factors such as under performance of females particularly from co-educational schools, and segregated curricula also act on the few females and prevent them from venturing into science programmes.

### **4.3 Gender Concerns of The University of Zambia Strategic Plan**

The University of Zambia Strategic Plan was instituted in 1994 in order to revitalise the operations of the University. It covered all the major areas of the university, these being, undergraduate education, postgraduate education and research, staff development, infrastructure and mobilisation of resources. A cardinal aspect of the plan was the incorporation of gender in all university programmes. The plan stated “the university will take affirmative action to enhance the participation of women in higher education”(UNZA, 1993:22). The focus of this study was to find out whether the strategic plan was fulfilling its gender concerns on admission which was “ to raise female admission from the current level of slightly more than one-fifth of first year enrolments to at least one-third by the end of the

plan period in 1998 and parity with admission of males by the end of the subsequent period but without recourse to differential admission criteria”(UNZA, 1993:33). Enrolment trends were thus examined to investigate whether the gender target was met. Furthermore, the gender distribution of students by school and field of study was analysed.

#### 4.3.1 Admission of First Year Students

The admission of females and males into the University of Zambia during the years of the strategic plan is shown in the table below.

Table 22: Total First Year Admission Figures for Part-time and Full-time Students in all Degree and Certificate Programmes at UNZA (Source: Academic Office)

YEAR	MALE	FEMALE	TOTAL
1994/95	643 (73.5%)	231 (26.4%)	<b>874</b>
1995/96	765 (76.3%)	237 (23.9%)	<b>1002</b>
1996/97	612 (74.5%)	209 (25.4%)	<b>821</b>
1998/99	601 (66.7%)	299 (33.2%)	<b>900</b>

. Figures for 1997/98 are missing from the table, as there was no intake due to the prolonged closure of the University in that academic year.

The figures in the table indicate that the admission of females and males was fluctuating during the years of the strategic plan. The goal set of increasing female admissions from about one fifth of first year enrolments to at least one third was only met in the 1998/99

academic year. The increase in this particular academic year could be attributed to two policy changes on admission by the senate of the University of Zambia in 1999 (UNZA, 1999). Firstly the University of Zambia senate in a bid to promote equity in admission resolved that 30% of first year places would be reserved for females in any field of their choice in the admitting schools. Both males and females would then compete for the remaining 70%. This policy was effected in the 1998/99 academic year. However, one weakness of this policy is that it does not talk of parity on a school-to-school basis. The second policy change was the liberalization of some first year places or floating of places, that is, allowing students to come into university as self sponsored. Previously the number of students admitted was mainly tallied to the capacity of the government to award bursaries only a few came as self sponsored. Under the new system, the University of Zambia offers places without reference to the Government's ability to sponsor students. Therefore, some students with financial capability have been admitted to the University hence increasing the enrolment figures.

#### **4.3.2 Distribution of First year Students by School**

The distribution of first year students by school or field of study is illustrated in table

23.

Table23: Distribution of First Year Students by School for 1998/99 Academic Year  
(Sources: Academic Office)

<b>SCHOOL</b>	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
School of Education	242	92	<b>334</b>
School of Humanities and Social Sciences	137	124	<b>261</b>
School of Natural Sciences	217	82	<b>299</b>

More students were admitted into the School of Education than the other two schools in the 1998/99 academic year. This could be attributed to high demand for the School of Education by most candidates. The School of Humanities and Social Sciences had the highest number of females. This could be because of the variety of programmes available in the school such as Psychology, Economics and Public Administration. Furthermore, personal interest in these fields could be responsible for the high number of female students in them. The School of Natural Sciences has the lowest number of females. Going by my findings from the secondary schools in the study, the low number of females in the School of Natural Sciences could be due to poor performance in Science and Mathematics by the majority of females in the School Certificate Examination. Harding (1992) argues that the under representation of women in sciences at tertiary level has its roots in secondary schools where fewer females than males enter into secondary schools and these few are predominant in arts classes. Wandiga (1997) made an observation that there are more students in art-based programmes than sciences in Kenya's public universities. He argues that females are affected more because of lack of science facilities at girls' schools, negative societal attitudes and cultural bias against girls taking sciences. These reasons advanced by Wandinga have

been cannot be said to be responsible for the students' (in my sample) choice of field of study:

### 4.3.3 Distribution of Students by Field of Study at the University of Zambia

A comparison was made between Social Science/Art-based fields and Science-based fields at the University of Zambia during the years of the strategic plan (see Table 24).

Table 24: Total Student Enrolment Figures (Full-time and Part-time) for Under-Graduates in Science and Art based fields at UNZA

(Source: Academic Office, UNZA).

ACADEMIC YEAR	SCIENCE BASED FIELDS		ART BASED FIELDS	
	MALE	FEMALE	MALE	FEMALE
1993/94	1625 (86%)	256 (14%)	597 (66%)	308 (34%)
1994/95	1611 (86%)	271 (14%)	548 (65%)	289 (35%)
1995/96	1836 (86%)	296 (14%)	1033 (65%)	550 (35%)
1998/99	1792 (83.3%)	358 (16.6%)	1365 (68.2%)	636 (31.7%)

- Figures for 1997/98 are missing from the table, as there was no intake due to the prolonged closure of the University in that academic year.

The enrolment of students in the science programmes was higher than that in art-based fields during the four academic years depicted in the above table. This disparity in enrolment was due to the deliberate University policy that stipulated a bias in admission towards sciences

(Kelly, 1991 and UNZA, 1994). Within the science programmes, male students were significantly higher than females, showing that they have continued to dominate the sciences. The average percentage of females enrolled in sciences was about 14%. However, in the 1998/99 academic year, there was an increase of about 2%, hence the 16.6% figure. This gender gap was the subject of enquiry in this study. There was also marked difference in enrolments between females in art-based fields and those in science programmes. In all the four academic years, there were more female students in art-based programmes than they were in the sciences. Morgrade and Bonder (1995) found a similar situation at Buenos Aires University in Argentina where there were more female students in Social Science related fields than in the Natural Sciences. They argue that feminine stereotypes play a major role in the choice of what to study at the University. This conclusion is at variance with my findings, which mainly point to personal interest and structural factors in the school system as being responsible for female and male students' choice of field of study.

A closer examination of the distribution of female students in various Science fields at UNZA revealed that there were disparities. Certain fields had more females than others did as exemplified by one academic year (1995/96) in table 25.

Table 25: Total Undergraduate Enrolment (Fulltime and Part time) in Science-Based Disciplines at UNZA for 1995/96 Academic Year  
(Source: Academic Office, UNZA.)

DISCIPLINES	MALES	FEMALES
Biology	678 (81.7%)	152 (18.3%)
Chemistry	870(85.5%)	148 (14.5%)
Physics	479 (85.4%)	82 (14.6%)
Mathematics	828 (85.4%)	141 (14.6%)
Engineering	382 (97.4%)	10 (1.6%)
Agriculture	253 (91.7%)	23 (8.3%)
Mining	144 (99.6%)	2 (1.4%)
Medicine	193 (63.7%)	110 (36.3%)
Veterinary Medicine	75 (83.3%)	15 (16.7%)
BSC Nursing	15 (21.4%)	55 (78.6%)

From the table we can see that females were predominant in nursing (78.6%). This was seconded by Medicine (36.3%). Biology and Veterinary Medicine also had sizeable shares, of 18.3% and 16.7%, respectively. This distribution is also prevalent in other Universities across the globe (Harding, 1992; Moore, 1995 and Subbarao et al, 1994). Engineering and Mining had the lowest percentages of 2.6% and 1.4%, respectively. Females have continued to shy away from these fields. The reasons for this scenario were the objective of the study. The following came out as having a bearing on the negligible presence females in science based careers as discussed in earlier sections: personal interest in a given field of study, segregated curricula, under-representation of females in the foundation classes, under

performance of females in the Grade Twelve School Leaving Examination especially those from co-educational schools, and unavailability of adequate career guidance.

The statistics presented in the foregoing revealed that in the years of the University of Zambia Strategic Plan gender disparities continued to exist. There was only a marked improvement in enrolment in the last year of the strategic plan. It must be noted that the increased enrolment at first year level does not mean an end to disparities by gender according to fields of study. This is a point that Subbaraoe et al, 1994 found in their study. The gender concerns of the strategic plan were not met except in the final year of the plan when there was a noticeable change in the enrolment figures for females as seen in table 21 in the foregoing.

#### **4.4 Summary of Findings.**

In line with the objectives of the study and research questions, this study found that the majority of respondents chose their present field of study out of personal interest. That is, be it Natural Science, Education or Humanities, the students female and male were attracted to these fields out of their own interest in them. In addition to this, other factors emerged as having been at play in directing the students to particular fields of study. These were segregated secondary school curriculum, inadequate career guidance and counselling and under-representation of females in the foundation classes.

In terms of pattern of choice between students from co-educational and single sex schools some issues worth noting came to the fore. Of the sample there were more females from single sex schools and mission schools than females from co-educational schools admitted into the University. However, there were more males from co-educational schools than those from mission schools. The number of students from private schools, both males

and females was far less than that of the government and mission schools. In terms of performance in the School Leaving Examination, the examination results from three schools, Munali, Roma and Kabulonga revealed that the girls from single sex schools did better on average than those from the co-educational schools including the males.

The gender concerns of the University of Zambia on admission were only met in the final year of the strategic plan. In the other years of the plan there were continued imbalances in the schools and the target of thirty percent of females admitted in each year was not met.

## CHAPTER V

### CONCLUSION AND RECOMMENDATIONS

The focus of the study was to find out the factors that influenced female and male students' choice of field of study at the University of Zambia. Particular emphasis was put on how these factors hindered females from participating fully in male dominated study areas, that is, science and technology domains. An examination was also made to establish whether there were differential career choices between students from co-education schools and those from single – sex schools. Furthermore, the study also sought to establish whether the University of Zambia was fulfilling the gender concerns on admission contained in its strategic plan of 1994-1998.

#### **5.1 Factors that influenced Female and Male Students' choice of Field of Study**

The study established that most students, females and males, were driven by personal interest in their choice of field of study. That is, they chose their fields of study out of personal interest in those fields. There was negligible gender difference in this assertion by the students. Additionally, other factors emerged as being responsible for the continued low participation of females in science programmes. These factors were segregated secondary school curriculum, under-representation of females in foundation classes, lack of adequate career guidance and counselling, and lack of political will at policy implementation level.

One observation was that the majority of females in the study felt that they had the intellectual ability to perform well in sciences. The survey of performance in Grade Twelve Examination confirmed this. Females in sampled single sex secondary schools

out performed males even in sciences. However the factors mentioned in the foregoing weighed against their full participation in science programmes at tertiary level. The continued effect of structural based factors such as segregated secondary school curriculum (in terms subjects offered in various schools), under-representation of females in foundation classes and lack of adequate career guidance, on females' participation in male dominated fields point to a lack of commitment by government in addressing gender concerns. This argument arise from the realisation that government is aware of them as evidenced in the policy document of 1996 Educating our Future but has been slow in redressing the situation. As such the structures in the education system continue to favour males. However, it must be acknowledged that the Ministry of Education in partnership with some NGOs has initiated intervention programmes aimed at improving the education of the girl child. Two such programmes are the Female Education in Mathematics and Science in Africa (FEMSA) and Programme for the Advancement of Girl Child Education (PAGE), which aims to increase females' participation in sciences and education as a whole.

An examination of the curriculum showed that there were differences in the curricula offered in secondary schools. Apart from the core subjects of English, Mathematics and a Science subject, other subjects varied from school to school. In single-sex girls' schools subjects such as Woodwork and Geometric Drawing were not offered while Home Economics, Food and Nutrition were available. Pure science subjects were offered to a limited number of students in all the four secondary schools surveyed in this study. Furthermore, the females were under-represented in the foundation classes, particularly classes offering pure sciences. This was shown in the

number of females in science classes in the secondary schools surveyed. Even the respondents from the University of Zambia indicated that the majority of them were from art-based classes; for those from science classes the majority were male. The under-representation of females at secondary level entails that fewer females than males are available to compete for places into the University of Zambia or other tertiary institutions.

In terms of performance, an analysis of the results of the four secondary schools in this study revealed a number of interesting things. The girls from Roma Girls, a single sex girls' school run by missionaries, out performed the boys and girls from Munali and the girls from Kabulonga, both Government run schools, in all the subjects. The girls from Kabulonga girls also outperformed the boys and girls from Munali and Kamwala secondary schools. This indicates that females have the cognitive ability to perform well or better than boys do. However, it must be noted that schools such as Roma are highly selective in admission at Grade Eight level. They tend to get the cream that are nurtured well while at Roma and consequently do well at Grade Twelve level. With regards to the university respondents more male respondents said that their performance was good in the science-based subjects than did the females. On the contrary, more females said that their performance was good in the art-based subjects compared to the males. These findings reflect what Kelly (1994) found in a nationwide study, which is that girls tend to under perform in sciences but do better in art based subjects.

Many respondents acknowledged receiving career guidance at secondary school. However, there were gender disparities in the responses. More males than females said

that they had received career guidance and found it helpful when they were making their career choices.

## **5.2 Patterns of Choice between students from Co-educational and Single-sex Schools**

It was observed that there were more females admitted into the university (from our sample) from single sex schools than those from co-educational schools. Additionally, there were more males from government schools admitted into university than males from mission schools. Though the number of students from private schools who entered university were less than those from single sex and co-educational schools, there were more females than males from private schools admitted into university. In terms of distribution by school at the University, there were more females from single sex schools in the School of Natural Sciences than those from co-educational schools. This scenario is linked to the performance of females in the Grade Twelve School leavers' Examination where we observed that those from single-sex schools performed. In fact they out performed the males. As discussed in chapter four, scholars argue that the single-sex environment enables girls perform well even in sciences.

## **5.3 Gender Concerns of the Strategic Plan on Admission into UNZA**

The gender concerns on admission were not met in the initial years. There were disparities in enrolment and on a school-by-school basis through out the years of the plan. The target of having 30% enrolment for females only happened in the final year of the plan. This increase is attributed to a two-fold policy change on admission by the university senate. Firstly, the senate reserved 30% of the places for females and the

remaining 70% are to be competed for by both males and females. The second policy change was to float some places for those who are able to sponsor themselves into university. This meant some would be students once admitted did not need to wait for a government bursary as was the case in the past. The strategic plan goals were not realized fully because of limited resources and frequent closures of the University.

### **5.3 RECOMMENDATIONS**

On the basis of the findings of this study, the following are my recommendations:

- I. Further research is needed perhaps from a psychological point of view why personal interest is the main factor that arose as influencing students' choice of field of study.
- II. Given that structure centered factors such as segregated curriculum contribute to females' low participation in science fields, it is recommended that the learning environment in secondary schools be improved and provide the necessary materials and facilities to make them more gender friendly.
- III. Guidance and counselling programmes in schools should be strengthened to help learners with subject and career choices. This guidance should start as early as upper primary so that those learners will not be hampered by earlier choices later.
- IV. The crusade to increase the enrolment and retention of females at all levels of the education sector should continue.
- V. The University of Zambia through the counselling centre, academic office and respective admitting schools should improve its involvement in providing adequate information about programmes offered at the university.

- VI. Owing to the role that parents, peers and teachers play in the life of learners, gender sensitization campaigns should target these people as well as the wider society in order to remove their stereotyped views about the abilities of females and what roles are appropriate for them.
- VII. Considering that of the respondents, more females from single sex secondary schools came to the University than those from co-educational schools, further research should be carried out on why this situation obtains. The findings could help in improving the learning atmosphere in other schools.

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Academic office, and fill in the appropriate column for floated places. Photo copies of Academic and professional certificates should be attached. Candidates applying for the Bachelor of Science Degree programme are required to have a grade B or better in mathematics.

#### **PARTIAL ENTRY EXAMINATION**

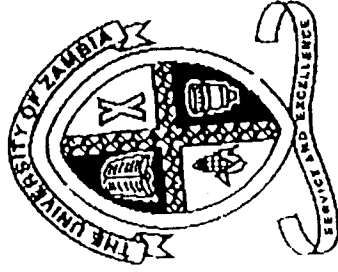
Under this mode of Admission candidates who are holders of higher Diplomas in Mechanical, and other technical fields may be admitted to the Bachelor of Engineering degree programme after passing an entry Examination conducted by the School of Natural Sciences in Mathematics and Physics. Candidates sit the same examination as first year students in Natural Sciences. Diplomas from Northern Technical College and Copperbelt University are required as entry qualifications. Others include City and Guilds.

#### **TYPICAL SUBJECT COMBINATIONS**

Bachelors of Science. (BSc NQS)

- |  |   |
|--|---|
| (a) English-<br>Maths-<br>Physics-<br>Chemistry-<br>Biology- | (b) English-<br>Math-<br>Science-<br>Agric science-<br>Geography- |
|--|---|

School leavers are advised to choose Bsc NQS when



#### **Bachelor of Arts - (BA NQS)**

- |  |  |
|--|--|
| (a) English-<br>Maths-<br>History-<br>Commerce-<br>RK- | (b) English<br>Physics-<br>Geography<br>Lt Languages<br>Biology- |
|--|--|

Recommended to select the Best five subjects.

#### **Bachelor of Arts with Education (BAED)**

- |  |  |
|--|--|
| (a) English-<br>History-<br>French-<br>Maths-<br>RK- | (b) English-<br>Geography<br>Nyanya-<br>Physic-<br>Commerce- |
|--|--|

**THE UNIVERSITY OF ZAMBIA**  
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University of Zambia

P.O. Box 32379

Lusaka

E-MAIL: [jngulale@admin.unza.zm](mailto:jngulale@admin.unza.zm)

**OFFICE OF THE REGISTRAR**  
**DEPARTMENT OF ACADEMIC**  
**AFFAIRS**

# THE UNIVERSITY OF ZAMBIA

## ACADEMIC OFFICE

### ADMISSION TO FIRST DEGREE COURSE

Any person shall be eligible for admission to any course leading to a first degree in the University if he/she: Satisfied the General Entrance Requirements of the University ( unless granted exemption in accordance with regulations)

### GENERAL ENTRANCE REQUIREMENTS

Passes in at least five subjects in the Zambia School Certificate, General Certificate of Education or Cambridge Overseas School Certificate; chosen from an approved list.

### ALTERNATIVE QUALIFICATION

Qualifications equivalent to the Zambia School Certificate, General Certificate of Education and Cambridge Overseas School Certificate may be accepted.

4. A person holding a two year Diploma of the University of Zambia or of an institution awarding the Diploma in associate relationship with the university is regarded as having satisfied the General Entrance Requirements.

### ENGLISH LANGUAGE

The language of instruction at the University is English. All candidates for admission are expected to show evidence of proficiency in English language.

### PROGRAMMES OFFERED

The University of Zambia does offer the following

programmes:-

### SCIENCE BASED PROGRAMMES

- Bachelor of Agricultural Sciences (BSc. Agric)
- Bachelor of Engineering (Electrical & Electronics, Agriculture, Mechanical and Civil Engineering).
- (B. ENG)
- Bachelor of food Science and technology
- Bachelor of Mineral Sciences (BSc. Min.)
- Bachelor of Science (BSc. NQS)
- Bachelor of Veterinary Medicine (BVM)
- Bachelor of Science with Education (BSc. ED)
- Bachelor of Medicine (MB.c.h.b)
- Bachelor of Science Nursing (Bsc NRS)

### ART BASED PROGRAMMES

#### SCHOOL OF EDUCATION

- Bachelor of Arts with Education (B.A.Ed.)
- Bachelor of Education -Primary (B.Ed.Primary)
- Bachelor of Education - Special (B.Sp.Ed)
- Bachelor of Library and Information Studies (BALIS)
- Bachelor of Adult Education
- Bachelor of Education in (Mathematics and Science)

#### School of Humanities and Social Sciences.

- Bachelor of Arts (B.A)
- Bachelor of Social Work (BSW)
- Bachelor of Mass Comm.

#### School of Law

- Bachelor of Laws (LL.b)

#### DIPLOMA PROGRAMMES

- Diploma in Adult Education. (DAE)

### SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

- Certificate in Demography

#### SCHOOL OF EDUCATION

- Certificate in Adult Education

#### SCHOOL OF LAW

- Certificate in Law

#### DISTANCE PROGRAMMES

All Art based programmes with an exception of Bachelor of Mass Communication, Social Work, Certificate in Law and Certificate in Demography are offered by Distance learning. Distance learning means students are engaged in home study for 3 to 4 years before they are invited to full-time study

#### FLOATING OF PLACES

The University has introduced a new scheme for those who meet the general entrance requirements as stipulated under item 2.1 and 2.2 of the General entrance requirements of the University of Zambia.

#### MEANING OF FLOATATION

In simple terms floatation means -diversification in the mode of Admission. Those Admitted under floatation are classified as self sponsored and are required to pay tuition and other fees up front on the day of registration.

#### MODE OF APPLICATION

Like in the non floated mode, Applicants under the float and mode should obtain application forms from the



Arts

Science Class

Physical Science

Q.7. (a) How was your performance in:-

(i) Arts Subjects - Good  Fair  Bad  Very Bad

(ii) Science Subjects - Good  Fair  Bad  Very Bad

(b) Did your performance determine your choice of school at UNZA?

Yes

No

Q8. What is the occupation of your parents or guardians?

Mother: ..... Female Guardian: .....

Father: ..... Male Guardian: .....

**SECTION B**

Q.9. (a) Which school are you in here at UNZA?

Education  Humanities  Natural Sciences

(b) Was this school your first choice? Yes  No

Q.10. (a) If No to question 9(b) what was your first and second choice?

First choice: ..... Second choice: .....

(b) Why was this your first choice? .....

.....

.....

Q.11. (a) Did you receive any information on admission requirements of the University of Zambia before you applied for admission?

Yes  No

(b) If Yes to Q.11. (a), state the source of this information:

University Calender

University Prospectus

Newspaper Adverts

Other sources: .....

(c) Was the information helpful in your choice of field of study?

Yes  No

Q.12. (a) If No to Q.11.(a), did the lack of information on admission affect your choice of field of study ?

Yes  No

(b) If yes, to Q.12 (a), how did it affect you?

Wrong choice of school

Choice of school without understanding programmes  
Available in that school

Other factors: .....

Q.13. (a) Did you receive any career guidance at your previous secondary school?

Yes  No

(b) If Yes, from whom did you receive career advice?

Head Teacher  Careers teacher  other teachers

Other sources: .....

(c) Was this career guidance helpful? Yes  No

Q.14. To what extent did the career guidance at secondary school influence your choice of field of study?

Very Much  A little  Not at all

Q.15. (For those who did not receive career guidance at secondary school). To what extent did the lack of career guidance at secondary school affect your choice of field of study?

Very much  A little  Not at all

Q.16. (a) Did your parents or guardians influence your choice of field of study?

Yes  No

(b) If Yes, was this influence in terms of:

Parental or guardians' advice  your desire to follow   
Their occupation

Your desire not to  other factors:  
Follow their occupation  
.....

Q.17. (a) Did the subject you were taking at secondary school hinder you from applying into a field of your liking?

Yes  No

(b) If yes, state the subjects that you were taking: .....

.....

(c) In what way were you hindered? .....

.....

(d) Which was the field of your liking? .....

Q.18. (a) Which of the following gave you advice on which school to apply to:-

Your brothers and sisters  Friends at Secondary School

Friends at the University  other people: .....

(b) If any of the above gave you advice, to what extent did their advice affect your choice of field of study?

Very Much  A little  Not at all

Q.19. (a) Those who are non-quotaed (Humanities and Natural Sciences): what field do you intend to major in?

.....  
.....

(b) Do you want to major in this field because of:

Parental or guardians advise

Personal interest in field

Peer pressure

Job Prospects after completion of course

Advice received during orientation at UNZA

Other factors: .....

Q.20. (a) (For those in Education and Humanities) Did you apply in these schools and not Natural Sciences because of?

Your lack of interest in science and maths

Your particular interest in Education or Humanities

Perceived monetary benefits after completion of course

Other factors: .....

(b) Do you think you would have performed better in Natural Science?

Yes

No

Q.21. (a) If it were possible, would you wish to change field of study (school) at the end of first year?

Yes

No

(b) If Yes, which school do you want to go to?: .....

(c) Why do you want to change? .....

.....

Q.22. (a) Why do you think there are few females studying Engineering, Mining, Veterinary Medicine, Geology, Physics, Agricultural Science and other science programmes?

.....

.....

(b) Do you think females can perform better than males or on equal basis (just as well as) with males in the above courses?

Yes

No

**Thank you for your cooperation.**

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