

UNIVERSITY OF DURBAN-WESTVILLE

**LIFE HISTORIES OF BLACK SOUTH AFRICAN SCIENTISTS:
ACADEMIC SUCCESS IN AN UNEQUAL SOCIETY**

V. Reddy

2000



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Doctor of Education Degree**

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**Promoters:
Professor J D Jansen (University of Durban-Westville)
Dr A S Thomson (University of Sussex)**

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DECLARATION OF ORIGINALITY

I, Vijjaluxmi Reddy, declare that this dissertation is my own work, and has not been submitted previously for any degree at any university.

Researcher

Promoter

Dedication

*This work is dedicated to my parents,
Rangah and the late Lutchmee Reddy,
who taught me to value education.*

ABSTRACT

The purpose of this research is to document the experiences of black South African scientists en-route to gaining a doctorate and provide an explanation of how and why they achieved academic success in the unequal South African society. The South African apartheid society was designed to promote black intellectual underdevelopment. Some managed to proceed to university and a few gained a doctorate. Little is known about these experiences beyond the anecdotal accounts. This study attempts a more systematic study about academic success in an unequal society.

The study used a life history approach to understand and explain academic success. The study is not located in any particular discipline or a priori theoretical constructs. The approach involved individuals relating their experience and their subjective interpretation of their experiences. I have written individual stories and by grounded theorising in a cross-case analysis I have suggested constructs to provide an explanation of why they achieved academic success.

This study gives us the social history of the education for blacks in South Africa for the period 1948 to 1994. The life stories are contextualised within that social historical period. In this study the analytical, research stories of individuals are presented. These stories illuminate the unfolding of the academic lives and the dynamics that shaped the unfolding of those lives. Using the ten stories a composite thick description of how the variables (social, institutional and individual) shaped the academic pathways for the group is presented. From this data explanatory constructs are suggested to provide an explanation of their academic success. In order to pursue and achieve academic success it was necessary that participants demonstrate academic capability and have access to resources (material and information). In this research I propose three new explanatory constructs plus a fourth one which is not unanticipated but expresses itself in unusual ways in the South African context. The three constructs I am proposing and which are not found in the life history literature about academic success are: academic role replication and expectation; strategic compliance and deferred gratification. The explanatory construct, coherence of roles and support mechanisms, had a particular characteristic in South Africa during this period.

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ACRONYMS

ABSET	Association of Black Scientists, Engineers and Technologists
ANC	African National Congress
ANZAC	Australian and New Zealand Army Corps
CSIR	Council for Scientific and Industrial Research
EUEA	Extension of the University Education Act
HBU	Historically Black University
HWU	Historically White University
NCHE	National Commission of Higher Education
NGO	Non-Governmental Organisation
NP	National Party
NUSAS	National Union of South African Students
PAC	Pan African Congress
SAARMSE	Southern African Association of Research in Mathematics and Science Education
SAIRR	South African Institute of Race Relations
SASO	South African Students Organisation
SCM	Student Christian Movement
SME	Science and Mathematics Education
TRC	Truth and Reconciliation Commission
UCT	University of Cape Town
UDW	University of Durban-Westville
UED	University Education Diploma
UND	University of Natal (Durban)
UNISA	University of South Africa
WRC	Water Research Commission

PROLOGUE

CHAPTER ONE

LIFE HISTORIES OF BLACK SOUTH AFRICAN SCIENTISTS: ACADEMIC SUCCESS IN AN UNEQUAL SOCIETY

1. INTRODUCTION

Achieving a doctorate is a milestone in anyone's academic history. This activity, which is not only dependent on an individual's cognitive ability, cannot be separated from the broader political and economic structures. The South African apartheid society was organised as a racially hierarchical social system. In the education domain, segregated and inferior schooling for blacks¹ provided the ideological cornerstone for social segregation, economic exploitation and political oppression (Nkomo 1990:1). One of the objectives of apartheid education was to promote black intellectual underdevelopment.

The South African apartheid society was a hostile environment for blacks wanting to pursue higher education, especially in the areas of mathematics or science. It was even more difficult to proceed to the level of a doctorate. The goals of apartheid education were not always achieved with some people gaining a doctorate. This study is about understanding how some individuals achieved academic success in this unequal society.

2. THE STUDY

This study *Life Histories of Black South African Scientists: Academic Success in an Unequal Society* has three purposes. Firstly, it is to write individual analytical stories which, because of the richness of the material, illuminate how the academic lives of the individuals unfolded in a particular context over time. These are stories that have not been told before. They have their own intrinsic value and could be inspirational stories for youngsters wanting to follow an academic path. But they are not just stories in the words of the participants²; they have been processed and are presented as analytical

¹ In this thesis I will adhere to what has become conventional South African terminology for describing different people living in the country. Black is used to refer to all politically oppressed groups, namely: Africans, Coloureds and Indian. Disaggregation of the term black to African, Coloured and Indians will be used to describe the impact of apartheid on the different groups. These classifications are not used in the same way as the apartheid state did.

² Researchers have used terms like respondent, interviewee, subjects, actor or participant for the people involved in the study. I will use the term participant.

stories. These analytical stories are written to indicate why a particular outcome, namely gaining the doctorate, was achieved. Secondly, using a grounded theory perspective, the study will generate insights about how black South Africans achieved academic success in this unequal society. The stories further provide the data for a cross-case analysis, which suggest patterns about why people progressed along the academic trajectory.

The third (subsidiary) purpose of the study is to make methodological contributions to the field of life history work. I come from a different disciplinary background (organic chemistry) to most life history researchers. When I began the thesis I thought there might be scope for cross-fertilisation of ideas between the sciences, social sciences and life history work. I am not a sociologist, or a literary theorist, or a life historian. I am doing a life history study. The advantage is that I am not committed to a particular framework and therefore am free to look at the issues in a new way and hopefully make some methodological contribution.

In this study I have two research questions. Firstly what are the experiences of black South African scientists en route to gaining a doctorate? Secondly how and why did they manage to achieve academic success in this unequal society? To answer the questions, in 1996 and 1997, I conducted life history interviews with ten black scientists and science educators who had gained doctorates. In the interview, the participants related their experiences en-route to gaining the doctorate. The educational experiences of the participants span the period 1948 to 1994.

3. RATIONALE FOR THIS STUDY

A review of literature about academic success in unequal societies revealed a dearth of information about achieving success in graduate programmes. There are studies about the educational achievement of minorities (in the United States and Britain) at school and undergraduate level. A perusal of the journals of higher education indicated that while there are studies about the experiences of blacks and experiences of women in the academy, there aren't any studies about the route to getting to the academy.

The philosophy underpinning the education for blacks in apartheid South Africa is best described in the words of the architects of apartheid. In 1945 J N le Roux (quoted in Rose and Tunmer 1975) answered the question in parliament of the type of education that should be given to Africans. "We should not give the natives an academic education, as some people are prone to do. If we do this we shall later be burdened with

a number of academically trained European and non-Europeans, and, who are going to do the manual labour in the country? I am in thorough agreement with the view that we should so conduct our schools that the native who attends those schools will know to a great extent he must be a labourer in the country.” A few years later Hendrik Verwoerd, Minister of Education in the 1950’s and later Prime Minister of South Africa asked, “What is the point of teaching a Bantu child mathematics when he cannot use it in practice?”

This apartheid philosophy led to an education for blacks, and especially Africans, which was characterised by under-spending, lack of facilities, overcrowded classrooms and unqualified or poorly qualified teachers. One outcome of this education has been the poor results in the matriculation³ examination. An indication of this is: “For every 312 African pupils entering Sub A in 1980 one matriculant gained an exemption with both mathematics and physical science.” The comparative statistic is that “one in five whites pupils entering the education system obtained a matriculation with mathematics and physical science as subjects.” The examination results in science and mathematics are very poor: The matriculation pass rates in 1990 for White, Coloured and Indian pupils were relatively high with 95% passing physical science, 91% passing mathematics and 88% passing biology. For Africans the results were dismal with only 15% passing mathematics, 44% passing physical science and 29% passing biology (FRD Indicator 1993).

Despite the constraints placed on the education for blacks, some have managed to defy the apartheid philosophy and have completed university education. A few (very few) have eventually gone on to complete a doctorate. There are an even smaller number who have completed doctorates in science and science education. Little is known about those experiences beyond the anecdotal accounts.

Traditional explorations about understanding education have tended to focus on what is wrong. There are other ways of understanding issues of success or failure in education. Researchers like Sara Lawrence-Lightfoot (1983) and Sarah Delamont (1994) have proposed refocusing of research agendas to study success. This study is about understanding academic success for blacks in South Africa.

The political freedom gained in South Africa in 1994 set the stage to re-tell some of the stories and to bring to the fore the lives of those who were oppressed. The Truth

³ This is the last year of schooling and is used for university entrance.

and Reconciliation Commission (TRC) was set up as an instrument to document the history of human rights abuses in the country. As South Africa comes to terms with its histories, there will be stories documented about different aspects of South African life under apartheid. One such story is the educational life histories of black scientists. These stories will serve to illuminate how these individuals negotiated the different aspects relating to their lives. Stories have the power to provide a nuanced and textured explanation of how a life evolved. These stories, with appropriate analysis, will contribute to insights about achieving academic success in unequal societies. If researchers can discover how a few overcame the constraints and what enthused them to be involved in research, it may be possible to use the findings to effect changes in institutions and encourage more blacks to be involved in research.

One can study academic success in an unequal society from different disciplinary foci, e.g. psychology (and individual factors); anthropology (and cultural factors); sociology (the influence of collectives) or political science (and the effect of power). Many studies of educational success or failure have tended to emphasise either the constraints of social structure or the power of individual agency. But as Marx said, “Men (sic) make their own histories, but they do not make it in circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past.” (quoted in Armstrong, 1987:61). In this study I have not chosen a particular disciplinary or theoretical focus to impose on the data. By using a life history perspective and a grounded theory approach I will look for trends and themes which suggest why this group of individuals achieved academic success. The life history perspective involves the participants relating their experiences about their academic pathways. This study assumes that the academic trajectory of individuals is shaped by different dynamics. The life history approach allows one to understand the dynamics shaping the experiences at a particular historical period as well as allows one to examine how these dynamics changed over time.

4. PARTICIPANTS IN THE STUDY

This study involved ten participants. Their names (alphabetically) and the institution at which they work are: Ahmed Bawa (University of Natal); Nomatamba Magi (University of Zululand); Romilla Maharaj (Medical Research Council); Nozibele Mjoli (Water Research Council); Khotso Mokhele (National Research Foundation); Prins Nevhotalu (National Research Foundation); Phuti Ngoepe (University of the

North); Bothale Tema (UNESCO-South Africa); Ntombizolile Vakalisa (University of South Africa) and John Volmink (University of Natal).

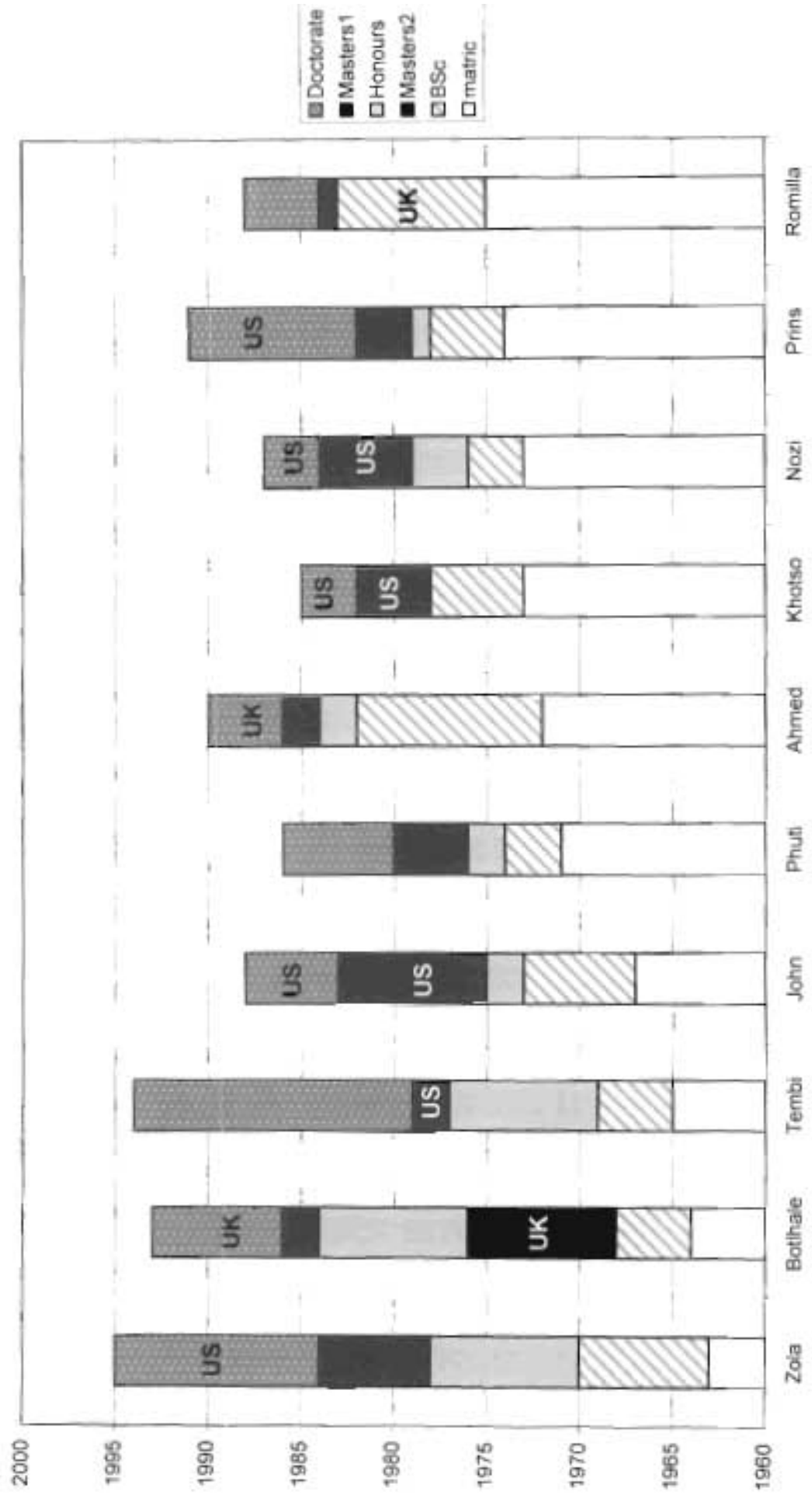
Of the ten participants (five men and five women) seven were classified as African (one Zulu/Swazi, two Xhosas, one Sotho, one Venda, one Tswana and one Tswana/Sotho); two as Indian and one as Coloured. They were born between 1943 and 1958. The oldest started school around 1950 and the last doctorate of the group was awarded in 1995. The school experiences of the group span from 1950 to 1975; undergraduate experience from 1964 to 1982; masters' experience from 1975 to 1986 and the doctorate experiences from 1982 to 1995. Six have doctorates in the sciences (two physics and four biological sciences) and four in science education (one in mathematics education and three in biology education).

This group lived in a society that was politically, economically, socially and educationally unequal. The life stories are contextualised during that socio-political historical period. Co-incidentally these dates are around significant landmarks in South African history. In 1948 the National Party became the government and this marked the formalisation of the apartheid state; 1976 was the year of the Soweto uprising which marked a shift in political relations in South Africa; and, 1994 was the first democratic elections in the country.

A profile of the education of the participants indicates that all except two completed their schooling in the required time. The time taken to complete their undergraduate degrees varied. Two completed in the minimum time required and three took an extra year. The other five had interrupted undergraduate careers and involved them not being on the campus for at least a year. These five spent between one and seven extra years before graduating with their first post-school qualification.

Seven of the ten completed their doctorates at overseas universities, two at South African universities on a full-time basis and one at a South African university on a part-time basis. All except one completed at least one degree at an overseas university. The graph that follows gives a schematic indication of when and where each one completed their degrees. In this table the United States of America (US) and United Kingdom (UK) is indicated. All other degrees were completed in South Africa.

FIG 1: When and where participants completed each qualification



5. STRUCTURE OF THE THESIS

I have not followed the conventional structure, which separates theory and methodology. The life history approach, which is both a theoretical perspective and a methodology, allows for the integration of these issues. In this thesis the theoretical and methodological issues permeate all sections of the work.

The thesis is divided into three main sections and two sub-sections.

1. *A Prologue* which describes the research project and the rationale for it. [Chapter One]
2. *Movement One* provides the landscape to life history work and the broader context in which the lives are lived. The background chapter provides a broader contextual description of the educational, political, social and economic conditions in South Africa during the period 1948 to 1994. The landscape to life history work contextualises life history work as a perspective and methodology and highlights the theoretical, methodological, political and ethical issues. [Chapters Two and Three]
3. *Movement Two* is in two parts. The first part deals with issues related to the representation of data in the form of storied narratives and the construction of these stories. The second part is the six stories constructed from life history interviews. [Chapters Four to Ten]
4. *Movement Three* is in two parts. The first part discusses the theoretical issues related to qualitative data analysis from the ten stories. The second part is the analysis of the data and suggests an explanation as to why this group succeeded in gaining a doctorate. [Chapters Eleven and Twelve]
5. *The Epilogue* summarises the theoretical and methodological learnings from the study. [Chapter Thirteen]

6. KEY ISSUES FROM THIS CHAPTER

The South African educational history from the perspective of black scientists has not been written. Their individual and collective stories have to be documented. There are studies about academic success in unequal societies at the school and undergraduate levels and there are studies about the experiences of people from minority groups in academic institutions. There do not seem to be any studies about the achievement of a doctorate in an unequal society. This study will contribute to filling that knowledge gap.

MOVEMENT

ONE

CHAPTER TWO

THE EDUCATIONAL, POLITICAL, SOCIAL AND ECONOMIC LANDSCAPE IN SOUTH AFRICA DURING THE PERIOD 1948 TO 1994

1. INTRODUCTION

The experiences of individuals can best be understood against the broader educational, political, social and economic contexts. This chapter provides an account of the conditions within apartheid society and especially in education (school and higher) that constitutes the immediate context in which individuals involved in this study lived. In addition there will be a discussion of the structure of the education system.

2. THE POLITICAL, SOCIAL AND ECONOMIC CONDITIONS BETWEEN 1948 AND 1994

In 1948 the National Party (NP) won the elections in South Africa and formed the government. The National Party's immediate policies were continued capital accumulation for whites on the basis of greater expansion of the manufacturing industry, the mechanisation of agriculture, Afrikaner economic advancement and separate development (called apartheid) as the mode of continued white political domination and black subordination (Badat 1999: 49).

The Nationalist government instituted various laws to ensure white domination and black sub-ordination. Some of these laws were:

- The Population and Registration Act of 1950 labelled all South Africans by race, making colour the single most important arbiter of an individual. All South Africans were classified into one of four racial groups (African, Coloured, Indian, White).
- The Group Areas Act of 1950 (also called Separate Development) controlled where the different race groups lived. Described by the Nationalist Prime Minister as “the very essence of apartheid”, this act required separate urban areas for each racial group. The conditions in Indian and Coloured areas were better and more developed than in African areas. The African rural areas were the most disadvantaged communities being located on land of the poorest condition with households not having running water or electricity.

- The Bantu Education Act of 1953 set out the guidelines for an apartheid education for Africans.
- The Extension of University Education Act of 1959 established racially and ethnically based universities.
- The Coloured Persons Education Act (No.47 of 1963) transferred the responsibility for education of the Coloured community from the provincial administrations to the Department of Coloured Affairs.
- The Indian Education Act of 1965 provided for the transfer of the control of the education of Indians to the Department of Indian Affairs.
- The Reservation of Separate Amenities Act of 1953 enforced what was known as “petty apartheid”, segregating parks, theatres, restaurants, buses, libraries, toilets and other public facilities according to race.
- The Job Reservation Act of 1956 indicated that there would be no competition from blacks for whites at a certain level of jobs.
- In 1959 the Promotion of Bantu Self Government Act created eight separate ethnic Bantustans (Transkei, Ciskei, Bophuthatswana, Venda, KwaZulu, Gazankulu, KwaNdebele, Kangwane). This was the foundation for grand apartheid. This secured the exclusion of blacks from the political system and the concomitant denial of full citizenship rights. The Bantustans, which constituted 13% of the largely barren surface area of South Africa, were also pivotal to white domination.

I will draw largely on the analysis provided by Badat (1999) in *Black Student Politics, Higher Education and Apartheid* and Nkomo (1990) in *Pedagogy of Domination: Towards a Democratic Education in South Africa* to paint a picture of the political, social and economic conditions in South Africa, especially as it pertains to education.

In apartheid South Africa social control over Africans was also maintained through extensive controls over movement, residence and employment (Badat 1999). The Natives Act in the 1940’s made it compulsory for all Africans from the age of sixteen to carry a reference book (“pass”) which had to be produced to an authorised officer on demand. During this period a number of laws and practices institutionalised the racially segregated and unequal provision of educational facilities and opportunities, housing, health care, transport, sports, recreation and leisure amenities. The government

prohibited inter-racial sport, worship, marriages and sexual relations. Although not experienced as harshly Indian and Coloured South Africans were also subject to most of the above laws. They were exempt from the pass laws but shared in common with Africans the experiences of job reservation policies, forced removals, and an absence of citizenship and political rights.

During the 1960s and 1970s whites owned most of the land and controlled almost all sectors of the capitalist economy. This was a period of economic boom. One result was the emergence of large business corporations. The new economy made large investments in technology and machinery. This had a significant impact on the technical division of labour. The previous unskilled-skilled labour dichotomy now gave way to one that required large numbers of technicians, supervisory personnel, administrative workers and semi-skilled labourers. In the context of job-reservation policies, the beneficiaries of the high and middle level jobs were mainly whites. Blacks were employed largely as semi-skilled labourers.

The 1960 to 1976 period both began and ended with the apartheid state in crisis. In the early 1960s the Pan African Congress (PAC) called anti-pass protests. The response by the government was the shooting of demonstrators at Sharpeville, the declaration of a state of emergency and the banning of the African National Congress (ANC) and the PAC. This method of dealing with the political crisis was to set the trend for the period as a whole (Badat 1999). New instruments were fashioned to suppress political activity. The Unlawful Organisations Act was passed in 1960. It was used to ban the ANC and the PAC. The General Laws Amendment Act provided for political detention. In 1967 the Terrorism Act was passed and during this period the Suppression of Communism Act was amended and eventually became the Internal Security Act in 1976. The military, police and security forces were restructured and strengthened to attend to internal dissent, as well as to the armed struggle launched by the exiled ANC and the PAC in the late 1960s.

The repression of political opposition created stability and extremely favourable conditions for capital accumulation. This provided the basis for the sustained economic boom of the 1963-1973 period; high rates of return on investment, extensive economic and political restructuring and the decline in internally based mass political resistance. The period also ended with the apartheid state in crisis. At the economic level a combination of factors led to recessionary conditions and an end to the economic boom.

Alongside this was the emergence of widespread strikes because of low wages and rising prices, which, owing to the number of workers involved could not be as easily suppressed as the others. These strikes together with the demonstrations and activities of black higher education students and school students signalled a revival, after a decade of silence, of mass and extra-parliamentary action. Developments in Southern Africa in 1975, like the successes of Frelimo in Mozambique, the defeat of Portuguese colonialism and the defeat of the invading South African forces in Angola all contributed to the militancy and assertiveness of black students. Thus, when the decree that Afrikaans should be the language of instruction for some school subjects was added to the under-funding, overcrowding and generally impoverished conditions of African schooling, the students were ready to take action. 16th June 1976 is a landmark day in South African politics.

The subsequent events were in the form of protest marches of the students, police shootings, countrywide student boycotts, parent demonstrations, and stayaways. The state responded, as in the early 1960's, with police and military shootings, mass arrests, detentions, the banning of individuals and the banning of numerous Black Consciousness and anti-apartheid organisations. The student uprising was of tremendous political significance. It contributed to the reconstitution of the terrain of mass extra-parliamentary politics in South Africa, and helped revitalise the exiled liberation movements. It also stimulated a re-thinking on the part of capitalists about how best to safeguard their interests in South Africa. The uprising compelled the state to engage in extensive restructuring of institutions, past policies and practices.

The division of the African population along geographical lines was to be supplemented by initiatives to promote class divisions. An explicit effort was made to foster the development of an African petit bourgeoisie (Badat 1999). After 1976 obstacles to training were to be removed, small businesses promoted and assisted, better houses built and petit discrimination eliminated. Considerable significance was attached to higher education in the creation of a black petit bourgeoisie. The aim was to produce a class of blacks who would have a stake in political stability and would "find their interests best served by an alliance with capitalism." Swainson (1991:95) reports that since 1976 there has been a massive increase in corporate investment in education and training and by the 1980's the ethos of 'social responsibility' was well established.

These attempts to “remodel political institutions, increase economic and education opportunities for blacks, and institutionalise relations between capital and labour in order to generate some legitimacy for the social order” (Stadler quoted in Badat 1999: 186) were double edged. On the one hand the reforms increased control in some areas and over some people and on the other hand granted concessions and attempted to co-opt others.

During the economic boom between the 1950’s and 1970’s, whites filled jobs at the skilled-labour level. As the economy expanded, however, the supply of white skilled labour could not match the burgeoning demand. Both capital and the state grudgingly began to consider ways in which this situation could be corrected. It now became clear that apartheid education had produced profound intellectual and occupational lags among blacks in general, and Africans in particular. At the higher education level, the disequilibrium could only be achieved, in the short term, by accelerated programmes and the judicious use of external scholarship assistance (Nkomo 1990:232). The long-term solution was the elimination of apartheid and the creation of a new social order.

Since 1976, there has been widespread interest within the international community, for varying motives, in providing scholarship assistance to black South Africans in particular since they have borne the brunt of educational neglect as a result of the apartheid system. Scholarships to countries like the United States of America, Britain and Canada were available in the country. There were also scholarships to the communist block countries but these were not accessible from inside the country. To uphold the apartheid structures the state also saw the need for a few blacks to gain a graduate education. The state did not disapprove of the scholarships to western countries. This meant that those who wanted to pursue an academic route could exploit this crack.

Black South Africans seeking to advance their education beyond the confines of apartheid found themselves in a double jeopardy (Nkomo 1990: 257). On the one hand, apartheid education served the interest of the racist regime by enforcing mass compulsory ignorance, by promoting limited literacy in response to the economic demands, by proscribing black intellectual development, by entrenching social stratification, and by giving the illusion of reform. On the other hand the educational reforms were regarded as a means of stopping a revolution (Nkomo 1990: 258): The quest for a decent and effective education for black South Africans was fraught with

contradictions. Nkomo recommended that in order to deal with the daunting challenges of the present and equip themselves for the more challenging tasks of a transformed South Africa, black South Africans had to take advantage of these opportunities despite the contradictions.

The post-Soweto period however was not simply characterised by state reforms. During this period there was an increasing centralisation and militarisation of the state and a significant shift in power from the legislature to the executive, with tremendous power and authority located in the hands of the State President. The State declared a State of Emergency in June 1986. This was renewed annually until June 1990. Areas of militant political opposition were occupied by the military, various organisations had their activities restricted and numerous activists were arrested and charged with treason.

The reforms and repression could not ensure continued white domination. The widespread political opposition in the country, the support for anti-apartheid organisations and the liberation movements, the severe international isolation and little improvement in the economic situation all combined to provide the impetus for the South African government's announcement on 2 February 1990 which set into motion political negotiations for a non-racial democracy.

3. EDUCATION IN SOUTH AFRICA DURING THE PERIOD 1948 - 1994

The major characteristic of the South African educational system (school and higher) is the legacy of apartheid ideology which provided the framework for structuring the educational system after 1948. This meant limited funding and inadequate provision of facilities for black (and especially African) education, as well as an organisational structuring of education that took a racial form. Starting with the Bantu Education Act of 1953, all education was officially divided along racial and ethnic lines to reinforce the dominance of white rule by excluding blacks from quality academic education and technical training.

3.1. Schooling

Segregated and, therefore, inferior black education have been common traits from the 17th century to the first half of the 20th century. Much of the pre-1948 education system was under missionary control. Gradually the state began to exert greater influence over African, Coloured and Indian education achieving final control from

1953 onwards. The conception was that education should be racially differentiated so that it provided elementary skills for Africans to meet the needs of industry and ensure that blacks would not compete with whites for the skilled jobs in the labour market.

The Nationalist Party victory in 1948 launched an extraordinary determination to gain firm control over all educational institutions for blacks. The Bantu Education Act of 1953, the Coloured Person's Education Act of 1963, and the Indian Education Act of 1965 were all pieces of legislation designed to ensure a differentiated and inferior education for blacks. The philosophy underpinning education for Africans is contained in Verwoerd's statement during the parliamentary debate on the Bantu Education Bill in 1953 that, "education must train and teach people in accordance with their opportunities in life, according to the sphere in which they live." He went on further to say that there was no place for the African "in the European community above the level of certain forms of labour." Even though no such specific reference was made of Indians and Coloureds it can be safely assumed, given South Africa's racial caste system, that their role and position was defined in similar terms as can be evidenced in their concentrations in certain occupations (Fatima Meer quoted in Nkomo 1990:294).

The Bantu Education Act of 1953 led to an education for blacks, and especially Africans, characterised by under-spending, lack of facilities, overcrowded classrooms, unqualified or poorly qualified teachers. There was also a shift in the curriculum because "by blindly producing pupils trained on a European model, the vain hope was created among Natives that they could occupy posts within the European community despite the country's policy of 'apartheid'." (South Africa. Parliament. 1954. Debates. Verwoerd). The Act introduced a system of education for African people designed to provide them only with skills that will serve the white economy.

The Bantu Education Act of 1953 proposed that all schools would fall under the control of the state and no school may be established without the prior approval of the Department. This meant that African primary and secondary schools operated by the church and mission bodies were given the choice of turning over their schools to the government or receiving gradually diminished subsidies. With the exception of the Roman Catholic Church, most churches either closed their schools or, under protest, handed the schools to the state.

In this new educational dispensation the State undertook to supply readers in the mother tongue and the two official languages to all primary schools. However, pupils in

post-primary schools had to buy all the schoolbooks they needed. All other school requisites, including pens and exercise books, in both primary and secondary schools, had to be provided either by the children, the Bantu authority or the parents association. Children without these school requisites were not to be enrolled in school. In this new educational dispensation Afrikaners occupied key official positions.

Nkomo (1990:2) lists the following objectives that apartheid education sought to achieve:

1. To produce a semi-skilled black labour force that would minister to the needs of the capitalist economy at the lowest cost possible. A related strategy was the intention to create a black middle class who would act as a buffer between the white minority regime and the vast disenfranchised black populace.
2. To socialise black students to accept the social relations of apartheid as natural. That is, to accept among other things, the supposed supremacy of Western civilisation (read white) and the “inferiority” of their own.
3. To promote white consciousness and identity for the purpose of forging solidarity between white labour and capital and to incorporate politically and ideologically white youth and workers into the state.
4. To promote the acceptance of racial or ethnic separation as the “natural order of things.” This was achieved through the imposition of separate ethnic schools to instill ethnic distinctiveness and pride enforced through separate ethnic residential townships in the urban areas and the Bantustans in the rural areas.
5. To promote intellectual underdevelopment by minimising the allocation of educational resources for blacks while maximising them for whites.

Nkomo describes apartheid education, at best, as a policy of benign neglect, at worst, as a policy that promoted compulsory ignorance. Examining the per capita expenditure on education for the different race groups provides an indication of the inequality of the education system.

Table 1: Per capita expenditure on education in South Africa (SAIRR Surveys, quoted in Christie 1987: 100)

Year	African	Coloured	Indian	White
1953-54	R17	R40	R40	R128
1969-70	17	73	81	282
75-76	42	140	190	591
77-78	139	253	513	913
82-83	146	498	711	1211
83-84	169	639	1112	1792

Nkomo illustrates the effects of the apartheid education with the following figures for 1984: the per pupil expenditure rate was at least ten times greater for whites as it was for blacks; there was a 50% attrition rate among African students by grade seven and barely 2% of these students successfully completed the twelve year school programme; a high illiteracy rate among blacks in general and Africans in particular; blacks made up only 34.2% of the university population and yet they formed 80% of the country's population.

The outcome of these policies in the work situation is that while blacks (Africans, Indians and Coloureds) constituted about 85% of the population; in 1985 they comprised 32% of the high-level manpower category, up from 25% in 1965 (for Africans as a separate class of this category the average is significantly lower) (National Manpower Commission 1987, quoted in Nkomo, 1990:295). The high representation in occupations such as nursing, education and government ministry somewhat skews the percentage. The rates are dismally low in such areas as engineering: 0% in 1965 and 0.1% in 1985; science: 0.6% in 1965 and 5.5% in 1985; medicine: 2% in 1965 and 8% in 1985; law: 0.9% in 1965 and 6% in 1985; architecture: 0% in 1965 and 3% in 1985 (National Manpower Commission 1987, quoted in Nkomo 1990:233). This situation arose in the context of the policy of separate development that no courses should be offered in the African ethnic universities for which employment opportunities did not exist within their "own societies."

Nkomo (1990) discusses the contradictions of an apartheid education. Four decades of apartheid have produced, on the one hand, hundreds of thousands of illiterate and semi-literate blacks who lack effective control over their lives. On the other hand, it has created, paradoxically, a serious structural problem for the economy due to a lack of skilled manpower. When Bantu Education was introduced the goal was to regulate African education to provide basic skills for use at the lower end of the occupational structure. At the same time restricted educational opportunities were available at the tertiary level to ensure the production of petty bureaucrats (clerks, interpreters, police etc) to run or manage apartheid structures, as well as social service professionals (doctors, nurses, teachers, lawyers and so forth).

3.2. Higher education

By 1948 there were 950 (4.6% of the total enrolments) black university students (Malherbe 1977:731). This figure reflects the under-development of both higher education and the pre-higher education sector. Most of the black students attended the South African Native College (later called Fort Hare) established by the Scottish Church in 1916. A small number of students also attended the white English-language universities of Cape Town, Witwatersrand and Natal and some enrolled through the correspondence institution, the University of South Africa. Although the white universities exercised autonomy over whom they taught, admission of black students was not encouraged (WUS/AUT quoted in Badat, 1999:49). The white Afrikaans language universities “rigidly refused to admit black students, although none of their charters, except that of Potchefstroom, prevented them from doing so” (WUS/AUT quoted in Badat, 1999:49).

In keeping with the apartheid philosophy of separate development for the different race groups and for an education in which whites would play the leadership role, the government passed the Extension of the University Education Act of 1959 (EUEA) which established racially and ethnically based universities. With this Act, the University of the North was established for Sotho, Venda and Tsonga speakers; the University of Zululand was established for Zulu speakers; the University of Fort Hare was restricted to Xhosa speakers; the University of Western Cape was for Coloureds and the University of Durban-Westville was for Indians. The EUEA formally restricted entry to universities according to race. Black students could be admitted to white universities only in cases where equivalent programmes were not offered at the black universities and only after ministerial permission was obtained. The period between 1976 and 1990, saw the establishment of several universities in the independent homelands. In 1976 the Medical University of South Africa opened in the homeland Bophuthatswana. Universities opened in the Bantustans of Transkei (1977); Bophuthatswana (1979); Venda (1983) and QwaQwa (1983). In 1983 Vista university campuses, for blacks, opened in the urban areas.

These ethnic universities were deliberately located in impoverished rural areas with limited social infrastructure and amenities. “It is the policy of my department that education would have its roots entirely in the Native areas and in the Native

environment and the Native community” (Verwoerd in the Senate of the South African Parliament: 7 June 1954).

The establishment of these universities along ethnic lines was consistent with the consolidation of Afrikaner hegemony and the production of a subservient black population. Black universities were not meant to sharpen the critical skills of students as was the case at white universities; they were meant to train “an African administrative corps to manage ethnic institutions in the homelands and, increasingly, to fill token middle management positions that have little impact” (Nkomo 1981:129). In keeping with the apartheid policies, the black universities were constructed largely as undergraduate teaching universities.

In 1959, on the eve of university education being segregated along racial and ethnic lines and placed under tight state control, there was a total of 4207 (this constituted 10.7% of the total university population) African, Indian and Coloured students registered at higher education institutions. Of these 4207, Africans constituted 44%, Coloureds 20% and Indians 36% of the students. Black students were registered predominantly in the humanities and education and were severely under-represented in the scientific and technical fields.

Between 1960 and 1976 there was a considerable increase in black student enrolments at universities. Enrolments at black universities rose by almost 400% between 1960 and 1965, doubled over the next 5 years and increased more than 100% between 1970 and 1976. Low fees, state bursaries and loans, expansion of the primary and secondary student enrolments facilitated access. On the economic side, in the 1970’s, the country began to feel the shortage of skilled labour. There was now recognition that blacks would have to be skilled, trained and involved in the labour market.

During the same period (1960 – 1975), black women were under-represented at universities. In 1968 they constituted 11.3% of the total black enrolments; in 1970 it was 18.9% and in 1975 it was 21.6%. From the inception to 1975 the new ethnic universities remained overwhelmingly male institutions in relation to students and academic staff.

After 1976/1977 there was a large amount of corporate capital invested in education. One aspect of corporate capital was to expand the number of bursaries for black students and increase the amount of money allocated for scholarships.

Programmes offering black students scholarships at overseas universities were also initiated and expanded. After 1976, there was an expansion in the number of first generation university students from working class families.

**Table 2: University enrolments in South Africa, 1969-1983
(SAIRR Surveys quoted in Christie 1987:118)**

	1969	1974	1976	1983
Black students in white universities, incl. UNISA	4886	9196	12 565	28 129
African students in African universities	1581	3541	5204	12550
Coloured students in Coloured universities	774	1440	2508	4487
Indian students in Indian universities	1621	2342	3124	5388
Total black students in all universities	8862	16 519	23 401	50 554
Total white students	68 550	95 589	105 879	126 609

There was strong state control at the black universities. White universities despite some limitations, enjoyed a considerable degree of academic freedom and administrative autonomy. Black universities were under the control of the Department of Bantu Education, Coloured Affairs and Indian Affairs. They were subject to extensive and authoritarian control with the responsible minister enjoying defacto control over both academic and administrative appointments. After the 1959 EUEA, all Rectors appointed to the black universities were committed Afrikaner nationalists. The state strategy was “to appoint their own men, some of them recent graduates, invariably from the Afrikaans medium universities and promote them rapidly” (Balintulo 1981 quoted in Badat 1999:71).

The severe restrictions on the administrative autonomy and academic freedom at black universities impacted in different ways: it conditioned the racial composition and ideological character of staff at the black universities and shaped the curriculum content. In 1970, black academics represented only 19% of the total academic staff at black universities and in 1974 it was 28.8%. At the African universities, in 1976, only 9 of the 105 professors and 14 of the 146 senior lecturers were black. At the level of junior lecturer there was greater parity between black and white (Badat 1999:72).

The conditions also served to structure the form of struggle and resistance that students would take – both in the formation of student political struggles and academic/intellectual struggles. Within this environment the three student organisations that impacted on the lives of the participants of this study were the National Union of South African Students (NUSAS); South African Students Organisation (SASO) and the Student Christian Movement (SCM).

Badat (1999) provides a description of these organisations. NUSAS had been formed in 1924 as a union of students at white universities. The majority of its members were white (in 1970 there were 27 000 white students and 3000 black students) (Biko 1978:27) and it had a strong support base among white leftist and liberal students at the English speaking universities. In the 1960's the Student Representative Councils (SRC) at some of the black universities affiliated to NUSAS. During this time, NUSAS provided one of the avenues to express its opposition to apartheid. It came under attack from the government and right-wing students. In the 1960's many black students felt a frustration and disillusionment with NUSAS and felt that it could not serve the immediate or long-term aspirations of black students. The South African Students Organisation (SASO) was formed in 1968. SASO became a loosely organised body whose task was the psychological upliftment of the black community. Africanness, positiveness and solidarity became its rallying point. In 1967 the Student Christian Movement (SCM) was formed as an inter-denominational organisation to explore what the church and individuals could do to bring about change in South Africa. On campuses there were close working relationships between SASO and the SCM.

With the ending of apartheid in 1994, the country set up a unitary system of education. All 21 universities fall directly under the jurisdiction of the Minister of National Education. While there are no restrictions as to who attends universities access is limited by the availability of funds. There are still many inequalities in the South African higher education system.

Bunting (1994) highlights some of them: access to higher education is skewed in favour of white people. In 1992 about 60% of whites aged between 18 and 22 were registered at a university or technikon or teacher training college, compared to only about 9% of Africans in this age group. In 1992 whites constituted 12% of the total population in South Africa, but had the following share of enrolments of higher education institutions: technikons 60%, universities 50%, teacher training colleges 15%. In 1990, 91% of all those in South Africa who held doctorates were white; 90% of those holding Masters degrees were white and 89% of those holding bachelors degrees were white. About 50% of students at Historically White Universities (HWUs) were enrolled for degrees specialising in fields which were supposed to be readily marketable – science, technology, business and commerce - compared to an average of less than 15% for Historically Black Universities (HBUs). In 1990, 45% of the academic staff at

HWUs and 23% of academic staff at the HBUs had doctorates as their highest qualification.

3.3. Research in South Africa

In South Africa the production of knowledge is largely in the hands of white intellectuals at the historically white institutions. The under-representation of blacks and women in research is a concern. There is a broad body of research documenting this under-representation (Qunta 1987; Evans 1991; Jansen 1991, Pityana 1993; Seepe 1993; Reddy 1995; Lewin 1995; Dyasi 1995; Naidoo 1996). The under-representation of blacks and women in research is also a concern to research funding councils and this is reflected in the mission statements of the Foundation for Research Development and Human Sciences Research Council¹.

Research conducted by Reddy (1995) reviews the status of research in science and mathematics education. In this research Reddy examined who were the authors of science and mathematics education research papers presented at the SAARMSE² conference. The proportion of SAARMSE paper authors according to race and gender over the period 1992-1994 is: white authors constitute about 60% and black authors about 40% of the total; females constitute 43% and males 57% of the total; black females constitute 14% and white females 29% of the total. African males constitute 17% and African females 5.5% of the total. Statistics in the Foundation for Research Development's *Science and Technology Indicators* (1993) show that the largest number of Masters and Doctoral students in the science and engineering fields are white. The picture with respect to Masters and Doctoral students' enrolment at university in Natural Science and Engineering (excluding Medical Sciences) is as follows: In 1991 enrolment for Masters and Doctoral programmes by race showed there were 252 Africans, 161 Indians, 106 Coloured and 4639 Whites. Genderwise 1060 females and 4102 males had enrolled. There are no statistics for race and gender in the science and engineering graduate studies but we can extrapolate that there are very few black females.

Another research concern relates to the underlying epistemological, theoretical and methodological assumptions of many of the research studies. Many papers on black

¹ These are now combined to form the National Research Foundation.

² SAARMSE is the acronym for Southern African Association of Research in Mathematics and Science Education.

education have portrayed the black student (especially the science student) in negative terms; such as having a lack of cognitive ability, poor study habits or lack of motivation to study science. Jansen (1995) in a keynote address to the SAARMSE raised concerns about science and mathematics education (SME) research in South Africa. Two of the concerns are the charges of racism and sexism in SME research. Jansen relates his experiences "... I was in a meeting recently where a noted South African scholar insisted that Indian students under-perform in science because of an innate (ethnic) reliance on memorisation." And, "I recently reviewed a paper titled 'Zulu students' conception of electricity', suggesting of course that Tswana or Sotho students would simply by virtue of their ethnic identity share a similar conception of light."

4. THE STRUCTURE OF THE EDUCATIONAL SYSTEM

4.1. School system

The structure of the school education system affecting the participants of this study was different for Africans and Indians and Coloured. African students attended eight years of primary school culminating in a public school leaving exam. High school was for five years from Form I to Form V. At the end of three years in high school students took a Junior Certificate examination and two years later took a Senior Certificate examination. In keeping with the Bantu Education Act African children needed to go to school for 13 years, as opposed to the other race groups (Coloured, Indians and Whites) who needed 12 years of schooling to qualify for a high school certificate. This system changed to twelve years in 1975.

Indian and Coloured students had 7 years of primary school (Classes 1 & 2, Standards 1 to 5). There were five years of high school (Standards 6 to 10) with students taking a Junior Certificate Examination at the end of standard 8 and a Senior Certificate Examination at the end of standard 10. With a Junior Certificate students could have entered the professions like teaching and nursing. For access to university all students needed a matriculation exemption certificate (this meant passing the matriculation with an aggregate of over 40%).

4.2. The University System

The general university qualification route was that students entering the university could register for a Bachelors degree. Most Bachelor degrees took a minimum of three years to complete. There were a few initial degrees that took four years to complete. On completing a three-year degree students then took an honours degree. The honours degree was generally completed on a one-year full-time or a two years part-time basis. With an honours or a four-year Bachelor degree, students could register for a Masters degree. After a Masters degree a student would then take a doctoral degree.

All universities in South Africa except the University of South Africa (UNISA) required students to attend lectures. UNISA offers its degrees through a distance learning route.

5. KEY ISSUES FROM THIS CHAPTER

The South African apartheid system disadvantaged blacks, and especially African, in the political, social, economic and educational spheres of life. The educational system was designed to produce a semi-skilled black labour force. One of the contradictions within the apartheid system was a recognition, from the beginning, that there was a need for a few black professionals to uphold the system. This need was highlighted in the 1970s by both the capital need and protest in the country. This meant access to tertiary education, a few scholarships for blacks and overseas scholarships. These contradictions in the system created a few opportunities that black students could exploit to proceed along an academic pathway.

CHAPTER THREE

A LANDSCAPE TO LIFE HISTORY RESEARCH

A good life history reads like a novel. Beginning with the objective facts, the reader is taken through his [sic] protagonist's life, one step at a time. The hero's reaction to each critical event are carefully detailed, and often presented in the light of other reactions and interpretations. The central figure in a life history presents the world through his own eyes.

Life histories are like novels in that the novelists, just like sociologists, interpret the experiences of their subjects within special theoretical frameworks ... A sociological life history is at once literary and theoretical. Without a theory to guide facts, a life history becomes bare description. Good life histories, like good novels, offer the reader a way of interpreting the findings.

[Denzin N K (ed.), *Sociological Methods: A Sourcebook* (London: Butterworth, 1970), pg. 471]

1. INTRODUCTION

The purpose of this research is to study the lives of black scientists in South Africa. I want to write stories of how their academic lives unfolded and provide an explanation for the achievement of academic success. I have chosen a life history approach for the study. This chapter will provide the landscape to understand the issues related to doing life history research. I will indicate why I chose this approach and will highlight the political, theoretical and methodological issues related to life history research. In addition I will discuss how I resolved the different methodological dilemmas which presented itself in the study.

2. MY GUIDING FRAMEWORK IN THIS STUDY

In undertaking this study to explain academic success in an unequal society there were certain underlying principles and assumptions that guided the work. Firstly, I did not want to locate the study within a particular disciplinary focus or apriori constructs. This would be an exploratory study where in-depth interviews and grounded theorising would suggest explanatory constructs as to why this group managed to achieve academic success. This would be a hypothesis generating rather than a hypothesis testing study. Secondly I wanted to write individual stories which would illuminate, from the subjective reality of the individuals, how various dynamics shaped the lives at particular moments and how these lives unfolded over a period of time. These stories would also serve a political function of illuminating success, and these scientists could serve as role models to other aspirant scientists. Thirdly, the life and the dynamics shaping the unfolding of the life change over time. I wanted to use a methodology that would capture the changes over time. Fourthly, while I wanted to capture the lives of

individuals, I also wanted to document the social history of black academics for the period and the place – apartheid South Africa.

Epistemologically, I concur with the realist position of Huberman and Miles (1998) who believe that social phenomena exist not only in the mind, but in the objective world as well, and there are some lawful, reasonably stable relationships to be found among them. In approaching this study I believed that regularities are to be found in the physical and social world, and it is from these regularities that we derive the constructs that account for individual and social life. This study is about seeking some of those regularities.

3. LIFE HISTORY RESEARCH

Throughout the 1980's a different kind of academic inquiry gained momentum. This inquiry invited the interpretations of previously ignored informants. Life history accounts provide a way to gain a first hand account of social experience from the participant's point of view. In life history research the method assigns significance and value to the person's own story or to the interpretation that people place on their own experience as an explanation for their own behaviour.

In life history research, the researcher conducts an in-depth interview with the participant in the study about her subjective meaning of her life experiences. The life history research attempts to locate the individual in their overall life experiences as well as the broader socio-historical background within which they live. Life history work emphasises the importance of the researcher in the process of gathering, interpreting and reporting biographical information.

Closely allied with the term life history are oral history, life stories, narrative, personal documents, testimonios and memoirs. The use of the different terms comes from the histories of the approach in the different disciplines. I do not want to dwell on the finer differences between these terms because I believe that the distinction is not important in my research but more likely to set up barriers. I will use the term 'life history'.

Life writings tell us something about an event or an experience. Each of these writings encompasses a certain distance (who is writing whose experience); time span (does it reflect a single momentary experience or does it reflect an experience over a certain time period?) and audience (who is the writing for – self, public or tutor). Autobiographies are self-initiated, retrospective, written accounts of a life and are

drawn out of the subject's own privileged perspective. Autobiography suggests the power of agency in social and literary affairs. Biography involves another person writing your life. The biography is constructed by interviews with central people or by reviewing documents. Life history is any retrospective account by the individual of his or her life in whole or part that has been elicited by another person. It uses both oral sources and personal accounts. In a diary events are recorded daily from an immediate perspective that is always changing.

Three forms of life histories can be distinguished: the complete, the topical and the edited. All three forms contain three central features: the person's own story of her life; the social and cultural situation to which the subject and others see the subject responding; and, the sequences of past experiences and situations in the subject's life. The complete life history will cover the entire sweep of the subjects' life experiences; and, the topical presents only one phase of the subject's life. An edited life story has the key feature of the continual interspersing of comments, explanations and questions by someone other than the focal subject.

4. LIFE HISTORY RESEARCH AND ITS UNIQUE CONTRIBUTION

Various researchers (Portelli 1991; Thompson 1988; 1993; Denzin 1989; Plummer 1983; Hatch & Wisniewski 1995) have highlighted the unique contributions life history research can make. The focus on the individual is the predominant characteristic that sets life history work apart from all other qualitative research. In sociology Denzin (1989) and Plummer (1983) indicate that by using a life history approach, human phenomena could be studied and understood from the perspective of the persons involved. The core of life histories is the continuous lived flow of historically situated experience with all the ambiguity, variability, malleability and uniqueness that such experiences usually implies (Plummer 1983). Life history research uses oral sources. Oral sources have the advantage to tell us not just what people did, but what they wanted to do, what they believed they were doing, and what they now think they did. Lives are flooded with moments of indecision, turning points, confusions, contradictions and ironies. The life history technique is peculiarly situated to discover the confusions, ambiguities and contradictions that are played in everyday experiences.

Most social science research presents material from a particular point of view. The perspective of life history research is the totality of the biographical experience – a

totality that weaves between one's own actions and the outside world. Life histories allow a reconstruction of the economic, political, cultural, migration and educational histories that are inaccessible through written documentation (Thompson with Perks 1993). Bogdan (1974: 4) shares this view.

The autobiography [life history] is unique in allowing us to view an individual in the context of his[sic] whole life, from birth to a point at which we encounter him. Because of this it can lead to a fuller understanding of the stages and critical periods in the processes of his development. It enables us to look at subjects as if they had a past with successes as well as failures, and a future with hopes and fears. It allows us to see an individual in relation to the history of his time, and how he is influenced by the various religious, social, psychological and economic currents present in his world. It permits us to view the intersection of men with the history of their society, thereby enabling us to understand better the choices, contingencies and options given to the individual.

Since a life history constantly moves between the changing biographical history of the individual and the social history of his/her lifespan, it can provide powerful insights into the process of change. In life history research a proper focus on historical change can be attained in ways that are lacking in many other methods. The gathering of a life history will entail a subject moving to and fro between the developments of her own life cycle and the ways in which external crises and situations (wars, politics, religion and economics) have impinged on this. A life history cannot be told without a constant reference to historical change and this central focus on change must be seen as one of life history's great values (Thompson 1981).

From a political perspective, the life stories (in the form of biographies and autobiographies) that have been published in the Anglophone world through the ages are those of the 'great white man – politician or general'. These are people with resources to have their stories told. Life history research has the potential and ability to produce the stories of individuals whose stories have not been told and who do not have access to having their stories written in the form of an autobiography or biography. Therefore the stories of disenfranchised and disempowered groups can be written. These stories can then illuminate how these lives are lived in their particular contexts.

5. A LIFE HISTORY APPROACH IN STUDYING LIVES

The revival of the use of life history projects has different origins in different countries and different disciplines. The resurgence of this methodology has both political and epistemological roots. As the Popular Memory Group (1982: 225)

indicates “Major shifts [in methodology] ... are more likely to arise from changes in political or theoretical preoccupations induced by contemporary social events.”

Many disciplines use a life history approach: literature, history, social science, education, feminist and minority perspectives. The disciplinary focus will highlight the approach that the researcher will use to interpret the experience and subjective meanings that the individual attributes to the experiences. Smith (1994) outlines the contributions from the different disciplines. Literary biographies create the possibility of a reflection of the human spirit, “it illuminates history, inspires by example, and fires the imagination to life’s possibilities. Good biography can create lifelong models for us.” The use of oral history projects, according to Thompson (1982: 99) can achieve something more pervasive and more fundamental to history. An oral history research project can be used to change the focus of research itself and open new areas of inquiry. It can give back to the people who made and experienced history, through their own words, a central place (Thompson 1988:2). Anthropologists have used life histories to study culture. The sequence of events as an individual passes through a culture during the course of a life is one view of that culture. Some psychologists have used documents to study personality or used life writings to look at stages in adult life, and aspects like mid-life crises. Sociologists create literary and narrative accounts and stories of lived experience. In sociological studies life histories can be used to study the individual in society – the study of the intersection of history, biography and structure. Feminists have used life writings to illuminate that the human experience is gendered. Studies on race and class would also echo these assumptions. Life writings for studies of race, class and gender examine issues of equity, power, social structure, self-definition and their inter-relationships (Smith 1994: 299). In education there is an attempt to use teachers life stories to change both the teachers themselves and the educational system. This involves getting non-mainstream voices entered into the dialogue about schooling.

Although the different subject disciplines use life history research, Portelli (1991) draws attention to the fact that this type of research tends to develop heightened awareness of inter-disciplinarity. Human beings do not belong to any one field of scholarly inquiry and therefore a life history study would involve convergence with areas like sociology, psychology, anthropology, politics and economics.

The use of personal narratives has been given a boost by feminist studies. According to the Personal Narratives Group (1989:3), traditionally, knowledge, truth and reality had been constructed as if men’s experiences were normative and as if being

human meant being a [white]¹ male. What was once accepted as normative is now recognised as being the limited and limiting perspective of a particular gender, class and race. This political climate of questioning knowledge production has raised questions in the different disciplines about whose experiences were used to create knowledge.

In South Africa, after the first democratic elections in 1994, the Truth and Reconciliation Commission was set up by the government to gather stories of how 'ordinary' people experienced apartheid and the atrocities committed during the apartheid era. Since it is a democratic state, it is time for South Africa's many histories to be told. The social history of black scientists is one of the histories that have to be written. In addition we need to use the experiences of these black scientists to generate knowledge about achieving academic success in an unequal society.

6. KEY METHODOLOGICAL ISSUES IN LIFE HISTORY RESEARCH

There has been much written about the theoretical and methodological issues in life history work and life history research. I take heed of the comments made by Hatch and Wisniewski (1995:131) "based on our review of manuscripts [as co-editors of *International Journal of Qualitative Studies in Education*] over several years, we see a strong tendency among scholars to reflect on their work and their place in it rather than do the work, a tendency Patai (1994:52) has labeled 'nouveau solipsism'." Hatch and Wisniewski continue "we are at the stage where we need a better balance between the examination of the methodological and personal understandings of life history and narrative procedures and the reporting of studies derived from this approach." There is a plea from researchers (Hatch and Wisniewski 1994; Thomson 1998) that there needs to be more studies using life history approaches based on the methodological consensus to date.

This section raises issues related to some of the debates in the life history field. In the discussion I will discuss the issue and indicate how I resolved it in my work. There will be further discussion of the methodological issues in chapters four, eleven and thirteen. The discussion of the methodological issues draws from work in the oral history, sociological, psychological and feminism fields and my perspective on these issues will be influenced by my realist epistemological position.

¹ My inclusion.

6.1. Memories leading to theories

In life history research, memories lead to theories (Portelli 1991). Thus there are questions about how well memory serves us: the reliability of memory, memory being distorted by other events or memory being mediated by subsequent events and learnings.

The process of recounting a life involves remembering things that may have happened a long time ago. A life history interview attempts to get a person to recount the event and attribute meaning to that event. But is the recounting an ‘exact replica’ of the event and does that matter?

The use of memory as evidence has come under criticism from traditional (documentary) historians and many qualitative researchers. The main criticism in the 1970’s, from the traditional historians, was that memory was unreliable as an historical source because it was distorted by physical deterioration and nostalgia in old age, by the personal bias of both interviewer and interviewee, and by the influence of collective and retrospective versions of the past (Thomson et al 1995:33). In addition, Thompson (1993) indicates that memory is always selective and its accuracy impaired by unconscious suppression, the confusion of one event with another (telescoping) and a slow but steady loss through the passage of time. Memory depends, not only upon individual comprehension, but also upon interest – one chooses to remember things that are of interest to you. When traumatic events are remembered from a long time ago and mediated by our present state there can be a tendency to glamorise these experiences.

While the early work in the narrative tradition sought to explain away the criticisms by looking at the process of remembering the work in the 1980’s by various researchers (Popular Memory Group 1982; Thomson et al 1994; Passerini 1979; Portelli 1991; Thelen 1990) saw memory as a process of creative construction. Rather than seeing memory as being an inert repository tapped from time to time by recall, these researchers saw memory as an active process of revision and creation. These researchers saw memory as a resource and by examining the composure of memory and why individuals construct their memories in particular ways memory could be used to explore the subjective meanings of lived experience as well as individual and collective memory.

Concern about the use of memory as evidence, ought to lead the researcher to take greater care with evidence. All recollections are a mixture of facts and opinions. Any life story is, of its nature subjective: a version of the past from one individual

perspective, seeking to make sense of the past. The special strength of oral history evidence is that it provides crucial evidence of driving forces, influences, relationships and turning points; even of mistaken beliefs that shaped decisions. Oral memory conveys both empirical information and subjective interpretations from the past and researchers need to distinguish between these two. The researcher needs to evaluate the evidence by looking for internal consistency in a particular interview and comparing it with other sources.

Portelli (1991) illustrates the historically conditioned nature of what people say by examining the types of folk songs that were recorded in different historical periods. Portelli examined songs collected in 1970-1972 and 1958-1959 and noticed that the type of songs (love, religious, political, social) were different in the two periods and what people chose to sing was dependent on the historical conditions.

In this study I am aware that the memory of individuals was affected by various experiences. In the process of remembering, the participants in this study, were making new sense and connecting the past with the present. An issue that affected the telling process is the political history of the country. The interviews were collected in 1996 and 1997. This was just after the first democratic election and during the time of President Mandela's leadership where reconciliation among the race groups was a key issue in the country. In view of the mood of reconciliation it is probable that they would have been silent about the bitter memories. The stories have to be understood as historically conditioned by that mood.

The participants in this study are in high level, public positions and they knew that there would be no anonymity in the stories. This would have affected the telling process. In any conversation, people always make decisions about what they want to say and what they want to be silent about. In the case of these interviews participants would always be making decisions about aspects of their lives they wanted to keep private and aspects they wanted to place in the public domain. In the interviews I took the stance of an empathetic listener and did not cross question experiences. If there was an indication that the participant wanted to keep certain aspects private, I chose to respect the private domains and did not pry. I was led by the participants about what they wanted to say.

In this research I acknowledge that memory would be constructed. Because of the mood of reconciliation and the public positions of the participants there would be silences about issues that they perceive would affect their public lives. In the stories I acknowledged and respected silences. It is not the purpose of this research to determine

the construction of the memory of the participants. I am looking at what was said and looked for internal consistency to provide an analysis from what was said. In addition, for the reader and researcher, to understand the point from which the story is told I interviewed the participants about their experiences after gaining the doctorate. The individual stories include a brief section about their careers after the doctorate.

6.2. Relationships in a life history research project

Life history research and the eliciting of experience and life accounts are shaped through the development of relationships. The nature of the relationship between the researcher and the participant affects the process of eliciting the experience and analysis of the data.

There is debate about the depth, quality and intensity of research relationships. Lawrence-Lightfoot (1997:137) outlines the characteristics of the relationship that would be located at the ends of this continuum which considers these dimensions. At one end researchers believe that “the relationship between the researcher and the subject should be clear, distant and formal ... to blur the boundaries would be to distort the researchers objectivity and threaten the rigor and validity of the research.” At the other end of the continuum, researchers claim that “relationships are complex, fluid, symmetric and reciprocal...and are likely to yield deeper and better social science.” In life history studies relationships would tend towards the side with a higher degree of symmetric and reciprocal relationship.

The life history interview is a social process and the result of a relationship between the researcher and participant. The researcher brings her own personality, understandings, experience and biography to the task of creating a life story. The participant brings certain expectations of what she thinks the interviewer wants and expects to hear and what will be not be ‘acceptable’ to the interviewer. In this research participants indicated that they were willing to participate in the project, “if it would contribute something to mathematics and science in the country, then I would gladly do it.” Their motivation to be part of the research project included presenting a positive view of their academic pathways and this would shape how they responded to the interview.

The process of listening and the relationship is shaped by an empathetic stance. Empathy denotes an intimacy, but an issue in this relationship is whether the researcher should offer her own experiences to develop rapport. Marshall and Rossman (quoted in

Lawrence-Lightfoot and Hoffman Davis, 1997:148) feel that researchers should not offer their own experiences. They suggest a stance of receptivity and openness, welcoming the interviewee's perspective and conveying the idea that the interviewee's perspective is acceptable and valuable. Larson (1997) relates her experience of being interviewed and she makes a case of the interview process being a conversation where both the interviewer and the interviewee share their experiences.

In addition to empathy and understanding from the researcher, there should also be some degree of resonance between the life of the researcher and the participant (Lawrence-Lightfoot 1997:148). The nature of the relationship is affected by issues of race, class, gender and whether one is an insider or outsider to the situation. Grele (1975: 135) comments that, "The recorded conversations of oral history are joint activities, organised and informed by the historical perspectives by both participants. No matter what the construction of the narrative, the product we create is a conversational narrative and can only be understood by understanding the various relationships contained within this structure." When the participant calls up deeply emotional experiences the researcher should be able to identify resonant experiences and feelings.

Although there is intimacy in the relationship there is also a need for boundaries between the researcher and the participant and a need to protect the vulnerability of the participant. Life history work can be deeply emotional, but it is not therapy. These are difficult lines to draw, but the researcher must keep in mind the question and guide the research. In the process of navigating intimacy the researcher must learn how to discern her own motivations and to see the difference between legitimate inquiry and voyeurism.

In order to understand how the relationship between the researcher and participants affects the research process, Measor and Sikes (1992) suggest that the researcher's position in relation to the research ought to be acknowledged, examined and explicated. I am a black South African female, of Indian origin, in my early 40's studying for my doctorate. I am a science educator and have been a past chairperson of the Southern African Association for Research in Mathematics and Science Education (SAARMSE). During this period I was involved in issues of research capacity building (for black researchers) and the politics and ethics of research. By virtue of my involvement in science education and SAARMSE I have come to know and be known by the community of science educators. This status gave me easier access for interviews with a number of the participants.

How did I affect the research process? In the research on some attributes I was an 'insider' and with others an 'outsider.' I was an insider to some of the participants as a woman but an outsider to men. I was an insider to the Indian group but an outsider to the African group. I was an insider as a science educator but an outsider to the microbiologists. We possess multiple identities and there were some aspects with which I had resonance and to other aspects that I was distant. During the interview process there must have been aspects that I missed and aspects that I was more aware of. In the stories I do not claim to have captured the total reality of the life.

When I consider the research relationship, the attribute that was the greatest 'impediment' in the data collection process was my awe of the participants. They had completed their doctorates and I was in the early stages of my doctoral research programme. I wanted to make an impression that I was a smart researcher, was aware of their status within the intellectual community and had to overcome my awe. I had to constantly remind myself that I was in charge of the research relationship.

During the research process I adopted the role of an empathetic listener. The research relationship was professional with the participants clearly committed to answering the questions to the best of their abilities and me trying to steer the discussion in a way that will provide me with data to answer my research questions. In the earlier interviews, I wanted to share my experiences with the participant and respond to their comments with my experience. This 'conversation' confused both the participants and me. With great difficulty I had to resist wanting to engage in a conversation and shifted to an empathetic listener and let the participant dominate the conversation space.

The issues of relationship in the analytical process are dealt with further in chapter eleven.

6.3. Crises of representation: al la post-structuralism and post-modernism

The post-modernists and post-structuralists view the use of experience to form theories about life as inappropriate (Hatch and Wisniewski 1995: 129). There is a distinction between lives-as-lived (reality), lives-as-experienced (experience) and lives-as-told (expression). A life lived is what actually happens. A life experienced consists of images, feelings, sentiments, thoughts, and meanings known to the person whose life it is. A life told, a life history, is a narrative influenced by cultural conventions of telling, by audience and by social context (E M Bruner as quoted in Miles and Huberman (1994), pp267). The researcher only has access to lives as told. In the life history

interview individuals give subjective meanings to their life experiences and researchers attempt to capture these meanings. In any research the issue is how we interpret the difference between a lived life and a told life.

Post-modernists and post-structuralists maintain that the act of telling one's story is an act of creating one's self. Michelle Foster (quoted in Hatch and Wisniewski 1995:121) questions whether biographical research can accurately represent reality since "post-structuralism questions whether researchers can gain access to an independent reality."

In the telling of the story, the participants and researchers are bound by discourse structures to a limited range of expression and understanding. These discourse conventions shape and in many ways limit how we conduct our own versions of a life (life-as-experienced) and how we organise and express ourselves through story (life-as-told) and how such lives can be understood and represented in text. The challenge for researchers is to reconcile real lives with representation.

The life as told may be different at different times with different audiences, or when told with a different purpose. Narrative identities are dynamic, partial, fragmented and context dependent. Postmodernists raise questions about the role of researchers, but life history work explicitly acknowledges the existence of multiple and possibly conflicting, personal realities and perspectives. It acknowledges the part played by the researcher in selecting the field of study and interpreting the data.

There is the issue of the researcher's subjective involvement in the construction of the life story or narrative. Tellers have their own purpose in telling the story and receivers have their own agendas and priorities in leading them to unconsciously or consciously select events to observe, record and report. Researchers need to acknowledge and monitor participation in the construction of the storied lives of the informants.

The concerns of the post-structuralists and post-modernists could be seen as debilitating and leading to a paralysis or they could create an awareness of the different issues that have to be considered when theorising about lives. In my research, the purpose of constructing the stories is to illuminate how a life unfolded within a certain context. I have no intention of dissecting the subjective interpretations given by the participants or of analysing their identity. As I explain later (Chapter 11, Section 2) I have taken a realist position in this research. The interviews will be used to construct stories, and readers will be told how the various issues impacted on the construction of

the story. In constructing the life histories of individuals, I have chosen not to represent the individual in isolation, but rather the individual is represented in relation to the “cultural systems that surround us” (Sparkes quoted in Hatch and Wisniewski, 1995:123).

6.4. Individual stories leading to collective understanding

One of the concerns of life history work is whether the stories are individual, solipsistic or idiosyncratic or whether they are connected to socio-historical events. Many researchers (e.g. Schempp, Denzin, Cole, Smulyan quoted in Hatch and Wisniewski, 1995) claim that what distinguishes life history work from other forms of narrative is that “the life is seen as lived in a particular time, place and under particular social circumstances rather than a simple collection of events” Hatch and Wisniewski consider the power of life history and narrative accounts in the dialectic between the unique experiences of individuals and the broad constraints of social, political and economic structures. Keegan (1988:131) also highlights the importance of the individual stories against larger context because, “When set in the larger historical context, the reminiscences of obscure individuals begin to reshape our understanding of major forces of social change.”

Academics like Karl Marx and C. Wright Mills have argued that we cannot understand the history of the individual or the history of society without understanding both. C. Wright Mills (1967) in his book *The Sociological Imagination* makes the plea that any social study must consider that every individual lives in a society and within a historical sequence. Therefore, “no social study that does not come back to the problems of biography, of history and of their intersections within society has completed its intellectual journey” (1967:6). Individuals live within a context – this could be the family, the community or the state. Any study about human and social action must shift between the intimate features of the human self and the impersonal remote structures present at the time. The life history method offers the opportunity for grasping the dialectical relationship between individuals and their social, political, economic and historical contexts.

If we recognise that individual stories ought to be connected to the larger contexts of society we need to know how. Goodson (1992) and the Personal Narratives Group (1989) both indicate the importance of applying theoretical frameworks to life stories to elevate the stories from the idiosyncratic and solipsistic. The Personal Narratives Group

address this issue in relation to women's individual experiences, "We maintain that personal narratives are particularly rich sources because, *attentively interpreted*, (emphasis added) they illuminate both the logic of individual courses of action and the effects of system-wide constraints within which these courses evolved" (pg. 6).

In this study, Chapter Two: The Educational, Political, Social and Economic Landscape in South Africa during the period 1948 to 1994, provides the broader context by which to understand the individual experiences. In writing the individual stories and in the cross-cases analysis in this study, the experiences are juxtaposed and made sense of against broader contextual issues. Further the interpretation will be linked to the analytical framework of the researcher.

6.5. Sampling and representativity

An issue for the life history researcher is the decision of who to research about. Should there be a random sample to ensure representativeness? Life history research is exploratory and intensive. There is little chance of a large, representative sample. A life history research could be hypothesis generating and these hypotheses could be tested with a more representative sample at a later stage. Life history informants are not taken as typical or representative. The sampling is strategic rather than random. Like Strauss and Glaser (1967) who use 'theoretical sampling' strategies, similarly in oral history interview people are chosen for what they can say rather than whom they represent. Grele (1975) suggests that in life history work, "interviewees are selected not because they represent some statistical norm, but because they typify some historical process. Thus the questions to be asked concern the historians concept of the historical process and the relevance of the information garnered to that process. The issues are historiographical, not statistical." Good participants for a research project are those who are articulate, able to tell a story and have a grasp of a particular cultural world. It is important that the story illuminates the issue being studied. This could mean that the stories of the most disempowered, who do not feel confident to articulate their experiences or reflect upon their experiences, might never get told.

The tension in life history work is the degree of uniqueness or typicalness of the story. In research, the stories, although individual accounts, relate to the broader and shared patterns of culture and it is the researcher's responsibility to draw out the common shared elements and to see the stories as both unique and representative.

Research using surveys uses items in the survey instrument that is generated from particular contexts. As the Personal Narratives Group (1989) indicate that knowledge has been constructed as though the [white] male experience has been normative. A life history approach, using a group whose experiences have not been analysed before, could lead to the generation of new hypotheses. These hypotheses are still incomplete because the methodology favours samples who feel confident to articulate their experiences. The knowledge generated from this research attempts to add a layer of meaning to the present body of knowledge. There are still other sets of experiences that need to be analysed (maybe by other methodologies). The research does not attempt to generate grand theory, from the ten data sets, but a local theory whose applicability in other contexts could be examined by using Lincoln and Guba's (1985) construct of transferability.

I decided to write the life stories of ten black scientists. The number ten was not a statistical choice, but one which I thought convenient. On reflection, it is possible to have a reasonable cross-case analysis with six stories. In the study I made a decision to document the experiences of black scientists. The decision was political because this was an unequal society. The choice was also based on the assumption that the academic pathways for the racially advantaged and disadvantaged groups would be different. The number of African, Indian and Coloured participants in the sample was not made on any scientific basis but had to reflect the population demographics. In the sample I interviewed seven Africans, two Indians and one Coloured. I made a decision that the sample would consist of five women and five men. This was to ensure an equal representation of the sexes.

My definition of a scientist was one who had completed a doctorate in the sciences or in science or mathematics education. To follow that route the participants would have had to complete a Bachelor of Science degree and then follow with graduate degrees in science or science education. I decided to interview people around a certain age group. If I wanted to write any coherent social history it would be more fruitful to look at a particular historical-contextual period. I decided the sample would be of people around 40 to 50's years – there would then be some resonance with some of my political and educational experiences.

In choosing the participants in the study I initially chose people whom I knew and could access easily, in the science and science education field. I knew that the life history method involved an empathetic, intimate stance. I chose people that I knew

because I felt that this would allow for a more open interview. I discuss the issue of sampling again in chapter 11.

6.6. Voices: given, stolen or heard

In recent narrative and life history research, the progressive political intentions have often been represented in the metaphor of voice. Many life history projects make the claim that the project attempts to empower the participants. In recognising the quest for equity and social justice of life history work; researchers must recognise their role in the production of life histories. Researchers talk about “giving voice’ to those who are marginalised because of class, race or gender. But can we (researchers) give voice?

Reissman (quoted in Casey 1995) places the issue of the role of the life history researcher in perspective: “We cannot give voice, but we do hear voices that we record and interpret.” The researcher is in a privileged position of having the skills to record and interpret voices. Portelli (1991:55) also shares this view indicating that that oral history “is not where the working classes speak for themselves.” The control of the history remains firmly in the hands of the researcher. In the construction of the life story the researcher sets the agenda for the interview, poses the questions and during the interview process tries to elicit the event, the experience and meaning attributed to that experience. The researcher is then responsible for the analysis of that data, according to a framework that has been set by the researcher. Chase (1996) raises the issue of who should control the “interpretive process” in qualitative research. As a feminist, in her research Chase had to grapple with the issue of her “authority as narrative analyst” in the research process. The researcher’s role is to transform particular stories into examples of larger social phenomena and this could lead to tensions with the participants. Chase acknowledges that the analytical and research process was driven by her agenda (frameworks, timelines and purposes). There could be a tension if the participant does not agree with the researcher’s interpretation but we have to recognise that in the research process that it is the researcher who has the “interpretive authority.” Sometimes, when there is conflict between the researchers and participants agenda it can result in voices being “stolen” (Elinor 1992) in the name of research and publication.

Researchers may see their role as ‘giving’ voice to the disempowered but we need to recognise that in situations of unequalness the problem maybe “not with the voices that speak but with ears that do not hear” (Casey 1995).

In this study I want to use the stories to illuminate the lives of the black scientists interviewed. The members of the group are capable of writing their own stories, if they wanted. However, I have chosen to do this research project and it is my agenda (gaining a doctorate or writing an academic paper) that is being best served in this process. I hope in that process, the research project can contribute to a more equitable research society in South Africa.

Linked to the issue of power relations and voice in the research is the question of ethics. Life history work is intimate, involves trust and could make the participant vulnerable. There are codes of ethics about treating the participant fairly, about trust, about ownership and authorship that are considered.

In this study, I am the researcher and set the question and methodology to answer the question. The final interpretation is mine, but it is based upon the participants initial interpretation of their experience. During the process of writing the stories I sent the stories to the participants for comment. I set up a mechanism to ensure that the participants had a say in what I included in their individual stories. These issues are discussed further in chapter four and chapter eleven of the thesis.

At the end of my interview the participants signed a letter giving me copyright of the taped interview. While I legally owned the words, my approach to the study was based on a code of ethics. The persons involved in the study had no anonymity and therefore anything written about them must meet their approval.

6.7. Advocacy in life history research

Life history work has a political dimension and in writing life histories there is an element of advocacy. The history and development of a life history approach, especially through the work of oral historians, educators and community writing projects have been linked with campaigns, group actions and empowering people who have been traditionally excluded from power, including the writing and rewriting of history. Many life history researchers see their involvement in this type of projects as contributing to a more just and equitable society.

Advocacy implicitly indicates a much deeper political and personal involvement by the researcher than that of external, distant researcher. Being a life history researcher is not a matter of ideology, of subjective side-taking or of choosing one set of sources instead of another but it does imply a commitment to a cause. A political agenda of illuminating a life perspective encompasses a more empathetic attitude towards the

teller and most life histories are written in a way that celebrates a life. Because of this stance a critique is that the researcher would not be able to maintain critical distance from the data in order to theorise about life. The writing could lead to hagiographic accounts.

This is a systematic study of lives. While the study is about the celebration of success, it is not a psychoanalytic study of the individual or an hagiographic description of the person. The purpose of the study is to understand why these individuals succeeded and it includes both the ups and downs. In all parts of the research I have made the analytical frameworks used to generate theory in the research explicit.

6.8. Storytelling or research?

An often asked question in life history research (which is done for academic purposes) is how the life history document differs from journalism or story-telling (popular writings). In life history research the data is analysed from some framework. This makes it different from journalism or story-telling. A life history account is not only about events or structures or patterns of behaviour, but also about how these are experienced and remembered. A person tells a story. A story written as is, without any analytical comments and an acknowledgement and explanation of subjectivity, is storytelling or journalism (Portelli 1991). Identifying and explaining subjectivity by the teller, explaining the event in terms of how it is experienced, remembered and told, or locating it in a socio-historical period is what shifts it from story-telling to research.

In life history research, we cannot say 'let the data speak for itself.' The researcher's job is to provide an explanation of the data in terms of the historical and social (including the nature of the relationship between researcher and participant) conditions under which the data was collected. The researcher has frameworks through which she looks at the data. This framework needs to be communicated to the reader.

6.9. Truths in life history research

The issue of truth in work that involves experience is a complex one. Critics of life histories say that authors of personal accounts can say what they want to say, hold back what they do not want to say and slant things to suit themselves.

The Truth and Reconciliation Commission (1998) describes four types of truth that were relevant to their work: factual or forensic truth; personal or narrative truth; dialogue or social truth; and healing and restorative truth. Factual or forensic truth refers

to the familiar legal or scientific notion of bringing to light factual, corroborated evidence and of obtaining accurate information through reliable (impartial, objective) procedures. Personal or narrative truth gives meaning to the multi-layered experiences of a story. This truth is told in the form of a story rather than through argument and it provides unique insights into the past. It captures peoples' experiences, perceptions and stories. Narrative stories record what has not been told before and seeks to recover parts of the national memory that had been previously ignored. The personal and narrative truth was central to the work of the Truth and Reconciliation Commission. Dialogue truth is social truth and the truth of experience is established through interaction, discussion and debate. Establishing this truth depends on the process through which it is told. In the TRC it involved people from all walks of life being invited to participate in a process which was transparent. A healing and restorative truth places facts and what happens within the context of human relationships and it requires acknowledgement of the experience. This truth is central to the restoration of the dignity of victims.

In my study, I am looking at personal truths. The Personal Narrative Group (1989) explores the dimension of plural truths: the truths of experiences, history and perceptions that are embodied in personal narratives. Passerini (in Personal Narratives Group 1989: 261) indicates that "all autobiographical memory is true. It is up to the interpreter to discover in which sense, where and for which purpose." To understand what is communicated in a personal narrative we have to consider the conditions which create these narratives, the forms that guide them, and the relationships that produce them. The life history researcher should determine the biases, silences and exaggerations and the analysis must include an explanation for these biases, silences and exaggeration.

Personal narratives produce truths that are specific and are not abstract generalisations of life. The Personal Narrative Group (1989:263) consider these specific truths as important because they are "revealed from real positions in the world, through lived experiences in social relationships, in the context of passionate beliefs and partisan stands.... It is because of their subjectivity, their rootedness in time, place and personal experience, and their perspective ridden character that we value them."

Generalisation without truth of experience is fruitless. Looking at truths from experience gives us an opportunity to generate theory from a different approach. In this process we may generate theory that questions assumptions underlying the traditional knowledge base.

In this study I accepted the stories told by the participants. I was not looking for forensic truth but wanted personal truth. It was my responsibility as the researcher to interpret the experience. The issue of truth is dealt with further in chapters four and eleven.

7. WHAT DID I DO IN THE RESEARCH

7.1. The question

The purpose of the research was to provide an explanation of how and why the lives of black South African scientists unfolded along their path to gaining a doctorate. I wanted to develop individual stories about their academic lives and had do a cross-case analysis to postulate an explanation as to why they managed to achieve academic success in unequal South Africa.

7.2. The sample

I chose ten people to interview [Appendix A]. See discussion above relating to issues of the sample.

7.3. Setting up the interview and logistics

I telephoned each of the participants and explained the project to them. I indicated the commitment and time needed from them to be part of the project. I followed the telephonic conversation with a letter outlining the goals of the project and what was required from them [Appendix B]. Without exception everyone indicated a willingness to participate. The reason they were willing to participate on the project was that “if it would contribute something to mathematics and science in the country, then I would gladly do it”. Many of them knew me from my involvement in the science and mathematics education research field and felt that the project would be credible. For those whom I had not met before, I mentioned the others who would be involved in the project and they also agreed to participate.

7.4 Interview schedule

I had two options of how to elicit the information: one was to have an interview schedule and the other was to ask an open-ended question about ‘tell me how you became a scientist’. As a newcomer to life history research I felt I would be better able

to conduct a structured than an unstructured interview. My first interview schedule comprised questions around the various shaping dynamics: politics, culture, society and individual. A colleague, Renuka Vithal, from the University of Durban-Westville, agreed to be interviewed under the pilot schedule. I felt that the interview jumped around different time periods and I was unable to bring coherence to the interview process.

I was then exposed to the Thompson and Perks interview schedule and felt more comfortable with the idea of a “biographical approach” (Levinson as quoted in Plummer 1983) or structured interview schedule for this stage of my training in life history work. Using the interview schedule developed by Thompson with Perks (1993), I developed an extensive interview schedule [Appendix C]. I piloted this instrument with Keith Lewin a colleague from the University of Sussex.

The revised interview schedule had a chronological set of questions. The initial questions were around early life, parents, siblings, grandparents, religion, politics, social class and how these impacted on the educational life history. The next set of questions related to primary and high school and the influence of the teachers, principal and the school milieu. Thereafter there were questions related to university life up to the time of gaining the doctorate. This data formed the main part of the stories. There was a set of questions related to work and work institutions; the research community and reflections related to how race and gender issues impacted on the trajectory.

Although I had a structured questionnaire, it was more as a memory jogger than a rigid plan. I asked a general question at the beginning and most people, in their answers, covered many of the questions.

7.5. Interview technique and mechanics of the interview process

During the interview I used a tape recorder (Sanyo Mini Cassette Recorder). I found tape recording and listening to the interview to be difficult. I spent lots of time and energy wondering if the tape was recording. This meant that I wasn't always totally listening to the interview and may have missed some chances for probing deeper.

I set up the tape recorder between the participant and myself and explained the project. I reminded people to talk about their experiences and started off the interview with questions from the interview schedule. I listened, empathetically, to the answers of the participants. My initial response was to have a conversation and recount my experience. I tried this a few times and found it got in the way, took too much time and

distracted from the purpose of the interview. I decided to listen to the participant and when the tape recorder was off I would add a bit of my biography or relate an incident from my life. With some of the women, at the end of the interview process, I suggested going out for lunch and then we would share experiences.

During the interview process I would listen and give, what I thought, was adequate time to answer. There were times when I rushed onto the next question before the participant had finished, but they were assertive enough to say 'I would like to go back to a point I made earlier' or say 'I have not finished answering that'.

I scheduled the interviews for three x 2 hour sessions. Initially, I wanted three consecutive sessions thinking that this would be convenient for the participants because then we could get the story 'at one sitting'. As I started the interview process I realised that this was tough on me to listen and digest and even tougher on the participants. They were in highly pressurised jobs and taking up two hours of their day for three consecutive days was a major chunk of time. For two of the participants (Romilla Maharaj and Phuti Ngoepe) I made special trips to places a long way away from Durban (Cape Town and Pietersburg). I conducted the complete interview on consecutive days. For people from Durban, Gauteng and University of Zululand the interview process sometimes stretched over a few weeks. One participant's interview was difficult to schedule over a few weeks. It took a few months to complete the whole interview. Appendix D indicates the time for each of the interviews.

Many of the participants were in high level public sector positions and were articulate about their experiences. During the interviews there was a problem when they would go into an intellectual, abstract mode and express opinions and theories about issues. I was interested in their subjective experiences and interpretation of those experiences. I would then re- direct them to talk about their experiences. As the participants knew they would not have any anonymity they to be selective in what they said. They were in public positions and the experiences and reflections they chose to share would be determined by the impact this had on their present public positions. Here I took the stance of an empathetic listener and did not cross question experiences. If there was an indication that certain things would be private, I chose to respect the private domains and did not pry. I was led by the participant about how much they wanted to tell.

MOVEMENT

TWO

CHAPTER FOUR

CRAFTING A STORY: REPRESENTATION OF DATA

1. INTRODUCTION

I have generated the transcripts from the interviews. Now what? I have chosen to represent the life history interview data in the form of storied narratives. This movement will be in two parts. Part I(Chapter Four) deals with the theoretical issues related to the development of the stories. Part II (Chapters Five to Ten) contains the six stories that I have constructed from the transcripts.

In this chapter I will discuss issues related to: the epistemological and political dimensions of stories; stories, narratives, storied narratives and the construction of analytical stories; examples of how stories are written; issues to be considered in constructing a story; the truth value of a story and what I did in the process of constructing the story.

2. EPISTEMOLOGICAL AND POLITICAL DIMENSION OF STORIES

Stories provide a way of coming to know (epistemological function) how a particular outcome was achieved as well as serve a political function in illuminating lives that would have otherwise been unknown.

2.1. Epistemological dimension of stories

One of the problems in qualitative research, especially in case study and life history work, is the question of explanation. Can the researcher say what causes something to happen and why? According to Olson (quoted in Bruner 1985), in traditional Western thought, true knowledge comes from logical and formal style of reasoning. In recent years other ways of reasoning have been proposed. The cognitive psychologist, Jerome Bruner; the social scientists, Becker and Abbott, the neurologist Sacks and the author Krog have used stories as a way of knowing and providing an explanation.

Bruner (1985:11) contends that there are two modes of cognitive functioning, which he calls a story and an argument. The story and the argument provide distinctive way of ordering experience and constructing reality. These two modes, though

complementary, are irreducible to one another. A story and an argument have operating principles of their own; their own structure and type of causality and their own procedures of verification. Argument convinces one of truth and verifies by eventual appeal to procedures for establishing formal and empirical proof. Stories convince one by their lifelikeness and establish not truth but verisimilitude (appearance of being true). An example of this is the term *then*. 'Then' functions differently in the logical proposition "if x, then y" and in the narrative "the king died, and then the queen died." One leads to a search for universal truth conditions, and the other for likely and possible particular connections between two events.

Bruner characterises these two modes of thought as the paradigmatic and the narrative. The paradigmatic or logico-scientific mode attempts to fulfill the ideal of a formal, mathematical system of description and explanation. The purpose of the explanation is to show causality with dependent and independent variables. Bruner(1985:13) contends that the narrative mode deals in human intention and action and the vicissitudes and consequences that mark their course. It strives to put events into the particulars of experience, and to locate the experience in time and place. Bruner, a psychologist, focuses on the individual and human intention and action. Narrative psychologists have used the telling of stories to understand how individuals interpret and give meaning to their lives. Krog (1998) sees narrative understanding as our most primitive form of explanation. "When events fall into a pattern which we can describe in a way that is satisfying as a narrative then we think we have some grasp of why they occurred" (1998: 196-197). Sacks (1985: viii) uses stories in medicine "to bring us to the very intersection of mechanism and life, to the relation of physiological processes to biography." Sacks further contends that in neurology the patient's personhood is essentially involved, and the study of disease and of identity cannot be disjoined. In the social sciences, Becker (1992:108) describes the work of Abbott, who advocates the use of stories to explain why a phenomenon occurred. Stories are used in research to focus on process, on the temporal dimension in which the phenomena occur. Stories treat the phenomena to be explained as something that comes through a series of steps. This type of analysis focuses on discovering the sequence of steps involved in the process under study. Causal analysis takes the form of a tree diagram, showing how a case progresses from step-to-step. Causes for the action operate in different ways at different times. What is explained is more complex than dependent and independent variables. Instead of the outcome being described as a value of a variable, the outcome is described as a

different form of organisational or individual activity, a different way of putting together a number of common and interdependent activities. Becker (1992:209) cites Cressey's study of embezzlement which "describes and explains the genesis of the commission as an act of violation of financial trust" as an example which uses this approach.

The analysis of causes leads to a probabilistic statement of what might happen. Narrative analysis leads to the statement of a sequence in which the outcome is known.

2.2. The political dimension of narratives

The telling and documenting of stories has political importance. Traditionally, knowledge has been constructed in ways that have often not incorporated all experiences. Stories provide a way of bringing other voices into the centre of the public discourse. Featherstone (1989: 376) calls this "a people's scholarship," a scholarship in which "scientific facts gathered in the field give voice to a people's experience." Lawrence-Lightfoot (1997) considers the narratives produced (which she calls portraits) as both documents of inquiry leading to new understandings as well as interventions to instigate change. Stories can broaden the audience beyond the walls of the academy to a wider, more eclectic audience. A wider audience's understanding of a situation then affords a way to bring about change.

Stories were very important during the days of apartheid in South Africa. Stories provided a tool to illuminate the conditions of oppressed people and workers. Stories generated from oral history projects have been used to tell the story of the "underclass"; provided an interpretation that is different from the existing interpretation and used to educate the masses. Paul la Hausse (1990) documents the different oral history projects in South Africa in 'Oral History and South African Historians' in *Radical History Review*. These projects, which contribute to telling a different history of South Africa, cover areas like mining, agriculture, sharecroppers, mass movements, migrations and working class communities destroyed by the apartheid state. Luli Callinicos (1990), also in *Radical History Review*, documents the popular history movement in the 1980's. The dominant influence of this has been the labour movement who writes mostly for working class people. Some universities attempted writing popular history and saw the process of rewriting history as a political resistance. "People's Education" was an important movement in South Africa in the 1980's. The movement attempted to present an 'alternative history' to be used in schoolrooms. Post 1994, as South Africa strives

towards reconciliation, stories have been used to document the past as well as provide a therapeutic mechanism to come to terms with its past. The Truth and Reconciliation Commission has documented the apartheid stories of individuals and organisations.

The stories that have been written have, understandably, been those of the most marginalised groups. There are stories about workers, poor people and women. This review does not include stories about academics. But the stories of people who have succeeded and stories about middle class people also need to be written.

3. STORIES, NARRATIVES AND STORIED NARRATIVES

Stories provide exciting alternatives for connecting the lives and stories of individuals to the understanding of larger human and social phenomena. Stories are used in disciplines as diverse as anthropology, history, sociology, political science, psychology, medicine and literature. Each discipline has its own history and purpose for using stories, and, depending on the history, this linguistic style is called by different names. The term narrative and story are often used interchangeably. While not wanting to labour the distinction between the two terms, I want to differentiate between the use of story and narrative and indicate why I will use the term storied narrative.

Much of the narrative work has emphasised “how we tell our stories rather than what is told” (Munro in Hatch and Wisniewski 1995). Researchers, especially those studying psychology, socio-linguistics or identity, are interested in the “intimate perspective of a narrator’s interpretation and understanding of her/his own life” (Etter-Lewis 1993, pxii). In these cases how the life is narrated is important. Other researchers, like Goodson (1995), are interested in what happened and how this is linked to the social, historical, political and economic contexts of a life. In my discussion I will use the term *storied narrative*. In storied narratives I am contextualising the data generated from the life history interview (i.e. a participant’s interpretation and understanding of his/her life) into social, political, economic and institutional contexts.

Biographies and autobiographies are examples of stories that provide an understanding of the way lives are lived in different situations and how it unfolds over time. The documentation of individual stories can lead to an understanding of the dynamics that had an impact on a person at a particular time. Evelyn Fox Keller (1983) in the biography of Barbara McClintock: *A Feeling for the Organism* says, “Understanding that the spirit of a scientific era cannot be learned from the scientific or historical literature alone, we need to know about the lives and personalities of the men

and women who make the science.” Nelson Mandela’s (1994) autobiography *Long Walk to Freedom*, set against the backdrop of the racist South African society reflects both Mandela’s story as well as the story of the African National Congress. Kenneth Manning’s (1983) biography of the scientist E E Just *Black Apollo of Science: The Life of Ernest Everett Just* was categorised by *Science* as a book which “blends social, institutional, black and political history with the history of science.” The autobiographies of Ellen Kuzwayo (1996); Phyllis Ntantala’s (1992) and Mamphela Ramphele (1995) tell the story of personal and political growth of black women in South Africa.

Looking through the shelves of a bookstore or a library, one can find biographies and autobiographies of South Africans involved in politics and sports. There are no stories of South Africans in academia.

3.1. Storied narratives

Using Bruner's categorisation of the paradigmatic and narrative cognition, Polkinghorne (1995) has classified two types of narrative inquiry. He calls the type of analysis that employs paradigmatic reasoning, *analysis of narratives* and the type that uses narrative reasoning *narrative analysis*. In analysis of narratives researchers collect stories as data and analyse them with paradigmatic processes which result in producing themes that hold across the stories (this will be discussed in detail in Chapter Eleven). In narrative analysis researchers collect descriptions of events and happenings and configure them by means of a plot into a story. This is discussed in this section.

While we know a great deal about how science and logical reasoning proceed, we know very little in any formal sense, about how to make good stories (Plummer 1990; Polkinghorne 1995; Bruner 1985; Lawrence-Lightfoot 1997). The generic make up of a story is that it has a temporal dimension. It has a beginning, middle and an ending. It is held together by recognisable patterns or events called plots.

Stories have been used in different disciplines to serve different purposes. In the psychological domain the subject matter of stories is human action (Bruner 1985; Polkinghorne 1995; Sarbin 1986). Narratives are then constructed to explain why a person acted as he or she did and makes actions understandable. In the sociological domain, narratives are constructed to illuminate the dynamic interaction between individual agency and social structure. Stories are also used to illuminate lives and they are powerful because through stories we can “capture the richness, complexity and

dimensionality of human experiences in social and cultural contexts conveying the perspectives of the people who are negotiating the experience” (Lawrence-Lightfoot 1997).

3.2. Process of constructing a story

In the process of narrative analysis the researcher organises the data elements into a coherent, developmental account. The outcome is a story. Polkinghorne(1995) describes narrative analysis as the type of discourse composition that draws together diverse events, happenings and actions of human lives into thematically unified goal-directed processes. Narrative configuration is the process by which happenings are drawn together and integrated into a temporally organised whole. The configurative process employs a thematic thread to lay out happenings as part of an unfolding movement that culminates in an outcome. The thematic thread is called a plot and the plot’s integrating operation is called emplotment.

The result of narrative analysis is an explanation that is retrospective, having linked past events together to account for how a final outcome might have come about. Narrative analysis composes the elements into a story. The researcher asks the question, “How did this happen?” or “Why did this come about?” and searches for pieces of information that contribute to the construction of a story that provides an explanatory answer to the question. As the plot begins to take form, the events and happenings that are crucial to the story’s outcome become apparent. The emerging plot informs the researcher about which items from the gathered data should be included in the final storied account. Elements which do not contradict the plot, but which are not pertinent to its development do not become part of the story. This process is called narrative smoothing (Spence 1986).

Polkinghorne (1995) proposed the following steps in writing a story. Firstly it is to arrange the data elements chronologically. Identify the elements that contribute to the outcome. The researcher then looks for connections of cause and influence among events and identifies action elements by providing the ‘because of’ and ‘in order to’ reasons. These connections are not one on one but are combinations and accumulations of events that influence a response or an action. Lastly, the researcher writes the story. The storied product is a temporal organisation in which the meaning of each part is given through its reciprocal relationship with the plotted whole and other parts.

In a story there is a narrative structure called the plot. Through the plot people understand and describe the relationship among the events and choices of their lives. According to Polkinghorne (1995:7) plots function to compose events into a story in the following ways: Firstly, a plot delimits the temporal range which marks the beginning and end of the story. Secondly, it provides criteria for the selection of events to be included in the story. Thirdly, plots temporally order events into an unfolding movement culminating in a conclusion. Fourthly, plots clarify explicitly the meaning that events have as contributors to the story.

A person's life story is an expression of his or her self-understanding of a situation. The researcher's job is then to identify the meaning or understanding that is already implied in the story of the teller. The interpretation is dependent on factors such as: the quality of the relationship between storyteller and interviewer/researcher; the specific interaction with the story-teller during the interview; the theoretical perspective from which the researcher chooses to read the story; the researchers own experiential frame of reference and subjective perspective.

In constructing the story the researcher could use the interview data and provide commentary and interpretive comments. Atkinson (1997:72) suggests ways in which this could be done. The researcher could comment on what is already in the life story; provide background information as an introduction to the life story or provide a perspective that is not already evident in the life story but could serve to highlight and emphasise the important themes in the story. Other ways in which this could be achieved is for the researcher to include the missing historical, social or cultural background information or insights on what the life story describes; to set the stage for what happened, or, to include the researcher's own experience in doing the interview.

3.3. Research stories

Miles and Huberman (1994:147) use E. M. Forster's famous lines "The king died and then the queen died" and "The king died and the queen died of grief" to distinguish between a descriptive and analytical story. In the first statement the events are listed; the second statement includes an explanation of why something happened. The function of an analytical or research story is to answer the question how and why a particular outcome came about. In producing a story, the researcher draws on theoretical expertise to interpret and make sense of responses and action.

Polkinghorne's (1995) guidelines for constructing stories draw from his work in the psychological domain where stories are used to describe human action. In these stories, how something is said, rather than what is said is important. The research stories I am writing illuminate academic lives. The stories will describe human and social action. In writing these stories my focus will be on what is said. I want to illuminate how individuals negotiated the different dynamics in their lives during a particular historical period. Further I want to illuminate how the dynamics and the negotiation of those dynamics changed over time. I will use Polkinghorne's and Atkinson's guidelines as a basis for the construction of the stories. I have written the stories to show the interplay of political, social, economic and individual dynamics.

The use of stories in research is not acceptable in all domains. Positivists reject the notion of a subjective reality. One of the underlying tenets of positivism is of a single reality that is independent of the researcher. Life story construction uses experience as data and is dependent on the interaction between the individual and the researcher (the issues are discussed in chapter three). The post-modernists and post-structuralists have concerns about the representation of lives in texts. E M Bruner (quoted in Hatch and Wisniewski 1995) distinguishes between a life as lived, a life as experienced and a life as told. To that list I would add Derrida's concern about life as written. The post-modern critique of stories is that the process of writing involves giving linearity to a life that is messy and disordered. The writing process, which gives order and stability, could convey an incorrect impression. Derrida, a deconstructivist, questions the very possibility of representing a life in the form of a text. Denzin (1989:14) provides a summary of Derrida's position. Derrida (1972) believes that we cannot fully understand the inner life of a person because the understanding is always filtered through the glaze of language, signs and the process of signification. And language is always inherently unstable, in flux, and made up of the traces of other signs and symbolic statements. So there can never be a clear, unambiguous statement of anything.

While the post-modernist and post-structural critique is important to consider in writing the stories, there is also a danger that the critique could lead to a paralysis. I acknowledge that the story is not life but it is a way of a meaningful representation within a text. Understanding the critique provides the researcher with a framework to re-examine their work and improve the quality of representations they produce.

4. REVIEW OF STORIES WRITTEN FROM EXPERIENCE DATA

I reviewed stories which were constructed by different researchers who used experience data. This section reviews how different researchers have re-presented interview data in the storied narrative form. In this section I will look at the construction of stories, but the construction of stories cannot be separated from the way the interview data was generated. A limitation of my review is that I looked only at “Western writers” and did not survey Asian, African and Latin American writers.

I reviewed stories that also included literature on how stories were produced. The stories were from different authors (Bogdan 1974, Lawrence-Lightfoot 1983, 1994; Shostak 1989, Etter-Lewis 1993, Atkinson 1997; Frisch 1990; Thomson 1994; Terkel 1984; Parker 1972; Keegan 1988); different theoretical and disciplinary backgrounds (sociology, education, identity and race, feminism, anthropology, linguistics and race; psychology, oral history) and different forms and styles of writing the story.

The process of moving from a transcript to a story involves making a number of decisions. Some of these decisions are: the degree of editing from the transcript to the story; the theoretical perspective framing the story; the audience of the story; in whose voice the story is written; how is the relationship between author and narrator articulated. Stories depicting the different forms of relationship between the author and the narrator can be represented as different points on a continuum. One end places the participant at the centre of the story and the other end places the researcher at the centre of the story. From the stories that I reviewed I have created the following categories.

- i. Story presented in the participant’s voice to be used for future research (Atkinson).
- ii. Researcher edits the transcript for documentary purposes (Frisch).
- iii. Popular stories through the voice of others with very little theoretical commentary (Terkel, Parker).
- iv. Writing through the voice of the participant from a particular theoretical position (Bogdan, Shostak; Etter-Lewis).
- v. Stories written with the researcher as narrator to illuminate the life and a particular theoretical position (Thomson, Lawrence-Lightfoot, Keegan).

4.1. Story presented in the respondent’s voice to be used for future research

Atkinson (1997) describes the work at the Centre for the Study of Lives where researchers interview people, on tape, about their lives and then the life stories of the

interviewees are written. The finished product is entirely a first person narrative, with the researcher removed as much as possible from the text.

The life story ends up as a mini autobiography with one person having guided another through the telling of his or her own story in his or her own words. The researcher then creates the story. The transcription process consists essentially of leaving out researchers' questions, using standard spelling, creating sentences and paragraphs, adding missing things and possibly reorganising certain sections to keep common subject matter together (Atkinson 1998:56). After the tapes have been transcribed, transcripts are given to the interviewee to look over. An excerpt of a story written at the Centre is:

Then dad saved more money, and that's when he bought a bigger store in West Philadelphia, in a nicer neighbourhood. He and my mother were great in the food business. She would make homemade potato salad, homemade coleslaw, and my pop would put up pickles in a barrel. He sold herring out of a barrel. They were business people, trying to stock up on what the people wanted. (pg. 81)

After the story is written the researcher tries to make meaning from the story. The story can be used to examine the ways that people understand their lives and see their relationships with others.

4.2. Researcher edits the transcript which is used for documentary purposes

Frisch (1990) discusses the use of interview material in documentary works that are intended for broad public audiences. The use of oral history extracts in research, especially in combination with other forms of evidence and documentation, means that the researcher has to confront additional questions of context, selection, representativeness and verification. According to Frisch the use of the interview material in a documentary implies a "focus and the necessity of having material fit within and contribute to the illustration of some kind of thematic framework"(1990: 83). The key issue in preparing interviews for documentary use involves attention to how material actually "works." Insertion of relevant interview excerpts into the larger interpretive structure of a documentary is a complex matter.

In the editing process, Frisch proposes "an aggressive editorial that does not shrink from substantial manipulation of the text." (1990:84). Therefore one must come to know the material well, abandon the problem of literal reproduction and craft the document into a form that will answer to the needs of successful presentation and communication. Translation from sound to print begs the question of fidelity to the

material. In this translation “it is better to edit in close-to-standard transcription: character, culture and voice come across via the overall syntax, flow and usage of the transcribed spoken language rather than the attempt to recreate sound itself.” A further consideration is that translation and communication must be considered within a social and political context. Questions need to be asked about whether it is wise to use ‘working class’ language (which could exacerbate the class divisions) in a text where the format is edited and there is correct syntax, correct spelling, regular words and flowing sentences.

Frisch illustrates the editing process by using an interview from the book *Portraits of Steel* he co-authored with Milton Rogovin. This book, about iron, steel and related workers links interviews to photographs. Frisch presents a full-source transcript and an edited transcript. In the editing process there is cutting, shifting, neatening of language and the creation of a coherent transcript. The first excerpt is the full transcript of an interview with David Hughes (pg. 104). The second transcript is an excerpt from the edited transcript (pg. 89).

S	E	FULL TRANSCRIPT	S	E	EDITED TRANSCRIPT
1	1	MF: Well we can start with the stuff that you were just mentioning, or we can backtrack and talk about the work you were doing, or, which would you...	1, 3	1	MF: Well we can start with the work you were doing, or...
2			3	2	
3	1-2		4	3	DH: Well, I could say that the last four years since being out at Shenango, the most I made, for money, was about \$4,000 a year, just working minimum wage jobs, security, you know, security jobs, nobody wants you, you know, just can't find a job.
4	3	DH: Well, I could say that the last four years since being out at Shenango, the most I made, for money, was about \$4,000 a year, just working minimum wage jobs, security, you know, security jobs, nobody wants you, you know, just can't find a job.	4	4	
5	4		5	5	
6	5		5	6	
7	6		6	7	
8	6-7		7,8	8	
9		MF: Yeah, so its been mostly sort of temporary things that you'd - a little here and a little...	8,11,	9	Other jobs would pop up, being with the economy so bad as far as mechanics' jobs, they just want to pay you minimum wage. Carpenter's job, I think I worked for what, five bucks an hour, they just want to
10			12	10	
11	7	DH: Yeah, more or less, just that. Other jobs, you know, would pop up, being with the economy so bad, you know, as far as mechanics jobs, they just want to pay you, you know, minimum wage, carpenter's job, I think I worked for what, five bucks an hour, they just want to work you to death, you know, and knowing that you're...	12,13	11	
12	7-8		13,14	12	
13	8-9		15	12	
14	9		15	14	
15	10				
16	11,13				

S=Source E=Edit

Frisch's is explicit about the active role of the researcher in preparing the document for communication. However he does not indicate whether the edited transcript was sent back to the participants to gauge whether they were in agreement with the edited version, which are in their words.

4.3. Writing through the voice of others with very little theoretical commentary

The writings of Studs Terkel in the United States and Tony Parker in Britain have been classified as “vox populi or guerilla journalism.” Terkel and Parker record life histories and these are written as stories with little commentary. Terkel and Parker, who have both been involved in radio work, make no claim to their work being ‘social science or research’ or being located in any theoretical or disciplinary focus.

Tony Parker, in an interview with Paul Thompson (1994) and Studs Terkel in an interview with Ron Grele (1975) discuss the structure, form, language and editing processes in writing stories from the taped interview. Both Parker and Terkel indicate that an interview is transcribed and turned into a story by removing the questions (although Terkel sometimes indicates his questions to inform the reader how a response was generated). After listening to the tapes both note the important parts and try to capture the essence in the story. The story is written in the first person narrative. In the writing process both writers include the non-textual cues from the interview, try to be as near to the language of the person as possible (e.g. middle class, black woman), edit for clarity (eliminating false starts and fixing some of the grammar) and try to capture the individual characteristics and emotions of the person. Both acknowledge that in the writing process it is equally important to capture what the narrators say and what they do not say. Terkel and Parker refuse to theorise from their stories and leave the reader to judge whether what had been said is valid or not.

Terkel indicates that out of 60 pages of interview transcripts he would write a story of about five or six pages. He makes the decisions about what to keep and what to eliminate. Neither Terkel nor Parker indicate how they validate the story they have written from the interview. Terkel acknowledges refining the transcript and making a judgement about what he thinks are the essence with the justification, ‘I know pretty much how she thinks’ (Grele 1975:39). In their interviews Parker and Terkel are silent about the processes of moving from the transcript to the story i.e. story construction.

A Good War (1984) and *Working* (1974) are two examples of Terkel's books. In stories from half a page to about ten pages Terkel captures their memories of the war and the feelings of people doing virtually every kind of job that Americans do. In the story Terkel writes a few lines of commentary to contextualise the story: who the persons are; what they do and where the interview took place. The story is written in the voice of the participant. Terkel might interrupt (in italics) the story asking a question or

making a comment. An excerpt from a story Terkel wrote about Maggie Holmes in *Working* (1974:113):

My grandmother, I remember when she used to work, we'd get milk and a pound of butter. I mean this was pay. I'm thinkin' about what my poor parents worked for, getting' nothing. What do the white think about when they think? Do they ever think about what *they* would do? [Maggie Holmes voice]

She had worked as a domestic, hotel chambermaid, and as 'kitchen help in cafes' for the past twenty-five years, up North and down South. She lives with her four children. [Terkel's voice].

The stories written by Parker in *In No Man's Land: Some Unmarried Mothers* cover a longer historical period of the unmarried mothers' lives than do Terkel's story. The story deals with family and early life and their developing and changing ideas in and about life. Each of the stories in *No Man's Land* is about 25- pages. The story has a plot, an outcome and the characters are developed. In the text Parker demarcates his and the narrator's words. The narrator's text is conversational. Parker's text takes the reader into the context and the conversation space in which he is a listener. An example of the writing in *In No Man's Land* (Parker 1972:21) is presented. The dash (–) sign at the start of the paragraph indicates the narrator's voice.

- The future should have been just as he planned. I suppose it would have been too, if I hadn't got this idea in my head, suddenly and quite unremovably, during my last year at school...gracious, I've been rambling on, I hadn't noticed how dark it was getting. I must turn the lights on. Excuse me. [Narrator's voice]

Talking, she got up from her chair and moved idly across the room; touching the wall with her hand she felt vaguely backwards behind her, fumbling for the edge of the framework round the frosted glass sliding door. [Parker's voice]

Heaven knows where the idea had come from, because I don't know; out of nowhere. [Narrator's voice].

Terkel's and Parker's stories are powerful in depicting a social history. Their style of writing is easy. I felt the narrator was talking to me. This easy style about important social issues has attracted a wide popular audience.

4.4. Writing through the voice of the participant from a particular theoretical position

These are texts, which read as first person accounts have two authors: the narrator and the researcher. The writing of the stories raises the tension between scientific honesty (i.e. publishing raw materials) and readability which involves issues of editing. Three examples of the way different researchers have written research stories are discussed.

In the sociological autobiography, *Being Different: The Autobiography of Jane Fry*, Bogdan (1974) gathered data and presented materials for sociological rather than any other purpose. Jane Fry's story is a journey of what it means to find out that you are a transsexual and how then you have to navigate through life. Majorie Shostak's story of *Nisa: Life and Words of an !Kung Woman* is an example of an anthropological narrative. It is also an example of a story written by someone who does not share the linguistic and cultural background of the narrator. In both cases the presentation has the participant's story and researcher's interpretation. Gwendolyn Etter-Lewis, a socio-linguist, wrote stories of African-American women, who were educated between 1920 and 1940, in the professions.

All three researchers conducted interviews which were tape-recorded. The length of the interviews varied with Bogdan having 100 hours of interview time with Jane; Shostak between 25 to 30 hours interview time with Nisa and Etter-Lewis interviewed 80 women for about three hours each. Shostak first translated her interviews from the !Kung language to English. Thereafter, the interviews were transcribed. After the transcription process all the authors read the material, coded it for chronological order (although this was done to a lesser extent by Etter-Lewis) and organised it for coherence. Material that was not central to the authors' purpose or repetitious was eliminated. Material was combined to provide the fullest description. Bogdan and Shostak edited for wordiness and used a literary structure that was determined by a popular readership as well as convincing other researchers in their discipline. In her stories Etter-Lewis kept the speech patterns of the participants, because her analysis involved looking at both content and form.

The autobiography is written as Jane Fry's words and Bogdan organised and arranged 750 pages of transcripts to seventeen chapters, a 192-page story. Each chapter relates to some main event (which Jane had identified) in Jane's life. In the conclusion Bogdan says that, "Jane's story stands by itself as a rich source of sociological understanding and probably does not warrant a lengthy conclusion". The story illuminates Jane's life as well as characteristics of society and institutions. An excerpt to illuminate the writing is provided from the section *The Autobiography of Jane Fry*.

This was a definite time of swing in my life. I started to become aware of boys sexually, too. The girls started dressing differently than they did before – they started becoming more feminine. I felt like going that way too, and all of a sudden I felt that I had so much to cover up. It was like a mad dash mentally to keep covering things up. (Pg.49)

While Bogdan indicates that this is an 'autobiography' of Jane Fry, he is the author of the story. He does not indicate whether the constructed story was given to Jane to read.

Shostak (1989: 230) describes the structure of the story *Nisa: Life and Words of an !Kung Woman*. The structure of the story reflects three distinct 'voices'. The first voice is the story of Nisa. Presented in the first-person narrative, Nisa's voice was translated and edited from the taped interviews and chronologically ordered into fifteen chapters, from 'Earliest Memories' to 'Growing Older'. The second voice was the 'official' anthropologist's, putting Nisa's story into cultural perspective: the ethnographic background to topics Nisa discussed were reviewed in headnotes preceding each chapter in her story. The third voice was Shostak's voice – not primarily as an anthropologist's but as a young American woman experiencing another world. This voice was sandwiched on either side of fifteen chapters of narrative and ethnographic notes (introduction and epilogue). An illustration of the writing style is (Shostak 1982:129/130).

The early years of many marriages are stressful ones for both partners, especially when they differ in age. [a few lines later] Because sleeping next to a strange man can be frightening for the girl, an older woman, usually a close relative, sometimes accompanies the girl and sleeps beside her in the marriage hut until she begins to adjust to her new status. (Anthropologists voice)

My mother said, "Yo! My daughter! They were moving about?" I said, "Mm. They woke me while I was sleeping. That's why I got up and came back to you." She said, "Yo! How horny that Bo is! He's screwing Nukha! You are going to leave that man, that's the only thing I will agree to now." (Nisa's voice pg. 135)

The story of *Nisa* is also an example of a story written by someone who is outside the linguistic and cultural background of the respondent. In the printed English word there are questions about how the !Kung style of narration matches the English style of writing and questions about how Nisa could engage with this interpretation.

Etter-Lewis's (1993) stories of African-American women in the profession are presented in part one of her book. These nine stories are constructed from a 45-minute excerpt of a whole narrative. Etter-Lewis questions the boundaries about what constitutes autobiographies and the way they should be written. The final text of her writing "contains a complexity of life events and crises woven into a multi-faceted whole, shifting between the past and present. This discourse variation or intertextuality within a single narrative creates several levels of micro-structure which parallel and intersect one another, but do not necessarily form any type of immediately detectable

sequence or chronology.”(1993:178). An excerpt from one of the stories in *My Soul Is My Own*.

My father became Mayor of the town. One of the beginnings of the town was Mar, Marcus Garvey’s ah, interest in taking people back to Africa...was the fact that he felt there, was no way that black people were going to get a good deal in these United States. And he, along with ah, what was his name, the man for whom the town was named, along with another man who ah, was the son of one of the people that was with John Browns raid. And ah, they were trying to get water and they discovered that the water was very metallic and they kept sounding farther and farther down and they spent so much time there, that they decided, well maybe we better start a town here. (pg. 5)

In reading the stories I was not distracted by the speech patterns but sometimes I found that the narrative digressed and I had lost the thread of the story. I also found contradictions between Etter-Lewis’s theoretical position about the construction of narratives and what she did in the constructing the narratives. Etter-Lewis indicates that an important part in constructing an oral narrative is the relationship between the researcher and the interviewee; yet this relationship is not acknowledged in the story. Nor does she indicate whether the participants of the project had a chance to review the final constructed story.

4.5. Stories written with the researcher as narrator to illuminate the life and a particular theoretical position

In these stories the researcher narrates the story and the purpose of the story is to illuminate the life and a theoretical position. Examples which are explored below are Thomson’s (1995) memory biographies; Lawrence-Lightfoot’s (1983; 1995) portraits of successful schools and African-Americans of privilege and Keegan’s (1988) history of “ordinary Black folk” in rural South Africa.

Thomson (1995) wrote memory biographies about Australian soldiers involved in the Great War. Thomson wanted to know how these soldiers composed their memories to make sense of their past and present lives. In a two stage process to develop the ‘memory biographies’, Thomson adopted a “guided life-history approach which focussed upon the men’s pre-war lives and their lives as soldiers and ex-servicemen” as the first stage. In the second stage (a few years later) he conducted a second set of ‘popular memory’ ANZAC¹ interviews with five of his initial interviewees. In these second interviews the respondents were encouraged “to go back over their experiences

¹ ANZAC refers to the Australian and New Zealand Army Corps.

as soldiers and ex-servicemen and to reflect upon the ways they had come to terms with their wartime past” (1995:11).

Thomson indicates that this popular memory approach suggests a particular structure for writing up of the interviews. The write up should highlight the interactions between experiences, memories, identities and the legend and show how these interactions have changed over time. In the story Thomson focuses on three main periods of the ANZAC experience and narratives: during wartime, during the post-war period and in the 1980's and 1990's.

In writing the memory biographies, for the most part Thomson used the chronological approach “noting where the stories I used as evidence for past meanings were redolent with retrospectivity. I broke the chronological flow at certain key points to explore the layers of meaning in the memory of a particularly significant experience” (pg. 239). An excerpt from one of the stories illustrates the writing of the memory biography.

Bill's various accounts of his enlistment in 1915 show that while he tried to compose an affirming memory of the event, his remembering was influenced by other, public accounts. In our first interview, Bill's initial explanation for joining up was that it was a very personal, spur of the moment decision:

Oh, I don't know. I think it came suddenly. I used to pick up the papers and see fellows that I knew and mates that had been knocked over[...] One of my very good mates, he was a bit older than I was, but he was a lovely fellow and I read in the paper one morning where he's got knocked, so I thought, 'Well, I'll go and have a go at it.'

In response to a follow-up question he denied that he felt under any pressure to enlist, yet at the time and subsequently there were a number of public influences that affected his decision and how he remembered it. (pg. 82)

An integral part of these stories relates to analytical comments regarding remembering and the composure of the memory. This approach increases our understanding of composure of memory but can “reduce understanding of an individual's life as a whole”(Thomson 1995: 239).

Sara Lawrence-Lightfoot uses narrative work to capture goodness in institutions and individuals. Lawrence-Lightfoot (1983) was aware that social scientists tended “to focus on what is wrong rather than search for what is right, to describe pathology rather than health.” In developing the stories (which Lawrence-Lightfoot calls portraits) of schools or African-Americans of privilege, Lawrence-Lightfoot looks for goodness.

These stories then illuminate more general phenomena. In *I've Known Rivers* (1995) the theoretical orientation guiding the development of the story is the exploration of the dynamic intersection of class, race, culture and gender. In *The Good High School* (1983) the stories “seeks to capture the culture of these schools, their essential features, their generic culture, the values that define their curricular goals and institutional structures and their individual styles and rituals.” (pg. 8). The audience of these stories is both people inside and outside the academy. Therefore the challenge in writing these stories is that they should be both readable and trustworthy.

Lawrence-Lightfoot (1997) indicates that the essential features of developing portraits are: context (includes physical setting, references to the history and culture of the setting); voice (the voice of the researcher is everywhere); relationship (relationship between the researcher and the respondent is at the centre of portraiture) and emergent themes (the portraitist works to develop a process and a structure for categorising the data, for tracing patterns and for capturing and constructing themes). The portraitist then develops the story. In the development of the story the portraitist invokes artistic principles.

In writing the stories of either the individual or the institution Lawrence-Lightfoot looks at the data and searches for coherence, for bringing order to phenomena that people may experience as chaotic or unrelated. Lawrence-Lightfoot (1983) explains the analytical process. The process involves reading the data several times and offering tentative hypotheses and interpretations. When there were contradictions, the researcher would search for the roots of dissonance. When there were repetitions and elaboration of similar ideas the researcher would underscore them and find traces of the central themes in other contexts. Slowly the story would begin to emerge, filled in over time with detailed evidence, subtle description and multiple perspectives. At some point there is a shift from searching for evidence and distilling themes to one of composition and aesthetic form, from finding the plot to telling the story. During the transition from empiricism to aesthetics, the researcher needs to take care not to distort the material. An excerpt from the crafted story in *I've Known Rivers*.

It is hard to know how to give shape to this final session, how to give words to the sadness we both feel. I am haunted by Toni's bereft feeling that her mother has left her so little. I remember that one of the most precious legacies left by her mother has been the memory of her wonderful voice. Toni has said repeatedly, “*My mother's power was in her voice.*” She meant this in two ways, I think. First, she has always known her mother as outspoken, forceful in her honesty. Her mother

always possessed the voice of power, clarity and confrontation. “My mother always said what she thought. She was not like me. She was not worried about other people's feelings.” (pg. 285)

The power of the stories crafted by Lawrence-Lightfoot is in both the content and the artistic presentation.

In *Facing the Nation: Portraits of Black Lives in Rural South Africa*, Tim Keegan (1988) explores the “rural experiences of black South Africans living on the highveld during the course of the century.” Field workers in the Oral Documentation Project at the University of Witwatersrand collected these life stories. These stories were then transcribed and translated. The purpose for collecting and documenting these histories is to understand the past more fully. In reconstructing the past and writing these stories, Keegan supplements oral testimony with other, more formal, written sources of evidence. This evidence provides the “larger context of public events, of political and constitutional, economic and institutional developments, in relation to which ordinary people lead their lives” (pg. 161). In the process of writing the story, the historians’ skills are used to bring together the diverse pieces of evidence. In these portraits the author tried to give meaning and context to the life stories told by the respondents using evidence and conclusions drawn from other research. An excerpt from *The Life Story of Ndae Makume* developed using oral testimony, which has been supplemented by other evidence, is:

Thus in 1913 the Makumes reaped their crop, gathered their livestock, their goods and chattels, loaded their ox wagons and left Rabie’s employ. As was the case throughout the arable districts in the winter of 1913, many of the tenants in the neighbourhood were also turned off the land rather than submit to the demands and exactions of landlords. ‘They started scattering in all directions,’ recalls Ndae. As the Makumes trekked to their new farm, Kleinfontein, they came across many others on the road, moving from one tenancy to another; but unlike the Makumes, most of them were unlikely to find better terms than those they had left behind. (pg. 11 & 12)

In the stories developed by Keegan, it is the researcher’s voice that is the most prominent.

5. ISSUES IN WRITING A STORY

A review of the literature about stories that have been written suggests that a number of questions can be asked and decisions taken when constructing stories. I have formulated a list of questions that I had to answer when developing my stories.

- i. What is the *purpose* of developing the stories and who is the intended *audience*? Are the stories descriptive (what happened) or analytical (how and why did it happen). Linked to purpose is the question about *audience* for the stories i.e. are they stories for the academy or are they popular stories.
- ii. What is the *theoretical orientation* or disciplinary focus that underpins the construction of the story? A story has a plot or overarching theme that keeps the various elements of the story together. The purpose of the story is to illuminate some general phenomena, and this phenomenon must be made explicit.
- iii. Is the *interview conducted* by the author or by other field workers? If other field workers have conducted the interview how are their contributions acknowledged in the writing process.
- iv. Are the stories constructed from only oral interview data or are other *data sources* also used?
- v. Are the experiences related in the interview located within a *larger context*?
- vi. In whose *voice* is the story written? Will the participant or researcher narrate the story? If the researcher is the narrator of the story then there is a decision about the intensity of the researchers' voice. Will the researcher's voice be muted and subtle or will the data be reworked and the story told mostly in the researcher's voice.
- vii. Does the writing acknowledge the dialogical *relationship* between respondent and writer?
- viii. What is the *cultural and linguistic distance* between the researcher and respondent of the story and how is this made explicit in the story. In stories translated to English, how does the author ensure that the translation is authentic?
- ix. What is the degree of *editing* from the transcript to the story? Is there editing for grammar and language, readability and coherence?
- x. Are *non-textual cues* from interview included in the writing?
- xi. Are the researcher's *questions* to the respondent included in the story?
- xii. How does the researcher include *silences* in the text?
- xiii. Who is the *author* of the story – researcher, respondent, data collector or both?
- xiv. To what extent does the analytical story embody *artistic principles* in crafting the story?
- xv. How does the researcher include comments about the *telling process* and about remembering?

xvi. Are the constructed stories sent back to the respondent for *comment*?

Section 7 on *How I Wrote the Stories* illuminates the decisions I took in constructing the stories.

6. TRUTH VALUE IN STORIED NARRATIVES

I am asking the question about truth-value in relation to the shift from the transcript to the construction of the story. In Chapter Three I dealt with the issues related to truth-value in life history work.

Bruner (1996:11) in differentiating between a story and an argument indicates that an argument convinces one of truth and verifies by eventual appeal to procedures for establishing formal and empirical proof; whereas stories convince one by their lifelikeness and establishes not truth but verisimilitude (appearance of being true). There are unique issues linked to the evaluation of narratives because narrative inquiry inhabits both social science and artistic spaces. Narrative researchers might see their inquiry as an aesthetic reconstruction of a person's life with the inquirer acting in a fashion similar to an artist who takes a situation and reconstructs it in order to convey something about it (Blumfeld-Jones 1995; Lawrence-Lightfoot 1997).

The issue of truth criteria in narrative research is addressed differently by different researchers and this may also be linked to disciplinary issues. Some researchers believe that these constructs are not important in the research (Etter-Lewis in socio-linguistics); some see it as difficult (Atkinson in psychology); some see it as a researcher's responsibility to establish (Lawrence-Lightfoot in education) and some are explicit about how they deal with it (Bogdan in sociology). Different researchers refer to the truth-value in stories by different names. For example Polkinghorne refers to the 'credibility' of a story; Lawrence-Lightfoot refers to the 'believability' of the story and Blumfeld-Jones to 'fidelity'. To me establishing the truth criteria in stories has two dimensions: firstly it is about ensuring consistency in what is told and secondly it is about having a plausible plot.

In writing stories one of the first aspects that researchers like Atkinson and Bogdan looked for were consistency and coherence in the way the story was told. Although people react in inconsistent ways to different situations there should not be contradictions in what is related. Secondly, but to a lesser extent, researchers look for external consistency i.e. do the events related make sense in terms of what was

happening in the broader context at that time and place. After a story is written, researchers may seek corroboration with the respondents (by sending them the story) about the events written.

In an academic story the researcher introduces a plot or overarching theme which links together the various events to provide an explanation of why a particular outcome came about. Polkinghorne (1995) reminds us that the plot is the researcher's construction and will depend on a point of view (psychological or a sociological plot). Since the plot is the researchers' construction, it is not appropriate to ask whether it is 'true' or 'real.' The researcher, after critical listening and interpreting, will select the themes that will be used to tell the story. The purpose of narrative analysis is not simply to produce a reproduction of observations, but to provide a story in which the range of disconnected data elements are made to cohere in an interesting and explanatory way. The evaluation of the generated story is "on its explanatory power and plausibility" (Connelly and Clandinin 1990).

Lawrence-Lightfoot (1997:247) indicates that in creating the stories the researcher has a responsibility to ensure that the stories are believable. The researcher must develop a narrative that is authentic and convincing. This is referred to the "yes, of course" experience as resonance and is a way of establishing authenticity. To Lawrence-Lightfoot the stories developed should have resonance with three different audiences: with the actors who will see themselves reflected in the story, with the readers who will see no reason to disbelieve it, and with the researcher herself, whose deep knowledge of the setting and self-critical stance allow her to see the "truth value" in her work.

An important aspect in the construction of the story is the extent to which the researcher and interviewer can co-operate in constructing a text that is fully representative of the interviewee's life. Shostak (1989) draws on the work of the anthropologist Crapanzano to explain how she enhances the 'truth value' in Nisa's story. Crapanzano (as quoted in Shostak) indicates that personal narratives do not exist independently of the collaborative process (researcher and respondent). Peoples' stories are not in the final form, shape and content waiting patiently for the biographer to open their 'tap', allowing the preformed story to escape. An interview is an interaction between two people; one, with unique personality traits and interests at a particular time of life, answers a specific set of questions asked by another person with unique personality traits and interests at a particular time of life. Shostak describes the relationship between herself and Nisa as best as she could and she indicates that the

narrative “thus reflected a finite contract between fifty-year-old Nisa and twenty-four-year-old Shostak; any other combination would have produced a different result”(pg. 232).

The above discussion led me to formulate the following framework for enhancing the truth-value in the stories I have written.

- i. Read the data and the stories to ensure that there is an internal consistency and coherence in the story told to me and constructed by me.
- ii. Studied documents about the socio-political situation for the period that the experiences are recounted to ensure that there was external coherence.
- iii. From my experience as the researcher and a review of the literature, ensured that a plausible plot is articulated.
- iv. Sent the story to the participants to confirm factual issues. The researcher develops the interpretation, theoretical orientation and analysis.
- v. Gave the story to a number of academics to read and presented the ideas at academic conferences to check out the degree of resonance with other academics in a similar situation.
- vi. Since the story is a co-construction between the researcher and the participant. I had to indicate aspects about myself and how I shaped the research space and interpretation.

7. HOW I WROTE THE STORIES

I had the transcripts. Now what? I knew I wanted to write a story about each person. The purpose of the story would be to illuminate how an individual negotiated the various dynamics of her or his life in order to gain a doctorate. I was writing these stories for the academy and I wanted this as a research story. I did not want the story to be a mere listing of a sequence of events. Initially I saw the story writing process as consisting of two parts: the descriptive and the analytical.

I read a number of re-presentations of narrative interviews (Shostak, Thomson, Etter-Lewis, Randall, Frisch, Middleton). The first decision I had to make was whether I wanted to write as participant first or third person. I also had to make a decision on the length of each story. Within the context of the thesis I decided that each story should be about 20 pages long (single spaced). This meant that it would be around 12 000 words.

I experimented with the shortest interview (Ahmed Bawa). I (the researcher) would be the narrator of the story. In the story I paraphrased excerpts of the story and

included large chunks of direct speech. I called this the descriptive story and attempted to provide a synthesis and analysis at the end of the story. Excerpts are provided to illustrate my approach.

Up to the age of 14 or 15, Ahmed went to the mosque, but this was more as a social function – after mosque you went to the café and had something to drink. But religion was not a significant part of his life. In fact Ahmed caused quite a stir in the mosque ‘there was one occasion, after the prayers, when the molvi saib was talking about the whole notion of predestination and I put up my hand (I was 14 or 15 at the time). He got a shock – this is never done in the mosque – here were all the elders. [Ahmed Bawa’s story].

School provided the social arena for the discussion of issues about larger philosophical issues and questioning things that did not make sense. The questioning of larger issues led to Ahmed asking questions about things preached in the mosque and him being chased out of the mosque for doing the ‘unthinkable.’ [Researchers commentary]

With my limited skill of crafting a story, I found that this approach did not work well. The story was also not very readable and I found that my (narrator) voice got in the way and interfered with the story rather than enhancing it. Further I did not provide a sharp commentary but rather repeated parts of the story. I decided to abandon this approach.

I was impressed with Shostak’s portrayal of Nisa in the book of the same name. I decided to write one of the stories (Nozibele Mjoli) with the respondent as the narrator. In the process of writing Nozibele’s story, I eliminated my questions, re-ordered parts of the transcript so that there was a coherent sequence, eliminated repetitions and paraphrased parts of the responses. I refined the writing of the story to improve readability and eliminated aspects of the interview so that I could get to twenty pages. I called this the descriptive story. At the end of each of the different sections (childhood, schooling, university) I attempted analytical comments. In writing the ‘analytical’ comments I wanted to draw attention to certain aspects and attempted to explain an event in terms of some contextual dynamic. I also wanted to comment on the process of remembering. My first attempt at analytical comments was weak and amounted to mostly repeating the interview text. An example of the writing follows:

The family house in Umzimkulu consisted of several units called a homestead. My mother was primarily responsible for running the house and the farm as my father was teaching. Farm responsibilities included looking after and milking cows and goats, planting of the fields, the harvesting etc. The children had to help - they had to work in the fields, look after cattle, milk cows and goats. However these were not the most enjoyable way to spend time. I enjoyed milking cows. I am not scared of them. [Mjoli’s story]

Nozi was born and grew up in rural Transkei in 1954. Rural Transkei means little exposure to the ‘outside world’ with limited access to opportunities and a deliberately under-developed place. It also means a place without electricity and running water, there is subsistence farming where the whole family gets involved in carrying water from the stream and spending days in the farm tending to the cattle. [Researchers comment].

Writing with the participant as the first person made for better readability, but I had some (tiny) misgiving about writing the story in the first person participant's voice. I continued with other descriptive stories (Ngoepe, Tema) writing them in the first person participants voice. I attempted to write deeper and sharper analytical comments about the story. I sent these descriptive stories to the respondents and one person (Tema) responded with comments (mainly spelling and correcting one 'fact'). She did not raise any problems with the format of the story but thought the analysis was weak.

I continued with two other stories (Volmink, Mokhele) in the same format. My misgivings about using the format of first person participant in writing the stories deepened. Writing Mokhele's story was troublesome – it was a 10.5 hours interview and about 100-page transcript. In the process of constructing a 20-page story, I did massive editing. I felt that this was a dishonest process. I was writing the words for another person. I gave Mokhele the story and asked for comments. After reading parts of the story he indicated that the story gave him problems. I had written the story with him as narrator, but he indicated this would not have been the way he would have written his story. He attempted to correct some of the parts that gave him difficulty, but in the end gave up because there were too many alterations. I realised that with a group of high profile people the image projected by the written word is important. The participants were very articulate about their experiences and, being in the public eye, were cautious about what they wanted to say, how it was said and the image they wanted to project. They were cautious about how their words appeared in print, especially if it was presented as though they had written them. There is a difference between how a person talks about their lives and how they write about their lives.

At about the time that I was interacting with Mokhele about the re-presentation of his story, I was also preparing to present one of the stories (Tema) at a conference (Gender, Science and Technology in Malawi). Given that the story was written with Tema as narrator, I wrestled with the question of claiming authorship for myself. During this time I had begun reading the book *I've Known Rivers: Lives of Loss and Liberation* by Sara Lawrence-Lightfoot (see discussion above for a discussion of Lawrence-Lightfoot's approach). I attempted to craft Tema's story in the style that Lawrence-Lightfoot used. I felt comfortable with this approach because it was a clear declaration that I was crafting the story. My primary data source was the participant's experience, but I was responsible for the writing process. I paraphrased the respondent's responses,

commented on what was said and attempted to make connections and contextualise the experiences.

Further I became more aware of the need for me to declare my central plot and frame the story around the key questions of my research. The overarching theme in writing the story was to answer the question, Why did these individuals achieve academic success? The structure was to follow the chronological path and illuminate how the political, family, economic, social and individual dynamics interacted to produce the academic trajectory that it did. These were not going to be just interesting, romantic stories of overcoming obstacles. It had to be critical and sharp and look at both how they negotiated their path as well as the compromises they had to make in getting to their goals.

My analysis was now embedded in the story. There was no longer a descriptive story and separate analytical comments. The analysis would be in the way I configured the different experiences and reflections to illuminate how the life unfolded. The descriptive part of the story would answer the question of *what* happened. This would be in the format of this happened and then that happened. The analytical part of the story would answer the question of *how* and *why* did something happen. According to Huberman and Miles (1998), this involves justifying an action, giving reasons, supporting a claim and making causal statements. I attempted to structure the events of the story in a way that reflected causality –even if this was retrospective. The causality was linked to the research question and a plot, which unfolded over time.

Writing the story in a way that I was narrator gave me freedom in the writing process. The life story is a co-construction and I acknowledge that I made decisions about what to keep in and what to leave out. I now put myself into the story and indicated how I felt and responded at different times. One of the respondents (Tema) commented, when she saw a draft of the version with me as narrator, that she thought this was more honest. In addition to being the narrator I included non-textual cues and moods. I was also able to comment on how I was feeling at any point in the interview. An excerpt of a story written:

Bothale is now irritated by my questions to explain more about the period and indicates that this is so obvious and she does not see how it would help me answer my research questions. I urge her to continue, as it is important for me to hear her experiences. “I just want to say that to have studied at Turfloop, you studied in a situation where no one was interested in your success. The chemistry and zoology were large classes but they were happier because we supported each other. The

lecturers were horrible. I do not know what I got out of that situation. They had these lecture notes that they dictated from and somewhere along the way we would get a hang of what was going on because we had to write examinations and tests.”

I rewrote the storied narratives from six sets of data using this approach. These stories reflect the issues about construction of stories discussed in section 5. I decided to stop at six stories because they were sufficient to illuminate the unfolding of the academic pathways in different contexts. I would use the ten interviews in the cross-case analysis.

The individual stories goes beyond the story of gaining a doctorate. The career pathways of black scientists after gaining the doctorate are a research study on its own. These stories include a brief analytical description of their career paths until the time of the interview. This provides a rounding up of the story as well as gives an indication of where they are today. Their current position would impact on how the story is told.

Each of the participants told their stories differently – with different emphases, different ways of telling, different amounts of reflection and giving emphases to different parts of their lives. In telling the stories most participants emphasised their own character and determination as crucial to their success. My role as the researcher was to highlight the significant other dynamics that contributed to their success. The stories attempt to capture both the different personalities of the participants and highlight the issues outside themselves that contributed to their academic success.

A question in the writing of stories about academic is how much of the personal needs to be included. Participants may have mentioned children but not a partner. Or not mentioned the social context and relationships in their lives. As I discuss in chapter 13, I had to decide whether knowing about the personal was important to the story or was my personal curiosity. The participants knew the purpose and public nature of my research. I decided not to probe further or comment on the personal because I believed in the separation of the personal and the public. If I were asked to relate my academic life story, I would not include my personal life. Nelson Mandela’s autobiography documents the break-up of his marriage from Winnie Mandela without giving personal details. Not having those details did not detract from the power of the story.

I also realised that for the experiences to be understood by an outside reader, these experiences needed to be juxtaposed against the policies and laws of the country during a particular historical period. The autobiography of Nelson Mandela in *Long Walk to*

Freedom is a good example of the approach which encompasses personal experience located against broader movements in the country. I therefore included brief related policies in the stories. As I was writing six stories the historical and policy dimensions repeated themselves and I removed them to Chapter Two which describes the educational context in the country during the period 1948 to 1994.

These analytical stories were sent to the participants for comment. Those that returned their stories made minor factual corrections and did not dispute the plot and structure I had imposed in the story. One participant asked questions about anonymity. She indicated that while everything she said was true it also involved other people. I indicated that it was impossible to mask the identity of the respondents because being in high profile positions it would immediately be clear who they were.

8. KEY ISSUES FROM THIS CHAPTER

Stories provide a way of connecting the lives and stories of individuals to the understanding of larger human and social phenomena. Stories are used to illuminate lives. In South Africa there are stories about workers but there are no stories about black academics. These stories will reflect how the interplay of the political, social, institutional and individual dynamics shaped the unfolding of their academic lives. The individual analytical stories suggest why the participants achieved academic success. These themes will be discussed in greater detail in chapter 12.

Chapters Five to Ten are six of the research stories that I constructed to illuminate how individuals negotiated their academic path in an unequal South African society during the period 1948 to 1994.

CHAPTER FIVE

ACADEMIC LIFE STORY OF DR AHMED BAWA

From the earliest age I had this understanding that it was the knowledge business that I was interested in.

Close to the end of my four and a half-hours of interview, in 1996, with Professor Ahmed Bawa I asked him about the kinds of issues in which he is presently interested. We talked about his interest in the issues of philosophy of science (“I am increasingly of the view that we are approaching the situation that persisted in the past where the study of astronomy or the study of physics was seen in the context of natural philosophy”); the convergence of the humanities and science (“there are issues like the Uncertainty Principle from physics which has implications for the social science and humanities”); research capacity building in the country (“ultimately it is about building a new culture which begins to see scientific activity as important”); the role of the contemporary black intellectual (“it is very important to be substantial role models and to actually present to our young people that we are able, capable and there are opportunities to actually make it in the scientific world”); the social responsibility of scientists (“a few years ago you would have found that the dominant view among scientists was that it is not our business about what is going on in the communities and in industry. That is changing”).

Ahmed Bawa is a physicist. At the moment he is the Deputy Vice-Chancellor of the University of Natal. He is the chair of the Council of the Foundation for Research Development, is on the Board of Directors of Atomic Energy Co-operation and is on various other national committees on Science and Technology. He has been involved in writing the National Science and Technology Policy Documents and National Commission of Higher Education (NCHE) Documents. Ahmed says that coming out of the NCHE process were a whole range of interesting philosophical projects that he is reading around. These projects are in the area of trying to understand the process of knowledge production and trying to understand how to link the process of knowledge production with the useful utilisation of knowledge. The theme of knowledge production is mentioned a few times in

the interview. As he is one of the leading physicists in the country¹, I asked what he liked about research and the research experience. He passionately said, “I absolutely enjoy developing new ideas and putting together research projects which involve other people and allow partnerships to develop. This has persisted in my life. I do not know how long I can maintain myself in this job (vice principal). Sooner or later I will definitely go back to research areas. I don’t know what area of research it would be. It may not be in physics.”

The academic life story

Ahmed Bawa was born in 1955. He completed his matriculation year of schooling in 1972 as the top student in the Department of Indian Education.² Ten years after completing his matriculation, he obtained his Bachelor of Science degree, with distinctions, from the University of South Africa (UNISA)³. In 1986 he obtained, *cum laude*, an M.Sc. in Nuclear Physics from the University of Durban-Westville and in 1989 obtained a Ph.D. in Theoretical Physics from the University of Durham (UK). Of course Ahmed’s trajectory in academia was affected by the political situation in South Africa. “Had I been a white South African and gone to Wits University in 1972, I would have simply slipped into the system and it would have been plain sailing. I think I was sufficiently bright to have worked the system and have come out with a first class degree. All the [prison] detentions were on the basis of being black in South Africa and being involved in all those struggles. I have never let the impediments in the research process which come from being a black South African bother me. I am quite sure, had I been at a white university, my nuclear physics research would have been quite different, because there might have been more facilities than those at the University of Durban-Westville (UDW)⁴. I am not sure whether that would have altered in any substantial way the quality of my work.”

The academic life story of Ahmed Bawa illuminates very clearly Marx’s statement that lives are made in conditions not of one’s own choosing. This story illuminates how an

¹ He is a B rated scientist in the FRD rating scheme. This means he is an internationally recognised physicist, still getting funding is publishing.

² There was a different schooling and examination system for each of the four racially classified groups in the country.

³ UNISA is a distance learning university.

academic trajectory is shaped by an individual, living in a particular family and social milieu, which is located in the South African political system.

Family: wholesome, warm, and secure but not lavish upbringing

Ahmed Bawa, who is in his early 40's, was born at his maternal grandmother's home in Durban. He is married to Rookaya. They have two daughters; Nadya, who is 16 years old and Mishal who is 10 years old.

Ahmed's family home is in Sevenoaks⁵, a farming area, near Greytown. His parents, Cassim and Hajra Bawa ran a shop that belonged to the family. Ahmed grew up in an extended family system. His paternal grandparents lived in a big house (called the 'Big House' by family members) in Greytown. His family would visit the 'Big House' about three or four times a week and have a meal there. The Sevenoaks house "was like a farmhouse" with three bedrooms "nothing architecturally nice, but warm." There was electricity in the area, but it went out at 10 o'clock at night; then they used candles. The Bawas used a coal stove.

Ahmed describes his childhood as "warm and safe." Family involved parents, siblings, grandparents, uncles and aunts - an extended network. All of these people had an impact and shaped, to a smaller or larger extent, the trajectory of his life.

Ahmed's maternal grandfather, Ebrahim Mall, had passed away when his mother was a little girl. His paternal grandfather, Kharwa Essack Bawa, a subsistence shopkeeper, passed away when Ahmed was about three years old. Ahmed's constructed memory about him suggests that "he was a warm and gentle person, very proper and he had a fantastic reputation for honesty." Ahmed relates a fascinating story about his grandfather. "He was brought here (to South Africa) from India when he was 10 years old by his father. The father had planned to settle here, but for some reason he left my grandfather with another branch of the family in Greytown and returned to India - the idea was that he would come back again. But that never happened. My grandfather was left as a 10-year-old boy on his

⁴ UDW was designated a university for Indian students and is categorised as an Historically Black University. The HBUs were set up as teaching, not research, institutions.

⁵ To go to Sevenoaks from Durban, one first travels about 90 km to Pietermaritzburg and then follow the road for about 20 km to Greytown. Sevenoaks is a 'little hamlet' about 18 km from Greytown.

own with this family and he grew up with this family. Even more fascinating is the fact that there was a young kid, a Zondi boy, who used to play with my grandfather. My great-grandfather had said to this young Zondi boy, 'Would you please stay with him wherever he goes.' Until the implementation of the Group Areas Act⁶ our families actually moved together." Ahmed's telling of this story illustrates how the family stories impacted on a political identity and awareness.

Ahmed considers both his grandmothers as "special people". His maternal grandmother, Marian Mall, grew up in Mauritius but her family was from India. 'She was an extremely warm and astute person. She had to take care of herself and her children, because her husband had died at a very early age. When my uncles, aunts and my mother were still very young she kept boarders and would make foodstuff to sell.' Marian Mall and her family lived in different houses in the Durban area. She never owned a house because she could not afford it. Growing up, the Bawa children would spend vacation times in Durban, and they would also visit during weekends because Ahmed's mother missed her family. The Durban Mall family played a significant role in Ahmed's life.

Ahmed uses the words 'stunning'; 'strong'; 'dominant' to describe his paternal grandmother, Ayesha Bawa. "The family hinged around her and intersected with her. The fondest recollection I have is that on two or three occasions during the night, you could hear her checking every door and window and checking that everyone is covered. My recollections as a child are extremely safe feelings. I knew that if there was the slightest danger facing me she would leap to my defence. When we sat at the dinner table she would watch over all of us making sure that we all ate. She could only speak Gujarati and Zulu (an Indian version) - not a word of English. My grandmother was magnanimity - she was this really big human being. The fondest recollection I have is of anyone walking into the house (the house was always open), sitting at the table and everyone knew that they would be welcomed and treated to a meal. She was the kind of woman who just took control of things and took control of her life."

Ahmed describes his father, Cassim Kharwa Bawa as "very gentle and very warm, a person who finds it difficult to refuse." Although schooling was limited (he went up to

⁶ In the Group Areas Act it was legislated what the different racial groups had to live in different areas.

standard 2) he was completely numerate and literate. His mother , Hajra Cassim Bawa, gained her standard 8 but she did not make use of her education. She married and moved to Sevenoaks, but her heart was always in Durban.

Ahmed's father was a subsistence shopkeeper but was not very successful at it. "Part of the problem was that at an early age he had decided and made it clear to us (the children), that he did not want us to be in the shop. These subsistence shops depended on family continuity. But when he made that decision the shop had no chance. When we finally left the shop, all he had to show for the shop was some furniture and three children who were educated." Cassim Bawa's decision in a little hamlet and at that time (early 1960's), shows his foresight to encourage his children to explore other options. Ahmed's father said to his children, 'You are all bright, so you must study and qualify and become something'. Nothing came in the way of Ahmed's schooling and he did not have to argue for his time. Cassim Bawa's decision was probably influenced by Ahmed's mother who saw education for her children as a way of moving out of being a subsistence shopkeeper in Sevenoaks.

Ahmed knew that his parents considered doing well at school as important. He did not feel it onerous since he performed well at school. His outstanding performance put pressure on his younger brother and sister, both of whom were also bright. Another quality that the family considered important was "absolute honesty." Ahmed relates an incident: "There was one occasion, when as a young boy, I stole some money from an uncle of mine. When I was caught there were severe repercussions. I had to get on the prayer mat and pray. I was made to apologise to my uncle." His parents valued the qualities of being decent, friendly and nice. So, they could not understand it when around standard 7 they considered him as "growing up a rebel." Around age 14 Ahmed began "to disengage with them in many genuine respects about many intellectual issues. I sometimes feel that was a horrible thing to do. It just happened. On the other hand I think they provided me the space to do it, unknowingly I think." Ahmed had a close relationship with his father until around age 14 - this age seems to have been a turning point in his life. "One of my fondest memories was joining him everyday at 7pm to listen to the news. I don't know why we did that. He certainly did not say 'come and listen to the news'. My brother did not do that. After that was Mark Saxon and Segei with 'No Place to Hide'. We did from time to time talk about

the news, but that came to an end at about age 14. I have a sense that he was slightly intimidated by me - that may have happened. I don't think I was being arrogant. On the other hand he felt left out."

Although his parents did not articulate it, they expected Ahmed to become a doctor. Being a doctor was viewed as a high status occupation in the Indian community and was the expectation of most parents. However he was allowed to play around with ideas and "even when I said I wanted to do Physics, they were quite aligned with that, even though they didn't have the faintest idea what physics was."

Ahmed's younger siblings are his brother, Shaheen, and his sister, Rizwana. He describes Shaheen as "much more adventurous and gregarious than me - in terms of exploring the grey areas. He was quite happy taking on the school when those opportunities presented themselves. Later in life, like me, he was involved in the United Democratic Front(UDF) and the African National Congress(ANC)⁷. He was involved in the underground, whereas I was involved at the open level. He is an electronics engineer, but at the moment he works as a Director of Technology at the National Intelligence Agency." Rizwana is an "absolutely bright person." She did very well at school until the matriculation exams. She completed an honours in Geography at the University of Natal and had several impressive jobs. At the moment she is running her communications business in Johannesburg. Several cousins lived in the Sevenoaks home and in particular two cousins, Farouk and Fazila, helped in the shop. "They were like an elder brother and sister. The fact that they were there meant less responsibility for us in the shop."

The home language was a mixture of Gujerati and English. "When we were at the big house in Greytown, it was Gujerati. But in Sevenoaks with my parents, it was English." Ahmed grew up in a Muslim household "except for the fact that there was no pressure on us to pray. We should thank my father for this. We did go to madressa⁸ but when it became difficult for us to go there was no real pressure." Up to the age of 14 or 15 Ahmed did go to the mosque, but this was more as a social function since he enjoyed being with people. "I think I was irreligious from about day one. I can't remember a day where I thought this was

⁷ The UDF and ANC were liberation organisations. The ANC was unbanned in 1990.

⁸ These are religious instruction classes and are generally held after school.

something important to do.” When Ahmed was about 14 or 15 years, he caused quite a stir in the mosque. “After the prayers, when the molvi saib⁹ was talking about the notion of predestination, I put my hand up. He got an absolute shock and freaked out. This is never done in the mosque. Here were all the elders. I said there is something wrong here: if it is predestined that I am going to be a rogue, why should I be punished for it because I had no say in it. I could see that he was trying to find some answer, but he couldn’t. Eventually he became very angry and said that the devil was talking through me and he chased me out of the mosque. I found it truly fascinating that the community then thought that I had done something wrong. At that stage I thought this was ridiculous. It was a very difficult decision at the age of 14 or 15, but it was easily made. I was saying that this is a load of nonsense, but saying it in a community where other people saw it as being very important.”

This incident illustrates Ahmed’s nature to ask questions about things that do not make sense and challenge structures like the mosque and religion. When I asked Ahmed where this notion of questioning came from, he said that his parents never prevented him from asking questions, but they never encouraged it as well. It also seems that around the age of 14 or 15 he began questioning many aspects. It was a time where he also withdrew from interaction with his parents.

When Ahmed discusses the shaping of his political awareness and identity, he relates an incident which he remembered when he was at ModderBee prison (during a political detention) in the 1980’s. He and Frank Chikane were talking about their childhoods and were driving each other further and further back. He suddenly remembered this incident which occurred when he was about three or four years old. “My father’s shop was a typical small corner shop - there were shelves against the wall and a counter between the shopkeeper and the customer. One day, I was on the outside of the counter (where the customer stands). I had my elbow flat on the counter, my head over my wrist and I was looking down at the floor. I suddenly noticed this African guy next to me, who was barefooted. I saw his feet. I counted his toes. It suddenly struck me that he had ten toes just like me. This was a big revelation to me. As I think back it was the one incident that had an enormous impact on me. It was almost a sense of jubilation. I had discovered that we were

⁹ Molvi saib is the priest.

the same. Thereafter I counted other peoples' toes, fingers and looked at their nails etc.” The second incident occurred when he was about seven or eight years old. “The police were in my father’s yard. They were going to arrest someone whom they said, had stolen something. My father was trying to intercede and said, ‘Why don’t you try to understand why he stole this’. At first I said to myself that that [father’s question] was a silly question. I engaged with that and it suddenly dawned on me that what my father was saying was that people might have a reason to steal. That again made me think differently. When I think back to my childhood I see that as a very significant event.” Ahmed says that, by far, his political awareness and identity were shaped by inputs from his uncle Hassan Mall (mother’s brother)¹⁰. Mall had been banned for several years; was a member of the Communist Party and Natal Indian Congress. “While he was banned, during vacation, he would take me for a few days to stay at his house (I was about 13 or 14 years). That was very nice for me because he had the most wonderful library - books on politics, mathematical books, everything. He was perhaps my most important influence in politics.” Another aspect of his uncle’s life that made an impact on Ahmed’s life was that he was not married to an Indian Muslim person but to a Coloured and a Christian. “That was very important in my upbringing. This said to me that there was nothing wrong with this. They had the most gorgeous children who were totally well and normal.” In Sevenoaks, from an early age, Ahmed developed friendships with children outside the Muslim community. “That was very important in my development.”

The family belonged to the “merchant class”, but his father was a subsistence shopkeeper and their future depended on the big wholesalers from Durban. However, there was never an occasion when Ahmed thought there won’t be food at home or his parents would not be able to send him to school; but there was no money for expensive books. Although the family were subsistence shopkeepers in a little hamlet, “there was a certain complication with regard to my particular nuclear family. My mother came from Durban and she actually thought she was different from others in Greytown. To give you an idea, on Eid¹¹ Days, we would wear clothes that would only reach Greytown about two years down

¹⁰ Today he is a judge in the constitutional court.

¹¹ This is a holy day for Muslims.

the line. It was a bit awkward. But there was also a nice sense in that we felt like ‘what do the Greytown guys know about fashion’. But there was also a sense of ridiculousness in trying to be different from others, for example, as a six-year-old child, on my first day at school, my mother made me wear a cap. I got to school and realised that I was the only kid with a cap. All the other kids knew they did not have to wear it, but I had to wear it because my mother thought I had to be different.”

The paternal and maternal family attitudes to education and academia were different. On the paternal side there was really no culture of education except in the Sevenoaks home and a cousin who studied medicine in Ireland. On the maternal side his uncle was already an advocate. This difference presented itself as a competing force in Ahmed’s life - one part of the family encouraging him to study and other uncles saying ‘You are wasting your time with studies - we will buy you a shop.’ The critical thing was that his father recognised, at an early age, that the running of those little shops did not present a bright future.

Schooling: one brilliant and two good teachers

Ahmed went to Greytown Indian Secondary School¹² in grade 1. When he was in standard 5 a new high school was built and this school became the primary school. School was 17km away from Ahmed’s Sevenoaks home; so for the first four years of schooling he lived with his grandmother. His parents took him to Greytown on Sundays and fetched him on Fridays. When his brother, Shaheen, started school, he refused to stay at their grandmother’s house. So his father had to arrange transport from Sevenoaks to Greytown everyday.

Ahmed’s memories of primary school education are “all warm. I have very few bad recollections of school. Even the bad recollections, when I think about them, were character forming and forced me in particular directions which I am not unhappy about.” Of course this is one of the issues of retrospective recall and a personality like Ahmed’s not wanting to wallow in a negative situation and be a victim. An incident in primary school which stands out in Ahmed’s life is recounted. (The memory of this incident was prompted when he recently gave a talk at his old school). “I remember in standard 1 there was a teacher,

¹² This school first catered for both a primary and secondary school education.

Farouk Moola, and he took us for science. It was quite fascinating because one day he came to the school with a 5 liter tin and a primus stove - usual things for an experiment. He had some water in the tin and heated it up. After heating it up we saw this water boiling and steam escaping. He got one of us to put the cap on and to turn the primus stove off. The tin crumbled. It was like magic. When I think back, the most important thing in this whole episode, for me, was that he (the teacher) did not have the faintest idea what was going to happen. He was discovering at the same time as we were discovering it. I don't think he had done this before. I could see the anxiety on his face. This was an absolutely stunning learning experience. The whole thing was like magic - seeing this tin crumple. Unfortunately it was the only thing he did. I am almost eternally thankful to him. He did not explain it properly, but it did not matter."

From the time Ahmed was in Class 1, he had a sense that he was good at most things. He compares his situation with his daughter presently. "Our young daughter is not a star, nor is she too bad. She was at a school in Durban and was put in the C class and performed at a C class level. When we went to Pietermaritzburg and the school authorities learnt that Rookaya and I were educated people they put her in the A class. Now she is performing at the A class level. It is amazing how environment helps to lift people." The power of educational capital!

In primary school Ahmed was totally frustrated by the need to write neatly and the emphasis being placed on that. Ahmed coped with this petty behaviour by recognising that "I was smarter than the teachers." In school some "teachers hated me and others loved me." He grew close to those who loved him. "I could see they were seeing things in me." There were other teachers who were "very small minded. This was because I was a smart kid." Generally speaking Ahmed found his primary school teachers uninspiring. He always came top of the class.

The primary school classrooms were "fine", but there were limited facilities. The class size was between 35-40. The school had no special audio-visual equipment, but there were free textbooks. There was no library in school. There was only a white library in town which "we were not allowed to use." Ahmed's parents would allow the children to buy a

few books when they went to Durban. “I did not do much reading.” His parents never helped him with his homework but they would ask if it was done.

Ahmed says that in his schooling career he had “one brilliant teacher and two good teachers”. In standard five Ahmed went to the new high school. One of the teachers, Krish Nankisson, recognised that he had talent in mathematics. “I think I have a lot to owe to him. In standard five Nankisson gave me this book, *Modern Mathematics*, and he put me on a track different from the rest of the class. By April/ May I completed the book. Already in standard five, he exposed me to standard six work and I completed the syllabus. I just lapped it up. I enjoyed the rules; learning the rules and applying the rules. When he was teaching in class, it was work I had already done and I picked up finer points where necessary. By the time I was half way through standard eight I had already completed the matriculation syllabus.

Some teachers supported Nankisson’s way, others did not. “I just carried on my own”. Another important teacher in Ahmed’s life was his standard 9 &10 mathematics teacher, Vic Pillay. (He later became Director of Indian Education.) “He was, for me, the most outstanding mathematics teacher. He was also the Principal of the school. He and Nankisson had the most profound positive influence on me. There were others who had a negative influence, which resulted in a positive outcome. First of all I enjoyed Vic Pillay’s lessons. When he came to class I just felt happy. I knew here was somebody who knew mathematics. Although I had done these things before I felt that there were things that I could learn from him. There was a sense of excitement and exuberance about him. Here was someone who had achieved. He had a B Sc. degree in mathematics and chemistry. He made me register for Additional Mathematics.¹³ He tutored me in the evenings.” Vic Pillay impressed Ahmed for a number of reasons. The first day Pillay walked into class “we stood up and he said, ‘Don’t stand when I come to class’. Every other teacher made us stand in straight lines. Immediately there was a sense that there was something different about this guy. The other side was that he taught in a very traditional way on the blackboard but would constantly expect us to engage with what he was writing. He would constantly stop

¹³ Additional mathematics was not one of the subjects on the school timetable: but bright students were encouraged to enroll for it, work on their own and then sit for it in the matriculation examination.

us as we went along and ask, ‘What is the next step? How do you do this?’ Every single person passed mathematics at the end of the matriculation year. He was a very solid teacher. When I think back both to my school education and university education there is nothing wrong with traditional teaching.”

Ahmed loved cricket. Vic Pillay also played cricket. “When I was in standard seven (before Vic Pillay’s time) we went to the Principal and said we would like to play cricket in the Natal Schools Week in Durban. That Principal’s response was, (I will never forget his words) ‘You duffers can’t play cricket here, you want to play in Durban.’ Then Vic Pillay came and we raised the question with him. He said that was fantastic and we would find the money. The first inning that we played we were 21 all out; and I had scored 11 not out. That year I was selected for Natal.”

In high school, other teachers who had a positive influence on Ahmed’s life were Bhikram Roopai (also a friend), Samjowan and Alfred Simon. “Bhikram taught us geography. He was trying to find himself and where he figured in the scheme of things. He recognised in me someone who was not happy and trying to figure out things.” Samjowan, the biology teacher, “was impressive. He had a Masters degree which was unusual. I loved engaging with him.” In the evenings, Bhikram (he was a religious man), Samjowan and Ahmed would talk about God. “It was a very important time for me because it was also a time when it became clear to me that while the rules in mathematics were very nice and easy to handle, there was a whole range of complexity outside of that easy world, that I had to handle. The nice, neat, technical world you have in mathematics does not play itself out in the world. Just about that time (I was in standard 7 or 8) a disciple of Guru Maharaji visited us. He spoke to us. This was the first time I got a taste of relativism. He said that if one gets someone from Iceland and brings them to London they would say how warm it is but if one gets someone from South Africa and takes them to London, they would say how cold it is. Suddenly the whole exactness of science disappeared out the window. That impacted on me enormously. It said to me there is a need to look at life in a more relativistic way.” This is Ahmed, the intellectual, questioning, linking the different aspects of life and trying to make sense of the broader issues of life. The teacher of English, Alfred Simon, also played an important role. He took the class for half the year in matriculation.

For the other half there were teachers fresh from training college who could not cope with teaching a matriculation class. “In half the year he just opened up English for me. He approached things from a different angle - challenging us with new interpretations of poetry and new topics for essays.” Ahmed describes his high school years as very pleasant.

In high school, Ahmed took six subjects: English, Afrikaans (“I hated it”), Mathematics, Biology, Geography and Accounting and he also wrote Additional Mathematics. His school did not offer Physical Science. It was offered in schools in Indian schools in Pietermaritzburg (about 40 km from his home) but Ahmed did not want to go there. “It was too much of a hassle going away from home”. In the matriculation exams that year (1972) Ahmed was the top student in the Indian Education Department. Ahmed describes the quality of education in the Indian schools as “was not really bad. If someone had a little critical awareness, the system had possibilities. The education did not foster critical awareness, it did not foster questioning. You had to come in with a little bit extra.” Ahmed reveled in school and was “in some ways too successful. At the age of fourteen I was selected to represent Natal High Schools for cricket and by the time I was 15 I was playing for SA High Schools. I was good at athletics, soccer and was good at anything I touched. In the academic world I did not even have to try to come first in class. I was reveling in school.” Ahmed was also selected for the South African School Cricket team¹⁴. In fact in 1973 Ahmed was offered a scholarship (by the West Indian coach Keith Barker) to go to England to play cricket and study. Ahmed’s parents said no. At the time “I was very angry, but in retrospect I think it was the right thing.”

High school for Ahmed involved more than academic work. In addition to the engagements with Roopai and Samjuan about the larger issues of life, Ahmed also expressed his dissatisfaction with the South African apartheid political system. “In our matriculation year we had to have this Republic Day¹⁵ festival. My first political act was changing the South African flag for the Union Jack. I was Head Prefect for two years and I was able to go to staffrooms, stockrooms and had access to all parts of the school. The flag

¹⁴ The SA cricket team was selected mainly as a symbolic act because SACOS had imposed a self boycott. SACOS did not support the white teams playing international sport, so the players could not permit themselves playing international sport.

was in the stockroom, all wrapped in paper. I knew from previous years that all they would do was take the packet with a hook hanging out and connect it to the pole. On the day they would simply take the paper off and raise the flag. It would be a Union Jack instead of the South African flag. Unfortunately one of the teachers discovered the switch before the ceremony. The security police was called.” [The police did not figure out that it was Ahmed who made the switch]. In his matriculation year, Ahmed also looked for an organisation where he could be part of something politically. “I made my first foray into the SASO¹⁶ offices and spoke to people. The reception was not very warm. They perhaps thought ‘Who is this youngster?’ and I probably looked like a spy.”

When he was in high school Ahmed had “no idea” what he would do after matriculation. “I thought about genetics, about mathematics, medicine of course but I never applied for medicine. Basically I didn’t have the faintest idea. Eventually I applied to do science - physics, chemistry, mathematics and applied mathematics.” He cannot really explain his choice to study physics and chemistry. The one incident which may have biased him to science was when he was 13 years old and very ill with rheumatic fever for six months. His parents agreed to buy him an electronic set (Ahmed had seen the advertisement). “I played around with this in bed. One day I made a radio. I cannot forget the exhilaration of setting up this circuit. Then I had an earphone, twiddling around with the knob, changing the frequency and suddenly I heard LM radio. I could not forget that. That was really wonderful. I wanted to understand this radio, how it worked. I did not have the faintest idea of how it worked.” But he acknowledges that there was no particular reason for that decision and he could have been swayed by something else, say genetics. “If someone came to me at that time and said ‘Why don’t you do genetics? Why don’t you do law? It is very good’, I would have done so. I was also good in mathematics and good in biology.” Later in the interview Ahmed says, “Ultimately when I think about it, I wanted to be different. It was not so much about doing physics and chemistry, but different about what everyone else was doing.” Ahmed had been impressed by and remarked about teachers who had Bachelors and Masters degrees in science.

¹⁵ This used to be on 31 May and was a day of celebration by white South Africa for breaking away from the Commonwealth and declaring itself a republic.

¹⁶ SASO stands for the South African Students Organisation. See chapter two for details.

Undergraduate years: it was going to take a long, long time

Ahmed has difficulty explaining his decision to study at Wits University¹⁷. “I cannot believe this. (He says with absolute disbelief) The only place I applied to was Wits. I cannot believe that I did that. Wits accepted me, but I could not go to Wits. It was not only the case of getting ministerial permission. Getting permission to go to Wits was heard in parliament.” Ahmed went to Wits in 1973 to do Mathematics, Applied Mathematics, Physics and Chemistry. “I had fights from the beginning. I was already into the Black Consciousness thing and I saw every white person, especially the lecturers, as enemies. I do not know why I went there in the first place. I simply had a horrendous one term. I came back home and I refused to go back. My parents were devastated. I had just come first in the Indian Affairs Department. I had a big scholarship from Anglo-American because my parents could not afford to send us to university.” Ahmed was the only black person in the physics class at Wits. The chemistry class (which included engineers) had a few more black students. It is interesting to speculate the extent to which the culture of alienation for black students on white campuses affected Ahmed. Being away from home could have not helped.

When Ahmed reflects about the Wits experience from a distance (23 years later) he says. “I think they were wonderful. I think I was horrible. I think it was a new experience for them to, having a Indian student.... I don’t think they knew I was bright. I was hypersensitive as well. Almost everything they did I saw as being racist. There was some racism, but also a high level of sensitivity on my part. When I think about it now, it was part of the learning experience.”

In registering for a B. Sc. Ahmed had no idea what he was going to do thereafter but the “whole idea was that I knew I wanted to be a scientist.” His conception of a scientist was one who made discoveries. At Wits Ahmed was exposed to journals like the *American Journal of Physics*, and came to know about nuclear physics. “At that time, nuclear physics was cutting edge and one had the sense that developments in other areas like solid state

¹⁷ Wits in 1973 was for white students and a Black student could only study there if the subject was not offered at the ‘ethnic’ university and the Minister of Education gave permission.

physics depended on developments in nuclear physics. I was drawn into that terrain. Although particle physics was already going at that time, I had no introduction to it. If I had known about it I would have gone directly into particle physics.” Ahmed enthuses about the beauty of science “The one thing that appealed to me early on as I read about physics is the notion of simplicity in science. What was particularly pleasing to me about the notion of simplicity in science was that the closer and closer you got to cutting edge, the more and more “simple” the science became.”

In April, after the term at Wits, Ahmed went to the University of Durban-Westville (UDW) to see if he could get in. But UDW felt that he had left Wits University because of “political leanings” and he was refused entry.

Serendipity affects the trajectory, “We had an uncle who visited us from Pakistan. He said I should come to Pakistan. My parents got together some money and sent me to Pakistan to do a B.Sc.” Ahmed went to Pakistan with the intention of doing nuclear physics. A week after Ahmed got to Pakistan, Bhutto came to power and said foreign students must leave. Ahmed returned home after two weeks in Pakistan. He spent the rest of the year at home.

The following year (1974) Ahmed decided to go to University of Natal medical school. This may be seen as an act of appeasement to his parents. “In some senses I was giving in to my parents. I was saying, sorry. I was going to medical school.” He stayed in medical school for three years, but it was a torn apart three years.

His preliminary¹⁸ year of medical school (1974) was his first rigorous introduction to physics. “What I found quite fascinating at the time was that physics appealed to me much more than chemistry or biological sciences. The subject that I liked after physics was English and not chemistry or biology.” At that point he did not feel too bad about losing the dream of doing nuclear physics. “Various people had indicated to me that medicine gets interesting and I could become an academic in medicine. The fact that I felt that I had really fouled up the first year in some senses, provided some level of impetus to follow through.”

¹⁸ This is a year before starting the medical degree. He would have probably been asked to do that because he did not do physical science in high school.

In addition to his medical studies Ahmed was also involved in political activities. He was involved in the Black People's Convention (BPC)¹⁹ and Black Allied Workers Union²⁰. He was not really involved in medical school politics. "In some ways it was a sort of arrogance - saying that I ought to be involved in the politics outside than the politics inside." Because of his political activities the security police detained Ahmed for a few days in April.

He was detained again in September that year. "It was a long one, for about 13 months in solitary confinement. I was detained on the night of the pro-Frelimo rallies after Mozambique was freed. We took a national decision to have these rallies and one of the biggest ones was the one organised at Curries Fountain [Durban]. That night I was detained and taken to prison. At first I was detained for 48 hours. That was extended to 14 days under the Criminal Procedures Act. Then it was made clear to me that it was detention under Section 6 of the Terrorism Act.²¹"

Being in solitary confinement and having a sleeping problem (he sleeps for four hours each night) meant that he had to be very disciplined to use his time. "What I could NOT do was simply do nothing." People who were religious prayed. "I was told quite early on that permission had been given for me to write my exams. Later I was told that books had been sent to me, but I never received those books. In solitary confinement there were no books, writing paper or pens. I then recalled my physics, biology and chemistry and tried to understand how I could learn in the absence of books. In particular I solved problems in my mind. I can remember doing the usual two-pulley problem and then extended that to three pulleys and then tried to see how to solve a four-pulley problem. It suddenly dawned on me that there is a way of extending the solution. It was a useful exercise in some respects, because it allowed me to play around with ideas which would have been fairly constrained if I was learning out of a textbook. Textbooks would have stopped at two pulley problems." As usual Ahmed turned a situation to his benefit - turning any event into a positive one. Of course in solitary confinement there was also interrogation and the 'studying' had to occur

¹⁹ BPC was very active in organising drama productions and meetings.

²⁰ This was a trade union type of organisation.

²¹ This was the dreaded Act which gave the Minister the right to hold people in detention for indefinite periods of time, until he was satisfied that people had divulged all the information.

between these interrogation sessions. This affected the learning process. At the end of the year Ahmed wrote his exams and passed.

The other thing that Ahmed did in solitary confinement was to write poetry which he memorised and wrote it down later when he was released. His poetry has appeared in student journals and newspapers in England. After the exams he switched over to other things and thought quite a lot about the whole political situation. “It was during that period that I made a conscious move from thinking along Black Consciousness lines to thinking along Congress and ANC lines. It was actually a very interesting phenomenon for me because I actually spent a considerable amount of time *thinking* [he emphasised] about these issues. The one thing that strikes you heavily after you have been through this is how important it is to have somebody to talk to. When I came out of prison there were a whole range of different things which I realised, later on, I had dealt with in a very simplistic way”.

When Ahmed was released, in October the following year (1975), he could not pick up his medical studies. For the rest of that year he worked as a salesman in the Sevenoaks Trading Company.

In 1976 Ahmed went to first year medical school. He describes the year as being fine and he was enjoying it, but he didn't think he did very well. “I think it was the first signs that I was losing interest.” He did not spend a lot of time studying and one of the lecturers brought it to his notice that “ I was pretty messed up from the detention. As far as I could see I thought I was pretty OK. After I was released from prison I used to spend every single Sunday and every Wednesday night watching federation football. It was a crazy thing because I had never done this before. I found myself constantly in town during the busiest times, walking around where there were crowds.” A lecturer who made him aware of his behaviour patterns helped him think about what he was doing. Coping with the post-detention period was difficult but “at that time I did not see it as difficult.”

When Ahmed was released from prison he continued his political work. In 1975 and 1976 he got involved in the general workers and industrial workers benefit fund - precursors of COSATU²². Ahmed experienced a crisis in medical school in his second year

²² This is a workers' trade union.

(1977). “I was faced with Anatomy and Physiology. Suddenly I was faced with having to do a tremendous amount of swotting. I could not see any alternative ways of learning these things. I suddenly realised that I had made a dreadful mistake. I studied the whole year. I was quite good at most things. What I did, to provide myself with certain amounts of relief was to focus on things like evolution. That was much more exciting. There were certain aspects of anatomy that completely fascinated me. What freaked me out was studying for this.” People around him tried to help him through second year, saying, ‘Work through the second year and third year will be fine’. From about September that year, Ahmed gave up on his medical school studies. “At the end of the second year I pulled out. I wrote the exams, passed one and failed one.” Later in the interview when Ahmed was asked about his most frustrating experience in his academic trajectory he said, “I found second year medicine totally frustrating. Now, when I think back, I think it was a good experience for me. If anything what it told me was that for some reason which I don’t understand very well, I was cut out to do certain things and not cut out to do other things. It was a very dramatic experience. I really struggled in those second year courses.”

Towards the end of 1977 Ahmed married Rookaya. Ahmed’s parents and Rookaya’s grandparents were very traditional and when they knew that Ahmed and Rookaya were going out (they had been going out since Rookaya was in standard 8), they simply said, ‘Get married or don’t see each other’. The next Saturday they got married. Rookaya was still in matriculation that year, so on the Monday she returned to school. Rookaya lived in Pietermaritzburg and Ahmed lived in Sevenoaks.

After dropping out from medical school, Ahmed knew that there was no possibility of him going back to university on a full-time basis. He decided to work and study through UNISA. Eventually he managed to get a job as a salesclerk at Umvoti Farmers Equipment in Greytown - an experience which he enjoyed.

In 1978 Ahmed registered through UNISA for Mathematics1 and Applied Mathematics1. He was allowed to take across three credits from the Medical School. There is great excitement in his voice as he says. “Finally I found my home.” He adds with absolute certainty in his voice, “The track was set. It was quite clear to me that I wanted to be a physicist and an academic. I just wanted to do physics.” At that time he did not really

think about doing a doctorate. He loved studying and ended up with distinctions in mathematics and applied mathematics.

In 1978 Ahmed continued living in Sevenoaks. Rookaya was studying at the University of Natal and living in Pietermaritzburg, so Ahmed visited about two or three times a week. Natal University gave him a scholarship to study there for the second year. He did Mathematics 2, Applied mathematics 2 and Physics 2 and passed all the subjects with distinctions. He was given a scholarship for the third year. It was going very well until May 1980 when he was detained again. This was the year of the second string of school boycotts. University students were providing support for the students, but the security police saw them “as instigating the boycotts - which is absolute nonsense.” The first two weeks of his detention was in solitary confinement. Thereafter he was taken to Modderbee Prison in Benoni and held under Section 10 of Internal Securities Act, which was detention with other detainees. He was in prison until September; so it was too late to catch up with his studies. With the detentions Ahmed realised that his academic career was going to take a long, long time. ‘I was quite resigned to the idea of working, studying part-time, and being in detention.’”

Ahmed’s family, especially his father, found it difficult to take the detentions. “The farmers at Sevenoaks [his father’s clientele] totally freaked out when they heard. Even the African community in Sevenoaks thought I was a jailbird - there was no high level of politicisation. Rookaya was politicised and fully in support with what was happening.”

Ahmed then got a job as a laboratory assistant at the University of Natal (Pietermaritzburg). “It was a nice year (1981) in some respects. Rookaya and I got our own house. Rookaya had started teaching. We had our first baby - Nadya was adopted in 1981. She was born in 1980 and came to us when she was nine months old. Rookaya’s mother was very good. She was very happy to keep Nadya for a while”. It was clear to Ahmed that he had to finish his degree, so he registered for Physics 3, Mathematics 3 and Applied Mathematics 3 through UNISA. He ended up with distinctions in all of them. Ahmed thoroughly enjoyed working through his physics modules at UNISA. “I was totally excited by it. I was sitting here and reading a few textbooks and discovering a world of physics. That was all the help you got from UNISA. In my third year, in physics, I did both third and

fourth year modules of physics (i.e. honours modules).” In 1982, ten years after he had finished his matriculation year, Ahmed completed his B.Sc. with distinctions

During his undergraduate years there were two lecturers who made an impact on him. Ahmed enjoyed the lectures of Owen de Lange, a theoretical physicist, and Prof. Raab a quantum mechanics expert. “Being exposed to Owen de Lange and Roger Raab was very important. I thrived as a student. Watching Owen de Lange gave me an indication of how beautiful theoretical physics could be. I tried to understand what it would take to be a good theoretical physicist”. During the undergraduate years, it was Ahmed who made up his mind that he would go into academia. The only lecturer who suggested this was Owen de Lange. “Owen de Lange recognised talents in me and he would say in class that there were only two in this class who could go to a Ph.D. I knew I was one of them. That confirmed that I was going to go further.” It did not seem that lecturers actually encouraged students to follow a graduate course. “It wasn’t the same as how I got people excited by physics and post graduate programmes at UDW. I found that odd.” So it seems that if there was no drive from the individual, it would be highly unlikely that there would be encouragement from the lecturing staff. This was different from high school where teachers play a big role in encouraging one to go further. During this time there were very few black students at the University of Natal, because one still needed ministerial permission but at that stage the system was breaking down.

Life at that time was very hectic. When Ahmed came back after work in the township, he would interact with the family and then think about studying. He thinks he managed because of his sleeping problem and could switch off from one aspect to do physics “even though my head was buzzing.” For Ahmed all the different aspects of his life were coherent - family, activist, physicist. “I was enjoying what I was doing in terms of science. I felt I had a role to play in terms of becoming a black physicist in SA. That linked the politics to my commitment to study hard. On the other hand it was completely clear to me that I did need the family situation, because without the family situation one side of me would be lacking. It would seem to me that there was always a sense of coherence with all these three different things. When I was campaigning in our struggle to set up the UDF, it

didn't seem that that was opposed to doing physics or the family. There are stories in Pietermaritzburg that when we were at a meeting, Nadya would be running around."

The start of graduate work: the university is my home

In 1983 and 1984 while working as a laboratory technician in the physics department Ahmed did the physics honours part-time at the University of Natal (Pmb). In the honours course again it was Owen de Lange and Roger Raab with whom he was "enthralled. It was clear to me that it was theoretical physics that I was keen on. I remember reading various books about theoretical physics - about methodologies in theoretical physics. Of course the centenary of Einstein's birth was at that time and there were also many activities about relativity. That completely captivated me." At that point there was no doubt in Ahmed's mind that he would study further.

Towards the end of his second year of the honours (October 1984) Ahmed had a telephone call from Krish Bharuth Ram of the University of Durban-Westville asking if he wanted to come to UDW to do a junior lectureship. "I leapt at it. Rookaya was irritated by it. I was moving from a permanent position as a technician to a one-year post as junior lecturer. We moved to Durban. I suddenly discovered that this [the university] was my home. I enjoyed teaching. I enjoyed being at university." In December 1984 Ahmed and Rookaya had their second baby, Mishal. Rookaya then decided to stay at home.

Around May, 1995, Ahmed started a M Sc. in nuclear physics on a part-time basis (he was a junior lecturer) with Krish Bharuth Ram. He was completely engrossed in it for the next 18 months. Around about June / July 1986 the opportunity arose for him to do a Ph.D. in England. It seems that after gaining his bachelors degree the rest of his academic trajectory was smooth sailing.

Ahmed explains his masters project. "In nuclear physics there is an area called nuclear spectroscopy. Just outside Cape Town, there is this national accelerator centre. It now has a big cyclotron. At that time there was a van der Graaf accelerator and it accelerated protons to about 5 MeV. One of the things you could do with 5 MeV protons is to bombard them into tritium cells. You then have fusion reactions and you can produce more energetic neutrons at about 22 MeV. Krish Bharuth Ram designed an experiment (he

is an experimentalist) where he directed the neutrons(22MeV) to a zirconium target. The zirconium target is very special because the nucleus has one proton sitting on the outside of a very closed set of shells. The rest of the protons and neutrons are fairly well contained. The neutron comes through, picks up the proton (called a pick up reaction) and you have a deuteron coming out at an angle. You can measure the intensity of the output in terms of angular spectrum. The angular spread or distribution of the deuterons depends fundamentally on the structure of the zirconium target. My job was, firstly, to try and understand what the value of the peaks were and secondly to understand why they came out in this particular way. The theoretical calculations gave an understanding of the structure of the zirconium nucleus. I enjoyed the project and did, I think, a very nice calculation.” Ahmed obtained his M.Sc *cum laude*.

As Ahmed was approaching the conclusion of his thesis “it became clear to me that there were many fudge factors that were introduced because we know that there is a whole physics that underpins nuclear physics (physics of the quarks, leptons, gluons) i.e. particle physics. You are not yet at a fundamental theory level. It became clear that I wanted to get to particle physics.”

Ahmed had his first academic publication while he was in the second year of his M.Sc. “I published with Krish Bharuth Ram on the research I was doing. We heard in 1987 that the paper was accepted, but I had very little doubt that it would be accepted.” The motivation to write the paper was that “the currency in physics was getting publications in important journals. When I had done this calculation, it was clear that this was something we had to publish. Krish Bharuth Ram was supportive and helpful.”

Ahmed describes this period as the easiest time for the family. Their daughter, Nadya, had just started school, Mishal had turned one and Rookaya was at home at that time and was studying for her honours in library science (“she may have been a bit bored”). Ahmed was then offered a scholarship to study theoretical physics in Durham. The scholarship was from the World University Services. It was offered to Ahmed because of his involvement with the African National Congress. Ahmed left in September 1986 and Rookaya, who was completing her exams, and their daughters joined him in January.

In 1985 and 1986, Ahmed was involved in various political activities, but it was not to the same level as when he was in Pietermaritzburg. “My political home was Pietermaritzburg and when we moved to Durban circumstances were different.”

The Durham experience: working with a community of researchers

Ahmed describes his Durham experience very warmly. “It was stunning.” He burst out laughing because that was what I expected him to say. “We had a great time. Rookaya studied as well. She did her Masters in Education. For me it was just wonderful - for the first time after medical school I was able to do physics on a full time basis. The first year of the Ph.D. was spent doing course work. I was slightly concerned because I did not have any formal training in theoretical physics - everything I had learnt up to that point was just imbibed. At the end of the first third of the year I wrote an exam and passed. That was quite an important step for me. What was fascinating though was being called in by the course co-ordinator who said, ‘We are very, very surprised’ and I asked ‘Why’. He said it was because I had done so well. I asked why he was surprised. He said that I was the first student they had from Africa and they did not think I would do well. This was the kind of preconceptions they had about people from Africa.”

Ahmed’s only concern about studying in the UK was that he had done very little particle physics before. He did not have any concerns about whether as a black person, he would cope on the international scene. “I was very worried about being able to slip into the system. I had to do a lot of background reading to come up to speed. I had the most wonderful supervisor - James Stirling. He was an absolute inspiration for me. He was so brilliant. For example, I would do a calculation and place the graph in front of him. He would take one look at the graph and say, ‘No, no, this is not correct. Go back and do it again’. He was so totally experienced. Just by looking at things he would very quickly come to conclusions. He was also very innovative and very sharp with finding new ways of doing things. It was a wonderful experience for me.” In Durham, there was another side to the physics experience for Ahmed - working with other physicists, some of whom were outstanding theoretical physicists. “It was a very nice experience to be in the company of about 20 postgraduates from various parts of the world and actually interacting with them,

seeing their development.” The importance of working and being in the company of some very brilliant people.

Ahmed describes his research project in Durham. “I had two choices. One was to go into that area of theoretical physics which is almost on the verge of mathematics. It would be largely untestable in terms of experimental testing. The second choice was to engage myself somewhere in the interface between the experimental and theoretical parts - doing work in theoretical physics which was closer to what was testable experimentally. I thought hard about making a choice and eventually opted for the second one. I think it was an important choice in that it allowed me to engage with experimentalists. It also provided me with an opportunity to do calculations which were used widely at other experimental institutes.”

Particle physics is really about the fundamental particles (you cannot break them down further) in nature. Firstly there are twelve fundamental particles and they constitute all matter in the universe. Secondly, there are four fundamental interactions which explain the way in which these particles interact with each other. One of these forces is gravity (depends on the masses and the distance between them), another is electromagnetism which depends on the charge. Then there are two nuclear forces - one is called strong nuclear force and the other is a weak nuclear force. My calculations tried to understand the unification between the weak nuclear force and the electromagnetic force.” Of course the big challenge in particle physics is to develop a theory of everything - a description of a fundamental force within which the other forces are subsets - so Ahmed’s work contributes to that challenge.

During his Ph.D., “largely due to this wonderful supervisor”, he had four or five publications in international journals. The work was at the cutting edge “experiments were being done and not even completed and I was doing calculations which were contributing to shaping those experiments”.

The three years at Durham were smooth sailing and the Bawas had a great time. They had many wonderful friends, the children were at school, Rookaya was studying for a Masters degree and “just to be able to do physics full time was wonderful.”

This university experience provided Ahmed the opportunity of going to other places in Europe. “I went to Poland on two occasions because my supervisor put me in touch with someone who was working on a similar programme to me. She and I set up a collaboration which continued for many years. She was also an important influence on my physics. I made a trip to CERN, the big particle physics research institute in Geneva. This was an absolutely stunning experience. I spent two to three months and worked closely with experimentalists and theorists. While there I also visited Hamburg where there is this big German accelerator. I went back several times and have a range of collaborations with people there. The most fascinating thing was meeting all these top rated international scientists, especially the older people and trying to understand what kind of science they did in the past. Amongst them were Nobel prize winners and people who just missed Nobel prizes. I totally enjoyed it.”

Gaining the Ph.D. for Ahmed was slightly but not overly exciting. “There was no phase transition for me. I got the Ph.D. - great.” The regret he has, though, is not taking up the post-doctoral fellowship that was offered to him. This is obviously a big regret in his life as he mentions it again later in the interview. “Just before we left I had an offer to do a post doc at the University of London, working with a good physicist. It was a prestigious post - doctoral fellow. Now, I think that was perhaps the one single major mistake I have made in my academic life. I think it would have done me a tremendous amount of good had I stayed on for another two years. We turned it down on the basis of wanting to get back to South Africa and contributing to the struggle.” There were a number of political changes in the air and Nelson Mandela was released early in 1990. “If there is anything in my life I could change around that would be one of the things. That would, of course, have had a whole range of implications. I do think I needed those two years as a post doctoral fellow before coming back to South Africa.”

Ahmed, of course, has an amazing intellectual ability, but there has to be more for someone to succeed in gaining a doctorate. He finds the question of why he succeeded in gaining a doctorate a fascinating one and says, “From the earliest time I can remember I wanted somehow to be involved in the knowledge industry. There was a time when I thought I would like to be a teacher. I never thought I would like to be a doctor. There was

never a time when I thought I would like to be an accountant. I always wanted to be in the knowledge business. Being a writer occurred to me a few times. The moment that I discovered that it was physics that I really wanted to do, then I think that set the pattern. It was clear to me that I needed to get the Ph.D. When I finally got the Ph.D. it was not such a big deal; it was just so that I could get a good lecturing job.” According to Ahmed another contributing factor to his success: “Had I not in standards 7,8,9 had some indication [from the teachers] that I was good at mathematics I think that would have had a dramatic impact on my life.” This highlights the role of school and teacher. “There was no one in my family who was good in mathematics. That realisation [that I was good at mathematics] was an important one and set me out from the rest of the class. There wasn’t someone saying that academia was a good thing to get involved in or to be a lecturer.”

Ahmed says that his marriage and family life have enhanced his academic work. “I think you might get a different picture from Rookaya. The fact of the matter is that it was much tougher for her to get to where she is than it was for me. After we were married, for several years, it was not just my studying part-time, I was also spending nights out in the township, working on various things - working on the establishment of the UDF etc. My being involved in these activities meant that there was some level of support system available to me. She also did a lot of studying part time. That meant a certain amount of understanding when we were both studying. In some ways the fact that we were a nuclear family unit and that, in particular, Rookaya’s family were close to us, actually did, from time to time, provide us with the opportunity of going to the library in the evenings. So that support system in terms of family was helpful.” Another aspect that contributed to his success was him making his part-time studies successful. “If I did not make my part-time studies successful, I don’t know what I would have done.”

Homecoming: physics and transformation

When Ahmed completed his doctorate at Durham he sent applications to South African universities for a job in physics. “I had resigned from my position at UDW when I left. I wrote to the physics departments at different universities in South Africa. Essentially UDW said, ‘Come back’. One of the liberal white universities forwarded my application to

Krish Bharuth Ram saying they thought I would be much more comfortable at UDW than anywhere else.” And this was 1990!

When Ahmed returned to the University of Durban-Westville, he was involved in particle physics research. He did not have any shortage of resources because in 1991 he was made a President’s awardee of the Foundation for Research Development - that came with a grant of half a million Rand. Before starting the Ph.D. Ahmed had two publications, he had published during his Ph.D. and when he returned he was publishing about five or six papers a year. On the basis of the Ph.D. publications, the publications for the last one-year, and the peer review (with international evaluators) he was awarded the FRD President’s award - a very prestigious award.

He also got involved heavily in physics education and science and technology policy - areas that he still works in. He also got involved in transformation issues at the university (“one must understand the context of UDW at that time”) - this “sucks you dry. At UDW I kept trying to find sufficient time to do research. When I look back I don’t think I would have done it any other way. I don’t think I would have cut back on the transformation work.” He was still producing papers in physics but acknowledges that if he had not been involved in transformation work, he would have probably produced more papers and he would have liked to develop a big research group.

Because of the context in which he was working (Ahmed was teaching 400 physics students), Ahmed has got involved in physics education. “With the intake of students at UDW the system was just not working. It was quite clear to me that while some were passing the exams there was very little learning going on.” Ahmed worked to improve the quality of engagement between students and himself, and between students and the material. In 1991 Ahmed adopted a “materials based approach. I provided students with notes (students had textbooks) provided them with tutorials and then in the class I would do nothing else but provide them with a five minute input at the beginning to indicate the terrain that would be covered for the day and then got them to work through a set of worksheets in the 45 minutes in a mode that fostered pairs working together. The other thing I did was to force the students to verbalise the physics because I realised that was a major problem.” This approach was not used in sections of the physics syllabus so one

cannot see the overall change, but there was a marked improvement in the performance on the section that Ahmed was teaching.

In his present job, as Deputy Vice Chancellor of the University of Natal, Ahmed is involved in a limited amount of research and it is obvious from his comments that he misses research. "I wish I had negotiated when I took up this job to spend half a day a week in research." Besides physics research Ahmed has been involved in developing the governments science and technology white paper and the national commission higher education report and other policy documents.

Ahmed burst into laughter when I asked him what the impact of his work on the broader society has been and said, "Zero". So how does the activist and physicist come together? "There is no application of particle physics at this point in time, except that particle physics has driven technology in a very substantial way. With regard to the activist side, I have had a tremendous urge to demystify what I do and have written several papers about that and spoken at various venues about demystifying knowledge - the theory of demystifying knowledge and also demystifying particle physics, actually talking about particle physics in a demystified way."

Ahmed has experienced a collegiality among the South African physicists in his field - there are no more than six people working in the sub-particle physics field. He finds the international academic world fascinating and says wistfully, "One wishes one can be like them. In some respects these are full time physicists - they do nothing else. We are involved in so many different things; and then we have to do some physics on top of that. Many of them do not do any teaching at all, except for post- graduate teaching. We have to do tremendous amounts of teaching."

I asked Ahmed to reflect on how he thought his race impacted on his life in academia. He had difficulty answering this question and said he had never thought about it. At first I could not understand why he had this difficulty. He talked about the fact that he was aware that "there were a few Indian physicists that had impacted substantially on research in physics and to be honest I did not really identify with these people. If you ask me if that had an effect on me - it didn't. I always see myself as South African rather than Indian". I then realised that by using the word race, it focused on Indian. I then explained

the question I was trying to ask, i.e. how do you think being a black South African shaped your life in academia? “Ha, that is another side and I feel that is an interesting thing. Always at the back of my mind was this need to succeed. It was important for me to become a physicist because there are very few black physicists in South Africa. That was a very important realisation at an early age - not just to qualify, but to be good and rigorous and to do things well and make it absolutely clear to whites in South Africa that we can do it too. Sounds pretty naive. It was something that occupied me from an early age and it continues to occupy me. Whatever we do we must do it well, not simply to show the white people, but to show ourselves that we can do things successfully and do things well.”

When I asked about his reflection on how being a male, affected his life in academia, he acknowledges, from looking at his family unit, that if he had been the woman in the family his life would have turned out different. “If Rookaya had said that she would like to study full-time, while I worked that would have not been a problem. But I know if I had to do the kind of child caring and rearing that she did, and I must be completely clear especially after we had our children I don’t think it was an equal contribution to the household, I would not be where I am now. I am quite sure I would not have done the Ph.D. The other side is that I also remember clearly while I was in school that women in my class did play a much more docile role than I played, but many of those woman are successful and became doctors. So had I been brought up as a girl, my path would have been different”. Ahmed says that Rookaya’s achievements are much more impressive than his. “Irrespective of what happened in my life, I think I would still have become a physicist because to me it was crystal clear what I wanted to do after the medical school experience. With Rookaya, it was a different path - she initially registered to do a social science degree largely because she did not know what she wanted to do. When she gained her first degree we had Nadya. She then did an HDE, began working, did a diploma in school librarianship while working and we had our second baby. Thereafter she did her honours while she was at home with the second baby.” Rookaya completed her doctorate in 1997. After years of working as an academic she has moved to a high profile management position (she is Deputy Director, KwaZulu Natal Provincial Library Services). She has no intentions of going back to academia, whereas for Ahmed he cannot think about anything else.

Life these days is hectic with this job as the Deputy Vice Chancellor of the University of Natal. One gets the feeling that he cannot wait to get back into physics. He still has to balance the different parts of his life - family, academia, committee work.

As we end the interview I comment to Ahmed that his life story illustrates the coherence amongst the different parts - family, academia, work and activism. These aspects are not separated but interwoven. Ahmed is surprised that I am pointing out that his life is special and the kinds of activities in his life are not usual. He is at pains to point out that there are many physicists who have similar kinds of lives. "I think amongst physicists there is a certain kind of radicalism which says something like we enjoy what we do but that we got to constantly understand what our role in society is". This probably comes from Ahmed's pragmatic approach - something needs to be done so I did it, there is no big deal about it.

Ahmed's success in the academic field is as the result of the interplay of his own abilities and motivations to be a physicist but these would have not been possible to achieve without the significant role of family and the foresight shown by his parents. His story also illuminates the pull of the science world (which is ordered and secure) and the real world where there is more turmoil. He manages to achieve some balance between the two.

CHAPTER SIX

ACADEMIC LIFE STORY OF DR NOZIBELE MJOLI

If I keep searching I will find a place where I can use my talents

Nozibele Mjoli is a microbiologist who studied for her initial degrees at the University of Fort Hare and her doctoral degree at Notre Dame University in the United States. Nozi is presently a Research Manager at the Water Research Council (WRC) in Pretoria. She has held many positions: a school teacher, laboratory technician, lecturer at University of Bophutatswana¹, research officer in the department of microbiology at the University of Cape Town, a Project Leader in the Division of Water Technology at the Council for Scientific and Industrial Research and senior lecturer at the University of Durban Westville.

A colleague who had attended a meeting of the Association of Black Scientists, Engineers and Technologists suggested Nozi's name to me. I telephoned her and introduced myself, requesting she be part of the project. She readily agreed and we set up meeting times. In what I was to discover was her efficient manner, she promptly faxed me acknowledgements of correspondence and maps giving directions to her offices.

I interviewed Nozibele Mjoli in December 1996 and January 1997 for about five hours. Towards the end of the interview process, after I had asked Nozi about how she felt about the telling me about her life, Nozi asked *me* how I felt about the process and listening to her story. I commented that she had underplayed the various high and low experiences in her life – she has a very pragmatic approach to her life and will not labour on her experiences. In writing her story I was again made aware of how much I felt she had underplayed her experiences in life. My challenge, as the writer, was to emphasise those experiences.

Beginnings: if you have a father like mine who got his education through struggle, it would be a shame not to get anything

Nozibele Mjoli was born in Boksburg, at the home of her mother's parents, on 12 November 1954. Her parents are from uMzimkhulu in Transkei² where they have lived

¹ Now called University of North-West.

² Transkei was one of the homelands in apartheid South Africa. This area now falls in the Eastern Cape.

most of their lives. Nozi had very little interaction with her paternal grandparents. By the time she was born both were dead, but she had heard that they were very poor and did subsistence farming like most people in the rural areas. On her mother's side she had a step-grandmother and a grandfather. The family would travel from Transkei to Boksburg to visit them once a year. Her maternal grandfather, Jacob Lozini, worked as a clerk in the mines in Boksburg: but he had started off as a teacher (in uMzimkhulu) when a standard six education was enough to teach.

There is great pride in Nozi's voice when she describes her father, Paul Mjoli. Nozi describes him as hardworking and says, "He came from a very poor family and managed to work and put himself through to school and got a Bachelor of Arts degree, which was quite a major achievement for somebody from a rural area." Paul Mjoli was fortunate to gain financial assistance from one of his distant relatives and studied on a full-time basis at the University of Fort Hare. Paul Mjoli then worked in a secondary school, teaching English and arithmetic, and later became an inspector of schools. When he retired as an inspector he went back as a contract teacher. He finally retired in 1996.

Nozi's mother, Doris Mjoli, also came from Transkei. Nozi's maternal grandmother had died when she was in standard three. Her father was then working in Johannesburg so she had to stay with relatives. She managed to continue and qualify as a teacher. However, she only taught until she got married. After this, Nozi's father did not allow her to teach. "She had to stay home and raise her children and there are nine of us." Nozi describes her mother as "a very strong and enthusiastic person who is always involved in some community project."

In the Mjoli family there are six girls and three boys. Nozi is the eldest. Khuleka, who comes after Nozi, is married, lives in Matatiele and is a teacher at a college of education. Next is Nhlanhla, the deputy chief executive of a company involved in funding for housing. Zandile, at number four, is a senior manager at Eskom. Louie, Nozi's first brother is number five, and he teaches at a school in Transkei. He lives close to their parents and takes care of them. Louie is the only one in the family who is still in the hometown. After Louie there is a sister, Zungile, who is a medical doctor. Then another brother, Sibusiso, who works for Telkom, in Durban, as a marketing manager. At number eight is Pumla who is the youngest of the girls. She works as an accountant for Barlow Rand in Johannesburg. The last born is Mzotolo who graduated with a Law

Degree from Natal University and is serving his Articles in Umtata. Nozi explains the number of children in her family: “What used to happen with families in rural areas is that if they did not get a boy, they used to keep trying until they got a boy.” There is a sixteen-year age difference between Nozi and her youngest brother.

I comment that this is an amazing family story where everyone has done well educationally and ask Nozi what she thought was the reason was for this success. “I think it is because my father is a graduate. He worked hard to make sure that he saved enough money to send everybody to school. I went to university when it was easy to get scholarships, so I had scholarships right through. My father had to pay fees for my younger brothers and sisters, which, when you consider his earning was not much at that time.”

It is still a close family unit with all the children going home (to uMzimkhulu) for Christmas. Nozi’s mother expects that. Now with the family being much bigger - there were about 13 grandchildren in 1996 - they visit for two or three days. Nozi is thankful for the closeness in her family.

The family house in the rural area of uMzimkhulu consists of several units making up the homestead. When the children were younger they had to work in the fields, look after cattle and milk cows and goats. Nozi’s mother was primarily responsible for running the farm. “My mother was the housewife who had to make sure that the fields were planted and harvested. When the children were in high school they had to help on the farm. My parents kept cattle so we looked after them and milked cows and goats”. Nozi enjoyed milking cows but did not enjoy staying out in the January sun from seven in the morning. Her parents are still living in the same homestead.

The homestead did not have electricity or running water – some areas still do not have running water or electricity³. Candles provided lights. Because Nozi’s parents could afford it, they had rain water tanks. These provided enough water to last them throughout the year. From about the age of seven the children had to fetch water from a spring about 500m from their home. This involved a steep climb and many trips to the spring – hard work. Nozi indicates that she is very happy to be involved in water now.

When asked to describe the community set up where she lived when she was young, Nozi indicated that the homesteads used to be about a kilometre apart. “You

tended to know almost everybody within a certain area and even people you were not related to were considered family. Children played together. When there was a party or if someone was sick, everyone came. In later years, with the resettlements and rezoning, they moved people together and left open spaces for grazing purposes. People are now closer in terms of physical closeness, but the community spirit has not got any better”.

The home language was Xhosa. At home the family communicated in Xhosa. In school everything was in English. Nozi’s curriculum vitae now indicates that she is able to communicate in Xhosa, English, Zulu and Afrikaans. During the interview she indicated that she had to study German as a pre-requisite for doctorate in the sciences – quite a language proficiency.

The qualities that her parents considered important in life and tried to instill in the children were “ do your best, hardwork and be good people”. Nozi was brought up in a Catholic household and was immersed in Catholic values and a hard work ethic. I asked Nozi about her parents’ expectations of her in life. “Parents always expect their children to do better than themselves. If you have a father like mine who managed to get a BA degree under those circumstances, then it will be a shame for anyone to waste his hard earned money and not get anything out of it. Because I am first born, my younger brothers and sisters followed my path - you finish high school and go and get a degree.”

Nozi indicates that her father did not put any pressure on her about what to study or what career she should follow, but an analysis of her story suggests her father’s strong influence. Nozi’s mother however felt that having the qualification of a teacher was a good thing because it meant you could not be unemployed. “As a result, in my family, only the last three do not have a teaching qualification. I did a University Education Diploma (UED) after my Bachelor of Science degree. My mother said ‘If you have a certificate as a teacher there is always a school that needs a teacher so you cannot be without a job.’ It is interesting now that it is unlikely that any of us will be teachers again; but it has helped in other areas like communication.”

Nozi was brought up in a Catholic household, went to a Catholic high school and a Catholic University. However, the fact that the high school and the university were Catholic were more by accident than design. Growing up, the children went to church on

³ Recently (1999) I drove past uMzimkhulu and saw boards indicating that pipes were now being laid to provide running water.

alternate Sundays because they had to take turns staying at home looking after the babies. “My parents went to Church every Sunday. When they did not go to Church, my mother especially, would feel that something terrible had happened.” As an adult Nozi says she has nothing against going to church; but when she moved to Pretoria and went to the local church she got fed up when they preached politics. “I did not want the church to tell me about the ANC and the wrongs they were doing. After a couple of those I thought I didn’t want to get up on a Sunday morning to listen to that. Until I move to an area where there is a church relevant to my spiritual needs I would not go”. Religion is an important part of Nozi’s life. “Because I grew up in an environment with my mother praying with a rosary all the time, religion became important to me and I appreciated prayer. Even now, although I don’t go to church, I still read the prayers.”

Nozi’s parents were not directly involved in the larger political issues. “In uMzimkhulu, like in most rural areas, the environment is such that you are so far away from things that you don’t really understand why things are the way they are. If I grew up in the city then I would have been more aware of the issues. It was only when I went to school in Marianhill, that I interacted with people who had more information and I began to understand the dynamics of the system.”

Trying to figure out the question of Nozi’s social class, within the African community, is complex. Since both Nozi’s parents were teachers, it put them apart, socially, from the rest of the community. In Nozi’s extended family it was only her parents who had a tertiary education.

Primary and high school: help from parents and the opportunity to attend Marianhill High School

Nozi was five years old when she entered Mhlaba Primary School as a pre-sub A⁴ pupil. School was a ten-minute walk from home. I asked Nozi to describe the school [which is not being used anymore]. “All of us [children] went to that school. It was an average rural school where you had a rondavel as a classroom and no facilities. Sub A and sub B children sat on the floor or outside when it was nice and sunny”. Class sizes varied because in those schools nobody was turned away. “When you start for the first time, your parents do not have to book - it was just taken for granted that all the children

⁴ Reception year of study.

in the area would go to that school. If the classes were too big, then they just divided the class into groups and taught one group outside or taught one group in the morning and one group in the afternoon.”

Nozi indicates that she had an advantage because her parents, being teachers, helped her with schoolwork. “I was ahead of the other children who did not have parents who could help them. English was supposed to be the medium of instruction from standard three upwards; but in reality instruction was a mixture of Xhosa and English and when it came to writing the exams, everything had to be answered in English. The textbooks and notes were in English. In this environment teachers encouraged students to memorise the books. That is the only way to deal with a situation where people have to adapt from using the mother tongue to English.”

Nozi remembers the teacher who taught her in standard three. “He was a very good teacher and when he arrived the results improved significantly. He also wanted pupils to memorise things and he punished pupils who didn’t. He used extrinsic motivation to get pupils to study. Well, it worked, because if you wanted to survive, you made sure that you studied or else you were in trouble.”

Primary school education ended in standard six. Nozi liked school, did well and performed at the top of the class. The schools did not provide any books, so parents had to provide the books. The school did not have any laboratories, so all the science (called nature study) was learnt from textbooks.

During the standard six year, Nozi considered high schools. There were not too many high schools close by. Her father taught in a secondary school in town, “but none of the children wanted to go to his school, and he also did not want any of us to go to his school.” Nozi speculates that the reason might be that he felt if he taught his children they might expect special treatment. Nozi realised that for a good high school education she would have to go to a boarding school. She applied to some schools in Transkei and to Marianhill High School in Durban. She knew that Marianhill was a good school and because her father went to Marianhill he helped her apply. Nozi was the only one in her family, as the first born, who was fortunate enough to have the opportunity to go to Marianhill. The others did not go there because her parents could not afford it. They went to other Catholic schools, “but they were not very good ones.” Birth order becomes important in a situation of limited resources.

Nozi started at Marianhill High School in 1969. We discovered during the interview that she had to go to school for 13 years before she got her senior certificate and I (of Indian origin went to schools designated 'Indian') had 12 years of schooling. Nozi says (and I agree) "We just did not know about other systems because of separate development and Group Areas." Nozi talks fondly of Marianhill, which was a boarding school. She was taught mostly by German nuns. "The German nuns were very hard working and they got everyone to work hard. The quality of education was good." The medium of instruction was English. They insisted that students communicated in English. "There were all kinds of punishment for speaking anything but English."

At Marianhill there were separate classes for boys and girls from Form I to Form III. For Form IV and Form V there were co-educational classes. "I don't know if this was of any significance to my education [laughs]". In Form IV and V her subject choice was mathematics, biology, geography, English, Afrikaans and Zulu⁵. I was surprised that she did not do physical science. Nozi explains that although there were physical science classes, for some reason the teacher did not like people from the Eastern Cape, so they were not allowed to join her class. As Nozi had done well in Form I General Science she had a choice of either physical science or biology for Form II. Because the teacher did not like her, she could not do physical science. I asked her how she felt. While she was upset, she felt that since the nun was going to teach the subject "insisting and fighting was not worthwhile." For the physical science class in the matriculation year there was only one girl and she had come from another school. I suggested that possibly the physical science teacher actively discouraged girls in her class. Nozi agreed that that might have been so. I was surprised that a nun had prejudices.

Nozi's reaction to the nun's decision not to accept her in the physical science class is indicative of her reaction to obstacles that she faced along her pathway. Her story illuminates a life where an individual feels she has something to offer and will look for a space and way where she can contribute. She has a 'pragmatic fatalism' where if things don't work out in one place she will look somewhere else.

I tried to probe Nozi's liking for and inclination towards the sciences. She indicated that she is curious, has an inquiring mind about how things work and loves to

⁵ Since Marianhill is in KwaZulu Natal she had to switch to Zulu.

“unravel mother nature’s secrets”. Nozi reads widely and I feel that she would have been successful in anything she embarked on.

I wondered what Nozi thought of doing after matriculation. She indicated that since there was no career guidance, she did not have many choices and “if you have mathematics you can go into science”. I probed further and Nozi indicated that “without career guidance you want to stick with things that you know. I knew that if I did a B Sc. degree, I would still be doing biological sciences and some mathematics.” I wondered why she did not follow a career like social work and Nozi replied, “Social work was out because if I had matriculation with mathematics and biology I would do a B Sc. I wanted to keep to things I knew.” With a B Sc. Nozi knew her choice of career would be either medicine or teaching.

Nozi’s high school biology teachers were good. There were laboratories. She had a good biology education. Nozi also enjoyed the mathematics taught by the German nuns who were “quite good.” Nozi says that in high school she worked hard, enjoyed her studies and did well. She did not really need anyone to push her, and could not think of any teacher really making an impact on her. Nozi describes herself as a “self motivated type.”

At Marianhill High School classes started at 8 o’ clock in the morning. They then went back to the hostel for lunch, had two hours of lunch break, came back at 2 p.m. for more classes and had practicals until 5pm. Supper was at 6pm and then from 7-9pm there was study time. At boarding schools, especially the Catholic ones, things are very structured and orderly. Students are not allowed to speak with anyone from night prayers until after breakfast. Nozi’s intellectual life thrived in that atmosphere.

Nozi says she loved Marianhill School – something she only appreciated years later. She did well in the matriculation examination gaining a first class pass with a B aggregate. Her best subjects were Biology, Geography and mathematics and her worst subject was in Afrikaans. She says she worked very hard in Afrikaans but German nuns taught them, so the average was expected.

In the matriculation year there was only one student’s performance that was better than Nozi’s. Nozi appreciates the competition in Form IV and V, indicating that when she was in the all girls’ class, she was ahead of the others and there was no motivation to make the gap bigger.

In her the matriculation year Nozi applied to Fort Hare University - being Xhosa speaking that was the only university to which she was allowed to go. She did not apply to Wits or Natal as she knew that she would need ministerial approval – and not having career guidance she was unaware of all the choices available to her.

Undergraduate years: academic excellence, political disruptions and a baby

Nozi was at Fort Hare University from 1974 to 1977 – first completing a Bachelor of Science degree and then a University Education Diploma. In 1974 Nozi registered for chemistry, mathematics, botany and zoology. This was the first time she was studying chemistry. She did very well in all her subjects, passing all four at the end of the year and gaining a B in chemistry. Nozi was fortunate to have bursaries to pay for her undergraduate studies. Access to bursaries for local and international study was important to follow an academic pathway.

Fort Hare was a new experience. One of the most difficult aspects was learning self-discipline. Nozi found this aspect difficult as she came from a Catholic institution where her life was a set of instructions. “That was quite an experience - just being on your own and knowing that whether you do your work or not is all up to you. You were not to be punished, so that was quite something.” At university people gave you the information and you could do as you liked. The first year was a year of transition and there was no support offered. Classes were large with about 400 students in first year classes. The medium of instruction was English.

Nozi describes the Fort Hare lecturers as “an Afrikaans speaking lot who were usually not very good.” They were not good in terms of their attitude and their knowledge of the subject matter. “The typical Afrikaans speaking lecturer at Fort Hare would talk, talk, talk and you could hardly hear what he (there were no females) was saying. He didn’t really care and was just doing a job. Listening to that recitation you could not see the relevancy of research”. Lecturers read from their notes and students tried to write notes while they read. “That did not tell us whether they knew what they were talking about or if somebody handed over the notes to them. They could easily have given us the notes and never even come to class and we would not have missed them. When you come from a good school you have a feeling about people who know what they are talking about. I didn’t have the impression that these lecturers knew much.

There were some lecturers who were blatant in saying that blacks did not have the capacity to do things". The pass rate in first year science subjects was less than 50%. Many of the lecturers may have had an honours degree and possibly studying for a Masters degree.

Nozi had one black lecturer, Professor Makhen who interested her in biology and research. Professor Makhen, a zoologist and an immunologist, brought some life to the subject and was very enthusiastic about getting students interested in further studies. Other lecturers seemed to actively discourage students from following a research career. "One of the botany professors was asked to come and talk to us about opportunities in botany for further studies. He said that if we wanted to be poor we had to just further our studies in Botany. It was hard work with no rewards. Obviously we did not want to hear about that."

Nozi realised that if she wanted to pass the exams she would just have to teach herself. "I can see why most people who come from schools which are not good cannot cope. You have to be able to take a textbook and make your own notes that make sense. At that level it is not an easy task for most people." The good background from Marianhill High School helped Nozi cope and do well at university.

In her second year, Nozi studied Biochemistry, Botany, Zoology and mathematics. She quit mathematics 2 but concedes that "if there was enough pressure for me to pass mathematics, I would have done it." The second year classes were smaller with about twenty students. She passed the three other subjects. In her third year she studied Botany and Zoology as majors. The class sizes in the third year were around 15. In these classes there were more female than male students.

Nozi completed her science degree in three years – unusual at South African universities and very unusual at black South African universities. Nozi agrees that there were very few students who managed to complete their degrees in three years. Those who managed to complete in three years were mostly students who went to good high schools (private, boarding) and who had passed the matriculation year with a first class pass.

Her completion of the degree within three years is, I think, particularly remarkable if you consider the political disruptions during that time and the fact that Nozi had a baby in her second year. At the end of the first session of interviewing, when the tape

recorder was off, Nozi mentioned her daughters and I asked about their ages. I realised that her eldest daughter would have been born while she was an undergraduate – she had not mentioned this as part of the experiences and I had not asked about the family. At the start of the second session I asked about her children.

Tembeka, her daughter, was born in June 1975. I asked Nozi how she managed with her studies. Nozi indicated that she continued studying. She thinks she missed the May tests. After this she went home. Fortunately the baby was born in June (holiday time). Nozi tells her story matter-of-factly and I expect more. I realise that my expectation is of what it would be for a 21-year-old Indian woman to have a child out of wedlock and the emotional traumas and pressures that would be put on the mother. I asked whether she then thought about staying at home with the baby or continuing with her studies. Nozi replied, “I was fortunate in that my mother was willing to take care of the baby so that I could continue with my studies.” I repeat the question and Nozi emphatically says, “Definitely not. Unless I did not have a choice. Then I would have to stay at home and look after the baby. Fortunately my mother was still a housewife.” I realised my questions were driven by my conceptions of motherhood and these were not the same as Nozi’s conceptions. I felt exposed.

Nozi was in her third year in 1976 when June 16 happened. “That was quite an experience, coming face to face with apartheid in terms of how we were treated during those riots. It was a very unpleasant experience - something I really wouldn’t like my child to experience.” With the various strikes, there was uncertainty about whether one would finish one’s degree at all. “It was a feeling that a degree not finished is the same as no degree. You feel after three years you have absolutely nothing to show for it and you do not know what will happen to you.”

When the university was closed in 1976, there was no indication of what would happen next. “There was a period I even taught for a month.” The university was closed for just over a month. Then the students were asked to return to lectures in December and the final examinations were written in January.

During the B Sc. Nozi considered becoming a teacher. Her undergraduate teaching experience made her see no other options. “It is only at honours level where you can, through writing essays and doing literature studies, see what research opportunities are available.”

In the third year, the zoology department tried to interest students in furthering their studies. They had students who were doing honours and masters, but Nozi decided to “stick to Plan A with the University Education Diploma (UED) and see if teaching was what I wanted to pursue as a career.”

In 1977, Nozi registered and completed the UED. “I think because of my science background, I found most things we did not challenging enough. At this stage I knew there was no way I could do a Bachelor of Education. If one looks at the academic transcript of a UED you have a string of A’s and B’s and someone says you are smart, you do not feel so. It was just so easy for me.”

During the three years at university Nozi’s academic success was due to the solid foundation she received at the boarding school and her ability to work on her own. Financially Nozi was lucky that she got bursaries for the three years. The main change she experienced at a personal level was an awareness of politics. This was especially so after 1976.

Honours: I wanted to know as much as I could.

In 1978 Nozi got a job as a teacher of biology to standard 8 students at Lourdes Secondary School - a Catholic school in Transkei. At that time it was easy to get into teaching. “You just tell the circuit inspector that you want to teach and tell him which school you want to go to and you would get it.” Nozi found that she did not enjoy teaching. “I decided that I did not have enough patience to deal with high school children who were not motivated to learn.” She felt she would do better teaching older people at university.

She had to choose whether she wanted to go to medical school or do an honours degree. During that year, her father’s brother became very ill and died. Nozi then realised that she felt uncomfortable around sick people, and did not have the make-up to become a medical doctor. She felt that she could be a researcher and hopefully contribute towards understanding diseases. Nozi knew that if she wanted to teach at the university or become a researcher she would have to get an honours degree and later a masters.

In 1979 Nozi returned to Fort Hare to do an honours. She got a CSIR post-graduate bursary for the studies. At Fort Hare the honours programme did not have

formal lectures: you wrote papers in different areas and then presented a seminar on whatever literature study you had done. Nozi found this exciting. “ For example if I was writing an essay on pollution, I would get myself involved in reading everything about pollution. I felt this was something I wanted to do.” Nozi’s first project in microbiology was about genetic engineering. “It was a difficult paper for someone who did not have a background on the subject. After spending enough time reading about genetic engineering I decided that that was what I wanted to do. At a later stage, when I applied for a Fulbright scholarship, I developed this into a brief proposal of what I wanted to do. Without doing that research I would not have known what I wanted to do and I would not have been able to narrow it down to specific problem areas that I wanted to investigate.”

There weren’t any formal lectures in the honours. The requirement was to complete two projects - she did one project with Prof. Makhen and the other project was some “stupid ecology project” [if Nozi does not like something she simply dismisses it out of her life]. She found the one with Makhen interesting. It involved following a disease and its pathology. As Fort Hare did not have facilities, to do the project Nozi had to travel to Rhodes University⁶ to use their equipment to read the results. Nozi found the project interesting but could only go to Rhodes twice as there was a cost involved in setting up the assay.”

Nozi enjoyed the honours. “There were four major topics to prepare. For each topic I got totally involved, and read and got all the information that I could lay my hands on. I wrote very good papers because I really wanted to know as much as I could. My motivation was that this was an opportunity for me to identify an area in which I could continue my studies. When I finished they wanted me to stay and do a Masters, but I said, ‘No thank you’ because there was not anything worthwhile they could offer me at that stage.”

Nozi did well in her honours degree getting a B aggregate. But she laments assessment at black universities. “At the black universities, it is just an unwritten rule that says no one is allowed to get 80% irrespective of the quality of their work. After

⁶ The distance between Fort Hare in Alice and Rhodes University, a white university, in Grahamstown is about 90km.

studying in the US and realizing that one can get 100% in an exam if one answered everything, I decided that if my students answered everything I would give them 100%.”

During her honours knew that she wanted to do a Masters and she wanted to do it overseas. She did not want to apply for ministerial permission to attend a white institution. “I just didn’t want to go through that”. But Nozi did not have any information about overseas universities and scholarships. None of the lecturers suggested how she could apply for an overseas scholarship.

Masters and doctorate: I like discovering new things

After the honours, Nozi got a job at the University of Transkei as a senior laboratory assistant. After four months at that job she applied and got a job as a lecturer in biology at the University of Bophuthatswana (UniBo), which had just been established. “UniBo was a good experience of starting at a new university and writing the syllabi. I thoroughly enjoyed it. Initially there were few students because it was a new university. Only the ones who did not get admitted elsewhere would venture going to a new university, which did not even have a building. Three houses formed the university and all classes took place in the rooms and the garage. Surprisingly, there was a laboratory. In the second year [1981] we moved to the campus.”

Nozi thoroughly enjoyed teaching for those two years. Professor Makhen had left Fort Hare and was at this university. Nozi again expressed her desire to do a Masters at an overseas university. Since UniBo offered a Bachelor of Science (Education) degree, Professor Makhen suggested she apply for a Masters in Science Education through the British Council. “Fortunately or unfortunately for me, the British Council’s policy was not to fund people from the TVBC⁷ states”. By chance Nozi talked with one of the professors at UniBo about studying in the United States. He had just got a scholarship and was on his way to Harvard. “It was the first time I heard about Fulbright. He gave me the address.”

In 1981 when Nozi was expecting her second daughter Amanda she decided to apply for the Fulbright scholarship. She says that she did not have difficulty with that decision as “it was only an application and if I got the scholarship I would make the

⁷ The homelands – Transkei, Venda, Bophuthatswana and Ciskei – were not recognised by many governments, including Britain.

decision.” I suggested to Nozi that her philosophy to life is a pragmatic one. “At times I am faced with very pragmatic decisions and I feel if I do not make a move, I would never make it. Fortunately things have worked out positively.” At the interview Fulbright made it clear that they did not fund spouses or accompanying children.

Nozi was awarded the scholarship and a place at Notre Dame University in Indiana in the United States of America. She found it very exciting to have got the scholarship at the first attempt. When the baby was born in May, Nozi took leave and spent two months (June and July) at her parents’ house in Transkei. She considered bringing up the baby herself, “but my parents felt that since I was in Mmabatho on my own, trying to bring up a baby would be difficult. I took an easy option. If they were happy and my mother felt that she was the only person with the capacity to bring up a child [laughs] - with her experience, I could not question it.” Nozi hired somebody to look after the baby because her mother had now gone back to teaching. Her daughter Tembeka was still staying with her parents.

Nozi found that organising her matters in South Africa before going overseas was smooth. Her parents were supportive of the scholarship and took the children as an extension of the family. As a permanent staff member at UniBo, Nozi got paid leave for two years so there were no financial worries. There was a promise of a job when she returned.

I wondered with having two children, if Nozi considered studying for the Masters at Wits or Cape Town University instead of overseas. Nozi was quite firm when she said: “I just made up my mind that if it meant going for the ministerial approval thing - I just hated it. I did not want to put myself through that. If there were choices where I didn’t have to go through something where I felt I was being done a favour by being allowed to study in a white institution, I would go for it. I had negative feelings about that whole system.”

Nozi left for the United States in July 1982 for a Masters in microbiology. She did not have any concerns about coping with the academic programme because “I believed if you work hard it is up to you and the medium of instruction is English.” Her concerns were about being in a foreign country for the first time and being so far away from everybody you knew.

Notre Dame is a Catholic University. Nozi attended Notre Dame because of the programme in microbiology. The Catholic aspect was co-incidental. Nozi found the atmosphere here far more relaxed than her interactions with nuns in South Africa. The American nuns and priests were like anyone else. She was surprised to see a nun wearing pants or having a Scotch before bedtime – “me, the South African was shocked.”

Nozi was the first South African in the department of microbiology. Nozi laughs about the perceptions that Americans have of a black person from Africa. For most Americans who have not been outside the country, Africa is a jungle. They were surprised that she looked like any other American. They also expected people from Africa not to understand English, so people explained things very carefully. Nozi found the American system very competitive. Coming from South Africa you choose whether or not you want to put effort to pass your tests. “Coming from South Africa you study to pass an exam. The Americans study to get the highest mark possible. My first year was a real culture shock of adjusting to the system. The Americans study everything because they want to get 100% in a test. My first semester was a very fast learning curve. If you prepare for an exam you have to know everything. In my first semester I got a B aggregate. In my second semester I got a A because I knew the rules.”

The Masters programme was for two years. The first year was course work and in the second year you do research. When Nozi left to the United States she was thinking Masters only because of the scholarship funding and she did not know how she would cope being away from family. “The first year was very difficult and in the first semester I wished I could go home.” Nozi was the only South African at Notre Dame that year. In the Microbiology department Nozi was the only black person and there was one Indian from India. So Notre Dame felt very lonely. In addition the winter was terrible. She wanted sunshine, but it was gloomy and freezing.

Many Americans were surprised that Nozi got admitted to Notre Dame. The irony is that she did not know anything about Notre Dame or that it was an exclusive school. Overall Nozi found the Americans very helpful – “they understood you were a foreign student who was just there to study and would go back to your country. It is not as though you were going to compete with them for jobs. Of course Black Americans had different experiences.”

In deciding on the masters research project, Nozi visited the different professors' laboratories. She decided to choose Dr Kulpa because he had his tenure and was involved in diverse projects, which meant the choice was wider; whereas the two younger professors would not have the same resources, were under pressure to get their tenure and they were doing very narrow areas of research. Nozi felt that going in with Kulpa was a safer bet in terms of completing the doctorate but it meant changing her original research topic.

Kulpa had a project on *Thiobacillus ferrooxidans*, which is a bacterium that is used in biomining. It oxidises the iron and sulphur. "You normally get a copper or gold rock covered with iron and sulphur. When iron and sulphur is oxidised, it becomes soluble and the copper or gold is released. I thought it was a good project as South Africa is a mining country." There was very little understood about how the *Thiobacillus ferrooxidans* works. Nozi decided that it would be interesting to identify enzymes that were involved in the process. "If I can find the enzymes then we can find the genes and help do it better."

During the second year of the Masters project the head of department and Dr Kulpa offered Nozi funding if she wanted to stay on for a Ph.D. They made this offer because Nozi did well in her first year. Nozi was very excited and flattered about this offer because she knew many South Africans who had struggled to get funds to stay on for Ph.D.s and they had to return to South Africa. This scholarship was very prestigious because Nozi was the only foreign student to be offered it. In the first year of the Masters Nozi had given thought about doing a Ph.D. but felt that she would return to South Africa, find funds and then go back. Nozi felt that if she was being offered the chance to do a Ph.D., she wouldn't have to struggle to find funds. The offer from Notre Dame involved paying her a monthly stipend as a teaching assistant.

In making the decision whether to accept the scholarship, Nozi had "to ask myself if I could afford to be away from home for another three years. At UniBo it was going to be unpaid leave. I was not really worried about whether I would get my job when I came back. Fortunately I would be able to visit South Africa in December 1983. I figured if I could go home at least once every two years. It wouldn't be that bad. I had a friend who said if I did not stay on I would feel really bad when they came home being Dr so and so and I would have missed the opportunity. She was very good in convincing me that if I

could get a full loaf, why settle for half a loaf. I said if I didn't have to struggle to find funds I would stay on."

To gain the Ph.D. meant firstly writing a comprehensive exam. Fulbright also required Nozi to graduate with a Masters. The comprehensive exams for Ph.D. candidacy gave her the qualification of a Masters.

Nozi started the Ph.D. in August 1984 and finished in 1987: "It was 2 years and 9 months of hard work. The most difficult part of a Ph.D. in the States is the comprehensive exams. You have to know everything that has to be known in microbiology and biochemistry. That is not the easiest thing to do. I decided I was going to enjoy myself while I got to know all these things. I made studying a fun activity. Notre Dame is a beautiful campus and has two big lakes. I decided I would get up early in the morning, pack my books and have a nice view. I enjoyed myself. My roommate was on a Ph.D. programme in Biochemistry. She just stayed at home in her pyjamas right through the period. I thought this was the most depressing state one can get oneself into. She ended up looking like she was an invalid because she never went outside."

Nozi continued with the same project she started in the Masters for the Ph.D. "After you pass the written exams you have to defend your project proposal. It is very traumatic but I decided to go in with the right attitude. There was an appointed committee. They were the people who would OK the project. In my area there was someone from chemistry, biochemistry and microbiology. Supervisors help you in the best possible way to prepare for an exam, but when you get there you are on your own. It was an interesting process and sometimes I answered questions with questions and the professors would remind me that my task was to answer question and not to ask questions. This was about testing your scientific thinking ability rather than testing the methodologies you say you will use."

Another requirement for the Ph.D. was to show proficiency in a foreign language. The argument for inclusion of a second language was that if you wanted to be a scientist, you had to be able to read articles in at least one other language than English. Nozi says she struggled through German but passed it.

Nozi had a good, supportive relationship with her supervisor, Dr Kulpa. She found research was fun when things worked. "When things don't work you ask yourself if this is really worth all the headache. In an environment like that almost everyone goes

through ups and downs: so it is just the culture of research. I have learnt more from things that did not work than things that did work. If you are involved in a new field you will not go in with cookbook type of procedures and get results. That forced me to read and try everything. In the process of trying you learn a lot and develop new skills and capacities.”

During Nozi’s time in Notre Dame, a typical day involved going to the laboratory by 8 in the morning and setting up the experiments for the day. Then it was to the library while some reactions were taking place and then running a gel electrophoresis to see if you have what you think you have. You then do an assay and in the afternoons Nozi had undergraduate practicals to look after. That usually took her up to 5 pm. Nozi says she was more of an 8 to 5 person. She worked on Saturdays and Sundays, but not at night unless absolutely necessary.

Nozi found the weekly seminars series where you presented your research to the department very useful. Every semester each graduate student had to make a presentation about his/her work to the department. “On Wednesday lunch time we had some pizza. It was nice when you were not presenting. When you present everybody grills you. It is a good process because it makes people think about their research critically. At UCT that was something they did not do. Your supervisor, like you, gets so familiar with your work that you need people who are not part of that work to point things that are missing. That helps improve the quality of the product, although some people who cannot handle that process end up in tears.”

Academically, Notre Dame was a very stimulating environment. “Annually they would invite prominent Nobel prize winning scientists who would present a series of seminars. They came for three days and when you see these people who have developed models and theories which are in a textbook, you wonder what kind of people are able to do that. When you meet them and sit and chat with them you find they are just ordinary people. That was very helpful to learn that they are not supernatural people who are able to do things. They do not talk about their models all the time. I remember, once I went to dinner with the person who had developed a recombinant DNA model. Four of us - three guys and myself - were asked to have dinner with him. The guys were saying that they were brushing up on Radding’s model. I said I would not be bothered to read the model. I didn’t think Radding would want to talk about his model over dinner. When we

went out, he was just very interested in us. There was a person from India, two Americans and me from South Africa. We talked about international relations rather than him boring us with more details of his model. It was good getting that kind of exposure.”

There was also a weekly seminar series with outside speakers. Nozi says she learnt a lot from them. “When you have never done research it takes a while to have a feel about what kind of research questions people ask and how they address them and how they get those answers.” Nozi glows when she talks about the research process. “I enjoyed the research process. It is a question of reading widely in your area and having a feel of what kind of questions people might ask you and whether you thought of that, that and that. It is not like they are there to make life as difficult as possible for you. It is just to get you to develop a scientific inquiring mind.” Nozi indicates that she developed the skills for a scientific inquiring mind when she was in the United States and this was not part of her training in South Africa. “The training I got at Fort Hare was not investigative type of training. It was more a factual kind of training. In the honours nobody showed you how to go about preparing a paper and presenting it.” Nozi says she developed the research skills in the United States, mainly through the seminar programmes and listening to all the different researchers. “If you attended the seminars and listened carefully you learned from different researchers how you should ask questions that would give you the right answer.”

I asked Nozi to explain her research project as though she was explaining to a matriculation student. “The question that I was asking involves an organism that can oxidise iron or sulphur. Those are different chemicals and I wanted to know how it does that. Does the organism have enzymes readily available to oxidise iron or sulphur irrespective of whether you give it iron or give it sulphur? Bacteria have either inducible enzymes which means that a bacterial cell will only make those enzymes when the substrate is available or it has constitutive enzymes which are made all the time irrespective of whether the substrate is available. What I wanted to know was whether the bacterial cell have enzymes to oxidise iron or enzymes for sulphur all the time - whether you feed it iron or feed it sulphur. In order to do that you take *Thiobacillus ferrooxidans* - let’s say for argument sake you grow it in iron and ask it to oxidise sulphur invitro (i.e. without giving it a chance to synthesise new enzymes). If it is not

able to oxidise sulphur, that means you don't have enzymes regularly available. Same as if you grow the *Thiobacillus ferrooxidans* bacteria in sulphur and just wash the cells and put them in a medium of iron and ask if the iron gets oxidised to ferric immediately or if it takes a couple of hours before you start to see a peak for the ferric. That will tell you if there is a lag before you see a peak; that the organism only makes the enzyme when the substrate is available. That enables you to identify proteins that you could link to the function because what you do is you grow your cells in iron only and grow them in sulphur only and then analyse the protein by using gel electrophoresis. The first stage is that if there are distinct proteins that are unique to each group that will give you an idea that those must be associated in unit functions. The next thing you can do is make antibodies, using cells grown on iron. What I did was isolate the actual protein that was unique for iron and made antibodies. Antibodies would specifically tell you whether what you see is an artifact or is actually the difference. If you take your antibody, allow it to react with cells that have not grown on iron, they will give a negative reaction because that protein is missing and those that were on iron will have it. I was able to identify a unique protein."

The research process had it ups and downs. One of the major difficulties was that the organism Nozi worked with grew very slowly, cells counts are very low and to culture it you need a 40-litre jar. That process took about a week. To harvest the cell needed a special machine that sounded like an engine and which drove everybody in the laboratory crazy. Thereafter it was fine. The experiment needed to be planned very carefully. Nozi says that the one thing that she learnt while doing research was to be careful – "when you have to measure a drop it means a drop. I learnt to be a stickler for details. I used to think that my mother would be amazed that I was so careful - trying to measure 1 microlitre and making sure it is exact."

During the three and half years of doing the Ph.D. there were no major obstacles. "There were the usual obstacles about experiments not working and you getting frustrated that you are never going to finish this Ph.D. What happens with most people is that towards the last year things start to work and it ends up that there are more things you want to do. I was a foreign student and I had to make up my mind that I had to stop here. Once I had that protein that was it - if anyone was going to assay for activity it was not going to be me. I had isolated it and showed that it was unique. I did some

absorption spectra analysis and showed it was a protein with metal ions bound to it. It was a characteristic of iron oxidases. I was able to get absorption spectra which indicated that when it is reduced or oxidised it shows different peaks at unique absorption peaks.”

Nozi submitted her dissertation. “Firstly you submit your draft to the committee. They tell you what they want you to do or are happy with the work you have done. If they are happy there is a public defense and after that they have an opportunity to say whether you have passed. It was exciting, but at that time I just wanted to come back home. I already had my ticket. I just felt I wanted to return home irrespective of whether they liked it or not.”

Nozi says it was “a good feeling” to get the Ph.D. And what did she think it was going to do for her? “Naturally you want to make use of all the knowledge and the technology you have acquired. After being gone from South Africa for many years you kinda of look forward to it. After being in the United States for that time where there were no obstacles in terms of personal development I was positive and ready to face the challenges.”

I asked Nozi why she thought she succeeded in gaining a doctorate when many others from her school or community had not? “Maybe other people were not interested in research. Personally I feel that other people have different interests. You have people who make an attempt and don’t make it. Maybe it is the wrong field for them. I don’t see myself as a better person or anything like that. I think it was the right thing to do and I was enjoying it when I was doing it.”

So what were her special qualities and strengths for success in the academic field? “I think it is the right attitude towards learning. Just keep at it and you will triumph if it is the right direction. If it is not the right direction you will not triumph. And you have to change direction. If things don’t work, ask yourself what can be done differently and do it differently.”

I commented that Nozi positively glowed about doing research and the research experience. “I like discovering new things that no one else has known until I came into the picture with the new information. I think that is the exciting part of research. I do not enjoy doing written things, but it is exciting to do the research where you always wonder what next.”

During the three and half years of the Ph.D. Nozi managed to come home for the Christmas of 1985 and 1986. It was good to see the children again. They had grown up without her, “so I was more of a stranger.” Nozi accepts this pragmatically: “I am very realistic that if you leave a child who is a year old - and come back a year later they do not really relate to you. Since they spent most of their time with my mother they established a closer relationship with her. The only person I am bringing up is Vuyo [her youngest daughter].”

As Nozi reached the end of her studies she had to decide what to do when she returned to South Africa. She still had her job at UniBo “but the problem was the facilities to do research. I knew that definitely UniBo was not going to be the place for me to spend many years because it is not easy to set up a research infrastructure in an environment like that.”

Work: I thought I could solve all the problems of Thiobacillus ferrooxidans

When Nozi returned in 1987, she went to the biology department at UniBo. This was different from Notre Dame. “When you have been in an environment with research and excitement and to come back to UniBo where there was no research it was like a cold shower. There was only an undergraduate laboratory. I used to go to Wits library⁸ as often as I could to pick up literature because I felt, after all the years I had worked developing research capacity, it could disappear fast in an environment like UniBo.

During her final year at Notre Dame, Prof. Woods of the University of Cape Town visited her department and gave a seminar. His group was also working on *Thiobacillus ferrooxidans*. Nozi talked to him and “he asked me to consider coming to join him. Since there were lots of things I still wanted to know about *Thiobacillus ferrooxidans* that was a good offer”. From UniBo she applied and got the CSIR post-graduate fellowship. In January 1988, Nozi started as a research officer in the Department of Microbiology at University of Cape Town – a position she held for three years and three months.

I was curious why Nozi chose the position of a research fellow (which would be on contractual basis) rather than tenured positions at other institutions. Nozi explains

⁸ The Wits university library was about a three hour drive from UniBo.

that at that time she was being recruited by the University of North, “but I was just not ready for that. At that time I thought I could solve all the problems of *Thiobacillus ferrooxidans*.” Nozi is full of excitement as she talks about *Thiobacillus ferrooxidans*.

Nozi describes her work at the University of Cape Town. “My intention was to see if I could find the gene for the protein that I had isolated at Notre Dame. Being a new graduate, I was still full of enthusiasm. I had discussions with my supervisor at UCT. The only approach we could use was to first isolate the protein and then sequence the protein. Once you know the amino acids you can work backwards, make a synthetic piece of DNA and use that piece of DNA to probe for the gene. On paper it is probably right - simple and straightforward exercise. But when it comes to the practicalities of it, it was not so. The thing that took longest was getting enough of the protein in pure form suitable for amino acid sequencing. For sequencing we relied on somebody from biochemistry. There was no technician to operate that machine, so the professor had to do it himself. In my first year I was mainly frustrated trying to get him to give us a good sequence that we could use. Each time he messed up my protein it meant I had to grow more of the organism and go through the process of isolating the protein which was also a long process. Finally he did the sequence and we had to try and develop a corresponding piece of DNA from the amino acid sequence. That was not a simple process since each amino acid has different genetic codes that can encode it. That makes it very difficult to find a suitable piece with the right information and when we finally identified a piece we made a short synthetic DNA probe. Now my task was to search for the gene. That was another very time consuming task. Essentially when you want to isolate a gene you take the whole bacterial chromosomal DNA and cut it into small pieces with endonuclease enzymes and clone these pieces separately. You hope you have one cell carrying just a small piece. That is like searching for a needle in a haystack because now you have all the different DNA clones, whose transformed cells carry different pieces of cloned DNA segments and you have to use a probe to ask which one has the piece of DNA that you want. To be able to answer that question you might have to go through a thousand or more individually picked colonies. You can imagine the kind of patience and praying. If you are lucky it might be in the first five hundred you screen. If you are not so lucky it might go into the two thousands before you find what you want. Finally I did isolate something which gave a positive; but even if it gives a

positive the problem is you are looking for an enzyme that oxidises iron in bacterial cells that cannot grow on iron, therefore, you cannot assay for iron oxidase activity. The only way to find out what you have is to first sequence the DNA and hopefully compare that with the sequences that are available and try and find something that might resemble an iron oxidizing protein. This was a very long shot process. At the end of the three years and three months, I had lots of sequences but the only handle I had on the project was that hopefully in other genes that had been sequenced in other organisms (which were in the gene bank) I might find something that resembled what I had. We kept searching through the database of gene sequences and kept coming with all kinds of things. Then when I was expecting the baby I decided that this was a wild goose chase. I decided that having a baby was a good opportunity to make up my mind to stop this and I should get serious. I would be gray before finding the gene.”

Nozi found that as a research officer she usually worked on her own. There wasn't the same vibrancy as at Notre Dame. “This is back to normal where you are seen as a competition and back home”. Nozi was the only black research officer. There was a black student who was doing a Masters and Khotso Mokhele had joined the microbiology department as a lecturer. One of the most frustrating aspects she found was being asked by people, [whites] ‘Why did you not just stay in the US?’ Nozi explains that “they were saying that the reality is, as a black person in South Africa, there are so few opportunities maybe I should just stay in the US where blackness was not a problem. I thought they had a nerve.”

In 1989, Nozi applied for a post at the University of the North and she was offered the job. But when she went for the interview and saw the dusty, unused laboratories, she thought she should “still stick around at UCT and try and find my gene.” I commented about Nozi's enthusiasm for research. “I always find I am most happy when I am in the laboratory doing my research. I felt at peace with myself and the world until month end payments brought in the reality.”

Besides the position at the University of the North, Nozi had not applied for other positions. She was enjoying Cape Town and not yet ready to quit. “It was 1990 when I made up my mind that I was leaving this whether I found the gene or not. I felt that being at UCT was not going to be in the interest of my career development.” The job as research officer was a dead-end job where you continue to remain a research officer.

There were no possibilities of tenured positions at UCT. Nozi told UCT not to renew her contract. To the concern of friends, she quit without having a job to go to. “I had decided to take the risk and be unemployed.”

When Nozi was working at UCT she stayed in Rondebosch. When she arrived in Cape Town she stayed with Romilla Maharaj (who was finishing her Ph.D.) for a month and then the microbiology department arranged an apartment for her. Nozi had no accommodation problems for the three years.

Nozi left UCT in March 1990. She was pregnant with her youngest daughter, Vuyo. She did not have a job. Although she had again been offered a job from the University of the North, she realised that was not what she had in mind. Nozi said she was looking for a job in an environment where she could use her research skills. She wanted a job where she would have more responsibility rather than being tied to one project. She wanted to initiate her own projects, get her own funding and run her own laboratory. “At most institutions you would have to be an academic member of staff rather than a research officer to have a laboratory of your own. As a research officer you do not have students whom you supervise. You are under somebody and the only way to access funds is through whoever is directing your research group.”

Nozi said she was not concerned about getting a job – rather she wanted a job that she would enjoy. She wanted to do research and knew that at the black universities she would have to do lots of teaching and have very little time for research. Nozi approached the Council for Scientific and Industrial Research (CSIR) for a job. She wanted to be in an environment where all the skills that she had acquired could be used to solve problems. She went for an interview when she was eight months pregnant. She was offered the job. She told them that she was planning to take three months off after the baby was born and would start in July. “Everything did work out.”

At the CSIR Nozi was the project leader in the Division of Water Technology. She worked on three projects: one was the application of the polymerase chain reaction (PCR) technology for the detection of poliovirus in water; another was the development of the PCR method for the detection of faecal coliform bacteria; and, the third was the use of gene probes for the identification of adenoviruses in environment water samples.

Nozi stayed at the CSIR⁹ for one year. She found it a difficult environment to work. She worked in a division with about 100 people and she was the only black person with a Ph.D. There were three or four whites in the division with doctorates and a few blacks with junior degrees. Nozi says that although interaction were difficult she basically “got down and did my work. If people did not like me that was their problem. In fact there was a guy who used to wear his AWB khaki uniform. He never speak to me. I knew that he did not like me, so I did not bother him and did not speak to him.”

Nozi found career development within the CSIR difficult. Having worked out the techniques for the different tests it thereafter became routine, and “I didn’t think this was what I wanted to do for the rest of my life.” Nozi then told the division manager that she was ready for more responsibility but her response was, ‘You are working with conservative, AWB¹⁰ people and they have to accept you’. Nozi thought this was ridiculous. “I had worked so hard in my life and now I had to prove myself to these people who only had diplomas from the technicon.” Her programme manager told her, ‘It is like a baby. You have to crawl before you walk’. Nozi said she felt that she was ready to run. She did not have time to waste waiting for them to accept her. “That is my attitude. When I feel I have a choice and I don’t like something and I can’t change it, maybe I should get out. That is how I felt about CSIR.”

I wondered what else Nozi needed to have, besides the Ph.D., to assume more responsibilities. Nozi says that if you are black with a Ph.D. it is still not enough. Nozi says that she thinks that part of the reason for her Divisional Manager’s caution was that she had been with the CSIR for about 20 years and had struggled to get where she was - being a woman and Jewish - and white males left their position when she was appointed. She felt that the organisation would not be able to deal with a black woman at a higher level at that time.

Coming back from Notre Dame with a very good Ph.D., having the UCT research experience and now meeting this resistance at work – I ask Nozi how she felt about it and where did she get the strength to continue the next day. Nozi’s strength to continue came from knowing that she had opportunities to develop herself and so “surely there must be a place where I can use my skills. Surely there must have been a purpose why I have been through all of this training. If I keep searching then surely I will find a place

⁹ The CSIR was staffed by conservative Afrikaners.

where I can finally be able to use my talents.” Nozi’s philosophy and approach is to keep on until she finds the right opportunity.

Because she did not see herself going anywhere at the CSIR, Nozi applied for jobs in industry but was not successful. Nozi then applied and got a position as senior lecturer at the University of Durban-Westville. She felt that if she were teaching then, at least, she would be making a contribution. When Nozi handed in her letter of resignation to the CSIR, people were surprised because “they thought I was having fun.”

When Nozi worked at the CSIR, she lived with her sister in Johannesburg. “When I started at CSIR, after three months I could not see any future there. I decided that there was no point in buying a house and at that time places were not open for me to buy”.

In September 1992 Nozi relocated to Durban and joined the Department of Microbiology at the University of Durban-Westville. She was there for two years and four months. At UDW, Nozi lectured microbiology, virology and immunology to second and third year students and to postgraduates. Nozi was able to do some research, supervise two honours students and present papers from the research at conferences. The full teaching load and supervision of students meant very little time to do her own research. Nozi says that the department had some facilities. She had a university research grant but running expenses were limited.

While Nozi was able to do some research, there were other difficulties. Nozi explains: “UDW is a mad place and the microbiology department was one of the troubled departments and still is in terms of human relations.” There were two camps in the department. Before Nozi joined the Head of Department was removed (by members of the department) and replaced by another person. After a while members from the opposite camp removed this Head of Department and replaced him. “There were various conflicts in the department. I realised by talking with people in different departments what was happening in microbiology was not a unique situation. In almost every department there was some human relations problem – right from the top management you get chaos where nobody trusts anybody and people feel that someone is out to get you. I just did not want to be in that kind of environment.”

Nozi says she enjoyed her time at UDW and got some of her students interested in research. She organised a seminar programme for the final year undergraduate students.

¹⁰ Afrikaans Weerstandbewing – this is an extreme right wing political grouping

From the material that was taught in the textbook one could not see the value of research. By students preparing presentations they could see opportunities for further study. “I think they learnt quite a lot from that - much more than they could learn from regurgitating their notes in a test.”

The staff composition was almost all Indian with Nozi as the only African academic staff and one or two whites. Nozi was the only woman in the department on the academic staff and another Indian woman joined later. Nozi bought property in Durban, thinking she was going to stay for some time. Vuyo, her daughter lived with her

During her time at the CSIR Nozi had taken a number of research management and marketing courses. When she was in Durban she enrolled for a Manager Development Diploma, which she passed with distinction. She had taken these courses with the intention of finding a position as a research manager or a senior scientist. When she had had enough of the conflicts within the department she applied for the position at the Water Research Commission (WRC) in Pretoria. That meant another move.

At the WRC her responsibilities are research on water supply and sanitation for developing communities. In the job she tries to “identify research needs and then find suitable researchers to do the research. When the research is finished our task is to make sure that the information gets disseminated to the users.”

Nozi was first appointed as a deputy research manager and during that time felt she was not doing as much as she wanted to. The person who was responsible for her work kept standing in her way. Now that she has assumed full responsibility of research she feels in control of what she is doing. In the organisation there are twelve research managers; two deputy executive directors and an executive director. There are two blacks in the management structures – Nozi and an Indian male. The management structure has two females. Nozi enjoys this work environment and finds that she has the space to continue with her work.

I asked Nozi what she thinks she would be doing next. “What I would really like is to be in a challenging environment where I can use my abilities to the optimum. I am soon going to reach a point where I want more responsibilities. Right now my passion is about water because I have experienced the lack it. It is not like I am married to it, but I would like to make a difference within this sector before getting to something else. If

that does not happen and something more exciting shows up I will be ready and willing.”

I asked Nozi what she thinks has been the impact of her work. “In my work here the people I work with (project managers) are almost all white. Now they get a different perspective to the problems. I can understand that. If I was trying to study white people and write about them, I would come up with a completely different story than a story that is written by a white person because my story is based on my perception of a lifestyle that I am not part of. That comes through in research reports. Lets say, for example, a person is using a survey questionnaire - the way you interpret your data is really limited to the written answers on your questionnaire since you don’t have a better understanding of where people are coming from. A good example is in one of the projects I am looking after. The research is being done by researchers from the University of Venda. The researchers are white and the field workers are black. In this social survey they are looking at the practices of people in terms of how they use their water. In the area that the researcher studied, there is reticulation with taps in the houses or the yards. The results say that people would prefer to bathe in the river. This is ridiculous. People who have taps in their yards definitely wouldn’t prefer to bathe in the river. It is a question of how you ask the question. The presentation to us was based on how she interpreted the questionnaire and drew conclusions based on what was written in the questionnaire. This is from a white perspective. You would then think that black people are very strange and not ask yourself why a person who has taken the trouble to have a tap in their yard or house is prepared to bathe in a river. From the perspective of not understanding their way of life, you just think that maybe it is their culture that people should bathe in rivers so maybe putting taps in their yards is not ideal because they prefer to bathe in rivers.” Nozi, in her present position, plays a critical role in challenging fundamental assumptions in research and interrogates the findings in relation to the perspective of the researcher.

Reflections: I’ve got my space and I am going for it

As we come towards the end of the interview I asked Nozi to reflect on some aspects of her academic life. How did she experience the South African academic world in microbiology? At conferences she is the only African woman and usually links up

with Romilla. There are very few black males at these conferences and they all tend to support each other. Nozi indicates that in her international experience in the United States, she never had problems about which she would blame racism. "I enjoyed myself and I think I got a fair chance. Unlike in South Africa where you realize this is a world that is out there to see you underperform." Nozi adds determinedly, "There is nothing that will stop me. I have got my space and I am going for it."

I asked Nozi to reflect on how she thinks being an African shaped her life in academia. "Whites of the same age had all the opportunities to develop themselves in terms of getting positions as researchers and access to funding and technicians who support them. I respect scientists from black institutions who excel because you are in a situation where you are really on your own and there is really no one who assists you to be the best you can be. You are on your own even if a UCT accepts you." On the positive side, Nozi says it helps you become a tougher person. "Being in an environment that is not very encouraging to your development, you tend to rely more on yourself than relying on the system to provide everything to make your life easy."

And how does she think her sex as a woman shaped her life in academia. "In most places in South Africa when they started employing blacks, they employed black males. I have not felt any constraints from my community or family as a woman. It is the workplace where I have experienced disadvantage. My work here [WRC] involves me working with white males and I have developed a very good relationship with the ones with whom I have worked. I still have situations where, when people finally meet you, they say, 'I thought you were man'. I don't know whether to apologise because they are disappointed."

Back to family and discovery of self

The final set of questions again relate to family. Nozi has three daughters and says that she does not think about marriage but would if the right person came along. "I feel things work the way they do for the right reasons. I like my independence and I like being able to make all the decisions about what I want to do without consulting with anybody. If I want to change jobs I don't have to negotiate with anybody. I have just to sit down and work out the positives and negatives and of course I know I am responsible for myself." Nozi sounds content with her life and "she likes being in charge of her life."

Her daughter, Tembeka, is now working at Eskom; Amanda is in standard 10 and Vuyo is doing grade 0. Vuyo lives with Nozi. Of course Tembeka and Amanda have a closer relationship with Nozi's parents than with her and she says "that is just a fact of life".

I asked if she would encourage her children to go into academia, but Nozi says that it would have to be their decision. "I will not try to influence them seeing that no one tried to influence me. I feel that everyone is entitled to make her own choice so that when she makes a mess of things she doesn't blame her parents. If I chose a life which does not reward financially, that is my choice which I enjoy until end of the month."

Nozi spends her spare time reading or watching movies. She likes reading about and understanding "what motivates us to do what we do and how we change it." I asked Nozi how she experienced the telling process and she says, "It is interesting. It is something which you do not have an opportunity to do. It is a kind of situation if you spend more time, you can get more information because things are kind of remembered. As an individual I really did not have the opportunity to look back and try and understand my life. I read one of these books and I think they have an exercise where they say you have a piece of paper and you draw – 'I was born here and this is where I am'. I never did that exercise because I thought it was just too much trouble. This more or less helps me try and look back and identify somethings in my life which I can learn something from."

CHAPTER SEVEN

Academic Life Story of Dr Phuti Ngoepe

I relate to my students not only as a physicist but as a person as well

I travelled from Durban to Pietersburg, about 800km, to interview Phuti Esrom Ngoepe, a professor of physics and director of the Materials Modelling Centre at the University of the North. Phuti and I had met briefly years ago and when I telephoned to ask him about being part of the project, he readily agreed saying that he thought it was a very useful project. The only problem was time to schedule interviews. However after various juggling I managed to set up a series of interviews that started on a Sunday evening.

As I listened to Phuti answer my questions about his academic path, I was struck by his passion for physics, his sincerity about issues in which he believes, his concern for other people and his politeness about issues where other people had made his life difficult. Phuti completed his doctorate in solid state physics, studying the ionic properties of certain solid electrolytes. He realised that certain experimental results could only be explained to a certain point and then you needed computational modelling to explain them further. He studied further and set up the Materials Modelling Centre - a centre that is supported by the Foundation for Research Development (FRD) and the Council for Scientific and Industrial Research (CSIR). Recently they hosted the International Materials Modelling Meeting.

Phuti works with other people and says that the success of how you work with other people lies in how “you listen and work with the people around you and how you listen to their concerns and not just see them only as objects who come to work but also look at their welfare. If they are happy they will do good work.” It is obvious in the interview that people are important to Phuti and he often brushes aside the incidents in his life that was painful. There is more to be read in his silence about the incident rather than what he says. Phuti says that sharing a life story can be “enabling and help other people,” but the difficulty is “how to put things in a polite way. I am forgiving and I don’t like to put out dirty linen - especially things that have been solved.” So in reading Phuti’s story the silences are as important as the statements.

Beginning: father was always excited about the progress of his children

Phuti Ngoepe is an African male in his mid forties. He was born in Borkum in Pietersburg, the home of his maternal grandparents. It is traditional in African families that the first child in the family is born at the home of the maternal grandparents. When Phuti was born his father was teaching in Ventersdorp, so Phuti spent the first six years of his life in Ventersdorp¹.

Phuti is named after his paternal grandfather. They spent some time together after his grandmother, Manopa, passed away in 1959. His maternal grandfather died about 25 years ago. His grandmother is still alive. None of his grandparents had any formal educational qualifications; but both sets of grandparents encouraged education for their children, which resulted in all of them having a profession. Phuti says it is difficult to know the part that his grandparents played in his upbringing, as he did not spend long periods of time with them.

Phuti talks fondly, proudly and warmly about his father, Senoko, and his influence on him. Senoko had been a school teacher, principal and school inspector. Senoko had a deep love for teaching and taught languages (English, Northern Sotho, Southern Sotho and Tswana). Phuti describes his father as a “very concerned, loving type of person.” He adds that his father “brought up all his children with good guidance, motivated them and he was always excited about the progress of his children.” Senoko encouraged the children to study, read and set up records of how many books they had completed reading and how long it took to read.

Senoko Ngoepe started teaching in 1936 at Kilnerton (in Pretoria). In 1951 he moved to Ventersdorp. He taught there until 1958 when the school had to be closed because it was a missionary school². Thereafter he moved to Pretoria where he taught at the Bantu Normal College³. The college was closed in 1959. He then taught at Kilnerton, which was closed in 1960. He moved to Hebron and stayed there until 1961. He then moved to Potgietersrus where he became the vice - principal of the Mokopane Teacher Training College. He stayed there until 1963 and then moved down to Beauty, which is close to the Botswana border, and stayed there for seven years. Phuti says his

¹ Ventersdorp is a town that was controlled by the Afrikaans right wing extremists. They made life for Black people very difficult.

² When Bantu education was introduced, all the mission schools were taken over by the Department of Bantu Education.

³ This was a post-matric teacher training college which preceded the University of the North.

father was “a very good teacher and his students still love him very much.” He taught until 1969 and then became a school inspector for about a year. He then worked for the Lebowa Government translating government documents from one language to the other.

Senoko Ngoepe retired in 1982, but two years later was drawn into the public service commission in the Lebowa Government. About two years after he retired he worked very hard to produce a Northern Sotho hymnbook for the church. He is strongly religious. Senoko Ngoepe is blind now and lives in Pietersburg. As Phuti talks about Senoko Ngoepe one gets the impression that he still has a tremendous influence on his son.

Phuti proudly describes how his father got his education. Senoko Ngoepe did a two-year teacher-training course after completing standard six. Thereafter he obtained all his further qualifications on a part-time basis. In 1946 he obtained a Bachelor of Arts degree from UNISA. About thirty years later he did an honours degree in Northern Sotho and went on to compile a masters thesis on translation which was almost finished in 1981 but his supervisors never looked at it thoroughly, so his thesis is still there.

Phuti’s mother, Ntakadi, was a nurse. She left him and his brother with the father when they were still young to do her training in nursing. Their mother joined them on a full time basis, after she finished her midwifery training, in 1960. The family then lived in Pretoria. Phuti says wistfully, and with some pain in his voice, “We used to miss her quite a lot even at that tender age. With nursing hours and night duty she had to be away. We spent very little time with her.” Phuti then adds laughingly, “Maybe my child will be saying the same thing about me one day.” Phuti acknowledges that his formative years were with his father.

Phuti has one brother and three sisters. After Phuti comes his brother, Thabo, named after his maternal grandfather. Thabo studied for a Bachelor of Arts and a Bachelor of Education degree. He recently completed a Masters degree in management. Thabo teaches at a college of education. Phuti and Thabo have always been close. There is then a big age gap between Thabo and the younger sisters. Morongwa (named after the paternal grandmother) comes next. Morongwa completed a Bachelor of Education degree at the University of the North and teaches at a college of education. Then there is Mokgadi (named after the maternal grandmother) who did a degree in nursing. The youngest sister, Choene, was in the process of completing her Bachelor of Arts degree at

the University of the North (1997). In addition to the siblings there were always cousins, who did not have the means for schooling, that stayed with the Ngoepes' and Phuti's father supported them through school.

Because of Senoko's job, the family moved a number of times. Phuti says that while it was interesting to move from one place to the other, there are places he cannot remember and he cannot trace old friends with whom he started school. Many of the places in which he lived do not exist anymore. The Ngoepes' had been displaced because of forced removals. Phuti regrets "not being able to see the place where one grew up, where one played. It is just in one's memory. Even my school in Potgietersrus has been destroyed. The school I went to in Pretoria is still there and I sometimes go there and visit and reminisce." Phuti is wistful as he remembers the past - the places may be destroyed but the memories remain.

Phuti's family were members of the Methodist Church so he was brought up with Methodist values. Religion was an important aspect of the Ngoepe household; Phuti says that religion is still an important part of his life. "The church provided a general background to appreciate good values, to fear God and to be exposed to things such as religious songs. These are things that you pick up at an early stage and which you draw strength from when you are depressed and when you are discouraged." The values which his parents espoused, were things like being decent and a hard work ethic. In addition each of the children was given chores. "For example, polishing everyone's shoes, baking bread, washing dishes and collecting water and wood when we were living in rural areas." Phuti's parents did not like liquor and they discouraged drunkenness because they saw it as something that was devastating Black people.

The home language was Northern Sotho. English was not formally taught at home - it was just picked up. Phuti says that his parents did expect him to achieve success in later life, but he did not know how far they expected him to go. His father had talked to him about the path he had set himself - Senoko had hoped to do a Ph.D. Unfortunately during his studies he overworked himself, and developed nervous tension and was unable to go further.

Politics was experienced in a subtle way in the Ngoepe household. His family were not activists but his father challenged the status quo subtly. Phuti relates an incident where, at one time, there was a debate about the issue of teaching primary

school children in the mother tongue. His father was an English teacher and attended one of these workshops. Here it was asked why the standard of English of primary school children had deteriorated. Senoko's response was that it had deteriorated because children in primary school were taught in the mother tongue rather than in English. He was challenged about this position and at a subsequent meeting he challenged the policy makers saying "he understood that people would not be properly educated if they are not taught in the mother tongue. He said he understood it in the same way that in South Africa, Germans are not well educated because they are not taught in their mother tongue and Italians are not well educated because they are not taught in the mother tongue. And in the same way Black people, if they are not taught in the mother tongue will not be properly educated! I think he had his own way of challenging the system, but it was not directly done."

Schooling: teachers saw potential in me

Phuti was six years old when he went to school, in 1959. "I attended three schools in one year. I started at the Mangolwane School in Mamelodi (Pretoria). After three weeks or so, we were moved to new premises. When we were at the new premises I moved again to another school, Boy's High. I do not know why we moved. At the third school I had three different teachers. My first year was so disrupted and at the end of the year I was not sure whether I had passed or not. At the end of that year Boys High School was changed into a higher primary school and we moved back to Mangolwane School. My grade 2 teacher was Miss Katherine Koma and she developed an interest in me. She was my father's former student. At school we used to have two sessions, a morning session and an afternoon session. If you attended morning session you didn't go to the afternoon session. After we wrote the first test in the first quarter she went to my father and asked him if he would allow me to attend two sessions. She said she saw potential in me and wanted to pave the way for me to go to university. I attended two sessions and my performance improved quite a lot under that teacher. Miss Koma really helped me and I moved from position 46 to position 7 and at the end of the year to second position in class." Phuti is not sure what Miss Koma saw in him. I suggested that she saw him as special because his father had taught her. The power of cultural capital! Phuti says that Miss Koma was a very good teacher and she was very strict.

“She had a stick - called it a Black Stick.” Phuti describes instruction in class. “When we read books at school we would repeat every sentence that we read and when we wrote something we had to repeat it.”

At the end of that year Phuti’s father got a job in Potgietersrus and the family moved. In standard one, Phuti had a teacher whom he describes as “a very strong and powerful woman. Even now, in her old age, she still commands a lot of respect.” Her mode of teaching was “to teach us mental arithmetic where she would stand in front and make us recite mental arithmetic. I think she was a good teacher.” Phuti says that he also had good teachers in standard two and three.

During primary school, from standard 2 to standard 6, Phuti wrote stories in a magazine called *Wamba - a friend of children: Motswali wa Bana*. Phuti attributes his interest in writing to his father. “In the family my parents used to tell stories about animals. And my father encouraged me to write stories about animals and to submit these to *Wamba*. I would write a story and my father would help edit and shape it.” Phuti wrote these stories in Sotho. In standard 6 he felt he could write a book.

Recently the editor of *Wamba* gave Phuti copies of his publications from the archives. Phuti says he liked seeing his name in the journal, especially since the people who wrote for *Wamba* included professors, like Prof. Kgware, the first Black principal of the University of the North. Phuti’s brother, Thabo, also wrote stories for *Wamba*.

At the end of standard 3 Phuti’s father got a post as principal of the secondary school in Beauty, near the Botswana border. The family moved. He did standard 4, 5 and 6 at this school. Phuti liked his schooling days saying, “We had teachers who were good. They used to encourage us to do things. I did not have homework or read anything else. I started taking my work seriously for tests in standard 5 and 6. At that time the subject I liked most was geography. I used to love reading and drawing maps. When I was in standard 4, I read standard 5 geography and loved it. I looked at the maps to see the names of places, people and vegetations. I developed a passion for that on my own. We had arithmetic, health sciences and history; but I don’t remember loving them as I did geography. When I was in standard 5 and did the geography of the world, I would draw the map of the world and put them on the walls at home. When the teacher drew a map I would say it was skew.” After school Phuti helped his standard 6 teacher draw the map of the world on the board.

The medium of instruction in primary school was the mother tongue. Phuti learnt in Sotho up to standard 3 and in Tswana from standard 4 to 6. “Initially one had to adapt, but I tended to like Setswana.” Phuti performed well in primary school. “I used to be in either position 1 or 2. In my standard 6 year in the whole circuit of Potgietersrus which ranged over a distance of 300km wide, I learnt recently that I got the highest in the circuit.”

Phuti attended state schools where the pupils had to buy most of the books. Often students had to write notes. The school curriculum included gardening, handiwork and needlework. Phuti did not like handiwork and got his grandfather to help him, but he says positively, “It developed a sense of appreciating different types of wood.” Phuti remembers needlework lessons. “I remember we would come with our needles and wool. We used to knit parts that used to go into jerseys. Needlework helped me because I am now able to use a needle to sew my trousers. It was a good investment.”

At the end of standard 6, Phuti went to the Mazu Secondary School to start Form 1. His father was the principal there. Learning was now in English. “There was a strong spirit of reading there. You would read while teachers were marking. School would be very quiet and everyone would be reading. I started reading Shakespeare, before it was introduced in the syllabus. I experienced something new. I saw the imagination of the man in plays like Comedy of Errors and Midsummer Nights Dream.” Phuti’s father taught him mathematics for three months. Phuti says these lessons were “formal.”

Phuti says that when they started learning through the medium of English in Form 1, it felt “prestigious and nice.” The subjects that Phuti did in Forms 1 and 2 were social studies, general science, arithmetic, three languages and agriculture (this was studied in Afrikaans). Phuti still loved geography. Now he also started to love general science. He had a good science teacher who used to engage them in discussions. The teacher would ask their opinions, but “there were no experiments. He would tell us something about lightning and explain how lightning comes about. He would teach us all these things in a lively way. We learnt about distillation by looking at diagrams. There were no experiments. Diagrams were the real things. You had to imagine how it functioned. He was a good teacher who engaged us.” He was different from the teacher who taught Agriculture. He “used to memorise a lot and he wanted everyone to memorise.” Phuti’s memories of the teacher who taught social studies was that “when you write down

something that is final, you are not allowed to scratch. If you have written and you scratch, then it is wrong and you write the right thing next to that. What I remember is that at the end, everything you wrote was perfect. He taught and trained us to do things in a very perfect way. He encouraged strong discipline.” Phuti says that in Form 1 he performed the best ever in his schooling career. “In Form 1, I had an aggregate in the 90’s - there was a high motivation in school.”

Phuti’s love and passion for school is communicated through his voice and I comment that he sounds like he really enjoyed school. It is a surprise to me when he sadly says, “Not all the way. Form 1 had something and I think that my passion for learning stopped in Form 1.” The passion stopped when Phuti went to Setotolwane in Form 2.

Phuti explains how he got to Setotolwane High. The main reason for going there was that mathematics and physical science were offered at that school. When Phuti went into Form 2, his father hoped that he would complete two standards in one year and then proceed to do a special course that will allow him access to do physical science in the secondary school. However, the education departmental regulations changed and he was unable to follow that path, and, quite by accident, his father met the daughter of a friend who studied at Setotolwane. She indicated that because the school was reintroducing Form 2, they were short of students for that class. Phuti’s father phoned the principal of Setotolwane, and the principal, after asking how Phuti was performing asked his father to bring him along. Phuti remembers how he was told about the decision. “I remember when we were going home my father said, ‘Phuti you will now be going to Setotolwane.’ It came as a shock. I was not prepared for that. I said goodbye to my friends and after a week or two I had to go. That was it. I left to Setotolwane.”

I tried to understand why Senoko Ngoepe was so keen on mathematics and science for his son. Phuti is not quite sure but says, “There was a high value attached to science and mathematics.” Phuti knows that medicine was valued as a profession but remembers his father talking more about people who did well in science and mathematics. “The two I remember were Dr Moqkwena and Dr Pashala. They majored in mathematics and physics in Fort Hare in the 1940’s and obtained distinctions. He used to talk passionately about them.” Phuti says that his father considered a B. Sc. as prestigious because there were very few people doing B. Sc. at that time.

Setotolwane, a state boarding school, used to be a missionary school. Phuti studied mathematics, physical science, arithmetic, social studies and three languages and, “I was very happy.” All the subjects, except Physical Science, were taught in Afrikaans. The teachers were White and mostly Afrikaans speakers.

Phuti says learning in Afrikaans was a change. He does not know if that killed the passion. “I used to enjoy arithmetic, which was taught in Afrikaans and wiskunde[mathematics]. The school had good teachers, but there was just the language problem.” Phuti explains the impact of learning in Afrikaans. “There was no passion for Afrikaans. The concepts could be understood, but it was not like going into Form 1 and doing things in English. We grew up in rural areas where you had farmers who were cruel and the police were feared. Whenever you saw a police car coming with a lot of dust at the back, you knew it was trouble. There was fear of the police. If you did not have a reference book you were arrested. I remember an experience when we were returning from a holiday with one of my father’s friends. We were in a car and were stopped by the police. They asked my father for his reference book. He had it. They asked his friend for his reference book. He did not have it with him and he was arrested. It was quite an experience for us as children to see him being taken to a police van because we felt that only criminals were taken to the police van. Suddenly we were seeing this man whom we knew so well, went to church with, respected and the principal of a primary school being arrested just like that. It left an indelible impression on us. That occurred on the eve of Verwoerd’s death - 5 September 1966. We were conscious of all these experiences and how harsh these fellas were and how they could beat us. These people were called ‘baas’ in rural areas. We knew that we had to call them baas or we would be in trouble. Suddenly when we went to school we were surprised that these people were not called baas in school but ‘Meneer!’ One was aware of the meaning of Afrikaans. I don’t know whether that killed the passion. I still did quite well, but not across all subjects. My languages were not as good as they used to be.”

Phuti describes his teachers at Setotolwane. He had a good English teacher. The Principal’s wife was the Afrikaans teacher and she was “patronising” to the students. A “nice elderly Afrikaans lady” taught physical science in English. In general the teachers treated them well, “but there was the question of the language.”

Phuti was a student who drew up his own learning timetable. “When I went to school I found out which book the teacher was using for Physical Science. I realised that the external examiner for the Junior Certificate Examination for Physical Science had his own book and the teacher was not following the external examiner's book. I looked for the book and started studying it. In mathematics I just drove myself and liked it and did things in advance. I used to go to the teacher and ask him to help me. He would say, ‘Phuti we have not arrived there yet, but this is how it is done’.”

I asked Phuti about geography and he answered, “Geography was taught in Afrikaans with difficult words but I still loved it.” But it was obvious that the passion had diminished. Phuti continued to do well at school. In Form 3 he wrote the external exams.⁴ These exams were written in Afrikaans. He passed with an overall distinction aggregate and distinctions in social studies, geography, history and arithmetic. He got B’s in Physical Science and Afrikaans and C’s in English, Sotho and Mathematics. Phuti was disappointed with his mathematics symbol, but happy that he had obtained a distinction aggregate. In fact this was one of the best distinction aggregates in the school.

Setotlwane was an Afrikaans medium school. The principal who was there when Phuti was in Forms 2 and 3, was an Afrikaans-speaking principal who allowed both the languages to be spoken. When Phuti was in Form 3, there was a new principal. He did not allow English to be spoken at school. The Principal had a strict language policy at school and he was deeply embedded in the government’s policy. Everything was done in Afrikaans - the morning prayer, all notices, church services. The students understood Afrikaans as the language, even if they didn’t like it. Phuti speaks highly of this principal and says, “He was a hardworking principal. He did not tolerate rubbish from the White or Black teachers. He was a no nonsense man - very authoritative, autocratic and did a good job. Immediately after he came to the school the results shot up and the school had a number of first class passes. We used to work hard. Every month there were monthly tests and he would make comments against every students’ name and compare that with the previous month’s progress and would write comments like ‘goed’[good], ‘uitstekend’[excellent]. He was very hardworking. Although he was a deeply entrenched Afrikaner, he took an interest in the students”. The principal was also

⁴ Called Junior Certificate Examinations.

the biology teacher. He had written a number of books and was “a very good biology teacher. I was doing biology in the matriculation year for the first time and this was in Afrikaans as well. That was difficult. I could not internalise biology and feel it in me. I had to learn it mentally. I tried to internalise but there were so many things to memorise that I could not make it part of myself so I studied it as an outside subject.” However, Phuti acknowledges that the Principal taught biology very well. The principal encouraged students, when they wrote tests or anything, to be to the point. “He said that we should write the relevant points so you could have a sentence of two words. He did not want to hear a long story.” Phuti says the principal was very strong academically and had strong administration, but he did not want to hear anything about English. When Phuti received his Ph.D. the principal saw it in the newspapers and sent him a congratulatory note. Although a man deeply entrenched in the government policy, he still showed respect for the students - unlike other teachers in the school.

The mathematics teacher insisted on Afrikaans. Phuti says, “He was derogative and when you started speaking English he would say, ‘Jy Engelse man eh’[you Englishman] and you would be punished for that.” When I asked Phuti about how the students felt about using Afrikaans he said that the students liked English “but you had to accept the fact that you were at this school and needed to learn in Afrikaans. It might have killed my passion.”

In standards 9 and 10, Phuti continued to work in advance in physical science and mathematics. But the mathematics teacher, whom Phuti says was a good teacher, discouraged that and said that he would teach step-by-step and Phuti should follow. Phuti thinks that the reason the teacher discouraged him from working on his own may have been because “he was concerned about us getting misconceptions or learning mathematics incorrectly.”

Phuti continued working on his own and aimed to finish the matriculation [form 5] syllabus by the end of form 4, write the matriculation exams in physical science and mathematics at the end of Form 4 and see how he fared. Phuti was motivated to follow this route by the senior students in the school. In 1969 Setotolwane introduced a teacher’s diploma after matriculation and many students who did not make it at university came to the school. There were students who had failed B. Sc. at the University of the North in the first year. Phuti and the other students were told that these

students had failed B Sc. but were very good in mathematics. These senior students helped the junior students and advised them on ways of studying.

However when Phuti was in standard 9 and 10 he was not sure what he would do next. “My teacher in mathematics had said that the university is a very dangerous place because there was politics there which will not be too good for me. He suggested I do the teacher’s diploma at the same school because then I would be nicely moulded and be a good guy when I left. I thought about medicine, but I felt that medicine would take a long time. Teaching is a good profession where you are able to reach people and you are able to plough back things into the community. I felt that I should do teaching. Then we were told, again by the mathematics teacher, that he had spoken to the professor of mathematics at the university and he said there was only one person majoring in mathematics and there were only two or three second year students. He said it was tough. He had majored in mathematics and applied mathematics and he indicated how difficult it was.” The principal played an important role in career guidance. He encouraged the students to go to university and advised them on the subject combinations to take. Towards the end of the year, the principal administered a set of psychological tests to the class and when he brought the scores to class “he said ‘you so and so, I know you are performing very well in the subject, but your psychological scores indicate that you are good in this; you so and so the psychological scores indicate this and you are sitting on your brains. When he came to me he said, ‘Your scores indicate that you are good at mathematical subjects’.” The words of the principal had an influence on Phuti’s academic trajectory.

Phuti was still not sure what he wanted to do when he completed the university application forms. “When I had to state what I wanted to do I hesitated and didn’t fill anything. I sent the form home for my father’s signature as guardian. When he returned the forms, he indicated that I had not written what degree I wanted to do. He said, ‘Have we agreed on B Sc.?’ and I said, Fine, it is B Sc.”

Setotlwane provided a good education. In Forms 4 and 5 the classes had about 20 or 30 students. It was a well-equipped school and there were laboratories. Phuti does not remember paying any extra school fees. He had a bursary in the matriculation year because of his mathematics performance in the Junior Certificate Examination. I asked Phuti about what he thought about the education that was given by the Afrikaner

teachers. Phuti feels that the teachers differed. “There were some teachers who beat the hell out of some children for very small things. Baaskap was in place. In addition there were teachers who were committed to producing good results. The principal was the driver and he wanted results. There were also teachers who made insulting remarks in class. One teacher, whenever he asked the class questions would say, ‘Steek julle voorpoete oop’ (Lift your front paws). That told us what they thought of us. Years later, when I was appointed to the university, the mathematics teacher came to visit someone there. When he came to the tea club he said, ‘Ja Phuti ek het hier gekom omdat ek het gehoor jy wil nie Afrikaans praat nie en van vandag af ek wil maak dat jy Afrikaans wil praat⁵’. I turned to him and said, ‘You did not want to speak English in Setotolwane. Now that you have come to the University of the North and I am going to make you speak English from today’. He looked at me. Others were getting interested. After some time he started talking to me in Afrikaans. I just ignored him. After some time he came and spoke in English. Then I turned around and spoke to him in English. After that, whenever we met, I imposed English on him. That tells you how strong their ideas were at school.”

Besides his academic work Phuti was involved in sport and debates, he was a school prefect and involved in the Student Christian Movement. The school was very religious particularly in Christianity. This religious ethos was and still is an important aspect of Phuti’s life. “It gave one very good, deep roots in Christianity. When I came to the university one of my first homes was the Student Christian Movement. It helped in me not being swept away by the university in the normal way that it does new students.”

When Phuti wrote the matriculation examination he did not do well in mathematics. In fact his D symbol in mathematics was his lowest symbol. He obtained a B for biology. “With that principal I did not have to study biology.” There was a mishap during the matriculation examinations. Phuti was not sure whether he should include this incident in his story or not. Physical science was the last subject that he wrote. When he had finished he packed his things and went home. Towards Christmas he looked at his question papers and found his multiple choice sheet. All the answers were still in his question paper! Phuti and his father went to see the principal. The Principal

⁵ Translated it means ‘I have heard that you do not speak Afrikaans and I have come to ensure that from today you speak Afrikaans.’

looked at Phuti and said, ‘Man Phuti wat het jy gedoen - he kan die heereksames skryf⁶.’ The Principal said he would see what he could do. When the results were released Phuti obtained an E in Physical Science. “I knew that was not my real mark. Overall I got a second class pass instead of a first class⁷”. In April the following year Phuti’s father went to the Department of Bantu Education in Pretoria for Phuti’s matriculation certificate. That certificate indicated first class instead of second class and the symbol for Physical Science was no longer an E but a C. Phuti then realised that the Principal had taken it up with the department and says, “He was a man of integrity.” Phuti remembers feeling an immediate sense of relief when he heard about the symbol change.

University: involved in various activities but studies were the focus

As a Northern Sotho speaker, Phuti could only apply to the University of the North. Phuti was interested in engineering but could not consider it because it was only offered at historically white universities. Medicine was only offered at Wentworth in Durban. The option was either Wentworth or Turfloop.

Phuti was disappointed with his matriculation symbols. When he came to university to register for the B Sc. he was told it was difficult. “When I walked into my room at residence, my room mate said, ‘well, if you have registered for a B. Sc. it means you will repeat next year’.” Phuti wanted to do mathematical subjects and chose mathematics, physics, chemistry and applied mathematics. He was advised by his parents’ friend to choose mathematics, mathematical statistics, applied mathematics and physics. “I said, three mathematical subjects and physics! I wondered if I had the capacity to do that. I remembered my principal had said that I had potential in these subjects. Since he had said that I decided that I was going to take these subjects.”

During the first quarter Phuti says he tried his best in all the subjects but did not do well. He obtained around 37% for applied mathematics; 35% for mathematics and about 40% for physics. “It was really discouraging. I felt that I needed some strategy for studying. The environment was not like school and there were no compulsory studies. Lecturers were moving at a rapid pace.” The day after he obtained his results for applied mathematics Phuti attended the graduation ceremony. “I was in my first year and I was watching this graduation ceremony for the first time in my life. I saw some people

⁶ Translated it means ‘ Phuti what have you done. You could write the whole examinations again.’

⁷ A first class pass had a 60% aggregate and a second class pass had a 50% aggregate.

graduating with a B Sc. degree and others graduating with an B Sc.(honours). I thought, ‘These people are graduating and I get 37% in applied mathematics. That means that there is something wrong with me. I felt I must just lock myself and study.’ Phuti then started studying in a group and this helped in giving a foundation in the subjects.

Just when Phuti got going with his studies things changed at the university. At the graduation ceremony Tiro⁸ delivered a speech and was expelled. The students went on strike and the university was closed for a month. All students had to leave the university. Ironically this period provided Phuti with the time to sit down and catch up with his work. When the university re-opened Phuti was at a different level with his studies and his test scores in physics and mathematics improved. In the June examinations they were even better.

For the rest of the year Phuti did reasonably well and passed all his first year courses. At the end of the year he got a distinction in mathematical statistics. In the second year he dropped mathematical statistics and continued with physics, applied mathematics and mathematics. Again his lowest symbol in the second year was in mathematics but Phuti took it into third year and majored in mathematics and physics. Phuti reflects on the reason for his choice of mathematics. “One thing that is interesting is that mathematics has always been the subject that I scored the lowest, but I always continued with mathematics. In Junior Certificate I had to continue with mathematics because I did well. I passed with a distinction. At university I wanted to pursue the physical sciences. But chemistry was described as a terror and I was advised to stay away from it. So I picked up my lowest subject, which was mathematics, and continued with it. I was given courage by what the principal had indicated at that time.”

Phuti was performing well in physics and getting around 60%. At the end of second year the professor of physics asked him if he was interested in doing honours in physics. Phuti was surprised and asked why the professor suggested this. The professor said that he had seen the good marks. This impressed Phuti and he realised, “Wow, this is really appreciated that I got 60%. It is really appreciated...then it means that I could do something.” Affirmative comments about Phuti’s work surprised and motivated him further. The approach of the physics professor was different from that of the mathematics lecturer. “Our mathematics teacher used to ask us, ‘Gentleman if you pass

⁸ Onkgopotse Tiro, a former SRC President, was expelled after a graduation speech that attacked segregated education and called on students to be active participants in the liberation struggle.

mathematics 3, what are you going to do?’ We were forewarned that we should all indicate that we would do the UED⁹. If you said that you wanted to do the honours you would be in trouble. So we used to say, ‘UED Sir.’ He would say, ‘Beautiful gentleman - you have to help your own people.’ He asked us this question quite frequently.” It is amazing how the political ideology translated into the interactions. At that time the purpose of the Black institutions was to train teachers and public servants. Research and the pursuit of intellectual activity was not on the government’s agenda.

Phuti had to write a supplementary exam in third year mathematics. When the timetable was originally set, the person setting the timetable, who was also the mathematics lecturer, said to his class, ‘Gentleman I am setting the timetable for the university. Tell me what subjects you are doing and I will space them out nicely for you, so that you get time for revision’. However, just before the exams began, the university went on strike during the pro-Frelimo rally when Mocambique got its independence (1974) and several people (including Cyril Ramaphosa) and the police arrested the SRC leaders. The exam timetable now had to be changed and all the subjects were now cramped together. Phuti is not sure if this was a punitive reaction from the university. The students went from the strike into examinations and Phuti got a supplementary for mathematics. He spent the whole of the holidays studying for the exams. When Phuti prepared for the supplementary exams he went to see the mathematics lecturer who asked, ‘Mr Ngoepe, if you pass supplementary exams what are you going to do?’ Phuti said, ‘UED Sir’ and the lecturer replied, ‘Beautiful Mr Ngoepe, you must go and help your people.’

At the University of the North, the lecturers were mainly Afrikaners, but the medium of instruction was English. This meant a switch from Afrikaans, which was the medium of instruction in high school. Phuti says, “Something interesting was that when I switched over from Afrikaans to English it was as though I had been taught in English all along.” Phuti is Sotho speaking. The medium of instruction at different points during his school and university period was Sotho, Tswana, English and Afrikaans! Phuti says that the lecturers “just interacted” in class and “depending on how the climate [e.g. were there student protests] was outside, lecturers would respond accordingly”. Although some of the lecturers had PhDs there was no culture of research. There was some

⁹ This is the University Education Diploma, which gave you a qualification to teach in a school.

research in the zoology department, but Phuti feels most people who were employed at the university, especially up to the early 70's, were there because of their philosophy and "you had to be aligned one way or the other to the Nationalist Party." There were not many English-speaking lecturers or lecturers who graduated from places like UCT or Wits. The lecturers would be graduates from places like the University of Pretoria, Potchefstroom or Stellenbosch.

Phuti says the main change he experienced during his undergraduate days was in his political outlook. When Phuti came to the university, "the first thing I sensed was that the things that we were taught in schools were out. We felt that this was the right path politically. I was exposed to people like Tiro, Aubrey Mokwena, Lekota and Matthew Phosa who spoke at these mass meetings." Phuti joined the Student Christian Movement. At that time the SCM was regarded as consisting of political softies. Other people who were part of the Students Christian Movement at that time were Frank Chikane (who was also Phuti's physics pair mate) and Cyril Ramaphosa, who in 1974 wrote the constitution of the South African SCM.

During his years at university, the physics professor who made him feel that he was doing well influenced Phuti. In addition, there were some Black lecturers, mainly in the Arts faculty, who were highly respected and were role models for students. Phuti used to attend some of these lectures. "I used to attend lectures in linguistics just to listen to a lecturer who was known to be very good in English and expressed himself very well. I remember listening to a lecturer who returned from overseas and talked about his experiences overseas getting a second Masters degree. Students asked him how he managed to get a distinction in England and why he couldn't get a distinction here. He said, 'When I was taught there I was given all the information freely, when you are taught here, you are taught as though you are looking through a keyhole'. I remember him saying that it was important for one to know one's field of specialisation - to appreciate what one was good at and to know something that one could do and do very well. I remember asking myself what I knew and could do very well. I realised there was nothing I knew or could do very well. Things such as this helped me to keep trying to find myself." There was also a strong Black Consciousness Movement across the campus and there were various activities relating to art, culture and political outlook.

Phuti says, “Some discovery of Black Consciousness helped to discover oneself. I was involved in all these activities, but my studies were my focus.”

We reflect that student politics is different today. Phuti says, “At that time we knew that administration was our enemy so there were clearly drawn battle lines. We knew that anything that came from administration was to be opposed. We took our studies very seriously at that time - if we have to stop studies there had to be a good reason. Because of the continuous confrontation with the lecturers, students had to study very hard. The students would say, ‘If anything else happens it shouldn’t be on my side.’ Students had to ensure that they were not on the borderline and could be failed easily.”

There were a small number of students in the final year classes - in physics there were five and in mathematics there were seven students. There were no women students. Phuti reflects on this and says, “Retrospectively I remember certain cases. In first year our professor would come in and say, ‘Gentlemen’... and later say, ‘Ladies.’ He would always forget ladies. I remember there were a number of women in first year and the professor would focus on one woman and ask her all the difficult questions until she disappeared from the class. Then he would ask the next woman student until she disappeared. At the end of the year we were left with only two women in class. When one thinks about that one realises how much pressure was put on women at that time. It was very unfortunate.”

Physics honours: I understood things fundamentally and the passion came up again

When Phuti initially registered for the B Sc. he wanted to do teaching; but after his vacation job experiences (at the end of his second year he did rural area surveying and at the end of his third year he worked in the Department of Geophysics at Wits University doing soldering) he decided on engineering. At that time for a Black person to do engineering at Wits (or any of the historically white universities) you had to first obtain a B Sc. degree at a Historically Black University. However, Phuti could not register for engineering at Wits University because he had not done chemistry and this was a pre-requisite. He decided to stay an extra year at the University of the North to do chemistry 1 and then do engineering at Wits. Because he felt that he couldn’t do only chemistry for one year, he decided to also register for an honours degree in physics.

At the end of the year he passed Part 1 of the physics honours and chemistry¹. He then decided to complete the physics honours. His intention was still to do engineering. Phuti had applied for and got a bursary to study engineering at Wits. As Phuti says, “Everything was in place. Then the professor came to me and asked, ‘Are you not interested in teaching here?’ I said, No, not at this university. I didn’t want to be isolated and excluded from the rest of the world. I was not going to stay here. He [the professor] said he would try to make connections for me. I said if he wanted me to remain he must indicate how he would make the connections so that I didn’t end up being frustrated. At the end of the year he organised that I go to an electron microscope conference. He also made sure that I would do my masters degree here. I thought about it for some time and decided to give it a try. That was how I switched from engineering to physics.”

Phuti went to the electron microscope conference at Rand Afrikaans University, where he was the only Black delegate. We share a laugh as he indicates that he had to stay with friends in Tembisa and travel to the conference. He was also sent to a chemical engineering conference in Germany. Again Phuti was the only Black person in the group. He says, “They must have been looking at having Black people in that group.” The group left South Africa on 18 June 1976 – 2 days after 16 June - the day that action took place on the university campus and the university was closed. Phuti says they visited a number of places and industries in Germany and it was “quite an interesting experience.”

During the honours year Phuti developed a passion for physics. “I studied and thought I understood things. I did not have any passion for physics. When I passed my first year the professor jokingly said, ‘Yes you have made it. Now you know all our tricks here and we will have to find people who will make things a little difficult for you’. The department was understaffed and they got two people from the University of Pretoria - Dr Schaeffer and Dr Kok – to come and teach. Those people opened my eyes. When they taught, for the first time, I began to understand things from first principles. I was the only honours student. They asked me lots of questions, concepts in mathematics and concepts in other disciplines. They tried to build the concepts and gave me reading. The following week we would sit around the table and they would ask if there were any questions on what I had read and I would ask them questions. I then started understanding things - things that were small definitions, things that I took for granted. I

started to understand these things fundamentally. Then the passion came up again. At the end of the year I wrote a difficult examination but I did not have to prepare much for it. In my undergraduate years I did not score good marks. The last time I scored a distinction was in mathematical statistics [in first year] and the best I could score in physics was around 60%. In honours we wrote two papers each year. In year one I scored 73% in one paper and about 56% in the other paper. In year two I got something like 84% or 85%. The same exam was written at the University of Pretoria. I just missed a distinction overall because of the first part. I then really began to understand things. That helped me when I began to teach at the undergraduate level - to teach from fundamental principles.” Phuti was the first student to finish the physics honours course at the University of the North. Others had started before, but no one had finished.

Graduate degrees: interference in experiments but determination to complete

When Phuti started the honours degree, there was no thought or motivation to do a Masters. Phuti explains, “If a university does not have a research culture it deprives its students. They don’t have immediate role models; they cannot see bridges that lead towards higher degrees and research activities. If you spoke about research and what went beyond an honours, it was something very remote”.

It was during the honours, and after the physics professor suggested that Phuti take on a junior lectureship, that the Masters became a possibility. In 1977 Phuti was appointed junior lecturer at the University of the North - the first Black lecturer in the physics department. Phuti then started a Masters degree at the university. There were some people in the department who helped him. In 1978, a new physics professor arrived from the University of Pretoria. Phuti started some experiments with the new professor. There were others in the department who were also doing experiments and research and Phuti experienced interference when carrying out experiments. He explains, “I would put things one way today and found them changed the next day. Things went that way until the end of that year.” When the professor decided to leave the university the following year, Phuti realised that after two years of work he was not going anywhere and there was no way that he could continue. He then decided to do his Masters elsewhere. Phuti does not give details about the experience, but we can imagine them. Later in the interview I suggested to Phuti that he threw in the towel with the

UNIN Masters, but he answered “That was not throwing in the towel. It was realising that things were not going to work and coming up with an alternative.”

Phuti then did a coursework Masters by correspondence through UNISA. Phuti opted to do the Masters through UNISA - a distance learning institution - because he was working at that time and could not leave work to attend another institution. It was tough being a lecturer and a student. “I worked during the day and studied at night. I was staying with my parents at that time and I made up my mind that I was going to work really hard. I started during the January vacation and did five modules per year. Each module had a set of assignments. Everyday I used to sleep at six in the evening until midnight and work from midnight until five in the morning and then it was university work. I turned on my music and worked like that - highly disciplined. I did that for two years and worked very hard and consistently.” Phuti ended up with distinctions in his Masters. And the response of his department? Phuti says there wasn’t much they could say but some were surprised.

In 1980, during the last Masters year, Phuti started making arrangements to do a Ph.D. on a full time basis at Wits University. He started it in 1982 and for 4 years, as a full-time student, studied solid state physics. Phuti took three years leave from UniN. This was not without difficulties. Some people tried to refuse his leave, but others told them that if they refused ‘this man he would resign anyway and go and what would you gain’. Finally Phuti was given nine months-paid leave and the rest of his leave was without pay. Phuti still had to apply for Ministerial permission to do the Ph.D. at Wits.

When I asked Phuti why he chose to do the Ph.D. at Wits University rather than go overseas, he burst out laughing saying, “because I was not married. There was a relationship that I had to first settle. If I went overseas I would have had to wait a long time before I settled.” In fact, in 1983, during his Ph.D. Phuti married Junie. He continued to live at Wits, while his wife lived with his parents in Pietersburg. Junie was studying at the University of the North at that time. Their son, Noko, was born in 1984 and Phuti continued living in the Wits residence. Of course things were tough financially during this period, because it was only for the first nine months of the four years that Phuti had a salary. “We lived on bursaries. It was tight and tense. I used to take every year as it came. I was not sure what I would get and I just went in and continued from year to year. I made it.”

When Phuti explained about his choice of Wits University he said, “Wits had a good solid state division for research” and “work in this area in South Africa was at the cutting edge field internationally and there was expertise to support me.” When I asked Phuti about his Wits experiences he replied that he had a good supervisor - a point that he made a number of times. It was obvious that there were other aspects of his experiences at Wits, which he did not want to talk about. Phuti described his work. “The tradition of this place (UniN) was solid state physics and I had a good background. I had done some theoretical papers in solid-state physics and others in nuclear physics. I had a love for solid state physics and its various types of applications.” Phuti adds that his supervisor, Daryl Comins, was good and “he was the kind of person who discussed things with me. He was fairly consultative and would ask for my opinion on a number of things. I think it was a good four years.” Phuti enjoyed the research environment at Wits. However not everybody was open in their welcome and “when I arrived there some people behaved as though I was just not there. We would just pass each other along corridors and passages, go with them into the tea-room, each just lived on. Since I was used to that kind of thing and knew what I had gone there for, it did not worry me. I wanted to finish my Ph.D.” Phuti’s body language and his silences about the experiences at Wits indicate that some members in the department made him invisible. However Phuti indicates that he enjoyed a good relationship with other students.

During his studies at Wits, Phuti and a few other Black students stayed in residence. Phuti explains: “You were not ‘allowed’ to stay, you just stayed there. I remember one night we were told that we had to leave and go somewhere else because the police were planning to search the residences for Black students. We said, ‘No, let them come and collect us’.”

In the Ph.D., Phuti used lasers to study materials. Phuti describes his days at university during this time. “It differed from day to day and time to time. It was a broad-based type of research activity at the beginning. Initially we concentrated on building equipment, testing equipment and building up techniques. At the same time we had to work out the theories that went along with the research programme. One piece of equipment that I worked on was the laser or the Fabry Perot Interferometer detection systems. Sometimes the laser would work well and when it broke down you had to wait for about two months to get a new tube from the United States. With the Fabry Perot

Interferometer we had to devise a systematic way of aligning the whole optical system. It took more than a year to get the equipment working. It took about two and half years before I was able to collect data.”

Phuti says he was not really anxious that the start of the data collection process took so long. “If you are dealing with anything that is on the cutting edge, that is the price that you pay because the equipment is unique and not everybody can access that type of system.” Phuti had to work out techniques for crystal preparation and techniques to deal with x-rays to crystal alignment. The validation of the whole system of experiments took about two and a half years. It then took another one and a half years to collect data. He did the write up afterwards.

Phuti’s study leave ended and in 1986 he returned to his position at the University of the North. In the two years, 1986 and 1987, he taught and wrote up his thesis. I comment to Phuti that in 1986 and 1987 he had family responsibilities, was teaching at the university, travelled to Wits and wrote up his research. How does one cope? Phuti says that he does not know and adds, “During my last year at Wits (1985) I worked all by myself because my supervisor had gone on sabbatical. At the same time I was busy building a house in Pietersburg, so I used to commute every weekend to look after the builders here.”

In 1986 and 1987, in order to complete the thesis, Phuti spent long hours at the university. “I used to stay here until 2 or 3 in the morning, writing up and finishing things. It was quite a demanding task.” I asked Phuti to explain his research, as though explaining to a high school student. “The title of my Ph.D. thesis is ‘High temperature studies of fast-ion conductors using Brillouin scattering techniques’. I could explain it from the materials point of view. We were looking at ionic conducting properties of these materials. These are normally materials that are used as solid electrolytes in things like batteries. Normally in batteries you have acids - in the acid you normally have a conduction of ions from one electrode to the other. Instead of using an acid we were studying materials that were solids which could operate in small batteries and we were looking at whether, when you heat these materials, they could have conducting properties similar to those found in acid batteries. We found that at high temperatures, above 1200K, we were beginning to see features that were ideal for operating batteries. The Brillouin Scattering technique was the method that enabled us to probe whether

these properties did exist in these materials. We measured, what we called, elastic constants. These elastic constants would change in certain ways and there would be anomalous changes of elastic constants at the point where the material began to behave as an acid in a battery.”

“The data collection process was quite demanding. You had to first prepare samples and preserve them in a particular way. After one had refined the methods, it would take two to three weeks to do one run. You prepared the sample and then put it in special capsules so that when it reached high temperatures it did not disintegrate or overreact. Then you took the sample and put it in a special type of furnace/oven which had special windows and you sent the laser beam through. From there you start heating up your experiment. It takes about a day to heat up the whole sample to high temperatures and sometimes in the middle of the heating up, when you go to high temperatures, you begin to pick up other competing effects which makes it difficult for you to extract your signals. Sometimes in the middle of the data collection process the laser would give up and you might have to wait about two months to get the laser replaced.”

During his research, Phuti worked essentially with his supervisor. “Before you do the experiments you do a thorough literature survey and set out your parameters. You start off with something that is known and which has been done in the past. If that works and you are able to reproduce your results then you go to materials that have not been studied before and you take them along a similar route. Then you begin to look at the features and you have a way of cross checking the reliability of your results until you say, Now this is it.” Phuti says that technically he enjoyed his stay at Wits and found it enriching.

Phuti gained the PhD in 1987. I asked him what gaining the PhD has meant to him. It becomes obvious that Phuti had not thought about this before and it took it matter of factly. He eventually answers, “By the time I got the Ph.D., I already had the essence of the research. I think getting a Ph.D. was something prestigious, but I had already read papers at local and international conferences so that by the time I finished writing the Ph.D. I was looking forward to doing research beyond Ph.D. Getting the Ph.D. was just a formality - of course I had to write a thesis which was quite an experience.” I tried to delve deeper and asked how his community and family felt about

the achievement and Phuti said matter-of-factly, “The community would always view that as a high achievement, but I knew within myself, what it all meant within the academic circles. I knew the long way I still had in front of me to be established in the field. People outside viewed it as a really big achievement, but I knew when I was all by myself what it takes to really make a mark.” And what does it take to make a mark in the scientific world? “You have to work really hard and publish extensively and be well known. One must generate a reasonable amount of new knowledge in an autonomous way. The Ph.D. is the training that puts you at a level where you are able to sit down and plan projects and publish. It gives you a wide variety of skills that will help you move on in the research field. I see that as a platform.”

So why did Phuti gain a Ph.D. when many others did not. He bursts into laughter saying, “I was stubborn. I did not give up. When I want to do something I will do it against all odds. I just tell myself - look against all odds - I am going to do this.” My question about what special qualities he has to make him successful in the Ph.D. also presents a problem and he says, “I really cannot tell you. It is difficult. Once I decide to do a thing, I make up my mind, sit down and put up plans and do it. Also the people who I have been living with and who have been close to me have been fairly helpful and supportive.”

From the passion in his voice it is obvious that Phuti loves research and the research process and I comment about it. While Phuti loves the research process he indicates that research is a tough life. “It takes special people to be around one and to support one. I normally talk to my wife about that and also to the people with whom I work about the support that they require - either from their parents or their partners. We find that you have to encourage people all the way, all the time to say, ‘Let’s go on, let’s do it’. There might be lots of factors that might try to distract their attention, particularly in this environment at UNIN, where the culture of research is not well entrenched. If you work too hard, maybe people are surprised why you are working so hard when you could be taking it easy. If you come here on a Saturday or in the evenings, it looks like an anomaly - whereas in other places people work on Saturdays or they work in the evenings and holidays. To work against that type of environment is not easy. You require the type of people who would be motivated and who would be determined to work.” However Phuti indicates that in research he likes “coming up with new ideas and

seeing the ideas implemented.” Another important aspect is seeing that these ideas are “relevant.”

When Phuti got his Ph.D. he was made senior lecturer in the physics department. During that year the university had employed other Black staff in junior positions but Phuti was the only Black with a Ph.D. and a senior lecturer. His responsibilities were teaching and research. After gaining his Ph.D. Phuti decided to continue the research project that he started at Wits. To do the experiments meant that he had to commute between Pietersburg and Johannesburg (320km). Fortunately the university provided him with funding to commute. Phuti chose to continue with this area of research because there wasn't enough expertise in the country and he felt that he should continue with this type of work. Slowly Phuti began to build crystal preparation facilities at the University of the North.

Post PhD: the Materials Modelling Centre

Phuti explains that certain experimental results could only be explained up to a certain point. Other things needed to be explained or interpreted by computational modelling. He therefore proceeded to do computational modelling and in 1988 spent a year at the University of Keele in the UK on projects involving computational modelling. The computational modelling complemented the work he did in his Ph.D.

Since 1988 there has been a collaborative relationship between the University of the North and Keele University on computational modelling. Starting off with very little resources and equipment and working by “patching up things,” Phuti, with support from the University and the Foundation for Research Development (FRD has been developing the policy of supporting historically disadvantaged institutions and assisting them to build the research culture) and from industries like Silicon Graphics, has now built up the Materials Modelling Centre. There are now honours, masters and one PhD student working in this area.

Both locally and internationally there is interest and support for the centre. The centre works with industries that are beginning to explore materials modelling in order to reduce costs. Modelling is also important for its predictive value and often, before experiments are done in the laboratory, there is computational modelling. There are collaborative relationships with the Royal Society and Universities of Oxford and Wales

in the UK. The reputation of the Centre has grown and in March 1997 they hosted the International Materials Modelling Conference.

In research there will also be obstacles and I asked Phuti to talk about the obstacles he experienced along his pathway. “I think it is when people put obstacles in your pathway deliberately. When we set new projects you sometimes find that there is tremendous resistance.” Phuti explains that when new projects like the foundation year projects and the Teachers Inservice Courses were being set up, some colleagues set up a series of obstacles and tried to “kick it down” calling it a “circus.” Phuti’s way of dealing with this is saying that if you believe that the project is good you continue working on it.

The other difficulty that Phuti is experiencing during this period of transition at Black universities is trying to establish a culture of research and at the same time working in a democratic and consultative manner. Both these processes are time consuming and “at times they seem to be in contradiction in terms of their demands, but both are important processes.”

Reflections

As we come towards the end of the interview I ask Phuti to reflect on different aspects relating to his academic life.

Firstly on how he experienced the South African and international academic worlds. He says there isn’t really a South African community and in the past the collaboration and co-operation amongst South African scientists did not flow so spontaneously. Each one works in different areas and “most people were interacting with people outside the country working in their own areas.” Phuti says there is an improvement now with people talking with one another. On the international scene he found that the interactions varied - some conferences are considered “families” and other conferences are aloof. It was through the international conferences that Phuti was able to form various international links and “it is those supportive links that have kept us going.”

Secondly I ask Phuti to reflect on how he thought his race, as an African in South Africa, shaped his life in academia. Phuti says the experiences in South Africa “taught me to learn to stand on my own and not to take things for granted.” Further in

interacting with other people [I assume Phuti means Whites] one has to be careful what one says and one always has to prove one's points. "If you say something and you are Black it is taken lightly." However with the changing political environment things have changed. Phuti explains how his role has changed in the different committees he serves on. "For example in the South African Institute of Physics. I had been involved in matters of science policy in the ANC even before the new government came into place. I remember a time before the elections when I used to challenge people in the SAIP community who worked in solid state physics and material science that it is time to look at what the impact of material science is on everyday life and be able to explain to the man in the street what this is capable of doing and be able to explain to the legislators the importance of the research. Some people refused and said, 'Do you want to tell us what research to do' and I said, No I did not mean that. What I am saying is that we have to constitute ourselves and be a force to be reckoned with in terms of shaping the scientific policy in materials at least because you are a specialist in that. Some people looked at this sceptically. After six months they invited me back and asked me what is it that I wanted to say. I explained to them that we should put forward a symposium on science policy in materials and invite people from industry and from government. We developed some discussion papers on the future of materials. At the meeting I told them it was time to shape policy and give guidance to government. If we did not do that it would be marginalised and it was an important area. They are now beginning to say 'yes, yes.' The thing that is now happening is that it is assumed that you know more because you are Black and the government is Black and therefore you are supposed to know things you do not know."

This led us to a discussion of the role of the Black intellectual and Black scientist in society today. Phuti says, "The Black intellectual is in trouble - the Black scientist is in trouble, because he is torn between worlds of policy, administration and doing research and everybody wants him. There are so few." Phuti sees the role of the Black scientist today to be "to provide, in a reasonable way, inputs in the formulation of policy, public awareness, to serve as role models and be able to do good science."

Thirdly I ask Phuti to reflect on how his gender, as a male, shaped his life in academia. Phuti is reflective and acknowledges that it "is a world of men and wherever you go you meet men." Therefore he may not have been aware of the difficulties

experienced by women. Phuti relates a story of a woman co-researcher and “what I noticed was that she did not have the freedom that we have as men. She couldn’t just go and work over the weekends. She had to look after the family and do other things. I could sense the restrictive patterns that were imposed on her.”

We came back to the issue of women in science when we discussed the racial and gender composition of the physics department in which Phuti now works. In the department there are about six or seven Black people and about three White people. There are no women faculty members. We then talked about women in the honours and Masters programmes. Phuti spoke regretfully about his experiences of trying to recruit women in these programmes. There are a number of beautiful, brilliant women who make it through undergraduate physics and to an honours course. So far the women who have started the course have left because of ‘love problems’ or pregnancy. Phuti says, “I discuss these things with my wife at home and ask what I should do? How can I encourage these girls? The conditions to which Black women are subjected are difficult. If this happened to a male student he would have continued. I would like to see more women in the programmes.” It is obviously a situation where the institution is supportive to the issues of the woman, but there are individual, personal factors that restrict the women.

Closing

We start the story with family and end with family and the home...

At various points in the interview Phuti emphasised the role of family and partners in his success. It is obvious that he had supportive parents and a wife who is supportive and shares in his work. His wife, Junie, is a lecturer at UNiN, teaching English for Science. Phuti says that they always talk about their work and share ideas. I asked Phuti how marriage has affected his career. “I could ask myself where I would be without the support I am getting from my marriage. It has enhanced my career. They are mutually supportive. I must tell you that as a young man, before you get married, your mind does not settle. You always think about the future: what type of wife am I going to get? It is very unsettling and very painful. Once you are settled within marriage a lot of things are put to rest. Of course it depends on the type of marriage you get.”

Phuti and Junie have a son Noko, who was born in 1984. At the time of the interview he was 13 years old. Would Phuti encourage Noko to go into academia? 'I will encourage him to do what he wants. I don't regret being in the academic world. It is a challenging world. It is not a paying world but it is a fulfilling type of world.'

Religion is still an important part of Phuti's life. "It provides a base to overcome challenges in life and to know that you don't only operate on your own. You have other powers that are behind you. It is quite fulfilling."

When I asked Phuti about how he spends his spare time, he laughed and said that he doesn't have any. His academic work is currently taking up all of his time, at the expense of a number of other things. Phuti would like to "cut down as much as I can in order to be able to re-establish myself, to look after more family matters and extended family matters, enjoy the company of my relatives and friends and enrich myself in that part - this has suffered in the last 10 years."

CHAPTER EIGHT

Academic Life Story of Dr Botlhale Tema

I like being an intellectual. It was a representation of the best I could be.

Dr Botlhale Tema is the secretary-general for the South African National Commission for UNESCO. When I interviewed her at the end of 1996, Botlhale was the national director of the non-governmental organisation PROTEC (Programme for Technological Careers). She had also been an associate professor in the Department of Biology at the University of Bophuthatswana. She completed her doctorate in science education at the University of Reading (Britain) in 1993. I interviewed her for about 4.5 hours over three sessions.

Botlhale and I had met briefly at an education conference in 1987. Since 1994 we have met and interacted at various science education conferences and our relationship has shifted from acquaintances towards a friendship. Botlhale was aware of my research project and was supportive and encouraging. When I asked Botlhale to be part of the project she agreed.

Beginnings: education as a value

Botlhale Tema is an African woman born about 50 years ago in a nursing home in Johannesburg. She is the eldest of five children of Davidson and Rhoda Moloto. The Moloto family home was in the Bafokeng Village, close to Rustenburg. At about the time of her birth Botlhale's father was appointed as a school principal and the family lived in that village for some time. When he was made school inspector the family moved and Botlhale says she never lived in any one place for a long time. "Mobility was a common trait in my existence."

Botlhale's father, Davidson Moloto, is 86 years old¹. Botlhale says she is very close to him "in a African way. He is very important to me". Her father was the first Tswana novelist and his books depicted village life and the Tswana past. In his retirement he joined the Bophuthatswana government as a deputy minister of economic affairs. Botlhale's mother, Rhoda Khwiti Moloto, completed her junior certificate and trained as a primary school teacher. Her mother did not teach after her marriage. Her

¹ Sadly he passed away in September 1998.

father said ‘I won’t have a wife who will be working.’ Botlhale says, “My parents are very good together. That is why, I think, we can’t get married.”

Botlhale remembers her paternal grandparents Steven and Elizabeth Moloto. Her grandfather was a minister who held a high position in the Dutch Reformed Church. She describes her grandmother as “a dominee’s² wife” and “the quietest woman I ever knew.” Because Botlhale knew her grandfather for a short while (she was ten years old when he died) she understands his influence in terms of expectations. There are family stories about how her grandfather and father got their education and the hardships that they had to endure in this process.

The Moloto family lived in Rustenburg in the Western Transvaal³. There was no educational institution of any note in that area. Botlhale’s grandfather completed his standard six there and then went to the Dutch Reformed Training Institute in the Free State to train to become a minister. To get from Rustenburg to the Free State you had to go to Botswana and get a train. In those days Blacks were not allowed onto the peoples’ coaches – they had to travel in the open cattle trucks. With the rains, by the time you got to your destination you were swimming in those trucks. “My grandfather got his education the hard way. My father had it slightly better.” Her father got his education in the Free State and Rustenburg, uninterrupted, up to standard eight. Thereafter he would work for a year and study for a year. “He went to Fort Hare and did matric in *one year (said with emphasis)*. He would say that if you wanted to study, you would tie a wet towel around your head to keep awake and therefore he could do two years of matric in one year. My grandfather was so excited and he would say, ‘Ketla gotsalla ngwana’ (Matric, I couldn’t get you, but I have a son who would get you). It was a major achievement. My father finished his degree at 35. I thought that was interesting and I asked him what education meant to him. He said there were two things. One was that to be educated amongst my people was to do things that other people had not done and, secondly to be educated meant that you had to acquire knowledge that seemed just for Whites. I asked what values underlie getting education. He said that in traditional villages without education, before the white man came, strength of character was a very important thing. As time progressed that kind of value was given to educated people.

² This is an Afrikaans word, referring to a minister in the church.

³ This area is now in North-West Province.

For me education was an expectation and it was also a very important value within the family. There was no choice linked to education.”

On the maternal side, Botlhale did not know her grandfather because he had died before she was born; but she had heard that he was involved with the African National Congress. During her high school years, Botlhale stayed for three years with her maternal grandmother, Pauline Lefanka. “My grandmother was on her own and used to work as a domestic servant. My mother felt guilty about not supporting her. My parents made the arrangement that the children would stay with my grandmother and by my father supporting us he would support her. What I noticed about her was that she was very, very independent. My father was supposed to support her, but she would go behind his back and do the laundry for White people. I admired her more than anything. She was a person who would not be pushed around. In our church, the Mothers Union⁴ used a certain uniform. She refused to do so. Everyone disapproved but she went to church and said she was not going to wear that. She was really proud and strong. I wish I knew her with my eyes of now. When I compare her with my mother, she is equally strong but she has the luxury of being weak at the same time because she is with my father.”

Botlhale is the eldest of five children. Her sister Pat, is deputy director in Health Services and lives in Mmabatho. Her brother Pappie is a consultant for Ernest and Young. Marlene is a radiotherapist and lives in Australia. Puli is a lawyer who has a law practice and consults for government. In addition, there was always someone living in the house. A recent count by the family showed that 24 people lived at the house at some time or the other. Since her father was a school principal, if someone came from another village and did not have a place to stay, they ended up staying at the Moloto home.

Botlhale grew up in a Tswana village and her home language was Tswana. Her grandparents spoke English to each other and to the children. Her parents would have liked them to speak more English, but they found this difficult to do in the village. In the village there were a few Afrikaner families so the only language people knew, outside SeTswana, was Afrikaans.

⁴ The women used black skirts and red jackets.

Bafokeng⁵ was linked to platinum mining, and had modern characteristics. “When I think of my context, I have always lived in a more modern house compared to other people. My home had a zinc roof, not grass like most other homes. What the roof was made up of was a determinant of your class. I also always had shoes. I remember when going to school, putting on my shoes when leaving home, taking the shoes off and becoming ‘normal’ like the other kids. My family, although we had a zinc roof and had shoes, were not an island and interacted with the rest of the village.”

Bafokeng village life was dynamic. Her father was an advisor to the chief. At that time the village was battling with the government for a share of profits from the platinum mines. There would be court cases in the village and when they won the children (called sunbeams, like girl-guides) would march around with small white flags.

The quality that her parents considered most important was humility. Her parents also expected the children to succeed in education. “Education was not linked to a career but was a value.” I thought this a significant point and comment. We both then engaged in animated conversation about education being a value. “For me it was a part of character. It went deep, even when you got married and chose a husband, my mother would say: ‘when I got married I was faced with choosing a rich man (someone who had a shop) or an educated man. I knew which I wanted. I wanted a man of letters’. The money has open, obvious, social status and education has internal status. In society it is more respected and more valued.” As Botlhale spoke about this she said “I have never thought about it this coherently before.” Because the concept of education as a value is so exciting as opposed to, for example, education for a career or economic development, we were both animated and fought for the conversation space. I realised my role as a researcher was to listen and I should let Botlhale talk. This was a very exciting part of the interview.

Botlhale comes from a religious home, where religion was a way of life. There was no way that you could have Sunday without church. “As I grew older, religion came to mean something different. It didn’t really touch my heart. Now I see it as a kind of spiritual anchor.” Botlhale belonged to the Dutch Reformed Church. This was a terrible embarrassment in her youth because the Dutch Reformed Church is linked to apartheid.

⁵ Recently I visited Rustenburg and was amazed to see the difference between the village administered by the Bafokeng and the other villages. Because of the platinum mines, the Bafokeng have more resources and are better off than other African groups in the area.

Further, her husband was the son of a Dutch Reformed Minister. Botlhale indicates that when you are growing up in the village, because you do not know any different, you see all churches as being the same. "When you start defining yourself politically and you find that you are Dutch Reformed, it becomes an embarrassment." I asked if the church influenced her educational trajectory and Botlhale indicates that for her, "My parents were my total influence in education."

When I asked Botlhale about politics, she started off describing the home ethos. "My mother and father liked ideas. At home we debated and discussed. When we came from school we had to show that we had ideas. Everybody would sit and talk about them. I do the same thing with my children. We sit, watch TV, comment on it and criticise it. I enjoy people who have ideas." Botlhale described the difference, politically, between people from a village and a town. "When you talk about politics in a village, people in towns do not understand what you are talking about. I knew about apartheid only when I was in matric. I had not interacted with White people as a subordinate until I got onto trains for boarding school where I was called 'kaffir'. I got to know Whites when I was a student at university. The White people whom we knew were farmers. We interacted with them and I was never in a situation where I or anyone in my family worked directly for them. It wasn't something that irked on a daily basis such that we developed rudimentary ideas of the politics of South Africa. We had typical village life concerns - milking cows and collecting water. As we grew older I went to boarding school, got to know the bigger world, picked up ideas about politics, brought them home and they got debated. When we went to university it became more focused and intense. I was at university during the NUSAS⁶ phase. My brother was heavily involved in SASO and he went to into exile. At about the same time my father was about to retire. I don't think he could deal with the idea that he was going to retire and have nothing to do. He got involved in the homeland government. When we ask him now about their involvement he says, 'We got into the homeland situation and I have to sit here and let other people determine how I live. I would rather see if I could fashion that myself'. At that time the family was polarised because of politics. The debates at the table were like wars. Interestingly, we came out of it. When my parents were in the Bophuthatswana Government my brother would say, 'Do you want me to kill my parents'. My father

would say, 'Go ahead and kill us. You made a choice, what makes you think we did not make a choice'. That was very significant in my family. You make up your own mind. We are all very stubborn people. For me politics is not what I am strong at. I am defined mainly by the fact that I have to bring up children on my own. I also am not very good at taking one side to anything. I like to keep my right to see all sides."

Primary and secondary school: not a happy period

Botlhale went to the Bafokeng Preparatory School in the early 1950's. Botlhale laughs as she repeats the word preparatory. Black American missionaries, the Spooners, had started the school. Botlhale says that she does not remember much about her stay there but "what I do remember was that early childhood learning was not a pleasant thing. I remember the [African] teachers being mean and vindictive. I don't dwell on these things, but am referring to it because you asked me." Botlhale indicates that the teachers' meanness was because she was a teacher's daughter and they had no patience with her. "All through my schooling within communities that knew me that was always the disadvantage. Even when I went to the high school at the same place, our teachers would be horrible and say, 'Look at her. You expect her to know. She is a teacher's child'. I don't remember what I learnt in school. I don't remember one sentence. My mind does that. It must have been totally unpleasant."

I ask Botlhale to describe the school. She says that it was big, but she does not remember what she learnt there. "My mind is just blank." Botlhale thinks since this education was before the Bantu Education Act, the language of instruction was English. When Botlhale was about 12 (in 1957) her father moved her to a Catholic boarding school, St Anne's Primary School in Rustenburg. In standard five and six White nuns taught her. Botlhale thinks her father may have moved her because of the Bantu Education Act. This Act, passed in 1953, placed education for Africans under the control of central government, and its underlying philosophy was to train Africans for menial job. This Act also called for the transfer of all church and mission schools to the state. This transfer was to take place on 1 April 1955. It is most probable that the

⁶ NUSAS was the National Union of South African Students and SASO was the South African Student Organisation.

Bafokeng Preparatory School, handed over control to the government. The Roman Catholic Church did not hand over their schools and continued operating, with its own curriculum and without state aid.

Botlhale enjoyed studying at St Anne's and made many friends. She performed at the top of the class and her school reports were good. The medium of instruction was English and they were encouraged to read many books. She studied arithmetic but "it was never my strong point and even now I am not a figures person." The school did not offer science and her father decided to move her out of that school.

Botlhale tried to get the reasons about this decision from him. "I am getting kids into science [in Protec] and I can give you a rational argument about why we have to get them into science. We would talk about the importance of scientific jobs and the economy. My father would not give you that kind of reason, but say that, for him, science was an unexplored field. He would say that it had aura that you would be doing something that other people hadn't done." Botlhale adds laughingly, "Another reason for my father removing me from St Anne's was that I wanted to become a nun and he could not bear it."

Botlhale returned to Bafokeng High School for her Junior Certificate (Form I, Form II and Form III). Her father had been principal at this school but was now promoted as school supervisor. This meant that her father travelled around and her mother moved to the family farm in Pilanesburg. Botlhale stayed with her grandmother in the township for those three years.

Botlhale says she performed well in Form I and II, but in Form III again felt the negative responses from her teachers because she was a teacher's daughter. "I remember one teacher that beat me so badly my father had to come to school." She says that the teachers were competent in their subject areas. Botlhale did well in most subjects but barely survived maths and science.

In addition, this period was characterised by the self-consciousness of teenage years. "A very troubled time. Boys were becoming an issue and that was disturbing. St Anne's was all girls. I remember it as a very uncomfortable time of my life. That was when I got to know boys, knew that they existed and knew they could have a relationship with you on a level that you didn't really understand. It wasn't a particularly happy and pleasant time."

The Junior Certificate examination was a public examination and Botlhale says she barely made it. “I would not put any value in terms of educational ability on that. I just could not concentrate. That’s all I remember. I could not concentrate. It was a time about sudden puberty and self-awareness. My performance did not please either me or my parents.”

For Form IV and V Botlhale went to boarding school again. She says that “this is a side that discomfits me and it was a period of difficulty.” Her father wanted her to go to Kilnerton High School in Pretoria. This was an elite mission boarding school. Many of the top brass Africans of Botlhale’s age went there. The brother of Botlhale’s principal at her secondary school mentioned Modise Sekitla High School. He told her (and her family) that the school was very good, had a very good English teacher and it was an African school. For Botlhale that was a period of her self-definition [as an African]. She said she wanted to go to that school and refused to go to Kilnerton. “I flatly refused to go to Kilnerton because everyone else went there. I said I wanted to go to this school. I have never made a bigger mistake in my life.”

Modise Sekitla was a boarding school in Hammanskraal. Botlhale speaks with difficulty, “I cannot reconcile that experience. Even now. I wish I had never been there. I haven’t come to terms with that part of my history. I am speaking about this for the first time. When I don’t like something I blank it out.” As Botlhale talks it is clear that she had a bad experience at the school. She describes the school as a “dump.” The physical conditions were horrible. There were times when there was no water. They would get water from a river, put lime in it and we had to drink that. Botlhale says she couldn’t tell her parents because this had been her choice. “I stayed in that dump as best as I could and bathed with cold water.” Worse than the physical conditions were the psychological conditions. “The principal was such a crook. He would encourage boys to fight and to steal. This was an African effort! I could not tell my parents.”

As Botlhale speaks about the school it is clear that this is first time she is visiting a difficult past. She reflects on the positives at the school. “I liked the school in the sense that it encouraged independence. You think for yourself and you are self-determining.” The English and the history teachers were very good. Botlhale says she had a very good foundation in terms of thinking. But these teachers only came to school three times a week, not on Mondays and Fridays, because they were alcoholics. Botlhale was very

impressed with the English teacher. “You would see a concept in Julius Caesar and Hamlet and he would cross refer. I just liked that. When our history teacher was doing the Great Trek he would read the causes of the Great Trek and would read Piet Retief’s manifesto and say, ‘It is ironic that you could have people who wrote that manifesto governing in this type of way’. It was so nice. He was a critical educator. In that horrible place I got a good education.”

In Form IV, Botlhale took six subjects: Mathematics, Physical Science, English, Setswana, Afrikaans and History. She did not take Biology. Botlhale enjoyed English and history, but not mathematics and science. “I was never a good one for math. I enjoyed science. Just enjoyed but not a high point. I was more a words person.” She performed well and was in the top 10 of the class. Botlhale was not clear about what career she would follow, but she knew she would go to university. She was influenced by her English and history teachers in school and thought she would be a lawyer.

Botlhale’s mixed feelings about Modise Sekitla is revealed in the interview. She says she was functioning much better mentally. “I remember it as a stimulating place although I cannot deal with it. I think it was the moral issue that bothers me so much that I cannot incorporate it into my history.” She realised that she had made a bad decision and somehow she had to stick to it and go forward. She acknowledges that the positive thing that came out of this experience was character formation. Botlhale repeats that she could not tell her father about this because he had been keen to send her to a good school. Her future husband was in a good school and “I was in this horrible, horrible place. I did not finish there. I got pregnant at the end of the year... Jesus Christ!”

Botlhale says she was a very slow starter with boys. “Boys used to make me uncomfortable and when I did think I was trying, I got pregnant”. Botlhale went back home, had her baby and then started afresh for Form V the following year. Her parents took care of her baby daughter, Dawn.

Botlhale went to Morris Isaacson High School in Soweto for Form V. This is what appears on her curriculum vitae. She had expunged the experiences of Modise Sekitla to the extent that she did not acknowledge it on her CV. When Botlhale went to Morris Isaacson High School in Soweto, she did not feel part of it. “I was too traumatised by my experience. I was just finishing off matric. That year was not significant. I was just a

visitor there. I was not part of the school. I studied more on my own.” At the end of that year Botlhale obtained an exemption pass and applied to Turfloop (University of the North) to study for a B Sc.

I had not known that Botlhale had a child while in high school. I was surprised when she mentioned this. I could hear that Botlhale was having a difficult time relating her experiences at Modise Sekitla. She indicated this was the first time she had spoken about that period. It was an emotionally charged period of the interview. I felt uncomfortable by the emotions. I did not know how to respond and after a pause, continued with my script. I was aware that I was not handling the situation well and with each reading of the transcript I became more aware of how poor my skills were at that point. In constructing the story, I have written it smoothly, but, especially at this point, the conversation slips between mathematics and science and boys and pregnancy. Never was I more aware of the criticism of life writing giving linearity and order to something that was not experienced or told in an orderly way. The writing process does not capture the variety of emotions interplaying at that point.

Undergraduate years: it was just a high to be knowledgeable

When Botlhale fell pregnant her father was hurt and expressed his disappointment. After the baby was born, she knew she would still go to university. “At that point, my father laid down the basics. I had to do exactly what he wanted and was not exercising a choice. I had made such a bad choice of schools and he had wanted to send me to a good school. Now I just had to do the right thing.” The right thing was doing a Bachelor of Science.

As a Tswana speaker the only university Botlhale could apply to was the University of the North. In 1965 Botlhale registered for mathematics, chemistry, zoology (she had not done biology in high school) and psychology. She wanted to do physics but because of the stories she had heard (‘people had been doing physics for five years’) she said, “Forget it”. She did attempt it the following year, but did not even get a yearmark.

I asked Botlhale to describe her experiences at the university. “You would go to class and be told that mathematics was not the thing for Blacks⁷, let alone Black women.

⁷ Shades of Verwoerd’s statement ‘What is the point of teaching a Black child mathematics?’

Lecturers would come in and the starting remark would be, '50% of the class would fail'." She dropped mathematics after a month because "it was a horrible experience." Botlhale says there was absolutely no interest in what students were doing and there was no encouragement from the lecturers. If you were a weak student there was no encouragement. The mathematics class was small. There were about 15 or 20 students with two women. "Contrary to the expectation that a small class would make it a good time for you, the lecturers got to know you and gave you hell directly."

In the chemistry class there was a lecturer who would lecture and finish the sentence on the [outside] stoep. "He used to dictate notes and as he went out of the door we would follow him out and ask the people who were standing outside what were his last words. We survived because there were many of us and we could make fun about it."

Botlhale is now irritated by my questions to explain more about that period and indicates that this is so obvious and she did does not see how it would help me answer my research questions. I urge her to continue as it is important for me to hear her experiences. "I just want to say that to have studied in Turfloop, you studied in a situation where no one was interested in your success. The chemistry and zoology classes were large but they were happier because we supported each other. The lecturers were horrible. I do not know what I got out of that situation. They had these lecture notes that they dictated from and somewhere along the way we would get a hang of what was going on because we had to write exams and tests."

The lecturers were by and large Afrikaners and they were conservative. She did not perceive that most were academically competent. Their language of instruction was "their horrible English." When Botlhale reflects on this experience she says, "My high school experiences were fantastic compared to the university experiences. Those alcoholic teachers were great for unlocking thinking and had a way of debating."

Botlhale stayed at the university residence. There was support from other students and they worked together. "I studied chemistry with Mamphele (Ramphela). She was very good and would help me with things I could not get. All of us, at that time, came from good schools and we had good basic education. We inspired and supported one another. What you would expect from the lecturer we got from each other." Botlhale describes Turfloop at that time as "very academic". Students were into philosophy and

Chaucer. The students valued education. “There was the culture of knowledge for its own sake. You didn’t study for a career. It was just a high to be knowledgeable.” Botlhale describes this intellectual feeling on campus with pride and longing. Turfloop was also a politically active campus. This was the period of the breakaway of Black students from NUSAS⁸ and the formation of SASO⁹. The Student Christian Movement was located somewhere in between.

In her first year Botlhale passed zoology and psychology. The following year (1966) she repeated some of the first year subjects and added geography. She went on to major in zoology and geography- two subjects that she had not done in matric. Botlhale was basically choosing subjects so that she could pass and gain the B.Sc. degree. There were no strategic decisions about choices that would lead to something.

Botlhale got her educational highs through small things like registering for English. “I enjoyed it and I had a very good time with Gessler Nkondo, a Black lecturer. I felt educated and had friends who did English and lived their learning. To live your learning is such a pleasure. I got that from English and not from science. I never became a scientist because atoms fascinated me. For me it was part of the deal.”

Botlhale fared better with the second and third year subjects. In the zoology class there were about 10 students - two or three females and the others males. I asked Botlhale if the interactions with lecturers improved in the second and third years. Botlhale was irritated with my question, because it was all so obvious. “You are seen as adversaries from beginning to the end.” There were only two students (females) in the final year geography class. “I don’t think the lecturer remembered our names. We were treated like a crowd of people whom he did not know.”

I was curious to know what motivated Botlhale to continue each day. I was aware of her deal with her father to complete the B Sc.; but was she inspired to develop a love for the subject? Botlhale laughs and answers, “The lecturers were adversaries and it would be ridiculous to expect motivation from them. You got motivated by your personal agendas and by your peers.” I continued probing wanting to know how she started developing a love for the subject. At first Botlhale protested that that was just not possible, but then acknowledged that she enjoyed aspects of it. “The funny thing is that I

⁸ NUSAS was the National Union of South African Students which operated on all campuses in South Africa. The leadership was White.

⁹ SASO was formed at the end of 1968 and was a student association with Black leadership.

liked it when my majors came together, where you get ecology in zoology and geography coming together. I enjoyed embryology. I enjoyed genetics. But there were no dramatic joys in university.” I wondered how much of her memory had been composed and in that composure she has sublimated things she had enjoyed at the university.

Botlhale completed the B Sc. in four years (UniN being affiliated to UNISA she graduated with a UNISA degree). During the B Sc. she did not consider studying further. “I knew from the subjects that I was doing that the only option was to teach. There are aspects of my study that I would have liked to develop, like meteorology, which was interesting and could have possibly become a career. But we were living in a situation where these were just pipe dreams.”

Botlhale says she did not consider a honours degree. “I had enough of Turfloop. I wanted to do the University Education Diploma (UED), get out, get married, get my house and be independent. I was focused in terms of going to start a family. I knew we would go and study later, but I did not know what we would study.”

After the B Sc., Botlhale did the UED. “We had many Black lecturers. There was more freedom and debate. It was fun and I enjoyed that.” Nobody failed the UED and there was good interaction with people from different departments.

I asked Botlhale how this university experience changed her. “Looking back there is nothing I can remember if you were not probing me like this. For me the whole thing culminates in pursuing a path set by my bad decision in matric. I had to live by it and I had to see it through. My one thought was that I would not let my Dad down again, so for me it was the tenacity in pursuing the degree. It has been something that has carried me through up to now. I don’t give up when things are difficult. I do not make it an option to give up.”

Upon completing the UED, Botlhale got married and went to teach. I asked whether she got married while at Turfloop and she bursts out laughing saying. “No, when I finished. You do things in an orderly way. You do not get married in the middle of your studies.” Botlhale got married to Sam Tema, a social worker, in 1970 during her first year of teaching. Sam was a family friend and she had known him a long time. He had been there through all her turmoil.

Work and masters: when there is a crisis go to school

Botlhale taught mathematics, science and English at Dr. W.F. Nkomo Secondary School. She could have done medicine, but felt it was not for her. All was going well in Botlhale's life. She enjoyed teaching and her son Thabiso was born in 1972. And then "Boom, my life had a crisis again. My husband died. Here I was sitting with two young children." Her husband Sam died in a car accident on 1 January 1974, four years after they were married.

"What to do next? Whenever something happened, my parents said 'go to school'. That has been my life actually: when there is a crisis, go to school." Botlhale started reorganising and pulling her life together. She taught at Hofmeyr High School in Attridgeville and started looking for a scholarship. Before Sam had died they had talked vaguely about going overseas to continue with their studies. She went to the embassies looking for a scholarship and landed a British Council Scholarship. When she was asked what she wanted to do she looked at the coursebook and saw Masters in Science in Parasitology. "I could barely spell the word. I asked what it involved and said: right let me go for that."

Botlhale did not have a plan about where to go and what to study. She knew that zoology was her major subject and it was something which she would have liked to pursue. "I would have liked to study things like palaeontology, but who wants to hire anyone with that degree. It wasn't open to us. I found the ecological side which is very popular now very interesting but it was not on offer then." She thought parasitology would be achievable. Botlhale's view was that with the Masters she would get a better job, "a job that will enable me to support my family."

Botlhale left her children with her parents, resigned from her school teacher's job (there was no study leave available) and went to a small town, Bangor, in North Wales. Why Wales? "I asked the woman at the British embassy where I could study. She said Wales was a good place. I later found out that we had different views about what is a good place." Botlhale was the only South African there. It was a very beautiful, but small place.

Botlhale was a bit nervous about how she would cope in Wales. "I didn't know whether I would make it. It was an interesting surprise, to see that you get grades as good as anyone else and the next time you get grades better than anyone else's." With

this success “you realise that it was all a lie. All those things we were told we could not do as well as other people was a lie, because I did just as well and most times I did better than them.”

Botlhale found the interaction with lecturers disappointing. “It was as authoritarian as here. I thought it would be a nurturing relationship. Some lecturers interacted with you, but it was not a norm. I think it is a general British norm for lecturers not to interact closely with their students.” During this time there were three lecturers who stood out. One (who did immunology) was a “total racist” and expected the worst from non-British students. He had a self-fulfilling prophecy. The second one, who did ecology, was good, but there was a distance with him. “You admired how he did his work. He took us for biostatistics, which I liked but I saw my math inadequacy coming out.” The third one did animal behaviour and became a friend and he was interested in South Africa.

Overall Botlhale enjoyed the parasitology course. It brought all the elements of biology together. “I feel it really boosted my knowledge of biology.” Botlhale did not find the theoretical part difficult. “I was dealing with words and I enjoyed writing essays. I was doing well getting A pluses.” She struggled a bit with the research section “because I was not sufficiently grounded in that type of thinking. Maybe because I did not do an honours here.”

In her second year of study Botlhale did her research. She looked at the development of dog worms’ eggs. At that time there was a problem in Britain where people lived closely with dogs and it had been found that people ingested these eggs and the worms infected you. It was important to control the transfer of infection from the dogs to humans. “They have resistant eggs and I was looking at the environmental (heat and humidity) conditions under which they developed and used home disinfectants at different concentrations to ascertain at what point they would be killed. I did not know that I would enjoy the subject when I started, but it was good.”

“During the first year of study there was a course on research methodology where you worked out your research methodology. For the research itself you are left on your own. You only interacted with the lecturer when you brought a chapter to him. While doing the research you refer to literature and get help from people around – laboratory assistants who are qualified to assist you, or you discuss with the doctoral students or

you go to the lecturer.” Botlhale says she had difficulty with the interpretation and analysis of data. She struggled with writing up something that was acceptable, and was glad when she finished her Masters.

When Botlhale had left South Africa she did not have any idea about research. She explains. “The way I taught my students biology and the way I was taught was totally different. As an undergraduate in a Black university, students would never come across a research paper. The process of interpreting data was never part of your undergraduate studies. That I think was the major disadvantage. I developed the ability to interpret and analyse critically in courses like English. In science most of the time it was recalling what you were taught and that is not good preparation for research. You have to learn to be curious about your studies and that did not happen in undergraduate years.”

The Masters took Botlhale 18 months to complete. Being in Britain and alone was a new experience. “To start with, it was a culture shock in that I had never been in a mixed society. It was my first experience of studying with White people. Gosh it was a shock to the system, sitting in a class with Whites next to you. The first day, I think, I got gooseflesh.” Botlhale was the only Black woman doing the course. She experienced two things. “People who were not racist really found it interesting that I was able to cope. Most people who knew about apartheid and Bantu Education were surprised with the contradiction that I was able to cope despite the background from which I came. Then there were the racists who wanted you to fail.”

Botlhale made many friends from different countries, but she missed not being able to speak to other South Africans. She especially missed other South Africans when 16 June 1976 happened¹⁰.

And how did this university experience change Botlhale? “I struggled a little when I did my research. You had an option to get a M Phil, which was without research. But I decided to stick it out. I learnt a lot about research methodology the hard way. I remember saying to myself that no matter how difficult it got I was not going to leave.” As Botlhale approached the end of her Masters degree were there any thoughts of a Ph.D.? “No. I wanted to get back to my children.”

Work again and another masters: attraction to education

When Botlhale returned to South Africa she did not have a job. She got a job at Hofmeyer High because there was a shortage of teachers. But Botlhale did not want a teaching job. “I wanted to do research. I wanted to develop the skills I felt I was lacking. I applied to research laboratories in industry for jobs. Even Ondersterpoort¹¹. That was when I started feeling the impact of apartheid. I don’t know how many applications I sent. The reply was always, ‘Regret, regret, regret’. There were job reservations¹² at that time. Those kinds of research jobs were not available for Blacks. Ultimately I got a job [she returned in 1977 and got a job in 1979], in Coopers Veterinary Station [part of Wellcome] in East London. I knew at the back of my mind that I wanted to end as a university lecturer. Teaching at the university involved research and I didn’t think I had the requisite skills. If I worked in a research station I could learn about research, become a good researcher and later work at a university.”

Botlhale worked in East London for one year. Because of the Influx Control Laws¹³ she could not get a house. “My plan was to stay in East London for five years. I thought after five years I would be confident as a researcher and would have published. To get a house in Mdatsane I was asked to become a Ciskein citizen and change my nationality. I did not want to change from one homeland system to another system. Because I could not get a house I could not bring my children there. I had been hoping to have a home and my family together.”

Botlhale enjoyed the job in East London. “I was senior researcher in the Helminthology laboratory. We were doing efficacy tests for South African Bureau of Standards (SABS)”. Botlhale and her boss, Dr Berger, published the results of the tests they conducted with the drug Oxfendazole¹⁴. Oxfendazole is a drug that kills worms in cattle and they conducted tests to show how effective the drug was. Botlhale says she was learning all the time. She felt that her qualifications and ideas were valued in the

¹⁰ On 16 June 1976, there were student uprisings in Soweto and this was heralded as the start of a new order in South Africa.

¹¹ This is a veterinary station

¹² Jobs were reserved for different race groups

¹³ There were only certain areas that Blacks could buy houses.

¹⁴ Berger, J & Tema, B.O. (1982) Oxfendazole: Anthelmintic activity against calves artificially infested with six species of nematodes and in calves naturally infested with tapeworms. *Journal of the South African Veterinary Association*. No.3, 189-194. And Tema, B O & Berger J (1985) Efficacy of Oxfendazole against *Trichuris vulpis* in naturally infested dogs. *South African Journal of Science*, No. 79.

organisation. If she stayed she knew that she would have been made responsible for one of the sections. That was unusual for 1979/ 1980.

Botlhale was the only Black researcher in the whole establishment. The main company, Wellcome, was in Britain; so the head of the station was British. Most researchers were White males but there were also some women who had done diplomas at technicians in parasitology or animal health. All the secretaries were White women. Botlhale knew that many people, including the secretaries, could not accept her position. "I did not want to spend my time understanding what they thought. They knew I was qualified with a master's degree, but, somehow, they could not accept it. I felt this does not affect me, and it was their problem. It was a separate life. At the end of the day I would go back to the township [Mdatsane]. The one difficulty was that I didn't have my children."

From East London Botlhale applied "for a million and one jobs in industry in the Pretoria area". This time she was not successful; so she had to look elsewhere. "I had ruled out Bophuthatswana as a place for looking for a job, but when I got caught in another independent homeland situation, I thought I may as well go to one that I knew. I got a job as a senior lecturer at UniBo." The University of Bophuthatswana (UniBo) trained science teachers and students qualified with a B Sc. (Education). Botlhale taught biology to first, second, third and fourth year students and supervised teaching practice. Botlhale was becoming attracted to the education side. During this period Botlhale could not do any parasitology research in Mmabatho. She explains: "Mmabatho was dry. Often we would take faecal samples from animals and they would be clean because the place is so dry. Parasites require a humid place to thrive."

The UniBo experience led her to change her career path. "The education people were more dynamic than the science people. They were more intellectual and I got attracted to them. I felt inadequate education-wise." Botlhale decided that she would really like to know more about education because "the people in the education conferences look more interesting than people in parasitology." In her second year at UniBo Botlhale went to a parasitology conference to deliver the paper that she and Dr Berger had worked on. At the meeting venue in Onderstepoort she asked someone where was the meeting was and was shown the kitchen! "I decided to get out of

parasitology. They were the most conservative people.” So she drifted to education which she was enjoying and decided to study for a Bachelor of Education degree.

Botlhale enjoyed the experience with the B Ed. She had interesting lectures from people who were her colleagues in the department - Bob Smith, Peter Buckland, Johann Graaf. At that time, UniBo was an intellectually vibrant campus with many progressive educators teaching there; subsequently they were dismissed from the university. “They had a language I did not know. They talked transformation through education and that education ought not to be the way it is”. Because Botlhale enjoyed education she knew she would proceed further in that direction.

The B Ed was an important part of Botlhale’s trajectory. Botlhale added that, “Another thing that appealed to me at that time was being an intellectual. I had a friend in history and she read a lot. She was a real intellectual. I liked to be an intellectual and I knew I wasn’t.” Botlhale said this in an almost wistful, little girl’s voice. This was the first time that Botlhale spoke about her pursuit of education. I asked why this appealed to her. “It looked to me a representation of the best I that could be. I couldn’t be an athlete; I couldn’t be a musician; I couldn’t be anything else. When I thought of possible things that people could be, I could only be that.” I suggested to Botlhale that she saw this as an entry into academia, but she disagreed saying, “I just wanted it for myself. It was a longing. The Turfloop that I come from was a very pro-intellectual Turfloop. I came from a home where intellect was really admired. I had never put them together before. I just knew that the person I would admire and like to be would be an intellectual. So much so that I got totally focused and I would not even have friends who were not intellects! The B Ed opened up a world which I could explore intellectually.”

After the B Ed, Botlhale decided to do a masters in science education. “My job was becoming my laboratory and I formulated my research questions and proposal from my work situation in UniBo.” However, the main thrust for the inquiry came from observing students failing their courses. “Your teaching becomes frustrating and you know that there is something wrong in the state of the learning and teaching situation. The hypothesis I worked from which led me to alternative conceptions was that, as Africans, we were disempowered in the learning situation, and our background was seen as a disadvantage. It is believed that we bring nothing to the learning situation. I did not think that my background was a disadvantage. That was why studies like alternative

conceptions become attractive. It seemed to say there were many things that the learner brought to the learning situation. I was interested in how the African saw the world.” Botlhale says that the concepts of defining oneself in the world and of Black consciousness had always appealed to her and she could make links between these concepts and the alternative conception framework.

She chose to study at the University of Cape Town “because it meant going to the coast.” During Botlhale’s year at UCT, her children stayed with her parents. When Botlhale got to UCT most of her research ideas were already formulated. From the first masters, she had learnt, the hard way, what it meant to do research. In her research Botlhale replicated Bell’s study which looked at the alternative conception of ‘animal’. She added the dimensions of rural/ urban and collected data from a rural village and an urban setting, Mmabatho in Bophuthatswana. Botlhale found that her supervisor was “good at statistics but not up to date with the area of alternative conceptions. I knew what I wanted to do and did it. I gave him [the supervisor] stuff to read and correct.” When her supervisor suggested John Gilbert [of Reading University, UK] as her external examiner, Botlhale was concerned about how he would respond because she had done it all by herself. John Gilbert liked the work.

Botlhale got funding for her sabbatical year from the Genesis Foundation and her university. The Genesis Foundation Scholarship was given to a senior person doing a master’s degree. The requirement was that the person be a role model for Black students. The Genesis Scholarship caused many stressful moments for Botlhale at UCT. Botlhale said she wanted to be a role model, but not by sitting down. She wanted to teach or be involved in some activity at UCT; but she was not given anything. There were battles with the Dean. At one time her stipend was cut off because they said she hadn’t given a report. Botlhale says they had not asked for the report. Botlhale says this was the time they were introducing Black students to the university “and they made such a mess of it.” When her stipend was cut the Dean hadn’t warned her and, “I just shouted at him and he was shocked. He never thought a Black person would react like that.”

Botlhale’s difficulty at UCT was that it was “a very White establishment and it was very difficult to get them to understand what it meant to be Black.” I asked Botlhale about her experiences as a Black woman at UCT. “During the high days of apartheid, being a woman was less of a problem than being Black. My problem with UCT was that

they did not know anything about us. They just saw us as a problem and saw nothing positive about me. They never engaged with me as an equal. They saw a bundle of disadvantage and that was it”[said with anger].

Botlhale found Cape Town a very difficult place for a Black person. At that time there were very few Africans in Cape Town. For Botlhale it was a culture shock. “You walk about in town and it is like Black people had been blown away by the wind. I would go into a shop with a cheque book and it seemed that no Blacks had bought there before.” At UCT she encountered people writing about the African view of life. “It was like reading about the travels of colonials coming to Africa.”

There were many battles in Cape Town. I asked Botlhale how she coped. “I fought a lot of the time. When I was exhausted I would go home.” Although there were battles, Botlhale was still pursuing her studies and focused on what she was doing. She enjoyed the studies. “Let me compare the two masters: in my first masters I struggled. I was not even sure about the concepts that I was learning. As an adult I focused on my work. What I didn’t like I fought against. I was in full control of my studies. I knew what it meant to do research. I had lots of support when I came back to UniBo. There were many people at UniBo with whom I could come back and talk. I did not depend on UCT. At UCT there were some intellectual engagements with people like Peter Kallaway and Wendy Flanagan.”

The doctorate: No Ph.D., no promotion

When Botlhale returned to UniBo she undertook some research on alternative conceptions. In her research she sought to explicate the views of traditional healers about the human body. She wanted to understand what scientific concepts traditional healers held. She published her findings in a South African epidemiology journal. The journal was not too keen to publish this article; but Botlhale felt that in order to prevent disease you have to understand different peoples’ conception of diseases.

Botlhale completed her Masters in 1986 and thought that that was the end of her studies. She planned to do “research, read, write, teach and get my life back.” Botlhale says that she had not thought of doing a Ph.D. “I thought by the time I had the second Masters I would have the tools to do research. A Ph.D. was too expensive for me. I still

felt that I could not be away from my children for three years. I was forced into the situation by unfortunate circumstances.”

As a university lecturer Botlhale felt that her career was not going anywhere. When Botlhale had initially been appointed to UniBo as a lecturer, circumstances made her acting Head of Department. After a short time they got a new Head of Department – an expatriate professor. Botlhale says she was happy with that decision because she did not feel that she deserved to be in that position. “I did my studies, learnt what it meant to lecture at a university and what it meant to be in a department.” The Head of Department was there for six years and during that period Botlhale was made senior lecturer. Botlhale explains that the reason for the promotion was that her experience in teaching was recognised. UniBo was considered a teaching university and the staff felt that teaching experience should be considered as being important.

When Botlhale returned to UniBo after her masters she found that her Head of Department had left. At that time UniBo employed a number of expatriates and, “they affected my career path. They would come and go.” Botlhale once again acted as Head of Department. “I realised that in the time I would learn how to run a department. The critical factor in running a department was not really one’s publications. The problems of the department were problems of student boycotts and such like. I felt I could run a department. However, when it was advertised, I did not get it because the other applicants had Ph.D.s and more publications. That is the thing about university that makes me sick. They would rather take someone with a million publications about the wings of a butterfly and make him HoD than a person with experience.” The university indicated that a Ph.D. was necessary to promote Ph.D. students. Botlhale felt that even if she could not promote Ph.D.s, she could hire people who had Ph.D.s to do that. “I did not think that I was underqualified as such for heading the department.” This process of selecting the Head made her very unhappy. She felt it was done in “a very clandestine way.” If Botlhale was given the job she would have been the first woman to be Head of Department. Botlhale found that the working conditions at UniBo deteriorated and people who had just got their masters were promoted to associate professorship and she was being sidelined. She confronted the university authorities and took the issue to the ombudsman. “That is how I got promoted. I had to really fight for it. On principle I could not accept it. It was such a difficult thing that after the fight I really did not enjoy

having it.” Botlhale was very unhappy at being told that she could not be promoted to Head of Department because she did not have a doctorate. “Since I had two Masters’ degrees I thought they were good enough. I thought I had the qualities to lead a department and I had acted twice. I decided I did not want to be constantly told that I did not have a PhD. I could get it, given the chance, so I decided to go and do it.”

John Gilbert, Botlhale’s external examiner for her masters at UCT, had given her a very good report. After that Botlhale wrote to him and said that, one day, when she was ready, she would like to study with him in the UK. After Botlhale hit a cul-de-sac with the promotion to Head of Department and after the big fight about associate professorship, she found working at the university tense and difficult. Botlhale felt she was now ready to do the doctorate. She was also due a sabbatical. Botlhale approached John Gilbert again and he started looking around for a scholarship. She was able to get a scholarship with a fund that was assisting refugees at that time. “It was poorly administered and was very difficult. But I got there.”

Botlhale went on sabbatical from her university for the first 18 months. Her children were now grown. Dawn, her daughter, was working and Thabiso, her son, went to Australia for a year on a Rotary exchange scholarship.

When Botlhale went to the UK in 1991 she had some idea of what she was going to study. “I began to see alternative conceptions as becoming stamp collections. I was interested in finding out how to change alternative conceptions and was looking at critical thinking in its broadest sense and what critical thinking in science meant.” This was bigger and broader than the alternative conception field. “If you develop a critical approach to things then you will be able to stop and examine every aspect of anything you are reading, hearing and so on, so that it becomes a way of life.”

In her first year, Botlhale set up her research proposal. “When I applied I sent a rough research proposal. Now I sat there with John Gilbert and developed the proposal. I liked my Ph.D. and I liked the supervision I got. For me he was just ideal; he gave me free rein that I appreciated. I was not a child who had to be told what to do. I wanted to feel the product would be my creation. At the same time he helped me draw the boundaries. He helped me with the research question and made it attainable. I also appreciated that a Ph.D. was not your ultimate work of worth. It is training where you marshal your thoughts in a way that can produce something. I really felt that I had the

space and time and I enjoyed the freedom to explore.” At Reading there were research methodology courses, time and freedom to read, libraries with all the literature available and interaction with other lecturers. “My Ph.D. was fantastic and it was also fun. I was closer to London and often went there. The Europeans are very philosophical and I enjoyed the discussions about philosophy.”

My research question revolved around an understanding of critical thinking in South Africa. “We felt that the criticism against Bantu education was a moral criticism more than an academic criticism. If you asked anybody to marshal an argument against what is wrong with Bantu education they would find it difficult to fill half a page. My study was more like a baseline study around critical thinking skills. My approach (which was a case study) was to find out, for example, (1) how does the matric biology syllabus encourage or discourage critical thinking; (2) how do textbooks encourage or discourage critical thinking (I took a sample of textbooks and analysed them) and (3) how does classroom interaction encourage or discourage critical thinking. I did classroom observation, some interviews with teachers and students and pulled the whole thing together and came up with my thesis. There had been no baseline information and the recommendations I made were in terms of this.”

Botlhale returned to South Africa in her second year. She went back to her job at the university and collected data for her research. When she was ready to go back she was hoping that she would be given leave without pay. “The university authorities said no and I had to resign.” This sounded a very unreasonable position from university authorities towards someone who was half way into a Ph.D. I asked Botlhale what they expected her to do. Botlhale said she thought they were a nasty bunch of people who discouraged people who strove to better themselves. The people discouraging her were senior Black management and administrators in the universities. “These were people who did not have Ph.D.s and kept saying that because you don’t have a PhD we cannot promote you.” Now that she was doing the Ph.D. they were setting up further obstacles.

Botlhale resigned. She rented her house in Mafikeng. Botlhale says she has always managed many things at the same time. “I work and I have a home. I am worried about this leaking roof and checking with bank managers that monies have been deposited.” She found the first year at Reading financially easier because she was still getting her

salary; so even if the scholarship people were late she coped. When she returned to Reading she was totally dependent on the scholarship people and it was tough.

Although there were financial worries Botlhale says she enjoyed the writing process. “I enjoyed the process of bringing data together. I enjoyed forming patterns out of scattered data and learning the methodology to do that. My supervisor was very good. He would take a chapter and read it in a week. I did the basic draft from November to June. Then I went on holiday to Italy. When I returned he had read the whole thing. I then polished it up.”

What was a typical day like when writing up? “I would get up, usually at 9, because it was cold and nasty there. My day started at 10 and I would work flat out. I would write, have breakfast, write, go to lunch, maybe take a walk, write, have supper and write.” During this time Botlhale discussed ideas with people at the university. “You have to have mentors with whom you can bounce your ideas around, especially when you start writing. One of my friends helped me with writing in a way that allowed my perspective to come through in the thesis. The thesis is your product and must reflect your creation.”

I asked Botlhale about her overall impressions of doing the doctorate. “John Gilbert was very good. At Reading they thought ‘that is smart, that is good, great, that is special; unlike at UCT where you are seen as a curiosity.” Botlhale appreciated the fact that “people valued my input and liked the fact that I was articulate.”

And, how did this university experience change her? “Before I did the Ph.D. I did not think it was really necessary, especially when I had two masters’ degrees. I thought that was equivalent. But I think a Ph.D. is a protracted study. You trace an idea over three years. You deal with so many ideas and finally sort out your ideas. I feel now I have a good ability to sort out ideas and put them into a pattern. I appreciated that. I find that this is my strongest contribution to Protec. A Ph.D. exposed me to a variety of methodologies and it strengthened my writing. You develop a style of writing.”

And what was Botlhale’s experience as a Black woman in a post-graduate programme in Britain. “The only thing that I felt very strongly about in England was how Africa is perceived in the West. It is so badly portrayed in the media. Their media is sending a very negative message. This meant that even before people have said anything you have already been judged and the tendency would be either to play yourself down or

become over assertive. You cannot relax and be yourself.” Botlhale found these media images particularly distressing when “you are homesick and all you see are naked people running around with traditional weapons. You want to see happy images.”

Botlhale enjoyed her Ph.D. experience and having gained it thought “it was a job well done. I suppose at the end of the day I could say to these people - yes I have done it and you thought I could not do it.” When I asked Botlhale why she succeeded in gaining a doctorate when many others did not, she burst into laughter and said, “What a question!! I don’t know”. I pushed for an answer. “For me failure was never an option. Given that option and supportive parents I could succeed. I never really worried about my children at any stage. Once I start something I don’t ever give up. I am very impatient, but if I start a project I will plug at it until I get it right”. For her success I suggest that tenacity was one of her special strengths. And what other special strengths does Botlhale have? Botlhale is embarrassed to talk about herself. “I think I am very good with ideas. Have you met academics who do not like talking about intellectual things? You have to like that field, so much so that you can talk about it ad nauseum. If I had continued in parasitology I would have done reasonably well, but it would never have filled me up as much as this field.”

Botlhale started the Ph.D. because she was thwarted for promotions. When she returned to South Africa, Botlhale found that having the Ph.D. did not open doors for her. “When I was in England and finishing I mentioned that I did not have a job when I got back. People were saying how can you worry about a job with your qualifications. They felt I would be snapped up. When I came back and I have never struggled more for a job. Sometimes I would get an interview but I would not be taken. I began to ask why? A friend of mine said maybe I was too stroppy and difficult with other people. Now it was like there was something extremely wrong with me.” Botlhale feels that in this country people are used to affirmative action appointments and there is no room for people who do not need affirmative action. Botlhale returned from the UK in September 1993 and kept looking for jobs. She got a job at Radmaste at Wits mainly because of John Gilbert's influence with people at Wits. “I went there and I became more a token person because they did not give me the real thing. I was not involved in decision making and I was not used to being in these positions.” Botlhale wanted to be involved in NGO work again and applied, unsuccessfully, to all the science NGOs. In one of her

meetings she met with David Kramer of Protec. He offered her a job. “I was bruised. I had been rejected so many times. Here was David saying wouldn’t you like to work at Protec. That was very nice. I felt that it was because David was brave and not threatened by me. If he was threatened he was thinking more about the organisation than himself and his comfort.” Botlhale started at Protec as the Operation’s Director and then moved to be National Director. In the job as National Director, Botlhale managed a staff of about 60 and managed the Research and Development Department.

Reflections: failure was not an option

As we came towards the end of the interview I asked Botlhale to reflect on aspects of her life. It is obvious that Botlhale likes the research and publishing. Her first publication was the paper on Oxfendazole. Botlhale says that seeing your name in print was “the nicest thing that can happen to you - the ultimate ego booster.” Of course it is not very nice to have papers rejected. Botlhale had to argue with one of the referees to have her paper accepted in the epidemiology journal. She also had difficulty publishing a theoretical paper on critical thinking in science which she took from her Ph.D. “I sent it to the Journal of Science, a refereed journal, and they refused to publish it saying that it had no application. Publishing in this country is difficult. I don’t know whether there is an efficient forum for evaluating peoples’ papers. Publishing is still an unclaimed area except for a small minority.” Botlhale laments the frustration of not being able to quote from her own people when she was studying. “There is very little coming out of Africa as a continent. I feel publishing is our challenge and one of the most ego boosting activity is seeing your name on hard cover.” When I asked Botlhale about what she saw as the role of the contemporary Black intellectual she answered again that “we have to produce ideas that will excite people and the government. We need to produce books that children can quote.”

I asked Botlhale to reflect on how she thought her race, as an African, shaped her life in academia. Botlhale does not like the representation of Blacks as semi-retarded and says that if Blacks are semi-retarded then it means that she is semi-retarded. Botlhale is concerned that Blacks are under-represented in the literary world and feels that it is very important for Blacks to start publishing and getting books out.

When she reflects on being a female in academia she says, “I have never been bothered about my gender. As a kid, being a girl was not a liability. I could do whatever I wanted to do with boys. As I grew older I suddenly encountered situations where I found prejudice just because of my sex. But it is not my problem. It is other peoples’ problems. I was able to do whatever I liked within my abilities. I grew up in an environment that allowed me that.” Botlhale is aware that some people in the professional field consider her image threatening. We discussed this. “A man of my equivalent position who behaves the way I do would not be seen as threatening. The image would be in keeping with who they are - as someone who is well educated, who is in a good position jobwise. You are expected to be a serious thinking person. My colleagues who are male are exactly like me in respect of how they conduct themselves. They would not be frivolous in a work situation. Outside the work situation it is different. So why is the image threatening? It is threatening because it is not the expected image. It is not the image a woman has to have. I don’t know what image I should have; maybe a frivolous and humble image? Similarly you can take that analogy and apply it to a Black person. If a Black person speaks intelligently, it disturbs the conception they have of that person. You are constantly confronting peoples’ preconceptions about you and their equilibrium is disturbed and you have to restore it for them, either by saying that that was not you or they learn to live with who you are - a thinking Black person.”

Home life: creating parameters for me

We spoke about family and home life again. Dawn is now an assistant hotel manager and Thabiso is still finding his way. Botlhale spends her spare time gardening, reading and with the family. Friday evenings and Saturday mornings are spent recuperating.

Religion is becoming important to Botlhale again. “I have taken a lot on my own. I know my limits and try to live within those limits. Having an idea of a God gives me comfort. It gives me the support system that it will all turn out OK. I have come to the conclusion that I need to be a spiritual person - not religious in the dogmatic sense – in order to create parameters for myself. I think I have the kind of personality that can go overboard. I sometimes feel that I can do anything and think that I am invincible. I also

feel I can be a little careless with other people. The idea of a God is, maybe, to create a parent to control this.”

Her future plans: “I would love to write a book. I am worried because I am going out of my field of training, but I also say to myself that everywhere I go I am accumulating valuable experience. I realise I am one of the few Black managers and maybe I should write some books on management issues. I also think I would like to take early retirement, but I would like to do some consultancy and part-time lecturing.”

I asked Bothale how she experienced the telling process. “Extremely exhausting. It is interesting because normally you don’t spend time looking over your life from beginning to end and you don’t ask yourself too many questions. You just have a continuous movie going on and you can’t spend too much time at any one point.”

CHAPTER NINE

LIFE STORY OF KHOTSO MOKHELE

My life was not a smooth plan that evolved over time.

Towards the end of our interview, I asked Khotso Mokhele what he thought about having related his academic life story to me. He replied without hesitation: “I loved it. I think one can learn so much from the experiences of other people. I believe that young black people can learn from the experiences of the Khotso Mokhele’s, Nozi Mjoli’s and Ahmed Bawa’s. This is an opportunity for me to contribute to find an answer to the question of what made one successful and to use that information to see how I can influence and create more success. I will avail myself to ventures of this nature because I understand, as the president of the Foundation of Research Development, more than most people, the complexity of the task we are all faced with in trying to get black people into the centre of the scientific arena of this country.”

I interviewed Dr Khotso Mokhele in the latter part of 1986. When I sent a letter requesting him to be part of the project, there was an immediate positive response to set up the meeting times. Soon after that Khotso had a major car accident and was off work. He suggested continuing the interview at his home. After the accident, Khotso was more reflective of his life and was missing his family very much. Being at home he talked in detail about the different aspects of his life. I am sure that if the interview were conducted in his office it would not have been so expansive.

Khotso Mokhele is the President of the Foundation for Research Development¹. He has a doctorate in microbiology and has held positions in microbiology departments at the University of Cape Town and University of Fort Hare. At the moment he is a member of various international and national organisations promoting science. Some of these are: International Scientific Advisory Board that advises the Director-General of UNESCO; Association of Black Scientists, Engineers and Technologists (ABSET) and South African Society of Microbiology.

¹ Now President of the National Research Foundation.

The life history interview lasted about ten hours and the transcription came to about 54 000 words. The way Khotso tells his story reflects that he had previously thought about the different dynamics that shaped his academic trajectory. His explanation for his decisions is often in political terms. My challenge was to use the 54 000-word interview and construct a 12 500-word story that will illuminate his academic path. I had to condense many parts of the interview to construct the story. This has meant less use of Khotso's actual words and more of my interpretation and synthesis.

Beginnings: I grew up believing there was something special about us

Khotso was born on 12 September 1955 in Bloemfontein. Khotso immediately links that date to two very significant events later in his life. In 1969, his grandfather died in the early hours of 12 September. Although Khotso was not his favourite grandchild, he called for him. The other significant event was that on 12 September 1977 Steve Biko was "killed and in my political calendar the meaning and significance of 12 September changed." One is immediately made aware that Khotso defines himself in terms of family and politics.

Khotso's ancestors, who are from Lesotho, later crossed the Caledon River and settled in Tweespruit, in the Trust area called Stasie (Station), just east of ThabaNchu. His grandfather then moved to Dierfontein in Bloemfontein. The family was then relocated to the Botshabelo (means east) township, which is where Khotso was born. Although Khotso's grandfather lived in the middle of the township, he was a cattle person. He kept most of the cattle in the Trust area in Thaba Nchu, but there were always three or four milking cows in the township. Although Khotso had a township upbringing, he remembers the grandchildren taking turns to stay with their grandparents, milking the cows and then selling the milk at Coronation Bricks. At his grandparent's house there were bees and beehives. One of the peculiar features of Khotso's upbringing is that it had both township and rural elements in it.

Khotso's grandfather's name was Mohlouoa (means the 'hated one') Israel Mokhele and his grandmother was Dihedile; but with the birth of her son Kenosi, in keeping with Sotho tradition, she was called Ma Kenosi. Khotso's paternal side of the family had a greater influence on his life because the family lived with them until 1959, after which his

father built their own house. Khotso's grandfather was a devout churchgoer. He would walk to the 7am church service on a Sunday – a practice that continued until he was in his 90's. Khotso did not know his maternal grandfather but knew his grandmother, Paulina Lebona. He was close to her until she died in 1972. He describes her as a very special woman and one with whom he shared a warm friendship. She had a strong influence on his life. She was a stalwart of the Methodist church.

I asked Khotso about his grandparent's influence on his academic life. He said that there was no direct influence, but explains that they had provided him with a warm and protective upbringing. Khotso says that when he was born the family had been hoping for a baby girl. Being a boy people's attitudes towards him changed. One of the consequences was that, contrary to the Sotho tradition of being named after somebody in the family (you get treated by adults the way that they would treat the person you are named after), Khotso was not named after anybody. His grandfather, in disgust at people's general reaction towards him, called him Bashimane meaning Boys. At church his father then gave him his name, David, and the name Kenneth because he was a great fan of Kenneth Kaunda. When Khotso's sister was born in 1958 everybody was happy. A year later, in 1959, his grandmother partly because of the satisfaction that she had a granddaughter that she yearned for, and, partly from guilt at the reception and rejection that Khotso had received, named him Khotso - meaning peace. Initially he carried the two names - Khotso Bashimane. Later Khotso became the dominant name.

Later in the interview Khotso returned to the question of his grandparents' influences on his attitude to education. They were tremendously proud of and protective over him, especially when he was the only one in the extended family who was succeeding in school. The protection was because of that success and the family perceived him as fragile child.

Khotso's father Kenosi (meaning 'I am the only one') quit school when he was in standard 7 and his mother quit in standard 8. Khotso's uncle, the tailor, had more education and had gone to boarding school. His uncle played a role in Khotso's formative political life. After standard 7, Kenosi joined the South African army. He was promoted to the rank of sergeant and during the Second World War he went to Egypt. Being a dispatch rider at

Tubruq² he was exposed to the top brass in the army. When Kenosi returned from the army he became one of the organisers of the Concept Party, the army band which played for troops at the different collection points in the country before they got into the ships for the north.

Khotso uses expressions like: “society person”; “he was one of the bright boys, hip boys in the township”; “my Dad had a worldliness” [he had been to Egypt and Italy; had seen Montgomery in the army; criss-crossed South Africa with the Concept Party]; “he attained the highest rank in the army and that gave him status in the township”. When Khotso talks about his father his words are warm and his tone one of amazement at who his father was and what he did. In the township there were people more educated than Kenosi, yet by virtue of his worldliness he “socialised upwards” and interacted with them. “They were more educated people than he, but he knew and understood the world a lot more than they did. He schooled them on world politics. He had a political mind and followed events around the world until his death. I could sit with my Dad and talk about Krushev and the Cuban Missile Crisis and he would relate the historical event as though he was there. He would tell us about the war and he would spellbind us with those narration’s.” Of all the children at home Khotso was the most interested in the stories.

When Khotso’s father was discharged from the army he became a bootlegger. In the 1940’s and 50’s there was prohibition and black people were denied access to hard liquor³. Khotso laughs when he says that it was not difficult for his father to socialise upwards. “Not only did he have the worldliness that made educated people want to be around him, but he also had the commodity that educated people could afford to buy.” The bootlegging business exposed the Mokhele family to a range of people, including the graduates of Bloemfontein.

Khotso’s mother, Moipone, was a domestic servant for a Jewish family and she worked for them until she dropped dead in their kitchen in 1983. She also ran the shebeen, as a gentle business, until her death. Initially the Mokhele's made quite a lot of money from the shebeen business. In 1958 they built a six-roomed house with the money from

² Tubruq is in Libya close to the Egypt border.

³ Prohibition was lifted in 1959.

bootlegging. “It was a house with long corridors and a bathroom that was never fitted. To show that my father had money (that was what the people who had money did) the roof was not a flat one but ‘V-shaped’⁴.”

Khotso says that his father had had problems with alcohol - he got drunk very quickly. As a student of biochemistry Khotso attributes this characteristic to his father’s low ability to detoxify alcohol. “My Dad was drunk from Friday evening to late Sunday afternoon. He would drink, cause scenes for an hour or so, crash out, sleep for three or four hours and he would be up again. The first thing that he would look for was the alcohol. He would drink, perform and crash out. Seeing my father drunk tore my heart out, particularly because of the exhibitionism. Playing in the street with your friends and seeing your father fall 15 times or so as he walked down the street used to hurt. My mother drank as well and that used to disturb me even more than seeing my Dad drunk.”

Although seeing his mother drink hurt, Khotso says she has “near angelic qualities”. She was a person who was able to take abuse from people and still continue to do good. She was humble and did not believe in vengeance. Khotso sees himself as a direct hybrid of his mother and father. “I picked up hypertension and asthma from my mother. I also picked up my ability to cry from my mother. My mother cried all the time - from joy, from sadness and from sorrow. I don’t have the burden that men do about crying. I cry from elation, pain and sadness. Many of the children at home picked up my mother’s humility. I picked up worldliness from my father.”

Khotso’s father drank heavily over the weekend, but he had his last drink on Sunday afternoon at about 4 o’clock. He would wake up at 7 or 8 o’clock in the evening and would be thinking work. Is the overall ready? Is the bicycle ready? From that time until Friday evenings he would be sober and the “best father in the world.” He would read the newspapers to the children and share stories with them. The family were Anglicans and did not eat meat on Fridays, on his way back from work (Fridays were pay-days) Khotso’s father would stop off and buy fish and vetkoek for the family and something for him to drink.

⁴ Called a ‘standark’ in the township.

The shebeen started off as a form of income for the family and later operated only over the weekends. This was more for social than economic reasons. Over the weekdays the Mokhele children did their homework in the evenings. They would not dream of doing homework on Friday nights, because the kitchen was full of people sitting around and drinking. The noise level would increase. Khotso says that shebeen life introduced him to aspects of microbiology. His mother would instruct the children, especially Khotso, how to make the home-brew. Khotso says that there were no indicators that the shebeen disrupted the life of the children. "In our entire neighbourhood we were the most educated. There are six of us and five matriculated. Two of us went to university; there is a teacher, a nurse and a chief clerk. We benefited tremendously from having all those adults." Getting tips also did not hurt.

There are six children in the family. Khotso's eldest brother Matshediso (means Blessing) Peter, was named after their maternal grandfather. He finished matriculation and is the chief clerk in the records department in a Bloemfontein hospital. The second brother, named after his grandfather's uncle, is Botsane Reginald. He finished Junior Certificate and he is a labourer in Bloemfontein, hopping from job to job. Then comes Khotso. The fourth is a sister. Because she was the first daughter and the first girl, in keeping with the Sotho naming tradition she was called - Ntsowaki (means mixture). She was given the European name of Mimi Prudence because their mother worked for a Jewish family who were great fans of Mimi Coetser. Ntsowaki is a specialised, registered nurse in Bloemfontein, and has won prizes for being the best nurse. Then comes a brother, Seemane Walter, who finished matriculation and trained as a primary school teacher in Bloemfontein. The last born, Dehedila Yvonne Delene, completed a BA (Social Science) degree from the University of Cape Town. She also has a post-graduate diploma in organisational management from the Graduate School of Business at UCT and is now working in Bloemfontein. Khotso and I shared laughs about the nomenclature and the notion of European/ Christian/ Calling names. Khotso says his father thought he was hip because of the European names he gave them. These were names that were supposed to show enlightenment. It was not Petrus or Johannes. Khotso says he is closest to his sisters. He says, regretfully, "This might be a disadvantage to all three of us. My unmarriedness may have something to do with it."

Before the interview Khotso had mentioned his yearning to go to Bloemfontein to see his family. As Khotso sits on the sofa in his tee-shirt and baseball cap, and talks about his family and growing up days, his face softens to that of about a 17 year old. The yearning for the family comes through in his voice and his expressions. I comment on this.

The home language was a street language that evolved in the community. The two dominant languages in the community and the Mokhele household were Setswana and SeSotho. Khotso has a MoTswana father and a MoSotho mother. He went to a Tswana school and spoke Tswana right from the beginning. While growing up Khotso was exposed to much spoken English, “My mother’s customers in the shebeen were all the graduates of Bloemfontein and people from families that were on the upper side of the income strata. My English now does not come near the kind of English that my father spoke. He thought highly of himself [laughter]; there is no question about that. There was a lot of English in the household. My mother being a domestic also spoke beautiful English. In the family home there were no books, so we could not read Dickens or Shakespeare. But there was a newspaper in the home everyday. My Dad would correct you if you spoke incorrect English.”

We discussed the qualities that his parents thought important in life. Earlier Khotso mentioned worldliness and humility as qualities that his parents instilled in the children. Khotso also mentioned the quality of independence that his parents gave them. The family ethos was such that one was never forced to do anything – the children were never forced to go to church after confirmation, the parents supported choices the children made after the matriculation exams (even though they might have had other wishes and desires for their children). Khotso relates a number of incidents involving himself and his siblings when his parents supported their decisions. “They raised us without telling us that we had to be responsible and take responsibility for the things that we wanted to do.” One example of this was when Khotso was about 17 years and in high school. “In boarding school, where we were allowed to smoke, I started flirting with smoking. I thought I was this hip dude. Everyone in the school had a packet of Consulate cigarettes. During vacation I looked at my mother straight in the eye and asked her permission to smoke. She said talk to your father. I went to the bedroom and asked my father permission to smoke. My father said talk to your

mother [laughter]. I again asked my mother. The next day, before she went to work, she placed a R1.00 coin next to my bag. In the meantime, my brother, who is six years older than I was smoking secretly in the toilet and I was walking around the house with a packet of Consulate in my pocket. I think it took me six months to finish the packet of cigarettes. That's the kind of parents they were: if you think you can handle it, do it. I quit smoking on my own."

Did his parents expect him to achieve certain things in life. "I had spoiled them because of my performance in school. They expected great things from me." Khotso says that his good performance, compared to his siblings and cousins, attracted attention to himself and he became the jewel of the extended family. Not only did his parents expect things, but the extended family and the community expected him to succeed later. Khotso was considered a good and well-behaved child. He says that he was lucky in that the area that his parents moved to was the good section of the community. Here there was no dagga smoking and kids went to school regularly. There was no hooliganism that crept into their lives. Khotso says the main reason for his success was that "by and large I got trapped in school by my early success. My primary drive in education was my early success which brought much attention onto me and everyone else [the community] told me how good I was and my parents were always there to support me."

The family was Anglican. Growing up, Khotso says he went to church because it was fun. "I went on Christmas Day and Easter Weekend because it was fun. I had new clothes and was going to show off. Religion was not important to me to the point of me recognising it as important at the time." In the grandparents' households, prayer was a prominent feature. However the Bible was an important document to Khotso. "I related to the Bible as a document in terms of humility that the Bible preaches. I related to suffering. I was the type of child who would cry everytime someone preaches from the story of Job. The story around the birth of Jesus Christ and the love of Jesus Christ still grabs me." Khotso still watches and is fascinated by stories of Jesus Christ. "It grabs me both intellectually and emotionally. I have difficulty with the mythology but relate to it at a human level more than anything else." With the help of his friends Itumelang Mosala (a priest and scholar of the

Bible) and Professor Mofokeng, a professor of theology at UNISA he has delved deeper into the Bible as a document.

Khotso explains many aspects of his life through a political lens. What were the political influences earlier on? “Politically Bloemfontein was a peculiar place. It was a place where the ANC was born as well as a place where the Afrikaner had a stranglehold on black people.” Khotso learnt global politics from his father. “My father could talk to me about Krushchev, Stalin, Fidel Castro, John F Kennedy, Nelson Mandela, Kenneth Kuanda, Nyerere and the Queen of England. My father was not an overt political activist but he had definite and very strong opinions.” Khotso’s uncle, the tailor, had been an active participant in the Defiance Campaign⁵ and was jailed. He got his lessons about national politics from him. Khotso relates an incident in 1961: “We came back from school with flags of the Republic. My uncle, after ripping the flags from his sons and burning them, came to my house, ripped our flags and put them in the fire. Of course as children we cried.” In the 1970’s Khotso learnt about politics and Consciousness in the streets of Bloemfontein. Khotso’s awareness that he was receiving Bantu education came directly from his parents and people from that generation. “They despised our education. They used to remind us all the time that they were products of ‘Royal Reader’ and ‘Longman’.”

I asked Khotso to define what social group his family belonged to in the community – this was a difficult question. “Let me answer the question in terms of how we perceived ourselves.” His grandparents were as uneducated as the other members of the community were. His father socialised upwards. After the prohibition was lifted his father worked in a number of paint selling shops. His mother was a domestic servant “so we are as working class.” But, the English spoken in his household made them slightly less working class than the other households in the vicinity. Khotso relates the story of “Death of a Salesman” where the main character Willie Loman, tells his family that they would only appreciate his importance when he dies. This would be judged by those who come to his funeral. Khotso says that when his parents died, “the township just came, the school principals, social workers came – this was a measure of their value within the community.” Khotso says he

⁵ In 1952 the ANC called for a Defiance Campaign where there was civil disobedience to protest the unjust laws of the country.

cannot understand the recognition his parents enjoyed in the Bloemfontein community. People in any part of the township would recognise the Mokhele children as ‘Sis Penny’s or Brackens child’. Khotso says there was a specialness about the Mokhele family, which was community, rooted. They did nothing spectacular [not class related]. “I honestly grew up believing that there was something special about us.”

Schooling: mastery of subject matter by teachers, knowing how to study and an insertion of politics

Khotso was supposed to go to school in 1962 after he turned six. However in 1961, when he was five years old, he decided he was going to school. When his brother went to school on the first day that school opened, he found a way to get out of the house before his brother and followed him to school. Fortunately, the school principal at the lower primary school was a family friend. They tried to convince him that he could not attend, but he cried; so they decided to make him believe that he was in school. The idea was to repeat sub A in 1962. He attended school for the whole year and created problems by topping the class. Now they could not make him repeat sub A. The principal organised matters and Khotso registered at school for the first time in 1962 for sub B. “That was the beginning of the manifestation of my attitude towards education. I literally forced my way into school. I was never really the child that was told to go to school.”

Khotso attended Merafe Primary School, a school that started off as an Anglican Church School, but was now under control of the State. The school was about 4km from his home and he walked to school. The school was a normal township school with no electricity and large class sizes (in the 70 or 80 range).

The language of instruction was Setswana. Khotso was unable to remember his proficiency in English, but said he took “English as a subject, and did fairly well because of the home milieu.” Afrikaans was also a chosen subject. And how did Khotso do in Afrikaans? “Running across my pre-tertiary education results, my lowest symbols were always in Tswana and Afrikaans!”

I asked Khotso to describe his primary school education. With amazing memory he remembered each of his classes and teachers. He enjoyed sub A and sub B. He thought his

standard 1 teacher was useless. His standard 2 teacher, Miss Mokala, was a family friend. She was a good teacher who was very strict. I asked Khotso why he thought she was a good teacher. “There was something about her that grabbed us. We felt like we were learning something from her.” After standard 2 Khotso moved to Gonyane Higher Primary School. This school was two houses away from his parent’s house. Here his teachers were “average” and “adequate.” His standard 6 teacher, Mr Wesi, impressed him. Khotso felt he was very good because of the examination results he produced. Furthermore “he had an aura of a person who truly knew what he was talking about.” Khotso was impressed by Mr Wesi’s mastery of the subject matter – something that he encountered a few times later in his schooling career. Khotso got a first class pass in standard 6. He had caught up with his elder brother, Botsane, who had repeated standard six.

Primary school education had no general science or mathematics. There was Tswana, English, Afrikaans, General Studies (history, geography and a little biology), arithmetic, social studies, gardening and woodwork. The language of instruction up to standard six was Tswana. Parents bought schoolbooks and uniforms and there were school fees and levies to be paid. At that time, Khotso says, he was not aware that some children did not have to pay for their schooling. I wonder how Khotso’s parents managed, financially, to keep all six children in school. “The more I earn the less I know how they managed. I don’t think my father earned more than R15 a week and my mother more than R60 or R70 a month.”

Khotso did well in school, “except in standard 3 when this girl beat me”. It was the year that he had started caddying at the golf course. This may have had something to do with his performance. It is obvious from the things that Khotso says and the way his face lights up when he talks about school that he loved school. I ask why. He says it is something he wanted to do because others were doing it. He never perceived himself as being brilliant although he knew that he had an easy time. Khotso says he was competitive. Something that might have been an advantage was that he knew how to study – a skill that made studying all the way to university very painless.

Khotso then went to Bantu Junior High School⁶. It was the only junior high school for Tswana speakers in the township. It was a government school in the old section of the

⁶ The name has since changed.

township – in fact Khotso’s mother had attended this school. The community took pride in the school. This school was about 5km from Khotso’s home.

Bantu Junior High School had a very good principal, Mr D.D. Rametsi, who had just returned after a stint as school inspector in Kimberley. “He was a fabulous orator with a Royal Reader English that used to grab us. To speak English is not just how you construct the sentences. It is also how you articulate them. I remember at one morning assembly he called us ‘sentimental non-entities’. [laughter]. All of us went running to our Student Companion to see what non-entity was. The principal was inspirational and had a fiery spirit in him. Unfortunately he did not have the teachers to support him.”

In Form I Khotso took arithmetic, social studies, general science, English, Afrikaans, Tswana and Woodwork. There are roars of laughter as Khotso relates his experiences in woodwork and gardening. “I cannot remember successfully making anything with my hands either in primary or junior high school. I was absolutely useless at woodwork. I am one of those who after working in the garden for two hours, find that my hands start to blister and bleed.” In standard six, when the woodwork inspectors came to examine the practical work, Khotso took his Dad’s toolbox and bought birds that were made from horns. This was certainly not in keeping with the policy of the Bantu Education system, which wanted to train Africans in woodwork skills, which would keep them in their place in society!

In junior high Khotso was introduced to general science. He loved biology. “I was truly fascinated by geotropism and phototropism.” Khotso enjoyed junior high school. He was further spurred to perform well as a result of a challenge. His eldest brother, Peter, and he had a running battle about who was smarter. When Peter was in matriculation he told Khotso that when he went to junior high he would not be at the top of the class. Khotso worked hard to prove Peter wrong. Khotso did well in junior high. The medium of instruction in junior high was English. The poor quality of teachers meant that the teachers and students struggled with the language. The students also struggled with the subject matter because many teachers had simply been promoted from primary school. There was also lots of drinking by teachers during school hours. “The quality of education and commitment from the teachers was so bad that it was a case of the blind leading the blind and the one eyed person becoming king.”

The students in Bloemfontein studied mathematics for the first time in Form II. There was a high failure rate in both the junior certificate and matriculation examination. Students and parents were not keen to take mathematics. Parents were more interested in their children passing J.C. than the subjects they took. In Form II, because of Khotso's performance in Form I arithmetic, he was placed in the mathematics class. There was no choice of subjects. Depending on how well they performed in arithmetic, students went into either a mathematics, biblical studies or woodwork class. I asked Khotso if he saw any importance in doing mathematics. For Khotso, being in Form II A or B carried a certain status because of the subjects being studied and one wanted to be there.

At Bantu High specialist teachers taught them. An old lady, Mrs Mokwena, taught mathematics in Form II. Mrs Mokwena was very motivated, worked hard and used to get hurt when the students did not respond to her. In Form II, Khotso was introduced to a "fabulous biology teacher. He had a B Sc. in Botany and Zoology from the University of the North. Being taught by a graduate made it very special." Mr Matlhabe mastered the biology subject matter and delivered it in ways that made an impression on Khotso. "He sealed my career fate." Mr Matlhabe also introduced study skills and talked about the broader aspects of education. He seldom punished the students. As Khotso talks about the various aspects that Mr Matlhabe taught them, he stops and says: "He was my first role model. I had never thought about it, but as I talk now I realise that he was my first role model."

The social studies teacher was very good but had to teach social studies in Afrikaans, which was not his first language. It was a school regulation that social studies be taught through the medium of Afrikaans. The other subjects were taught in English. In Form III, the mathematics teacher Mrs Mosini, had a good mastery of the subject matter and delivered it well. But she had an arrogant disposition towards the students and physically abused them when they did not understand concepts. This made her classes unpleasant. Khotso enjoyed most aspects of school. In Form II and III he did mathematics, biology, social studies (history and geography), three languages (English, Afrikaans, Tswana) and arithmetic. Physical science was not offered.

While at high Khotso was already thinking about going to university. He was encouraged by being told that he was clever. He had to fight off the expectation that he

should go to medical school. Were these shades of arrogance of wanting to be different? He was beginning to love biology and wanted to study it further. Khotso also felt he wanted to please his parents (“I never wanted to see my mother hurt”) by going to university. His brother, Peter, who had completed matriculation with a school leaving certificate had to start working immediately because he had a child and wife to support.

In the 1970’s the South African Students Organisation (SASO) had an influence on Khotso. “During the holidays, these university students used to walk around the townships barefooted, with their hair uncombed, wearing SASO tee-shirts (black tee shirts with the white fist) and carrying the Rand Daily Mail under their arms - just defying the system. Speaking this arrogant SASO English and with the arrogant disposition that SASO engendered in all its members. There was this aura about them.” The university students also gave them lessons in Black Consciousness and in revolutionary politics. They made university look very glamorous. Khotso was not really thinking career - he wanted to go to university.

Khotso decided to go to Moroka High School to complete his senior secondary schooling. I asked Khotso why he had decided to move from Bantu High School. He does not remember systematically making the decision. Rather, when he got his J.C. results with a first class pass (5 C’s and 2D’s with D’s in mathematics and Afrikaans) he made up his mind. Khotso says that without thinking he looked at his mother (it being a Sunday morning his father was not sober or awake yet) and announced that he was not going back to Bantu High, because he did not think he would pass matriculation. “I had a first class pass in J.C. For a kid who was number 1 in class, a pass in matriculation was not assured because of the quality of teaching we got there.” Khotso says this became the pattern throughout his life – “serendipity and things happening without planning.” When Khotso thinks about that decision now, he feels that his neighbour’s son, and his friends who had gone to Moroka, may have influenced him. He had always noticed that there seemed to be something better about them. They were part of “this superiority club and looked down upon us.” Khotso was aware that he had a good intellect and was better, academically, than many of them. Khotso had no idea from where his parents would get the money.

Moroka High was an old Methodist school, which had been taken over by the Bantu Education Department. The boarding department was still controlled by the Methodist Church. The dominant language in Moroka was Tswana and there were a few Sotho students. The school attracted students from Johannesburg and the Bantustans. ThabaNchu, is in the Free State, but fell under Boputhatswana. Khotso says he experienced “truly brilliant teaching” and interacted with many brilliant students in Moroka. Most of the teachers in Moroka were white and Afrikaner.

His love for mathematics began at Moroka. Meneer Visser taught mathematics in Afrikaans. The mathematics teacher was “impressive” and “brilliant.” Unfortunately he left at the end of Form IV. Because Khotso’s proficiency in Afrikaans was very bad, his strategy was that as the teacher talked he would learn the terms in English and not Afrikaans. Because of Visser's brilliant teaching the language did not interfere with his understanding equations of X’s and Y’s. The textbook was in Afrikaans. He knew that the matriculation examination was set in two languages. He could answer in English. “Meneer Visser would give us a problem, and during the afternoon studies period we would struggle with it in groups. The following day he would solve it in six or seven different ways. That was impressive. It blew my mind. I wanted to be like him.”

Khotso was exposed to physical science for the first time in Form IV. Mr Bosch, who was “mediocre” taught it in English. His classmates had started physical science a year earlier. “Physics scared me.” Khotso struggled with the concepts of vectors, scalars and motion. We laughed as he recounted his experiences with the trolley experiments where you drop a weight on the trolley and it is supposed to decelerate. All attempts to drop a weight from a height onto the trolley caused it to collapse. Khotso enjoyed the experiments on momentum transfer because they worked and one could understand the concepts. He understood the power of demonstration and that was something he did later as a teacher at Goronyane High School.

Khotso was sold on biology at Bantu High. At Moroka he was taught through the medium of English by Mr du Plessis who memorised the textbook. “He would walk into the class with no chalk, no book, nothing and he would say that yesterday we ended on page 32, second paragraph from the bottom. That was exactly where he had ended.” Khotso

found that mastery impressive. But as the classes became interactive and students asked questions, his weakness emerged. There was a “fabulous English teacher, Mrs Wessels, who brought it home’. The Afrikaans teacher was adequate. The disappointment was the Tswana teacher “who was a hopeless drunkard and unfortunately our only black teacher.”

Initially Moroka was frustrating because Khotso had not done physical science before and mathematics was taught in Afrikaans. At the beginning of the year he was ranked about 15th or 16th in class, but by the end of the year was ranked fourth. “In the face of real competition, because I had no competition before, I thought I had done reasonably well.”

At the end of the year, Meneer Visser and Bosch left. The new physical science teacher, Nel, was a B Sc. (agriculture) graduate from the University of Free State. Khotso imitated the teacher who on his first day of class started by saying ‘I am going to teach you about three dimensional.’ Nel then demonstrated by saying if one sat with one’s buttocks and feet on the floor and someone took a picture from the other side [the side of the feet], one’s feet would be bigger than the upper body. That was three dimensional. The class looked at him and thought, ‘This one is useless.’ One of the older students, David, then said ‘Meneer Nel, I think you are talking nonsense. Three-dimensional is length times breadth times width. It has nothing to do with the camera!’ Nel was destroyed by that lecture. The class made it clear they were not going to believe anything he had to say. If he did not know what three-dimensional was, and he had a B Sc.!!! Students then began to despise degrees from Afrikaans universities. The previous year they had an unpleasant experience with students from Free State University. They had visited Moroka for a day there and when they got into the buses, they grabbed their ears and started singing : “Bobbejaan Ting, Tong hongerige ding; Bobbejaan ting, tong, wonderige ding.”

Visser had left. Khotso recounts his and the other students first meeting with the new mathematics teacher. Moroka was an Afrikaans school in terms of control and domination. “On day 1 of the new school term the new teachers are introduced to us. Sitting on the stage in the hall was this new black guy with a thick growth of hair and a thick beard. When the Principal introduced the new teachers, they stood up and come to the front. When the Principal introduced Pitso Senatla, he walked to the front and gave a Black Power salute!

Wow! A Black Power salute in this school when this Afrikaner Principal was introducing him! We went wild. Why the roof did not collapse, I do not know.”

Pitso Senatla was to teach the Form V's mathematics. “We fell in love with him”. In 1972 SASO was strong and although Moroka did not have a SASO branch, the students regarded ourselves as members of SASO. Pitso Senatla used the methods espoused by SASO. He had to teach mathematics in Afrikaans and “his Afrikaans was horrible.” I was curious about Afrikaans being used as a medium of instruction for mathematics. Khotso says that that was Moroka's regulation. Senatla decided that he could not and did not want to teach mathematics in Afrikaans. When he started teaching in English the students loved it. “That is defiance.” Although Khotso enjoyed Senatla's lessons he knew he was “not a Visser from the point of view of the mastery of the subject material.” However he brought something else to the learning situation. “He brought defiance of the white system. That was a major addition. We drew on him, politically as well. He became our big brother and we made excuses for him as a mathematics teacher.” The students made up for Senatla's lack of mastery in mathematics teaching, by going to the textbooks and teaching one another. Khotso says he was good with algebra and geometry but with analytical geometry “there was a switch that did not fire.”

Khotso says that one of the important lessons he learnt at Moroka was that if he had difficulty with the concepts, he had to go to his classmates for help. One did not give up. The second important lesson was the notion of healthy body and healthy mind. One afternoon everyweek the boys had to go for a cross-country run. The school offered soccer, tennis, netball and athletics. “You help the mind by maintaining a healthy body.”

White Afrikaners who most probably espoused a Nationalist political ideology staffed Moroka. The students were exposed to and imbibed SASO principles of Black Consciousness. How were they to reconcile these two aspects? Khotso says they ignored where these teachers came from. Some teachers were caring. Other teachers did not want to teach concepts like Pan Africanism that was in the syllabus, because they were worried that it would make terrorists out of students. The students absorbed the self-empowerment messages of Black Consciousness. “We understood essentially that our fate began and ended with us.” The students organised, often clandestine, evening meetings where they

were given talks about politics, Black Consciousness and professional guidance talks. With this kind of philosophy the students were unaffected by the useless Tswana or biology or chemistry teachers. They taught themselves. They formed small study groups and taught one another.

Facilities at Moroka were good. There were laboratories for physical science and biology and specialist classrooms for mathematics and the other subjects. Class size was about 30 students with about four or five girls in each class. The best mathematics student was a girl. At the end of his matriculation year Khotso obtained an exemption pass with 3Cs and 3Ds. Khotso was enthusiastic about the description of his school and his love for school and learning. He admired the calibre of teachers. I wanted to know how his results fared relative to the whole group. Khotso then mentioned another aspect of the matriculation year. "In form V, I lost interest in school. I got drawn into politics and extra-mural activities. I was doing crazy things." Just before the June exams, Khotso decided that he did not want to write the exams, and concocted the story that he had a nervous problem. He went home and told his parents that he had seen the school doctor who had advised him not to study because it would exacerbate his nerves. But to show his fellow classmates, who were writing the exams, how much of a 'big deal' he was, he visited the school. And ran into the principal.

Khotso describes 1973 as a "rebellious period." He was angered and annoyed at school because he was not chosen as a prefect. To make matters worse, Khotso was accommodated in a room with the chief prefect. In his rebellious mood he did not wear his "full school uniform" and the "boarding master watched me and one day beat the hell out of me." He decided that he did not want to go to university and did not apply. During the year his performance dropped considerably and he did not write his September exam. Somehow through this rebellious period he managed to obtain an exemption pass in matriculation and was in the 20th to 30th percentile of the group. Khotso describes his time at Moroka as "a phenomenal learning experience - even the rebellious streak. I was a teenager and it would come sooner or later. But I came out of it." And he did.

With his parents' low income, how did the Mokhele family manage with fees? Khotso says he does not have a clue. They paid the fees on time. "How my mother (she and

not my father would worry about it) did it, I just do not know. She probably borrowed money from the Jewish family for whom she worked.” Peter, his brother, was working, but he had to care for his own his family.

Undergraduate years: the township kid registers for agriculture

When Khotso’s interest in school dropped and his performance deteriorated he was unable to face his mother (he was not so worried about my father) to tell her that he was not going to study any further. During his Form V year one of the people whom they had brought for evening vocational guidance was a medical technologist. “I decided that I would be a medical technologist and study at Madikote Technical College in Pietersburg.” Part of the attraction was that students were paid as they studied. “I thought I would use this to placate my mother who wanted me to go to university. When I explained it to her she understood.”

Khotso applied to Madikote Technical College. In February he got a letter from Madikote indicating that his application was unsuccessful. No reasons were given. This precipitated a major crisis. He did not know what to do and knew the only options were to work in the post-office or become a clerk. One day in casual conversation his brother, Peter, mentioned the problem to a colleague at the hospital. His colleague suggested that he telephone Oupa Moetsi, a chemistry lecturer at Fort Hare. The following day Khotso joined Peter in his office to make the telephone call. Oupa Moetsi noted the matriculation symbols and promised to call back at 3 pm. “Now the Khotso who loved school had come back and was depressed as hell. He was now waiting for 3 o’clock.”

To have gained admission to university Khotso needed to have applied in August. As a Tswana speaker Khotso would have had to apply to the University of the North. When Oupa Moetsi phoned back at 3 o’clock he said that if Khotso wanted to study agriculture he would be admitted at University of Fort Hare. At that time Fort Hare, which was the only black university with a faculty of agriculture, was canvassing for students and there was no ethnic discrimination in the faculty. During this time Khotso never thought of Wits, UCT or University of Free State on his doorstep in Bloemfontein.

Khotso was excited and just wanted to go to school. “It just did not matter what I was going to study. I figured that once I was in I would start doing the things that I wanted to do.” A few days later Khotso got on the train and left for Fort Hare. It was not planned at all. The township kid was going to study agriculture. At Fort Hare, Khotso enrolled for chemistry, botany, zoology and mathematics. These were the same courses chosen by people doing B Sc. in the faculty of science. “And the fun began. All the study habits I had learned over time came in very handy. My earlier discipline of continuous study made my academic life at university easy. The Moroka habit of group study I took to Fort Hare.” Khotso thinks he was the only student from Moroka who took these study habits to university. “There was a part of me that was just so political. I did not only understand it from the point of view that it should help me pass. I understood it from the point of view that this is what black people have to do. I understood Black Consciousness that way - our fate is in our hands and we have to do some of these things inspite of the forces against us.” From Khotso’s study group three of them obtained PhDs, one went onto a Masters and one completed a medical degree. Working in groups facilitated learning. “All of a sudden I started getting B’s and A’s. I had never got B’s and A’s in high school.” Khotso worked consistently. At the end of each day he would work with the relevant textbooks and rewrite the notes. During the exams he studied from the notes. “I had unlocked the secret of studying at university and it worked. At the end of the first year I passed all four subjects getting 3Bs and I C.”

Although Khotso had registered for a B Sc. (agriculture) in the first year, agriculture was not the career he had in mind. At the end of the year he thought he would apply to the University of the North or try to get into the science faculty at Fort Hare to do a B Sc. With the botany and zoology he hoped to be a schoolteacher. “Except my serendipitous path continues.” At the end of the first year Fort Hare introduced a new curriculum. It was a four- year B Sc. (agriculture) degree with majors in chemistry, biochemistry and microbiology.

With the old curriculum, Khotso would have taken majors like animal science and soil science. Here was a faculty of agriculture, full of kids from the townships with no relationship to agriculture. [We laugh]. There were a few students from the Bantustans who

were sent there by their homeland governments. With this new curriculum, “my prayers had been answered because I now became exposed to biochemistry and microbiology and got excited by it.” With the new curriculum there was also an industrial possibility, especially in the food industry.

Khotso continued with the degree in agriculture and in the second year registered for physics1, chemistry 2, biochemistry 1 and microbiology 1 (microbiology and biochemistry were second year courses). Khotso talks warmly about his introduction to microbiology. John Mildenhall took the students through the practicals. Khotso recounts the experiences looking down the microscope at hay infusion. “You take hay, add water, draw a droplet, put it on a slide and put a cover slip on it. You then look down at this thing, trying to see all these goggatjies moving all over this place. John Mildenhall comes by and says, ‘Oh my goodness, how beautiful this is! I can see a nematode going there, I can see a bacterium going there, I can see a yeast going there.’ I look at him and think something is wrong with him. It is that man and his enthusiasm for his subject that made me a microbiologist. John Mildenhall made me a microbiologist.”

His experience with physics was not the same. The first physics1 test was scheduled to be written on the day that the students were leaving for intervarsity matches in Zululand. Khotso thought this was “cruel.” He was involved in soccer and softball and so “don’t bother me with studying for physics.” He wrote the physics test while the buses waited for the physics students. “I looked at the question paper. I felt I had never been taught these things in class.” He put down one formula and somehow got 1%. “I didn’t care. After 30 minutes I left. I had made up my mind that I was going to drop physics.” At that time, intervarsity matches were the most important on his mind. On the journey back things looked differently. He discussed and thought about his decision concerning physics. When he returned to Fort Hare he decided not to drop physics but was determined to pass it at the end of the year. He ended up with 73% at the end of the year.

Khotso was completely self-motivated in biochemistry and microbiology. He was doing very well in chemistry and was enjoying university life. In the second half of 1975, Rob Bassett, an Englishman who was the Head of Department of Biochemistry, spoke to Khotso and two other students. He said he observed them during the year and they were the

three best students in his class; they did practicals very well and they understood biochemistry concepts. He wanted them to start thinking of doing a Masters in biochemistry. For Khotso, Rob Bassett's encouragement "really crystallised graduate school in my mind." Khotso told his parents about Bassett's comment. "To be told at second year that you are Masters degree material is exciting." His father thought he should start working after his degree, but his mother's response was 'if that is what you want to do, you have my backing and support'.

Rob Bassett crystallised graduate school for Khotso. There were also other influences. On campus there are young people doing Master's degrees and one wants to be like them. The other imperative was political. Khotso says there was meanness from the staff – both black and white. White staff would schedule tests on the day they left for intervarsity matches and immediately after they returned. Lecturers, when they walked into the first lecture would say, 'Half of you are going to fail'. Khotso says that while he could understand the meanness from the white lecturers he found the meanness from the black staff difficult to understand. Khotso quotes incidents of black staff wanting student's girlfriends and then failing the student if they were rebuffed. Khotso recounts an incident in chemistry. The lecturer photocopied chapters from a book and then told the bookstore not to order the book for the students. He did not prepare lectures and would then come to class and read from the book. "We, like fools, would scramble around to take down notes." At the end of each chapter there were problems and at the back of the book there were numerical answers, not solutions. He would draw his test questions from the questions at the end of every chapter. Once when he gave the class problems, one of Khotso's friends who was struggling with a problem, walked into the lecturer's office and asked for assistance. The lecturer had no clue how to solve it. He then lent the student one of his copies of the text. The students found that all the chapters were the same as the dictated notes. The questions at the end of each chapter were the questions set as tests and for exams and these were marked. The students figured out which ones were the test items and which were the exam items. During this time SASO was banned at Fort Hare, but there was still a strong leadership around and Khotso came to understand Black Consciousness. "Even though Black Consciousness emphasised the goodness in Black people and that Black

people must draw from that goodness it does not mean that you become automatically good because you are a Black person.” As Khotso grappled with those ideas he began to see himself as a lecturer who could be different from the others. “That was political. I arrived at that not as a career pathway but as a reaction to what I was observing.”

At the end of 1975, Khotso gained good passes in all the subjects. In 1976 Khotso returned to Fort Hare as a third year student doing three majors - chemistry, microbiology and biochemistry. He had finished most of his ancillary courses and was having fun at university. The courses in the agriculture faculty were semesterised and final exams were written in May. In June, the Agriculture Student Association (of which Khotso was the president) took a tour of Natal. They went to the sugar cane and mushroom farms. Then 16 June 1976. “I aborted the tour.” They came back to Fort Hare. The following day, since it was vacation time, students came back to their respective homes.

The student body had not dealt collectively with June 16th. They wanted to do that when they came back. The second half of 1976 was a very difficult time at Fort Hare. The university was closed and students were asked to leave campus. Later they were brought back and lectures resumed. The university was closed again and the students later brought back. The university was closed in August for the second time and the students stayed at home until the end of October. When the students returned, the university administration demanded that the students pay a R50 indemnity deposit by the next day or they were not to remain on campus. This was because the university administration felt that students had a tendency of damaging the university and this indemnity deposit was to cover the damage. The students protested and called a mass meeting. The Rector, Prof. de Witt, was present. Khotso asked a question. “I think I was quite polite and asked him to reconsider the deadline for paying the R50 indemnity deposit on two grounds. One was that it was late in the month and I knew many students did not have the train fare to get to Fort Hare and did not have the R50. My concern was the people who were not on campus. I asked him to postpone the deadline and use a radio to announce the deadline.” De Witt’s response was that he had it on good authority that only troublemakers had not returned. Khotso returned to the microphone and indicated that de Witt was wrong. de Witt, very politely, reminded Khotso who the principal of the university was. When other students raised questions they

were given the same kind of response. “Eventually I got fed up. I went back to the microphone and quite politely and quite gently suggested to him that his evening would be better spent with his family at home because he was starting to waste our time.” The other students agreed. Much to Khotso’s shock and horror de Witt said, ‘Thank you Mr Mokhele’ and left. “I did not think he knew me.”

Because of the number of strikes, the students lost about two months of term time. The term was extended to December and the students returned to write their exams in January 1977. Khotso was on semester courses except for chemistry. He found it very difficult to study in the townships in December 1976. There was a Black Christmas campaign in the townships. Early in January he returned to Fort Hare for the exams. “The timetable was bent on destroying us. Those writing History³ and Psychology³ had the following timetable. This is for real – Psychology 3 paper 1: 8-11; Psychology 3 paper 2: 1-4; Psychology 3 paper 3: 7-10. On one day. The following morning History 3 paper 1: 8-11; History 3 paper 2: 1-4; History 3 paper 3: 7-10. There were nervous breakdowns in those exam rooms. Students made strategic choices about which subjects to give up on just to be able to cope with the timetable. It was a punitive timetable. The failure rate was extremely high.” Khotso managed with his papers. He found the microbiology and biochemistry papers satisfactory as they were semesterised. Chemistry was a bit tough but he was helped by a good year mark and the textbook loaned to his friend by the lecturer. The problems that were to be set in the examinations were marked.

The students were instructed that as soon they finished the exams they had to leave campus. The university would reopen in the middle of February. At Fort Hare students had to reapply for admission to university every year. The fact that one passed did not mean automatic readmission. When Khotso arrived back home there was a registered letter for him. The letter from Fort Hare said, ‘We regret to inform you that your letter of re-application was not successful’. “I was going to my fourth year. I did not come close to failing any subject except for Physics 1 in the Physics test. I had A’s and B’s and C’s and no D. I was the first person in the entire Mokhele and Lebona extended family to go to university. I had seen my mother getting up with her asthma, breathing heavily and going to work just to make life better for me. I knew how much pride my family, extended family

and community had about me going to university. Now I was faced with the prospect of being expelled from university.” There is pain in Khotso’s voice as he recounts these experiences.

It was a devastating time. “My Dad did not say much but I could see the pain in him. It nearly destroyed my mother. The family was miserable. My life was miserable. Word quickly spread through the township that I had been expelled and everywhere I went people asked me about it.” Khotso’s parents learnt that a number of Fort Hare students who had been expelled had gone back to the university and were readmitted by de Witt in front of their parents. They suggested Khotso try that strategy. Their neighbour’s son had also been expelled and Khotso, his father and eldest brother, Peter, joined the Mulemala’s on their trip to Fort Hare. When they arrived at Fort Hare they had to make an appointment with the Rector’s secretary, Mrs Bellingham. The student’s file was then brought in. As the students waited in the foyer, they saw all the files, which were about the same size except for one. “The procedure was that Mrs Bellingham would go in for a minute with the Rector and then you go in with your parent. Ten minutes later you come out. Admitted. Smile. Mulemala went in first with his father. Mr Mulemala had solicited the support of Mrs Jabavu, the wife of the late Prof. D D T Jabavu who was one of the founding fathers of Fort Hare when it was established in 1916. They came out smiling. When Mrs Bellingham went in with the big file, I realised that it was my file. When the door opened my father and I got up to enter. Instead of Mrs Bellingham coming out, de Witt came out and said, ‘I don’t want this boy in my office.’ The outer office was full of parents. My Dad walked towards him and said, ‘Let’s talk about it.’ de Witt said ‘not this one. Your son must tell you what he has done on this campus’. Mrs Jabavu tried to talk to the Rector, but he did not relent. “You can imagine the trip back to Bloemfontein. I had to explain to my father what I had done because my father had seen all the other parents had had their children readmitted and the Rector did not even want to see him. I gave him some explanation, but really did not want to talk much.” Soon after that the students from the township started going back to university and Khotso was left in the township. The devastation of that event is still apparent.

The Mokhele household was very hurt and disappointed with Khotso. “At no point did I feel apologetic or feel sorry for the things I had done.” Khotso was extremely angry,

but his Black Consciousness politics helped him understand why it was happening. He was still angry that he was a victim. "Much as I understood why white people would do these things, I understood what we needed to do, as black people, to prevent them from succeeding." He considered other universities like Medunsa: but if you were expelled from one university you are expelled from all of them. He contemplated his future. "I am a fairly deliberative person but this was such a major and drastic development in my life."

Again his academic pathway was affected by outside events. There was a day school, Goronyane Secondary School, in Thaba Nchu. The school principal got to know that Khotso was languishing in Bloemfontein and they needed a mathematics and physical science teacher for Form 2 and Form 3. One day, sometime in February, he drove to Bloemfontein (there were no telephones at the school) and found Khotso sitting on a rubbish bin outside his gate. The principal discussed the situation at his school and asked Khotso to teach mathematics and science. Khotso was not interested in teaching. The principal returned the following week and found him sitting on the same rubbish bin. Again the answer was negative. He came to visit Khotso one day a week for two months. He later commented that one of the most frustrating things for him was to see Khotso wasting away like that.

"After being in the townships for a while, the anger got intense. I took an active and conscious decision to transfer the anger into an activity that would help black people." One day, in April, when the principal arrived Khotso told him that he would teach. That was in 1977. The school was in Thaba Nchu in the homeland Boputhatswana. They were to get their independence in December 1977. Some friends questioned Khotso's decision of working in a homeland. He had tried unsuccessfully for a teaching job at the school around the corner from his parents' house.

On 1 May Khotso went to teach in Thaba Nchu. His mother bought him a jacket and tie. At Thaba Nchu he earned R92, pre tax, a month. The Principal paid for his boarding and lodging. When Khotso walked into the Form 3 class for the first time, he was just not prepared for it. For the first lesson he followed the suggestion of the previous teacher that he grade the exercise she had given the class. He could thus gauge how well they understood the subject matter. When he went to class he asked for a solution to the first

problem. “They just sat there and looked at me. This went on. I don’t know if they are rebelling against me.” By the time he got to the fourth problem, one brave man raised his hand and said, ‘We have really not been taught mathematics and physical science since Form 2.’ Form 3 was a national exam covering material taught over two years - Form 2 and 3. Khotso walked out of the classroom into the Principal’s office and said that that was an impossible situation. The principal was writing in his book, “Without looking up or pausing his pen for a second he said ‘Yesterday those students were my problem. Today they are yours. You can walk away if you want to’. This was the same man who had been pleaded with me for two months.” Khotso thought about this and remembered his decision to refocus his anger and returned to the classroom.

He was now motivated to teach. The principal’s advice on day one was to think back to the teachers who had impressed him the most when he was of the students’ age and be as impressive as those teachers. I interrupt Khotso with another question, but he insisted that he wanted to complete describing his experience at Thaba Nchu. “I need to do that because the experience in Thaba Nchu was a very formative period in my life. To me it is still the best year of my life.” Khotso built up a composite of the different teachers –Visser in terms of clarity and mastery of subject matter and Pitso Senatla for the introduction of black politics into teaching. He thought of himself as a teacher and went to work. “At the end of the year, after having had only three and half teaching months in a school that has never done it before, and I don’t think has done it again, there was a 100% pass in mathematics and physical science.” Khotso said in addition to teaching them science and mathematics he taught them how to study.

There were political events at that time which had an impact on Khotso’s life. In 1977 Steve Biko died. Khotso was still in Thaba Nchu. While he had not formally joined SASO and the Black People’s Convention, Khotso was involved in these projects. Mangope, the Bophuthatswana homeland leader, got to know about that and when he visited Thaba Nchu in October to open a dam he reported to the community that he was aware that there were teachers who were inciting students against Boputhatswana’s independence which was to take place on 6 December that year. He was specifically aware

of two young teachers at Goronyane Secondary School. He wanted those teachers to be told that on 6 December they would be persona non grata in Boputhatswana.

As the year progressed Khotso had to figure out what to do next. He applied to Fort Hare again and it took long for a response to come. In January there was another registered letter which said, 'I regret to inform you.' Khotso knew that he could not go to another university because he had been expelled from one university. In addition to this none of the other black universities offered the same curriculum as the one he was following at Fort Hare. Maybe, he could convert to a B Sc. and take another two years at UNISA. De Witt was still the Principal at Fort Hare. Khotso's mother pleaded with him to go back to Fort Hare and plead for a place; but he felt that he could not do that. One day he relented to her pleas. "This time my Dad said he was not going anywhere - he had been humiliated the previous year."

Khotso made the journey to Fort Hare with a group of Bloemfontein students who were also expelled. The same routine: Principal's office, make an appointment, Mrs Bellingham gets the files from another vault. When Khotso and his friend (who was in a similar position as Khotso) came back for the appointment later in the day, they were seen together in the Rector's office. This time the reception from de Witt was different. "He was friendly and said we were two of the better students that that university had ever had. Because of our classroom performances and our extra-mural activities in sports he was prepared to take a risk. He said he would readmit both of us unconditionally. He said he knew that we were active in student societies and that there were no restrictions. We could participate in whatever we wanted and he hoped we would not make him regret his decision." They were readmitted. There was light. He was going to complete his degree. The trip back to Bloemfontein was very different from the previous year. When Khotso told his parents his mother cried and cried.

Khotso went back to Fort Hare, but his problems were not over. In 1977, the year Khotso was supposed to do 4th year, the agriculture faculty took a decision to discontinue the biological science curriculum. This created a problem for Khotso who wanted to complete the equivalent of an honours year in microbiology and biochemistry and one ancillary course. The Vice-Dean of the Faculty of Agriculture also did not want him back in

the faculty. The Vice-Dean was a police reservist and in 1976 when the police were chasing students around the campus, he joined the police. He wanted to use the excuse of the change of curriculum and there was no one to teach Khotso's outstanding course to exclude Khotso from the faculty. With the termination of the biological sciences curriculum, John Mildenhall ('the man that made me love microbiology') did not have any students. He had to teach service courses to agriculture students and he had had a personal clash with de Witt. John Mildenhall provided a solution by offering to teach the outstanding microbiology modules. Khotso was the only student in microbiology and was really turned on by it. He wanted to go to graduate school in microbiology.

It was interesting and enjoyable being the only student in class with John Mildenhall. Sometimes he would give Khotso a chapter to read or Khotso would give a lecture. In June, he did not go home for the vacation but joined Mildenhall on his research project. During the second half of the year John Mildenhall went to Australia and gave Khotso sections to be covered. He was to prepare notes on the sections and when John Mildenhall returned Khotso was to deliver a series of lectures to him. For the practicals, Mildenhall asked Khotso to purify a bacteriophage from a sewage sample. But it did not work out that way. "When John Mildenhall went one way I went the other way. I went jolling." Before he knew it Mildenhall was due back. He had not even started the purification. Khotso caught up with the notes but not the purification. Mildenhall was given a report by the Biochemistry lecturer that Khotso had been very irresponsible. "I remember the first time I met with him. He gave me this long lecture on responsibility and how I disappointed him and he was hurt. I felt so bad because he had been so good to me. I apologised and he walked out. The following day I walked past his office to class. He did not come out. I had really hurt him. I apologised to him again and he said, 'Let's see what we can do.' I made up for it. I passed."

During his undergraduate years at Fort Hare, Khotso did not have financial problems. During his first year he received about R100 (the fees at Fort Hare was about R350) from his father's ex-serviceman fund. He was told by friends at university that if he passed well there were a number of bursaries for which he could apply. From the second year onwards he received the Ernest Oppenheimer scholarship.

Sometime during his final year, Khotso in casual conversation with a student who was doing an honours in psychology, was shown some forms for a Fulbright scholarship. His professor had given him these forms but he was not interested in it and gave it to Khotso. Khotso had no idea what a Fulbright scholarship was. He had been considering going to Rhodes University for a masters, under Dave Woods, in microbiology. He applied to the US embassy in Cape Town for a Fulbright scholarship. In August he was invited for an interview in the Eastern Cape region. Fulbright gave 20 scholarships each year irrespective of race. Khotso was the only undergraduate being interviewed. In the interview he “just blew their minds.” His focus in that interview was industrial microbiology. Because of his clarity of what he wanted to study and what he wanted to do when he returned he was given the Fulbright-Hays scholarship.

Khotso performed well in his studies. His parents were relieved that he completed at university. Khotso got the Massey-Ferguson award for the best student in agriculture. After graduation at Fort Hare he organised a community graduation ceremony in Bloemfontein for all the people (about 16) who had graduated in all the universities. “We went into the high schools and invited the matriculants and their parents and used it as motivation as well. It was a day of tremendous pride for our parents and families and for everybody in the community.” Because he had received an American award he was the centre of the celebrations.

Graduate studies: I had no business failing in a place like this

From January until the time he left for the United States in June, Khotso worked for Lever Brothers in Durban. He was miserable there. His misery was compounded by the fact that the job he was doing as a graduate was done by people with a standard 7 or 8 qualification. From a health point of view because of his respiratory and allergy problems, this was not a good place in which to be. Khotso realised that he belonged in an academic environment and not an industrial environment.

The Fulbright scholarship for the Masters degree was for two years. The more Khotso understood the value of the Fulbright scholarship, the more he appreciated what he had achieved. Furthermore he knew he wanted to do a Ph.D. after the Masters. He did not want

to tell his parents that he would be away for at least six years. He discussed this with his brother, Peter. When he decided to do the PhD he wanted Peter to tell his parents that he had not made up his mind in the US, but had thought about it in South Africa.

Khotso chose to study for his Masters at University of California in Davis. He was registered for a Masters in Food Science. The first quarter was rough – it meant adjusting to the American system. Khotso was the only black student in most of the courses. That made him feel self-conscious. Khotso also realised his ambassadorial role and he felt a responsibility for the entire black race. “I knew they were stereotypes about black people and stereotypes about me. I felt that everytime I made a fool of myself in this class I would not only reinforce the stereotypes about me, but I would reinforce stereotypes about black people.” Khotso found the pressure that he was representing the black race quite difficult. His liberation from this pressure came in his second semester when he presented a paper at a graduate seminar course. Khotso spoke about the ultra high treatment of milk as a method of sterilisation. At the end of the presentation many of the students congratulated Khotso and the cleverest person in the group asked him if he had done research on the UHT of milk. “I said no, and she said that I talked as though I was so familiar with the topic. That was a liberating experience for me. All of a sudden I had given the best seminar.”

Khotso explains further why he found the seminar experience liberating. “I had a very politically active mind. When I was studying at Fort Hare, I was convinced about the dangers of Bantu education - we called it poison. Sitting on the plane to the US, I asked myself the question ‘Am I truly a product of Bantu education and what does this mean.’ Because if that is true, then I am not going to be able to measure up against people who came from an educational system that did not have that negative agenda of my system.” Khotso knew that if he could succeed at Davis, he could succeed anywhere. That seminar truly convinced him that he could succeed amongst global competition. After the recovery from the first quarter, Khotso became part of the top end of the class. Of course succeeding in the US raised a number of questions: Did it mean that Bantu education was not as bad as he thought? Was success due to an individuals’ own resilience? Why were black South Africans succeeding in the US, while not succeeding in South Africa? Khotso was

convinced that it was his own individual resilience that led to successes and that given a different environment black South Africans could perform as well as anyone else.

When I asked Khotso how did he found the masters programme in the US, he contextualised his answer by reminding me of his experiences at Fort Hare. “Besides John Mildenhall and Rob Bassett, many of the lecturers were mean. There was a chap who joined the department of biochemistry in 1978. He had a Masters. He had an attitude problem and we did not like him. He would ask us a question in class and we would sit there and look at him. His favourite question was, ‘Is it the white man’s magic to develop the black man to comprehend’.” In the US things were different. “One of the first things that struck me was a clear understanding that the lecturers regarded themselves and their role as one to help you. That said, to me, I had no business failing in an environment like that. The whole institution was geared towards making you succeed. I came out of an educational system - tertiary and pre-tertiary - where you had to be resilient to prevent the system from pushing you out. That was an empowering realisation.”

The helpfulness extended to matters outside the academic. His advisor assisted him to find accommodation. With the kind of support system he had, Khotso realised that his success or failure depended solely on him. Another source of excitement and encouragement at Davis was meeting the authors of textbooks (they were on Davis staff) he had used at Fort Hare. Khotso realised that he was in a good school. Khotso’s hero was John Ingram who had written *The Microbial World*. “When I saw him for the first time it was the same experience as when I saw Bob Marley for the first time in Davis. You have arrived!”

Khotso started his research project on the microbiology of rockfish in the summer. It was a light topic and he did very well. The research project related to storage conditions of rockfish. He did a microbial analysis on day zero and stored it under different conditions. The study was interested in moving away from freezing because of the energy requirements. Khotso attempted to use normal refrigeration and modified atmospheres. Microbial analyses were done at different conditions and there was a biochemical tracing of spoilage patterns under different conditions. It was a project that was good for a Masters student because you always had results, but Khotso encountered a problem for about two months. During those

two months he was unable to isolate one bacterial cell from that fish! And then all of a sudden without changing anything, everything seemed to go right. There was a high level of frustration but he had finished and it was a good thesis. He also wrote a paper from the research.

Khotso had already decided that he would do a Ph.D. in the US. I asked him what value he saw in the Ph.D. To answer he went back to his political roots. “Black Consciousness had taught me that we had to match white people toe for toe. Prof. Seretlo⁷ was a source of pride and motivation to many of us until he made a political blunder in 1975 and went to the Caprivi. You could have asked me the value of doing a Masters degree. The value of it was that black people had to think about more than medicine. Graduate work and research work was a direction that black people had to start considering seriously as career options. Further the choice to go to graduate school was a superior and enlightened choice. It was a choice that meant black people were getting unshackled. That was what I wanted to do and wanted to be.”

Fulbright had funded the Masters for two years and would not continue funding for the doctorate. In 1982 the Fulbright indicated that Khotso should return home. Khotso said that he was not going back home until had he finished the Ph.D. Khotso knew if he did not take this opportunity for the Ph.D. he may never have the opportunity again. They agreed to extend his visa if he could show proof that he had money to pay for himself.

For the summer Khotso got a teaching assistantship from his Masters professor and Fulbright extended his visa. The teaching assistantship (TA) ended and in the fall of 1982 he did not have money. It was financially difficult, but he somehow managed by taking loans (interest in the US was 2%). During this time Khotso took a range of courses in microbiology and molecular biology. Khotso knew that he needed to choose a laboratory soon so that he could get funds.

After the Masters Khotso did not want to be located in the Department of Food Science and Microbiology. He felt that would be a disadvantage to him, because his peers would be sitting in the department of microbiology. He wanted to be there, meet them in the corridors and be in that microbiology milieu. Molecular biology was very fashionable at the

⁷ Prof. Seretlo was a physics professor and the only Black professor in the sciences at Fort Hare at that time.

time and many students wanted to do their Ph.D.s in that area. Khotso took a course on the regulation of gene expression of prokaryotes. He found this “truly mind-blowing stuff” and wanted to get into the laboratory of Stan Hartz who was working in this area. But Stan Hartz’s laboratory was full. The other possibility was Milton Milig who was studying gene expression one notch higher. He was now looking at eukaryotic genes, which are more complex and a lot less understood compared to prokaryotic genes. Just before Thanksgiving 1982, Khotso was taking John Ingram’s class, and John invited him for Thanksgiving. “Gee whizz. This is John Ingram. I still called him Prof. Ingram. I said I would be pleased to come to Thanksgiving. I am still in awe of him”.

John Ingram also indicated that he would like Khotso to think about joining his laboratory. After weighing the various options, Khotso joined John Ingram’s laboratory in December 1982. During 1982 Khotso had taken a number of courses to prepare himself for the qualifying exams.

Khotso was doing well at Davis. He worked on two projects with John and on a Saturday project that he started on his own. He passed his qualifying exams and his research was going well. “Then my mother died in November 1983 which threw me into a tailspin. I felt guilt because I had not come home. I felt selfish because my mother had dropped dead in a white man’s kitchen. My mother had been ill with asthma, hypertension and diabetes. Why did my mother still have to be working?”

Khotso’s mother died the Wednesday before Thanksgiving and he had gone to Santa Cruz in San Francisco. He got to know about her death on the Monday after the Thanksgiving weekend when he returned to Davis. Khotso did not have money and his visa was not in order. John Ingram assisted with Khotso’s ticket and Fulbright assisted with the visa. The journey back to South Africa, for the first time after four years, was a strange trip. There was excitement about coming home and depression when the reason was remembered.

Khotso felt guilty about his mother’s death and contemplated studying for a PhD in South Africa. “I felt that I daren’t abandon my Dad and siblings like I had abandoned my mother”. He struggled with this dilemma, but his siblings advised him to go back to the US and complete the doctoral programme. Besides the Ph.D. programme, Khotso had another

tug towards the US – he had an eleven-month-old son in California and “I missed him terribly and he tipped the scale.”

Khotso went back to the US, he was determined to work hard and finish as soon as possible. But things started to go wrong. Khotso spent long days and nights in the laboratory. Absolutely no experiment that he did worked. His Saturday project was working well though. One day Khotso walked into John’s laboratory, and said he wanted to drop his PhD project because he thought he could develop another project. John’s response was, ‘I brought you into this lab to do this project. If you drop this project, you leave my lab.’ Khotso thought that John was “cruel” and “callous”. He could not understand how John could be so unsympathetic when he knew how hard he worked and he gave him reports on his work every afternoon at 5.30 in the evening as he walked out of the laboratory and the first thing when he came in, in the morning. Khotso walked away. He felt very angry and was going to pack his things and return home. Two days later he went back to the laboratory and he and John talked again.

John indicated that Khotso should not let science do this to him. He shouldn’t let science make him feel sorry for himself. He said that if he was going to jump from one topic to another then he might as well consider whether he was cut out for science. John was hard, but he was reaching Khotso. John indicated that he believed that Khotso was cut out for science and he should go back to the beginning and reconstruct the experiments.

Khotso did just that. “I went back and did the most basic of experiments and built up on that.” Things started to work again. Khotso discovered later that there was a major step that he was bypassing because he was rushing. “That was a major lesson that I learnt about research. There are times when you can shotgun it, but at times it just decides that it will not get shotgunned.” Khotso still managed to finish a term earlier than others in the group. Then he had another mishap. There was a laboratory in Germany that was working on the same kinds of things that they were working on at Davis. As Khotso was writing up his thesis they published three papers. “That was my thesis.” When Khotso spoke to John about it, he said that Khotso could not publish papers from his thesis because he did not think Khotso could add value to the scientific field.

I asked Khotso to describe his research project as he would to a standard 10 student. “There is a nitrogen cycle where if you take nitrogen gas (N_2) and fix it to ammonia you reduce it. This is a major activity in plant science because most of the fertilisers supply nitrogen and plants prefer nitrogen in the reduced, ammonium form. In the reduced form it can get incorporated directly into the protein synthesis machinery. That pathway is called nitrogen fixation. In nature you have to close the cycle. How then do you regenerate N_2 ? That was the denitrification pathway. The complete nitrogen cycle is nitrogen fixation - from N_2 to reduced nitrogen and then you oxidise the reduced nitrogen to nitrogen oxide and then denitrify it. The pathway starts from NO_3 (nitrate). You reduce it to NO_2 (nitrite) then go to NO (nitric oxide), then to N_2O (nitrous oxide or laughing gas) and then to N_2 . There are bacteria that denitrify and in fact all the N_2 that we have in the atmosphere is microbially produced through the denitrification process. In the project, that was the pathway that we were studying. We split up the pathway into a number of discrete steps and even though we all studied the entire pathway the enzyme that I concentrated on was the enzyme that took the final step in the pathway - the reduction of nitrous oxide to nitrogen and the enzyme that I used was the copper enzyme.”

Post-doctorate: working in the lab of a Nobel Laureate

John Ingram was keen for Khotso to do a post-doctorate in the US for at least two years. From Khotso’s description of Fort Hare and the other black universities John felt that he should pick up more biochemistry. Khotso applied to a few laboratories and was accepted. He chose to work in the laboratory of Hamilton Smith, the Nobel Laureate at John Hopkins.

In thinking about his academic choices in the US, Khotso was always preparing himself for working in a black university. “It was not at the back of my mind. It was at the front of my mind.” I asked Khotso to elaborate on what this meant. He knew that research wise, if he was at Fort Hare he would have to depend on himself. “I knew that I would be in a small department where the research team would be very small. If you had a gene to clone you could not run next door. If you had a gene to sequence you had to sequence it yourself. I structured the post-doc project in a way that gave me access to techniques, insights, know

how and ways in which a molecular biologist and biochemist thinks. I felt very confident about physiology.” During his time, as teaching assistant, Khotso tried to teach as many courses as possible in preparation for teaching at a black university.

Hopkins was a different kind of place from Davis. It was a more high-pressured institution and Khotso was learning new techniques. He got involved in a new project – the transformation in *Haemophilus influenzae*.

A few months into the post-doctoral programme Khotso got the feeling that his Dad was beginning to decline and he was feeling depressed about his Mum’s death. This weighed on Khotso and he became very distracted and decided to return home. He had money for three years but at the end of the first year he decided to return home. He wrote to his mentor and good friend, John Mildenhall, and asked him about job opportunities in South Africa.

Work: I expected to struggle for a job

A senior lecturer in microbiology at Fort Hare was about to go on sabbatical and they were looking for a replacement. In March 1987 Khotso took up the position of replacement lecturer at University of Fort Hare.

During the interview Khotso discussed in detail the issues relating to the job situation in South African for a newly graduated black scientist. Unfortunately because of the constraints of space and the main thrust of this story is related to gaining a doctorate, all of these experiences cannot be included. The work experiences are the subject of another story but I will sketch a few issues in this story.

Khotso joined the biochemistry/ microbiology department as sabbatical replacement for a year. It was a fairly research active department and Khotso enjoyed his year there. In addition to his academic involvement Khotso got involved in the Black Staff Association – albeit, reluctantly at first. Of course as he got more and more drawn into the issues of general politics on campus, his work in the laboratory suffered. Before he knew it he became the general secretary of the Black Staff Association.

At the end of 1987 Khotso’s contract as replacement lecturer ended and he needed to get another job. Institutional politics affected his fate. The Head of Department of

Biochemistry and the Principal of the University were in conflict and the Principal would not allow a new position to be created in the department. The Head of Department of Biochemistry and Khotso decided to apply to the Foundation for Research Development for a fellowship which was designed to help black universities in particular to draw black PhDs in. When he was awarded this fellowship he was “not allowed to teach without express permission from the Principal.”

How did Khotso feel, coming back from the US with a Ph.D. and struggling to get a job. “I expected to battle for a job. I did not have a romantic notion of getting a job. That was why I was prepared for the humiliation when I was told that they did not have a job for me. Even when I went out and got my own money I was told I could not teach. I had been told that Fort Hare had become the revolving door for young black PhDs. They would come in and stay for a year. The institution was made so unattractive that one had to go somewhere else. I was determined that I was not going to leave.”

In June 1988 Khotso attended a microbiology conference at the Council for Scientific and Industrial Research (CSIR) and Jennifer Thompson - current head of biology at University of Cape Town – approached him and asked if he was interested in a job at UCT. “Out of politeness more than anything else I said I would think about it. She asked me to send a CV. That I did when I got back to Fort Hare. I really had no plan to leave Fort Hare.” Khotso was enjoying his involvement in the institution both at the teaching and research level and with the outside lecturer activities. He challenged the Black Staff Association about who was setting Fort Hare’s agenda – was it coming from inside the institution or from afar? “Slowly academics at the university began reorienting the agenda of the Black Staff Association to a Fort Hare specific agenda to some extent. To me it had been locking itself in the broader agenda and completely ignoring the Fort Hare specific agenda.” Khotso was involved in raising academic matters and debating issues about where the institution wanted to go academically. He was involved in transforming the relationship between the Staff Association and the Principal to one where the BSA did not look to the Principal to solve their problems. “I knew I had a role to play on campus.” Khotso’s high profile position made some people “unhappy and before I knew it there were charges that

because of my AZAPO connections, I wanted to take the staff association out of the United Democratic Front to create an AZAPO branch at Fort Hare. It became unpleasant.”

Fort Hare was starting to become unpleasant for Khotso – both from the administration and the Principal because of the broader role he was playing and from the staff association because of his AZAPO connections. Academically he was fine and doing research. Khotso was invited to the interview at UCT. It went well and he was offered a job as lecturer in the Department of Microbiology. “Except that I did not want the job.” At Fort Hare he considered the job offer but “was still determined to remain at Fort Hare, inspite of the difficulties at that institution.”

The following year, he was begrudgingly asked by the administration to teach in microbiology when two of the lecturers were away. Khotso enjoyed teaching. The laboratory was not bad and he found that with the extra teaching responsibilities there was not enough time for the laboratory. But he continued his evenings in the laboratory. However the routine began changing. “It started becoming more and more difficult for me to go back to the department in the evenings. It gets to you. Sooner or later you find it a lot easier to leave at 9 instead of 11. Before you know it, you are leaving at 8. I found it more and more difficult to go back in the evenings. I was getting sucked into the culture of Fort Hare. In the evenings everyone congregated at a bar in the hotel in town. For the first two and half years I had a beer and interacted. Soon I was becoming a regular. I realised I was getting into trouble. The general academic depression of the institution was starting to get to me. At that point I decided I wanted out. I had a choice between my romantic association with Fort Hare as an institution and the fact that I was beginning to die as an academic.”

Khotso applied for and got interviewed for a job at the University of Western Cape; but, unfortunately, as a result of non-communication from the university on time, he could not accept that job. In the meantime he had spoken to Jennifer Thompson at UCT again and was offered a job.

He started as a lecturer in the Department of Microbiology at the University of Cape Town on 1 Feb 1990. On 2 February 1990 de Klerk delivered his momentous speech. With the changed political environment in the country, Khotso’s role had to change. As “a committed black intellectual” life was split between getting to the laboratory at 4 am in the

morning to start experiments and run them until 9 and then going to a meeting in Gugulethu. The early days of the 1990's saw the conflicts of him getting involved in the research of a vibrant department and being drawn into various political activities. There was also a personal tragedy when Khotso's father died during Easter.

Later in the year Khotso took up a four-month scholarship at University of Pennsylvania . "I arrived on Saturday and was in the laboratory on Monday morning at 8.30 and went back to the room at 2 in the morning. I was back in my environment. I was so happy to be in that environment. There were no distractions. I really enjoyed my life in the laboratory. I once again appreciated the laboratory and I was determined to back to the laboratory when I returned to UCT. I had rediscovered Khotso Mokhele, the laboratory rat."

Two weeks after Khotso returned from the US, he became the regional chairperson of the Azanian Peoples' Organisation in the Western Cape. "The laboratories of Philadelphia and Baltimore and California were not in my real world. In my world I could not be the scientist that I wanted to be. When I applied for the job as the president of FRD, one of the questions I was asked was about my academic productivity since returning to this country. I explained what it meant to be me, to come back to this country yearning to totally immerse myself in scientific research."

The competing demands were creating dilemmas and conflicts for Khotso – academic or activist? He asked himself fundamental questions: "Can I really be the scientist I want to be and remain in this country? In the end I convinced myself that I will not be a sell-out if I chose to express my role and my contribution through science. It was important that I be a successful scientist and not only a lecturer at UCT." Khotso decided to withdraw from political activities and concentrate on being a successful scientist. "I am the total immersion kind of person. I have immersed myself in this job, I don't have a life outside of this job. That is how I work.. Is it good? Is it bad? Who cares? I enjoy things when I do them well." Just after that decision Khotso was visited by Arendt, the then President of the FRD. "That changed the path of my life. Arendt came to see me about the Vice Presidency of the FRD." Khotso was just about getting used to his role in research and his role in society and in the country. With this offer of Vice-Presidency, a job he had not thought about, applied or wanted, Khotso was "put in a fix". Being 1992 it was also a politically difficult decision

politically. After long thoughts and discussions with friends in political organisations, Khotso realised that the job could bring together his two passions, science and “seeing black people coming out of the mess that they had been put into.” With this Damascus experience, three months after being offered the job, Khotso accepted. “I must say, four and half years down the line every morning, when I get up at four o’ clock, as I did this morning, it is a pleasure to come to this job. I do my job with passion, I do it with conviction, I do with pleasure, I do it with complete immersion. The sad thing is that I don’t have a life. I think in this job, I found myself.”

Reflections: being at the right place at the right time

I asked Khotso why he succeeded in getting a doctorate when many others from his community, school and university did not. Khotso mentions the role of serendipity. “My life was not a smooth plan that evolved over time. There are things that are inner and innate. Those characters will always drive me towards a particular point.” One of those innate things was his love for school. But he says those innate aspects are no guarantee for success. Parents and family were a very important part of the equation. The expectations that others had of him put pressure on him to succeed. Khotso says he had the good fortune to be at the right place at the right time. “I met many good people in my life: the John Mildenhalls, the Principal at Goronyane Secondary School who taught me what a challenge was, the John Ingrams who could be ruthless with me; the Vissers and Senatla’s at Moroka who shaped me and my biology and social studies teacher, Mr Matlhape, in junior high school in Bloemfontein. But I also have Khotso Mokhele who has a mind that enquires. I still had an enquiring mind and continue to explore.”

Khotso became the president of FRD at a very young age. What will he do next? “My contract is for five years. With the National Research Facilitation, I don’t know what that does to my contract. If the FRD has to continue in the current direction, the themes have a 10-year horizon and the programmes have a four or five-year horizon. I do not see myself beyond the beginning of the second phase of the programme. I will only be 46 or 47 at that time. I do not know what I want to do when I am 47. I know what I want to do when I am 55. When I am 55 I want to be a high school principal in Bloemfontein. In the meantime an

international job in science, science issues and science politics would be extremely attractive.”

CHAPTER TEN

Academic Life Story of Dr Romilla Maharaj

Success because of a combination of opportunity, support and self determination

When I interviewed Dr. Romilla Maharaj in January 1997, she had just started her new job¹ as Programme Manager: Research Capacity Development at the Medical Research Council. In 1988 she had received her Doctor of Philosophy degree in microbiology from the University of Cape Town. Subsequently she lectured in the Department of Biochemistry at the University of Natal (Pietermaritzburg). In addition to her science research and work, Romilla has been actively involved in the Association of Black Scientists, Engineers and Technologists (ABSET). At the time of the interview she was studying for a Masters in Business Administration (MBA) at the University of Cape Town's Graduate School of Business. This was completed in November 1998.

When I started the project of developing the Life Histories of Black South African scientists with the intention of interviewing five women, Romilla's name was suggested. Romilla's colleagues told me that 'like you she is very interested in the issue of research capacity building.' When I telephoned Romilla in Cape Town (this was the first time we chatted), I explained the project and the named the others involved in the project. She readily agreed to be interviewed and suggested that the next time she was in Durban she would visit me. This happened a few weeks later, and we met in the tea-room at the University of Durban-Westville. We talked about her new job, moving from Pietermaritzburg, her Dad and the unhappiness she felt when she was a student at the University of Durban-Westville.

Romilla then suggested that the three, 2-hour sessions be scheduled early in the New Year, over a Friday, Saturday and Sunday. I flew to Cape Town and interviewed Romilla on the Friday in her office at the Medical Research Council in Tygerberg; and, on Saturday and Sunday we had the interviews at her home in Mowbray. On Sunday, after the interview, we went to lunch at Rhodes Memorial and lapsed into conversation without a tape-recorder.

¹ She started in August 1996.

When I completed writing the story, I sent it to Romilla for comment. She made comments on the story and I have incorporated many of the comments in the revised version.

Beginnings: “parents accepting of my lifestyle which, I know, in the Indian society is not the norm”

Romilla has just turned 40. She describes herself at the moment as being in a ‘content, single state,’ but does not rule out the possibility of marriage. Romilla was born in Greys Hospital in Pietermaritzburg where she says, “you were allowed to be born but not treated².” She is the youngest of seven children. When she was born her parents, Mahabeer Ramrathan³ and Thulsi, were in their forties.

Romilla is regretful about not knowing enough about her family history. Her Dad has now started writing the family history for his grandchildren. Her Dad was orphaned when he was fifteen years old. Romilla remembers her maternal grandmother who died at the age of 106. Romilla was born when her grandmother was about 90 years and because of the age difference and there being many siblings around she had very little associations with her. Her grandmother was a priestess and a midwife. “Being a priestess she was very particular about how things were done. Her lifestyle was based on those stringent Brahman rules.” As she was very young, Romilla associated those characteristics with someone who is just very fussy. That made bonding very difficult.

Romilla’s voice is warm and proud when she describes her father, Mahabeer Ramrathan, as “charming.” Her Dad is in his 80’s. When she was young they did not have a close relationship. She describes herself as “very much Mommy’s girl.” The older siblings had a closer relationship with her Dad. It is different now with a strong bond between them. In the last two years, after her sister’s death “the roles have been reversed in that I am the guardian.” Romilla says that her Dad has always been very supportive of her education. “He is different from the average parents of that culture and age group. For example, when I came back from London and I told him that I wanted to go to Cape Town to do a Masters degree, his concern was to make sure that I had enough money to stay in an hotel. At no stage did he ever lecture me to marry instead of

² At that stage the hospital did not provide services for Black people, but there was a maternity ward for Indians and Coloureds.

³ “Mahabeer is her Dad’s name, Ramrathan is his family name and Maharaj is the surname.”

study. He has always accepted my choices. It has been nice to have a parent who does not put pressure on you.” Romilla describes her upbringing as being strict and protective but her parents were supportive of the choices she made and her Dad “accepts my lifestyle which, I know, in the Indian society is not the norm.”

Romilla’s father was born in Charlestown (near Newcastle) and an uncle brought him up. After marriage her parents moved to Durban where her father worked as a confectioner for about 20 years. At one stage her father ventured into his own business but he was not successful. “I think part of my father’s weakness in running a business is that he is too trusting and too easy with money.” The family then moved to Pietermaritzburg where they started from scratch again. Her father was a driver at a bakery and kept this job until he was about 70. He was still working as a pundit (priest) until the age of 82. Romilla says that her Dad has “a history of giving or losing anything material and then starting from scratch.”

Romilla’s Mum grew up in Ladysmith. At that time it was considered unsafe to send females to school. Romilla is puzzled about why her grandmother, who was learned and practising midwifery from medical books, (written in Hindi) did not teach her mother to read and write. Romilla speculates that her role would be to teach her daughter to be a “good wife and mother and not to educate her.” Romilla’s mother was supportive of her daughters getting an education. “Very atypical of the society from which we grew up and I say thank you to her for it. Mum’s words were always that as a woman, you have to learn how to function at the kitchen sink and have your education. People look surprised that I have a PhD in microbiology and still make roti.” Romilla was a first year university student when her mother died of cancer. When her mother knew she was dying she told everyone “to make sure that I get an education and got married.” There is still pain in Romilla’s voice when she describes the loss of her mother.

Romilla was born at about the time that her eldest sister had just started nursing⁴. With seven mouths to feed and not enough money, before Romilla was born her parents had thought about giving her to an aunt. They changed their minds when she was born.

⁴ She was among the first batch of nurses who had graduated from Grey’s Hospital

Being too young Romilla does not remember much about the financially tough patches of the family. But there are family stories about the period.

Romilla has seven siblings. Romilla's eldest sister, Savi, is in the nursing profession. She has been living in London (UK) for about 20 years. Her second sister, Neera, who was always sickly, died from a lung infection about two years ago. Next is a brother, Amick, who worked as a driver and branch manager of a dairy. He died of a heart attack in 1989. Fourth is a brother, Rabin, who studied as a medical technologist but is now in management. In 1979 he moved to Australia because, career-wise, he could not progress further in the hospitals in South Africa. He was not going to be promoted at Edendale Hospital (for whites) and Northdale Hospital (for Indians and Coloureds) did not have the technology that could give him job satisfaction. Next in line is a sister, Rathna, who is a housewife. Romilla says that Ruthna did have the opportunities to study, but that is a "sensitive issue." Sixth is a brother, Jay, who is a physical science schoolteacher in Durban. Six years after Jay came Romilla, 'the unplanned one'. There is a 23 years age difference between Romilla and her eldest sister - an interesting family life! "I remember they would go dancing together, and I was left at home". Romilla has a close relationship with Savi. "With Mum having died, and Savi not having children, she has always been the mother figure in my life. She gets tremendous pleasure from supporting and assisting others."

The language in the Maharaj household was Hindi, but Romilla answered in English. "I have regrets about not making an effort to learn the vernacular. I think we were the generation, who, in aspiring to improve our English, sacrificed our mother tongue." Romilla points out the difference between the Indians in South Africa who gave up their mother tongue to the Indian immigrants in Britain who speak the mother tongue until they went to pre-school or nursery school when they learnt English. The other reason for not learning the vernacular was that she did not like the teacher⁵ who taught Hindi. "It got quite bad and even bribery would not get me to go to the Hindi school. Eventually my Mum said that if I did not want to go to vernacular school I would have to wash the dishes at three o' clock. Often it was just my personality. If there were attempts to get me to appreciate the Indian language and literature rather than learn it for the sake of propagating it, then I would have adopted a different approach."

⁵ Hindi was learnt in classes outside the school system.

Romilla has very fond, warm, secure memories of her childhood. There was interaction with other families and children in the neighbourhood. With the sectionalism amongst the Indian community in South Africa, Romilla grew up in this “nice little greyish area.” Their neighbours were a Coloured family and the Patels⁶. Romilla says she spent much time interacting with neighbours. She attributes these interactions to her “strong headedness.” Romilla had exposure to different religious practices - she went to Sunday school and on church picnics; to the Garbas of the Gujeratis; and, at home lit the lamp. Romilla says she was lucky to have this “wide exposure and my parents not restricting where I went.” However she was not allowed to go to discos and parties.

Romilla’s parents considered “the concept of respect⁷” as an important quality in life. Romilla rebelled against some of the ‘rules’ to show this respect. She describes her household as “a typical Indian household where your father is the breadwinner and your mother is the financial manager.” Romilla does not remember her upbringing as being restrictive.

Romilla’s parents were members of the temple society. Her grandmother and Dad were priests and tried to teach her the scriptures. There weren’t too many superstitions being followed and religion wasn’t rammed down the children’s throats. “My father instilled in us the belief that you do not need to go to a temple to pray. I associate the practice of religion more with a sense of community. I have warm associations of having family prayers and havans. These often ended with my brothers and sisters singing the national anthem of India. Our parents were patriotic to India, but we [the children] were different. They saw themselves as Indian and we see ourselves as South Africans. I don’t consciously initiate a prayer at this stage of my life. The warm association has to do with the getting together of the families. My father is more into the spiritual and scriptures; that is not for me.”

Romilla describes her earlier years as “pretty apolitical. When my siblings started becoming more politically aware, I became aware. As I started developing I became more aware but I was certainly no activist.”

⁶ In racially divided South Africa it was unusual to have neighbours from another race group (Indian and Coloured). The Indian families were from different languages groups and different religious practices.

⁷ Embedded in this concept would be practices like not disagreeing with elders.

It is difficult to categorise Romilla's social class. Her parents were Brahmin chatree⁸. Her father went through the ups and downs of jobs and practised as a pundit for about 25 years. Also there is almost a generation difference between her sister and herself. Many of the earlier years are remembered as "sort of average family battling to make ends meet". Although Romilla's family wasn't financially well off, she had a sister who was a matron at the Northdale Hospital. "Although there was a sense that someone had progressed in the family, financially, we were not on the same rung as those whose parents were principals and teachers."

Romilla's parents encouraged her to further her studies. "My Mum constantly repeated that I should get a further education." Her Mum, who herself did not have an education, could compare the empowerment her eldest sister had compared to the other two sisters who did not have an education. Her eldest sister's ability to earn an income made a different impact on her life. Romilla says her parents must have always wanted their children to have an education. "When I was born my eldest sister went to Cape Town to study midwifery. The fact that they were supportive then - almost 40 years ago - of their daughter going to Cape Town to study, meant that they were always accepting and supportive."

Primary and high school: "I am a high achiever, but I don't have to come first"

When Romilla was about four years old she went to kindergarten and then to primary school. Class 1 was on a platoon system⁹. This school was then converted to a high school and for the next six years Romilla attended the Baijoo and Maharaj Primary School (BMS).

Primary school education was in a relatively well-sized school, which had a large playground. Romilla considers herself as part of a fortunate generation in that "we had teachers that encouraged us and gave off their best." Romilla says that her personality is such that "I am a high achiever but I don't necessarily have to come first. At the same time there is something in you that drives you to achieve." There were about four or five teachers, whose names she cannot now remember, who had been very supportive and encouraging. "I am sad that I don't remember too much about primary school

⁸ This refers to the family lineage and in Romilla's case it was being born into a family of priests (Brahmin). This is a high class.

⁹ This meant that there were two sessions in school.

education.” Romilla acknowledges the influence of others and says, “When one reflects now and even if one looks at post-graduate studies a lot has to do with people around one seeing one’s potential and nurturing it.”

Textbooks were issued on loan. Romilla was fortunate that there were two generations in her family. Her sister played a very important role financially. Romilla doesn’t remember the financially hard times that the family had. “There wasn’t money for luxuries but there was always money for the necessities like school fees, school uniforms and education.”

Although the family helped financially she did not get much help with her homework from the other six. “The influence came from being in an environment where I had a sister who was in the nursing profession, one brother was doing medical technology and another doing science. From junior high school I looked after the medicine chest. I knew which drug was for which treatment and I knew which antibiotic was for what.”

Romilla went to Raisethorpe High School. It was a large school and was considered one of the best Indian schools in the city at the time. Romilla considers herself lucky for being placed in the A stream from standard six to matriculation. “We were lucky because we were taught by the best teachers. Our class had to go around picking up litter during lunchtime because we were always noisy. In junior high we had about the best mathematics and accountancy teachers. I remember our matriculation form teacher had the reputation for churning out A’s and B’s in mathematics and physical science.” The headmaster was also encouraging and supportive. Romilla repeats that being in the A stream placed them in the fortunate position of being taught by the best teachers.

I asked Romilla to describe what she thought was a ‘good’ teacher. She says, “If I have to compare them with how we view education now I would say that it was all wrong. It was the clarity, the organisation, the dedication and more than anything the fact that they drove us to work to our maximum potential. The mathematics teacher would give us a new theorem and we had to learn it. He then tested us and if we had less than 70% we had to retake the test. We had to learn the basics. The physics teacher used alternate, unconventional methods. Some people thought he was a shirker; but I thought he made physics more interesting. When our accountancy teacher introduced a new

concept he would spend an entire lesson telling us stories related to the concept. By the end of the lesson we fully understood the concepts of customs duty, import duty, import tax. The teachers had a passion for their subjects. It is easier to score better marks if you are interested and motivated by the subject and teacher.” Romilla is animated as she recalls her high school days.

In matriculation Romilla took three science subjects (mathematics, biology and physical science), English, Afrikaans and accountancy. Her class of about 30 students was made up of about half girls and half boys. Romilla describes herself as “a high achiever. I remember there were three of us who would compete and we would be in the first five positions in the standard. I did not strive for a good position but I wanted a good pass.” However if she felt that she was undermarked deliberately she would ask for an explanation. For the most part Romilla enjoyed school life. “Ironically, I talk so much now, but I hated the oral exams. And, of course, I hated Afrikaans.” When asked how she experienced the sciences, Romilla said, “At that time it was almost impossible to get an A symbol in Biology. Biology was my strength. In matriculation, although I did better in physical science than in biology, my biology mark was still the top mark in the school. I have always enjoyed the biological and physical sciences. My mathematics was not as strong as physical science. Translating things into equations does not come naturally. I see things more in terms of structure-function relationships and in terms of logic. This is why I enjoyed accountancy so much. I was able to work through accountancy problems because I can work through something that is based on logic.” I asked Romilla where she gained the skill of working through something logically. “That is an interesting question. Only recently a colleague commented that I like everything in order. I think order is important. I was told that as a child, my cupboards were always neat. Maybe my environment influenced it, but I always feel that part of it was inherited. My mother was very much for order, neatness and tidiness.”

In matriculation her school day was very busy. “We often spent extra time after school in the laboratory and there were also extra classes over weekends and school holidays. The teachers were very committed and dedicated.” Romilla wrote her matriculation exam in 1975. This was the first group who wrote under the new Department of Indian Education. She gained a C¹⁰ aggregate pass.

¹⁰ This meant an aggregate between 60 and 70%.

As Romilla approached the end of her matriculation year she had to think about her future. She had the freedom to make a choice, and had support for whatever position she took. As someone who liked the biological sciences she was interested in medicine or pharmacy. “I never thought I would end up as a research scientist. I remember the kind of career guidance we got. They tell you about teaching, nursing and medicine. I did not even know what a research scientist was.”

Undergraduate days: “University of Durban-Westville and London are so different”

The following year, 1976, Romilla registered for the ‘Big Four’ (physics, chemistry, botany and zoology) at the University of Durban-Westville (UDW), which was the university for Indians. She did not apply to the University of Natal (Pietermaritzburg), which was on her doorstep because she knew that she could only apply for ministerial permission to study courses that were not offered at UDW.

The first year of the Bachelor of Science degree at UDW in 1976 “was a traumatic year because of personal circumstances: adjusting to university life and doing a B Sc. which was seen as a tough course.” Romilla spent the first few months adjusting to university life: being away from home¹¹, dealing with the volume of work and a different manner of instruction. Romilla’s first year class had about 700 students.¹² “You are not quite prepared for this. There was very little interaction with the lecturers because they had such large classes. The lecturers stood in front and delivered the lectures at a set pace, irrespective of whether or not students were following. You either sunk or you swam.”

Romilla found the first semester at university “tough” but by the second semester she had adjusted. But circumstances at home changed when her Mum was diagnosed with having secondary cancer. Unfortunately her family tried to protect her by not telling her. Romilla says she had been accustomed to having a Mum that was ill and expected her to recover. She found out about the cancer just about the time she was to start writing her final exams and “then I cracked.” This impacted on her studies and she would often make trips from Durban to Pietermaritzburg.

¹¹ She was now living in the university residences.

¹² This was a popular course because it offered access to medicine or pharmacy as well as completing a B Sc. degree.

The third level of adjustment that Romilla had to deal with was the 1976 Soweto uprising and the political activities on campus. “While I did join in the stayaway from lectures for political change, I think I was too worried about my Mum to be drawn into what was happening politically.”

In November 1976, Romilla went into the examination room knowing her Mum was ill. She knew there was the possibility that when she came out she could find out that her Mum was dead. Her Mum’s death in December had a traumatic effect on her life and impacted on her trajectory for the next few years. Romilla says that if she had known earlier she might have been able to deal with it better. The combination of her Mum passing away and failing her examinations has left bitter memories about UDW. She is bitter that UDW did not provide a support system when she needed it most. She was not told that under the circumstances she could have applied for an exemption from the examination and have written it later. She went on the advice of her family who said, ‘You have paid your fees already, have a bash at the examinations. It does not matter if you fail’. After writing one of her papers, she had discussed her circumstances with one of the lecturers. Romilla draws a contrast between his reaction and the reaction in London where she subsequently did her undergraduate studies. “He [at UDW] basically listened to what I said and that was it. This was in total contrast to the experience in London, where if a student was taking medication for hay fever during the examination the lecturer would advise that student to obtain a medical certificate just in case he or she did not perform well in the examinations because of medication”.

Romilla still feels disappointment with UDW and the university system which was demoralising and made it very difficult for people to pass. “I came through high school where I was in the top 5%. Now I felt that there was no longer a relationship between one’s capability and the amount of work one put into the course”. Another aspect of the UDW system that Romilla questions is the quota system. Many of her friends did not succeed in completing their B. Sc. degrees in three years. She thinks that the system had something to do with their failure. “The one thing that I recall is that you worked hard for your first test and scored 80%. You worked hard for your second test and now you scored 50%. Not having got back the scripts I started to question the quota system. There was no relationship between effort, potential and achievement”.

With the two major traumatic events (her Mum's death and failing her university studies), Romilla says, "I totally lost confidence in myself and I now looked for cheap and quick ways of obtaining the qualification that I needed. This was the first time in my life that I had to deal with failure. It was not a pleasant experience and I did not feel that I wanted to go back and repeat this".

In 1977 Romilla registered for a science teacher-training course at Springfield College of Education. She coped academically, but emotionally was still very unhappy. Her sister, Savi invited her to London. Savi had invited her before but Romilla wanted to be close to her Mum. In October 1977, she dropped out of Springfield and took her first plane trip to London. She had not planned to study there, but once there she decided to stay and study. Unfortunately she could only start studying in September 1978. Financially it was not possible to fly back and forth, so she stayed on in London from October 1977 until she began her studies in September 1978. Later in the interview Romilla says, "If you look at my curriculum vitae, you will see that I conveniently do not mention 1977."

When I asked Romilla what she thought she would study in London she answered, "With Mum dying and my having failed, my entire life had just crashed and there was only one aim in life. I wanted to obtain a qualification so that I could earn a living. There was no specific ambition. I looked at some of the options and the Higher National Diploma in Applied Biology was one of them. I was still thinking in terms of biological sciences."

Talking about 1976 and 1977 is still difficult for Romilla. It is obvious that it was a very traumatic period of her life. Romilla's decision to study in Britain was partly because of the structural issues relating to the University of Durban-Westville and partly because of her stage of life and family issues.

Savi was now the mother figure that Romilla needed. Savi and her husband had just started working in London and with limited funds were not able to provide entertainment. Being a nurse, Savi introduced Romilla to the chief technologist in the medical technology laboratories who employed her. But Romilla did not have a work permit. She voluntarily worked for eight months, without a salary, as a junior medical technologist at St. Helier Hospital. She describes the experience positively. "I had to abide by the same rules as everybody else. I worked from 8 to 5, no staying away from

work, nor did I even leave the laboratory half an hour earlier. It meant that I was not sitting at home, getting depressed and I was learning something. I learnt many skills. When I started my diploma, I knew the techniques that were being used in the laboratory situation. My organisational skills of practical and laboratory work was good. It was an experience that taught me interaction with people.”

In October 1978 Romilla started a two-year National Diploma in Applied Biology at the North-East Surrey College of Technology (NESCOT). “I started the first year and then I applied for a United Nations scholarship which I was fortunate to get. I started off the course feeling uncertain about my own capabilities, not having done A levels and I felt I came from a sub-standard education. In addition this was a multicultural set up. I started off working very hard and soon realised that the course was well within my capabilities and I was performing well in the course. I then relaxed and started really enjoying being a student. Within three months of starting the diploma my lecturers wanted to know what I intended doing after completing my diploma. They saw potential in me that they felt should be encouraged. They felt that I was capable of achieving more than a diploma. At that stage I had not thought further than a diploma. I got back my confidence in those two years. I worked hard and played hard. Our small group (30 in a class) had a very good relationship with the lecturers. One of the stimulating aspects there was that there were experts in just about every discipline - even within biochemistry. It was exciting being among them, attending seminars and interacting with scientists who were very active in their fields. It was intellectually very stimulating and socially wonderful. In contrast to the Durban -Westville set-up, it was very informal. I had adjusted to the cosmopolitan environment. The biggest adjustment perhaps was having a lecturer coming in and saying that he was Doctor so and so, call me John! We had a very casual relationship with the lecturers and would even go to discos with them. What I learnt from that is that not addressing someone as Doctor or Professor is not necessarily disrespectful. I respected my lecturers and at the same time we were friends.”

When Romilla had started off her studies, all she wanted was a qualification to get a job. But when the lecturers pointed out her potential and her success this caused her confidence level to increase and she began to look at further options to study. Romilla also realised that with the two-year diploma, she could only get technician and quality

control jobs. "I realised this would not give me job satisfaction. The job would be routine and I would get bored." One of the things that she learnt about herself when she worked as a general medical biology technologist was that she did not like doing the analysis and then just handing it over to the pathologist who would check the analysis and make the diagnosis. "I wanted to be part of that process. I realised an honours degree would open research possibilities."

At that stage Romilla had two choices: either spend another two years at college to get the equivalent of an honours degree or to get an exemption from the first year of a B Sc. degree at university. Kent and the University of London were willing to give Romilla an exemption. Price wise it would have cost almost twice as much to study at the university than at NESCOL. Going to Kent would have also meant commuting longer distances. After considerable thought and "all the adjustments and traumas that I had gone through I felt that I was better off remaining at the technicon and going for the advanced diploma.¹³ It would be less disruptive."

Romilla chose to do her honours in biochemistry. There were people who were in employment in the honours course. During the honours programme Romilla realised that an honours degree was not adequate training for the kind of research work that she wanted to do. "In the honours phase, because of the exposure, I started thinking research and became aware of the kinds of openings to research type careers." In the second year of the advanced diploma she applied for and got a doctoral placement in Canada.

On a personal level Romilla was not coping. She should have completed the honours programme within two years (and finished in 1982). In 1982, she bailed out of the finals because she was petrified about failing. "1982 is not in my CV and I have deliberately written it ambiguously. With all that had happened in my life and with all that I had achieved in three years, I was petrified that I would not make it. I literally blacked out. I wrote the first examination and subsequently discovered that I had obtained an upper second in the paper which I thought I had failed. Then I just cracked. We wrote four papers in one week. I started off with an upper second in paper one and I was down to about 40% by Friday." Romilla explains her uncharacteristic behaviour during this period. "I had put so much pressure on myself. I think it was closely tied to

¹³ "If I had to equate the standards I would say that the three year diploma is equivalent to an equivalent three year first degree in this country. The subsequent advanced diploma is equivalent to an honours degree".

my personal experiences. I had been in England for five years and I was not looking forward to coming back to South Africa. I wanted to get this upper second because I had this opportunity of doing a Ph.D. in Canada.” What all of this showed her was that the fear she experienced stemmed from unresolved issues in her personal life. “I had not dealt with Mum’s death and I had not dealt with failure at UDW.”

Romilla had to remain for another year to rewrite the examination. She felt bored going to the same lectures again. During this period Romilla worked part-time as a research technician at Guy’s Hospital. This placement in a research environment was part of the training programme. But she considered this a boring job and was biding time. During this examination Romilla was not aiming for a first, but just wanted to pass. She knew that one of the rules at the institution was that if you wrote for the second time, you could only get a pass. But she was awarded an upper second class honours in biochemistry. “They made provision for the fact that I was someone with an academic track record and had an anxiety attack. They saw that I was worth an upper second class. If they had not shown that support I might have never got my Ph.D. As I said I wrote my CV not reflecting that that I failed in 1982. If I had gone to Dave Woods and said I had flunked, I am not sure if he would have accepted me on his doctoral programme.”

Romilla contrasts the way students were treated at University of Durban-Westville with the way she was treated in London. “The UDW experience is still bitter because nobody told me what I was entitled to and being the only one in my family who went to university I did not know what to expect.” In London you were advised and helped along. The UDW experience was like an obstacle course; and the London experience assisted one to pass the course. Romilla says that the UK approach has made her the kind of lecturer she is. “My students say that I am not understanding because I expect them to work hard. I am a no nonsense person. I know that students have described me as tough but helpful. I am happy with that description. I am happy with my approach where I put the students interest first. This is very different from the way things were at Durban-Westville where a quota system seemed to have been followed.”

When Romilla completed her honours she was not keen to return to South Africa. “It had to do with the fact that I had unresolved personal issues about Mum’s death and the failure at UDW.” The lecturers in London helped in supporting and encouraging her.

“Apart from the marks that you get, you also need someone to help you believe in yourself. I had certainly regained my self-confidence. Ray Nichols and Graeme Litchfield were two lecturers at NESCOL who mentored and encouraged me throughout my student days there.”

When Romilla was studying for her honours, she began thinking about research and a Masters degree or a job if she could find one. She realised that with an honours degree the research job she could get would not give her the level of responsibility she would like. She considered doing the Ph.D. in the UK. Margaret Thatcher had just come into power and bench fees for a PhD were 7000 pounds sterling a year. Financially this was a near impossibility and getting a bursary for this was not easy. With her losing the second year of her honours, the Canadian option fell away. When she completed the honours degree in 1983 it was impossible to find the finances to pursue a higher degree in the UK. She decided it was time to return to South Africa. She looked at job opportunities and the possibility of pursuing a higher degree.

Graduate studies: science of vibrio and politics of accommodation

At the end of 1983 Romilla returned home for the first time in six years. She was not looking forward to returning. Romilla applied for jobs, mainly to the pharmaceutical companies and industry, but was unsuccessful. She thinks she was very naïve about job opportunities at that time and did “not know the correct approaches and ways of going about it.” At that time she also applied to do a higher degree.

For the higher degree Romilla was interested in molecular biology and DNA technology. She applied to do a Masters degree in the Department of Biochemistry at University of Natal (Pietermaritzburg). “When I returned I realised that we no longer required permits but I think there was still a quota system.” She was accepted for a Masters degree and given a Council for Scientific and Industrial Research (CSIR) bursary (something she did not know about when she was overseas). She was really interested in recombinant DNA technology and applied to the Department of Microbiology at UCT. In mid January 1984, Prof. Dave Woods asked her to come to Cape Town for an interview. Two weeks later she started the Masters degree.

When Romilla went to Cape Town she did not know anybody. One of the things that Dave Woods mentioned in the interview was that he was quite happy to take her

into his department and that “I would get the same excellent training as everybody else. But he could not help me with accommodation. He was not to get involved in politics. As a scientist I respect him very highly, but there were choices you had to make. If I wanted this degree I had to deal with the issue of accommodation.”

To add to not knowing Cape Town or having a car, Romilla did not have a clue where to find accommodation. Her brother introduced her to a person in Cape Town who helped to organise accommodation in Rylands. “The first six months were very traumatic living in Rylands¹⁴ and having to travel to the laboratory. Because of the nature of the research I sometimes just needed to get to the laboratory for 15 minutes to set up a culture on a Sunday so that I could get cracking on Monday morning. Or I needed to come in for 5 minutes to take something out of the incubator and put it into the fridge or look at my data. The nature of the discipline was such that it was far more effective to work six or seven days a week even though it might not be full days. I really dreaded the transport and accommodation problems.” Living in Rylands not only affected the research process but it was also, socially, a very alienating place. “When you come into a department at graduate level you don’t make friends as easily as you do when you come in at undergraduate level. Living away from campus also made it very difficult to make friends.”

Towards the middle of the year things became a little easier. Romilla managed to get accommodation in the medical school residence which was closer to the laboratory and her father gave her an old car which had been revamped. “It was easier to get to the laboratory. From a social point of view it was easier to interact and less alienating in the laboratory.” However from a research point of view she was getting frustrated. “I had just come from London where the pace was faster and the technology and the knowledge was on hand. Although Surrey was a technical college and less research was being done, the network of scientists around a core of knowledge was great. At that stage cloning in this country was very much at its infancy. I was coming to the end of the first year of my Masters and I had nothing to show.” She thought of abandoning the Masters and went for an interview for a research technicians position at the medical school.

¹⁴Rylands is an Indian area about 10 kms from the university. One travelled by bus to the university. In the mornings it was very difficult to get on the bus because of the traffic and the large numbers who were commuting.

Medical school was interested in offering her a job, but first wanted to discuss it with her professor. They phoned back and said that Prof. Robb was not prepared to let her go. “I plodded on and wasn’t getting anywhere. Towards the end of the year there was a turning point in my research. We were trying to make DNA libraries which basically involved taking DNA and cutting it into small pieces, then joining the small pieces to a vector which can be introduced into another host cell. Each host cell will contain a different piece of the DNA which can then be studied. This technology had now been available for a few decades and was made possible by the discovery of enzymes in bacteria which can cut and join pieces of DNA. This was one of the breakthroughs that made recombinant DNA possible - you can now cut and join virtually any two pieces of DNA and one of the vectors that we used for taking foreign DNA and reintroducing it into the cells are called plasmids. We were struggling with this. We were at the infancy in this country and we did not have many vectors. We used a vector that someone had brought from Belgium and managed to make a library. When that happened the whole department had champagne to celebrate. We had finally arrived! That was a turning point in my research programme. I now had something concrete that I could work on. I had succeeded in getting a clone of what I wanted. The next obvious stages were the characterisation. At that stage I decided that I would upgrade to a Ph.D.”

Romilla had two supervisors, Prof. Frank Robb and Prof. Dave Woods. “It was a good combination of supervisors. Dave Woods was more professional, very clearheaded and an experienced supervisor. Frank Robb enjoyed having the status of an overgrown school kid. Both of them were very enthusiastic about the work. Dave Woods, as a supervisor, was very good in that he supervised a large number of students but still had a very good idea about what all the students were doing. Every morning he would go around to each laboratory and chat with each student. If you were busy you would chat with him later that day. Frank Robb, on the other hand, would come running to you if he saw you were about to look at some new information or results. Even if you tried to lock him out you could not succeed. He was more in touch with the bench and would sometimes plan an experiment with you or even assist you with developing the technology.”

In the department there was a team of people working. There were not many black students doing graduate work. Romilla indicates, “It was very clear at that stage that if you got a degree from a historically black university then your qualification was not considered good enough for you to enter a historically white university. Ironically those very individuals ended up getting Ph.D.s in Germany and post-doctoral degrees in Harvard in the US. If you look at all of those individuals, you will find that those of us who got our first degrees out of the country or at historically white universities were able to gain entry into a historically white university for a higher degree.”

The issue about accommodation persisted throughout her studies and “virtually every year I was in tears because of the accommodation problems and sometimes friends would bring in their flowers and chocolates and say I am sorry, I don’t understand what you are going through but I feel for you.” In her second year of study Romilla managed to get a flat that was attached to the medical residence. During the time she was there Nozibelo Mjoli came to UCT on a post-doc and she did not have any accommodation. She got a spare bed and slept in the lounge for three months. At that end of that year Romilla was asked to leave the flat and “I was really, really very distressed.” Romilla is bitter about the experiences of trying to find accommodation at the beginning of each year and all the traumas caused out of that experience. She feels that UCT as an institution was unsupportive and did not care about the students. They could have been more organised in their approach to accommodation issues for black students.

Because of the Group Areas Act Romilla was not able to find accommodation close to the laboratory. About that time, UCT had acquired Groote Schuur Mansions. This was the first block of flats that they had acquired. “In order to live in this Rondebosch flat I had to apply for a residence permit. Once again I was weighing up principles versus desire to complete this degree. It was very difficult. I needed to be close to the laboratory. The only way I was going to get this flat was to apply for the residence permit through the university. In a sense I think I was being used as a guinea pig to test the water and see whether it could help to get black students to live in Rondebosch. It was not an easy decision to make because it clashed with my principles. While people were engaged in protest marches here I was trying to live in Rondebosch. In order to continue with my studies it was a necessary thing to do. Many of my friends refused to apply for permits. I went ahead and managed to get that permit. Having got a

permit for one person the university then used it to get a blanket permit.” By the next year there were about 80% black students in the Rondebosch residence. “For me one of the biggest traumas was the Group Areas Act and getting accommodation with which white students had no problems. The accommodation problem continued to the end. In fact I left UCT at the end because of the accommodation issue. I had obtained a postdoctoral position at UCT medical school. I had written up the doctorate while working as a post-doc.”

In the second year of her Masters degree, at the end of 1984, Romilla decided to upgrade from a Masters to a Ph.D. Besides the accommodation obstacle, other obstacles were the normal research ups and downs. Romilla had a CSIR and then FRD bursary for her four years of study. “I tried as far as possible to survive on what I had. Fortunately I had a sister who from time to time spoiled me with extra money.”

“We were working on an organism called *Vibrio alginolyticus* which was isolated from decaying hides by Dave Woods. One of the important characteristics was that it produced very highly active proteases (biological catalysts that degrade protein) and another enzyme called collagenase (breaks down collagen). The initial interest in it was the potential use of the protease in washing powders and the collagenase which could be used to break down the meat products. In our biochemical studies we started looking at the nitrogen metabolism in this organism because it was related to proteases. One of the advantages of recombinant DNA technology is that it enables you to isolate the specific piece of DNA, so that you can then look at the protein that is formed by DNA. You can then study the protein, you can make large quantities of the protein or you can look at what determines how the protein is made. You can also change the DNA to see what consequences it has on the protein. The broad interest in this bacterium was its nitrogen metabolism. One of the essential enzymes in nitrogen metabolism is an enzyme called glutamine synthetase which is involved in nitrogen assimilation. My aim was to clone or isolate that piece of DNA that was responsible for synthesising this enzyme glutamine synthetase. The technology for this is more advanced today. There are many approaches one can use but the approach that one used then was to isolate the DNA from the normal bacterium, to cut it up into small pieces and then put the small pieces individually into plasmid and then introduce the plasmids into another bacterium. You have what we refer to as a ‘library.’ In other words we had something like 6000 bacteria, each one

containing a plasmid with a different piece of DNA. Ideally, that chromosomal DNA was now being cut into pieces and was being represented by 6000 different pieces. The reason for using a plasmid is that the plasmid in the bacteria self replicates - in other words it makes copies of itself independently. Even though the bacterial cell is not dividing, the vector plasmid can make maybe thirty copies of itself. This provides an opportunity to make vast quantities of DNA in which you are interested. The piece of DNA in the bacterium and in the plasmid can also make large quantities of that protein product. We were interested in cloning the glutamine synthetase gene so that we could then isolate the DNA to study it: to look at the DNA sequence, to see what factors determine whether or not this enzyme is made in the bacterial cell. How does temperature affect it? How does oxygen affect it? Once we obtained that, I knew that there were very obvious things that we needed to do in terms of characterising the structure and studying the regulation of this enzyme.”

This was still a developing technology in South Africa, so Romilla found the research process “exciting but it was also very frustrating. Sometimes I struggled. I would discuss problems with others. Sometimes ideas were wrong and I felt that I was fumbling in the dark.” The group developed techniques as they went along. They were the first group to start cloning in the department; they had to set up to do the sequencing of DNA and had to set up to do the transcription studies. “This is a method that is used to find out exactly where RNA synthesis starts in a region of DNA. This technology was developing in the country so there was no one else in the country to consult with. Those researchers who were a year or two behind found it better. It was useful to go through the learning experience in developing methods, but frustrating because it slowed the pace of progress. It was challenging and the success was an exciting experience.”

Romilla explains the process of her research. “One of the things you can do once you have characterised the isolated gene is to find out more about how it makes protein. The DNA will make messenger RNA (translated into a different code). From the messenger RNA proteins are made (decoding of the message). There is a very specific point on the DNA at which messenger RNA synthesis starts. There are techniques for determining this. In the system that I was studying it was important that we determine that start in order to explain how the synthesis of the enzyme is controlled in the bacterium. I was getting frustrated. It was getting to the end of my fourth year and I

needed to write up. I remember Dave Woods telling me that I could not submit my thesis until I had determined the transcriptional start of the gene. I was very upset, because I just wanted to complete my Ph.D., and walked out in tears. Frank Robb came to me and lectured me about how good and dedicated I was. Of course that made me feel worse. He asked me to go home, rest for the weekend and we would think of a new strategy on Monday. On Monday we did design a new strategy. It was an idea Frank Robb had suggested earlier. About two weeks later I discovered what Dave Woods wanted me to do before I could submit my thesis. I walked into his office with the autoradiogram and he said 'right you can drink to that tonight'. It was a good balance having Frank Robb with whom you had a close relationship and Woods who was a very experienced and clearer scientist."

The atmosphere in the laboratory was collegial. There was much interaction with weekly laboratory meetings and seminars. "We were all working on the same organism but on different aspects and different genes." Romilla enjoyed her relationship with her supervisor. "I was on a learning curve. Your research was directed, but you made it your project and drove it as well. I was fortunate that I had good supervision from my undergraduate days to my graduate days. That experience moulds you into a supervisor as well. Dave Woods believed that what mattered was that you did the work, whether you chose to work a late shift or an early shift, and at some time you were around to interact. That is the kind of environment in which I functioned well. Both of them also kept up to date with the literature, so you were sharing that as well. There was also that freedom where, when you got a result you could buzz and say you wanted to discuss the result with him. I do know situations where people cannot do this. That is the kind of open and flexible environment in which I functioned well. In a research environment you need to be able to share that moment; so yes, I have pleasant memories of doing research, being able to walk into an office with test-tubes in my hand and share it with someone. With Dave Woods you had to take the initiative; whereas Frank Robb would be running behind you. There was a constant sharing of this excitement. It was a good working environment."

At the end of the four years, Romilla completed her bench programme, but did not finish writing it up. She realised she wasn't going to get a bursary the next year so she looked for a post-doctoral position. "I was specifically looking for something that would

last for about a year, because I had planned to write up, submit and then go for an overseas post-doctorate.” Romilla was fortunate to get a UCT post doctoral cancer research fellowship on the medical campus. She partially wrote up her thesis while working.

When asked to describe what getting a Ph.D. has meant to her, Romilla says, “Actually getting the Ph.D. is an anti-climax. Submitting and finishing writing that Ph.D. is a big moment. Then there is a fear of possible rejection of your thesis. If it is not rejected there is a sense of relief. By the time one gets to the end of writing a thesis, it is such a long drawn out task that one is more relieved to get it over and done with. The enjoyment comes from doing the research and the times that you spend in the laboratory. There is greater satisfaction from getting a publication accepted.” Romilla says that the Ph.D. is seen “as a qualification that I needed to have in order to get the jobs that I wanted.” Romilla had decided that she wanted to be involved in research and academia.

When I asked Romilla why she succeeded in getting a doctorate when many others from her school, community and university did not get one, she answered, “I think it has been a combination of opportunities, support and self determination. Without the self-determination, the support and the encouragement would have not helped. There had been a number of times when I considered quitting – like when you have spent a month on the experiment and you don’t get any result. However, when you get to the stage where you feel that the end is something you can attain, then the frustration is reduced.” Answering a question about her special strengths and qualities she says, “I think it is passion for the subject, the drive, the determination, the ambition and the dedication. Academia is an environment I enjoy. I enjoy intellectual interaction with colleagues and students.” Romilla obviously enjoys research and the research process. “I enjoy working at the bench, physically doing the experiments and seeing what you are doing”.

When I asked Romilla to reflect on how the UCT experience has changed her, she says, “Firstly, the whole experience focused on research and that was a very good training experience.” There was also a change at a personal level. “I left for England because I was running away from my personal problems rather than apartheid. During my stay in the UK, I did not see a very bright future for me in South Africa. During the five years in Cape Town I became very politically aware but not as an activist. I became

hopeful for change in the country with opportunities for myself and for blacks as a whole. I then felt hopeful to apply for a job at Natal University. When I finished at high school I never considered this an institution I could go to. At the same time I was feeling quite frustrated with the double standards practised at UCT.”

Around 1986 during her student days at UCT, Romilla presented a paper at a conference. Her supervisor, Dave Woods, encouraged her. “In research an acknowledgement of your work and your achievement is presenting a paper and publishing your work. At that stage in one’s career, one associates a publication with credibility. The initial publications are really important because you know that if your work gets published it means that your thesis is more likely to be passed. Subsequent publications no longer depend on this but there is a greater sense of achievement and satisfaction in getting that work published.” Most of the publications were joint publications. “My first publication was co-authored with my two supervisor’s. The bench work was solely mine. Then I had some co-authored publications. The nature of the work is such that it takes two years of full time research to get anywhere near a publication. And the field moves extremely fast. When I started my Ph.D. a cloned gene was worth a paper. By the end of five years it was worth a paragraph in a paper.” Romilla agreed with my comment that in research people do not start off working on their own, and that it is important to have a mentor with whom to work. “The nature of the work is such that you can have difficulties and unless you communicate and share the experiences and problems with other people it can be a very frustrating. At UCT, where there is a team, this communicating and sharing experience is made possible. In Chicago, where we were a large group, we learnt from each other and shared our experiences and expertise. Natal was isolating. Research, certainly in disciplines like mine is becoming more interdisciplinary and there has to be a core of people with whom you can share resources and interact with.”

After the doctorate: need for structural security

As Romilla came towards the end of her Ph.D. she saw her career in research and knew that the next stage in her training was post-doctoral work. “The nature of the discipline is such that one is not a fully trained researcher until you have undertaken post-doctoral research training and published as a post-doctoral researcher. The overall

experience of post-doctoral work contributes to one's development as a scientist. It is only in the post-doctoral phase that you are really considered an independent researcher.”

During her post-doctorate as a cancer research fellow at the University of Cape Town medical school, Romilla worked on the human tissue. She looked at diseased tissues. From a research point of view, it was not productive but she says she gained experience from working with co-workers. Romilla was in this post-doctoral position until May. By December the previous year she had to vacate her flat and lived with friends for a while. She decided to take another post-doctorate; but overseas this time. “Much of the leaving had to do with the problem of accommodation. On one hand there were opportunities for research in Cape Town but you realised that accommodation was always going to be a stumbling block.”

Romilla took up the second post-doctoral position at the University of Illinois with Prof. Ananda Chakrabaty. It was a very lonely experience at the university because it was a commuter rather than a residence campus. Romilla slotted in very easily into the research programme in Chicago. “The nice thing about working in such an environment is that you would work as a team of about 10 post-docs and 10 pre-docs. You had a broader scientific community with whom you could interact, seek advice and bounce ideas about. I worked on that project for about two years. One needs to work a little longer before one can say that I am a bit of a fundi in the field.” It was a good experience and during her period in Chicago Romilla had two peer-reviewed publications.

During that post-doctoral training in Chicago, Romilla decided that she wanted to return home and look for job opportunities. “I had enough of being a student. I wanted structural security in my life and I felt it would be good to have a home. I looked at faculty positions where I could still be engaged in research and enjoy teaching.” She applied for various positions in South Africa, including a position at Natal University. It was a job specifically advertised for someone with molecular biology training to set up a laboratory in the Department of Biochemistry. When Romilla got the job, the first thing she had to do was to set up the molecular biology laboratory. But she found that it was extremely difficult for young researchers to get support in South Africa. “When I came into the department, the faculty priority to set up the molecular biology laboratory was

number three on the list. After that it dropped to number twenty. I kept trying to stress the point that we needed this laboratory to get things going because the department had absolutely no facilities or equipment. It was a very frustrating time for me. About a year and a half later, a new Head of Department was appointed. He was very supportive. But the first two years were extremely frustrating for me. There was a bit of research money from the university. It was very difficult to set things with nothing and no support. I became demoralised. The reason I will criticise the system is that at the time I was appointed there was also a full professor who was appointed in genetics. This professor, a German, only stayed for one month but qualified for seed money, which in some institutions can be up to a quarter million rand a year for a professor. If you are a lecturer you get nothing and you are supposed to set up one of the most expensive high tech areas. I felt that the system was not prepared to take a gamble on a South African, but they were prepared to take a gamble on a foreigner who may not stay for long.”

During this time Romilla was getting more and more demoralised. “I had a publication drought partially because of that.” In the meantime she decided to use the seed money that she was getting from the university to get some basic equipment and build up a reagent bank. Romilla then decided to apply for Foundation for Research Development (FRD) rating and use the money from this to cover running expenses. When she applied for her FRD rating the head of the research committee said, ‘We don’t think you should submit now. You should apply next year and get a C rating’. At the time that she applied for a rating she had just turned 35 and knew that she could do better with a Y¹⁵ rating than a C rating. She applied for and got the Y rating. For the most part Romilla felt unsupported in the faculty (there was some support from her HoD). “I think the last straw was being told that I was not publishing and if I published they would give me support. I had to beg, borrow and steal until then.” Romilla felt more and more frustrated in the work environment.

During that period, at University of Natal (Pietermaritzburg), Romilla felt alienated in being at a historically white university and applied for jobs at other universities - University of Durban-Westville, University of Western Cape. She was unsuccessful. Romilla was also criticised by some of her black colleagues for taking a position at a Historically White University (HWU). Romilla acknowledges that the

¹⁵ Promising research award for under 35s.

majority of the black students are at Historically Black Universities (HBU), but says there are black students at HWUs and it is important for those students to have a support system from black faculty members. “What was being said was that I should not go to the HWUs. This meant we should not have access to these facilities. I remember Khotso [Mokhele] saying, ‘Stay at Natal’ and others saying ‘You have crossed the bridge by going to Natal’.” Romilla’s colleagues at the HBUs were under the assumption that it was easy for her and she would have easier access to funds, resources and infrastructure. Romilla says that would have been true if she had slotted into a programme where all the facilities were found. She had difficulties setting up a new laboratory at UNP because, in the university research committee, she was competing with established researchers, and being at an HWU she did not have access to the UDP¹⁶ funds. She fully acknowledges that people at HBUs had it hard in that they did not have facilities.

During this period of feeling isolated and frustrated, the first ABSET meeting was called. Romilla got involved in ABSET because she identified with the issues there and saw the need for a pressure and support group for black scientists, engineers and technicians. Her involvement with ABSET, in university internship programmes and student mentorship programmes put her “under tremendous fire in the department.” She was accused of being more interested in politics than research. “Given who we are and where we had come from it was impossible for me to bury myself in my laboratory and play with my test -tubes or engage with benchwork and not give some of my time to mentorship programmes. I was in a conflict situation with my faculty members. I felt that energy and time was being wasted in trying to argue and justify why I needed to get involved in the mentoring and internship programme. After the supportive Head of Department left it was more stressful. While there are departments that are so-called liberal there is still racism - subtle and blatant. There are obstacles that black people, both as faculty members and students, face at HWUs. I was criticised for taking five or six days during the year for ABSET meetings or mentorship programmes. The criticism made life unpleasant and it got quite serious where I had to get an arbitrator from outside the department. At the end of the day what it all boiled down to was that I had a stronger personality. I could not divorce myself from making a contribution and helping

¹⁶ The University Development Programme Funds (UDP) were set up to provide infrastructural support to HBUs because the apartheid government had disadvantaged them.

the black students in particular. I made it very clear that I was committed to these students and these programmes, but the argument was that I should have been thinking about molecules fitting together!” During the time at UNP Romilla did manage to set up a functional laboratory with a considerable reagent bank.

During this period Romilla was feeling “isolated and alienated” because “my views were different from my colleagues.” Romilla felt there was no way that she could not get involved in these programmes, even if it impacted on her research programme. UNP was not a happy place for Romilla. “When this position [at MRC] came up it was suggested that I apply for it. I thought this would be a different way of using my skills and I would be working with Dr Mapule Ramashala¹⁷. It was a difficult decision to make, because I knew that I was giving up a research career, but I could use my skills differently and try to establish research and infrastructure - something in which I had always been interested. If I were happy in the department I would have stuck it out and got through that hump into the publishing mode, but I was very unhappy and it was time to leave.”

Reflections: different places, different settings, different experiences

Romilla experienced the South African academic world differently in the two regions that she had worked, Cape Town and Natal. “The UCT experience compares favourably with the international scene. At the end of the day it boils down to an ethos within a department. In London, for example, even though it was a technical college where there was limited research, there was still a seminar programme, journal clubs, and interaction with lecturers. In Cape Town, there are active journal clubs in which you could participate. At UCT, from an academic point of view, each time a faculty member went overseas, he or she would come back and give a report. There was much sharing of information and interaction. We had ‘chatties’ during tea-times when graduate students had to give five-minute presentations of recent journal articles. There was an academic interaction. In Natal, John [Eccles] and I tried to get this off the ground, but we failed. There were fewer graduate students and less research was being done. This meant that rather than having a vibrio group, for example, and having weekly laboratory meetings, we tried to get the department involved where graduate students had to give a lunch time

¹⁷ Dr Ramashala was a Director: Human Resource Development at the Medical Research Council, but has subsequently taken up a position as Vice Chancellor at the University of Durban-Westville.

presentation of what they were doing. Normally that amounted to a report once every two or three months. There was tremendous resistance to this. Students felt that faculty would use this to belittle them rather than to give constructive advice. The other frustrating aspect was that it was near impossible to get people involved in regular research meetings or in journal clubs. People were too focused on their specific disciplines while they kept complaining that they didn't know molecular biology."

I asked Romilla to reflect on how the fact that she is a black person in South Africa shaped her trajectory in the academic field. She says that her opportunity came out of "purely personal circumstances that resulted in my ending up in London." From that opportunity came a big break in that she gained an honours, with an upper second in biochemistry from the UK, and was considered sufficiently well qualified for entry into UCT. "I am sure that had I been a UDW graduate my fate would have been the same as many of my other colleagues who had to leave the country to get their higher degrees. In some ways I can claim the benefit in having worked hard and having trained under a highly respected science system in the country. That does give you credibility. When you meet people they say, 'You must have trained with Dave Woods, you must have been well trained'. For me it was getting the first degree out of the country that created the break". She feels that things might have turned out differently in her work environment had she been at a historically black university at the time that the development programmes were being implemented. "Then I would have been able to use those development programmes in developing as a scientist. Because my pride had taken a little bit of a beating in having had a publication drought, I feel that only those individuals who understand the discipline and the difficulties would appreciate having a functional laboratory. If I had to take up a position at Natal tomorrow, with the reagent bank and the laboratory infrastructure, it would be very different because I would be able to go through a very brief lag phase and go straight into the research programme. Part of my reason for going back to Natal was that it is my home town and I had been away from it for so long. It was an opportunity to be close to the family again."

When I asked Romilla to reflect on how the fact that she is a woman, shaped her life in academia, she said "In student life and training, I have been fortunate that I have worked with people who have been very supportive of me as a person, irrespective of gender. In my post-doctoral training in the US, although the professor himself had fixed

ideas about male and female roles he was very supportive and not discriminatory of women. If anywhere, I felt it to a lesser degree was at Natal University. When you become faculty member it begins to surface; as a women you are in the minority.” Within the professional field there are two camps of men: those men who are supportive, encouraging and acknowledge you irrespective of your gender; and, those men who are very sexist.

In the broader community Romilla has had difficulties being accepted as “Doctor.” She relates incidents like wanting to cash a cheque or using a MasterCard and being asked if it was her husbands! The broader community did not really understand the concept Ph.D. Amongst family and friends, they have “pride in me to the extent of embarrassing me.” Romilla sees the qualification as an opportunity to open job opportunities and not as a status symbol. There is a sense of achievement and acknowledgement from those people who do understand its meaning.

Romilla is now programme manager at the Medical Research Council. She is studying for an MBA at the Graduate School of Business at UCT. “When I accepted this position one of the acknowledgements was that I lacked experience in micromanagement. I discussed the possibility of gaining skills and training in management as part of their affirmative action programme for developing managers for people from the disadvantaged community. When I took this job I wanted to continue with microbiology research; but the nature of this job and the nature of the research in which I was involved made it very difficult. It is very difficult to be an effective manager and an effective researcher; so I have moved from research into management. Part of this management training is for me to decide which way I want to go. What I am hoping to gain from this programme are not only management skills, but also skills involving strategic planning.” Her future plans: “Research capacity building is certainly a long-term programme. I am in a state of transition - from academia to management. I have been in this position for about six months and perhaps in about two or three years, will reassess and I will see which way I want to go.”

MOVEMENT THREE

CHAPTER ELEVEN

FROM INDIVIDUAL ACCOUNTS TO SOCIAL INTERPRETATION: GENERATING THEORY FROM STORIES

1. INTRODUCTION

In this study so far I have individual accounts describing and explaining how each person's life unfolded on her or his path to gaining a doctorate. These accounts illuminate how an individual negotiated her or his academic path in a South African society during the period 1948 to 1994. The individual accounts illuminate the interplay of the family, social, political, economic, institutional and individual dynamics in shaping the academic trajectory. The stories explore the ups and downs, contradictions, ambiguities, successes, failures and compromises in their academic lives. Each story describes what happened in their lives, and, by configuring the different dynamics through a plot, provides an explanation of why the life unfolded as it did.

I want to move from an explanation for the unfolding of an individual life, to examining, across the ten stories¹, how and why this group of black scientists managed to achieve academic success in the unequal South African society. This chapter will discuss the theoretical issues related to providing an explanation. The next chapter is the analysis. In this chapter I will discuss the following:

- i. the theoretical issues related to qualitative data analysis;
- ii. explanations and causality relating to using qualitative data;
- iii. cross-case analysis;
- iv. the theoretical issues related to analysis from life history data;
- v. examples of theory generation from life history data;
- vi. issues to be considered in analysis of life history data to produce theory;
- vii. how I proceeded with the cross-case analysis across the ten stories to provide an explanation of why this group achieved academic success.

¹ The stories of six participants are included in this dissertation. I have not included the stories of Dr Prins Nevhutalu, Prof. John Volmink, Prof Tembi Magi and Prof Zola Vakalisa. A brief description of each is include in Appendix A, in chapter 1, section 4 and chapter 3, section 6.5.

Although this chapter deals explicitly with the issues of analysis, it does not mean that this is the only time that analysis has occurred. Analysis occurs at all stages of the research process including the conceptualisation and data gathering processes.

2. QUALITATIVE DATA ANALYSIS

At the heart of analysis is the understanding that regularities are to be found in the physical and social world. Epistemologically, I concur with the realist position of Huberman and Miles (1998) who believe that social phenomena exist not only in the mind, but in the objective world as well, and there are some lawful, reasonably stable relationships to be found among them. Huberman and Miles indicate that the lawfulness comes from the sequences and the regularities that link phenomena together and it is from these that we derive the constructs that account for individual and social life.

There are no standard approaches to the analysis of qualitative data. This can be both an advantage and a disadvantage. It could be an advantage to allow one the freedom to explore different approaches to analyse data. The disadvantage could be that without one being explicit about the process and subjecting it to some criteria which indicates the degree of acceptability, this could lead to a relativist position where every explanation is as good as any other explanation.

Bryman and Burgess (1995) indicate that many qualitative research reports and research texts do not make the research analytical process explicit. They further indicate that many autobiographical essays about research remain silent about analysis. There are more reports on how I did the research (and the social interactions involved in the research process) than how I analysed the data.

2.1. Types of data analysis

Qualitative data analysis leads to the generation of a set of analytic categories. The analytic categories can be configured to provide an explanation for social and human phenomena. The work of Bruner (1985), in the psychological domain, has been useful in providing ways of using stories to produce explanations. Bruner has designated two types of cognition: paradigmatic and narrative. In Chapter Four, I discussed narrative cognition. Paradigmatic type inquiry gathers stories for its data and uses paradigmatic analytic procedures to produce taxonomies and categories.

Polkinghorne (1995) describes the features of paradigmatic cognition. The primary operation of paradigmatic cognition is classifying a particular instance as belonging to a category or concept. Paradigmatic thought links the particular to the formal. Most qualitative analytic procedures emphasise a recursive movement between the data and the emerging categorical definitions during the process of producing classifications that will organise the data according to their commonalties. Qualitative analysis then looks for a second level of analysis that identifies the relationships that hold between and among the established categories.

Polkinghorne (again from the psychological domain where the emphasis about stories has been on how it is said rather than what is said) uses Bruner's differentiation of the types of cognition to indicate different types of narrative research. He calls the type that employs paradigmatic reasoning in its analysis, analysis of narratives. In analysis of narratives researchers collect stories as data and analyse them with paradigmatic processes. The paradigmatic analysis of narratives seeks to locate common themes among the stories collected as data. The researcher inspects the different stories to discover which notions appear across them. Two types of paradigmatic analysis are possible:

- i. one in which concepts are derived from previous theory or logical possibilities and are applied to the data to determine whether instances of these concepts are to be found. Deductive inquiry starts off with a good bank of applicable, well-delineated concepts and takes on a more explanatory stance involving multiple, comparable cases.
- ii. one in which concepts are determined inductively from the data. Here the researcher develops concepts from the data rather than imposing previous theoretically derived concepts. Inductive approaches work well when the terrain is unfamiliar and/or complex and the intent is exploratory and descriptive.

The strength of paradigmatic procedures is their capacity to develop general knowledge from a collection of stories. This kind of knowledge, however is abstract and formal, and by necessity underplays the unique and particular aspects of each story. Analytic induction, grounded theory approach and grounded theorising are inductive approaches that have been used in research to generate concepts. Another important procedure used in qualitative research analysis is "thick description."

2.1.1. Analytic induction

To uncover constructs which explain the regularities in the social world, analytic induction uses an iterative procedure – a succession of question and answer cycles. Cressey (quoted in Plummer 1983) used this mode of analysis in the 1950's, and he indicates the procedures for analytic induction as follows:

- i. A rough definition of the phenomenon to be explained is formulated.
- ii. A hypothetical explanation of that phenomenon is formulated.
- iii. One case is studied in the light of the hypothesis with the object of determining whether the hypothesis fits the facts in that case.
- iv. If the hypothesis does not fit the facts, either the hypothesis is reformulated or the phenomenon to be explained is redefined. The new definition must be more precise than the first one.
- v. Practical certainty may be obtained after a small number of cases have been examined, but the discovery of a single negative case disproves the explanation and requires a reformulation.
- vi. This procedure of examining cases, re-defining the phenomena and reformulating the hypothesis is continued until a universal relationship is established, each negative case calling for a re-definition or a reformulation.
- vii. For purposes of proof, cases outside the area circumscribed by the definition are examined to determine whether or not the final hypothesis applies to them. This step is in keeping with the observation that scientific generalisations consist of descriptions of conditions, which are always present, when the phenomenon is present but which are never present when the phenomenon is absent.

2.1.2. Grounded theory approach

The goal in a grounded theory approach is to produce theories from data rather than from some apriori conceptualisation. Bryman and Burgess (1995) describe the steps proposed by Glaser and Strauss for grounded theory analyses. After some data collection and reflection on the general area of concern, the researcher generates 'categories' which fit the data. The researcher then moves from one particular sampling source to another according to theoretically relevant criteria that have evolved from the previous case. The researcher then attempts to formulate more abstract expressions of these categories. Hypotheses about links between categories need to be formulated and

tested in the field. Links with other theoretical schemes are then to be explored and the emerging theory is once again tested in the field. This method involves both ‘theoretical sampling’ and ‘constant comparison.’

2.1.3. Grounded theorising

Researchers like Hammersley and Atkinson (1983), Miles and Huberman (1994) and Polkinghorne (1995) recommend “immersing oneself in the data and then searching out patterns, identifying possibly surprising phenomena and being sensitive to inconsistencies, such as divergent views offered by different groups of individuals.” This analysis is exploratory or discovery oriented. The steps proposed by Boulton and Hammersley (1996) for grounded theorising are:

- i. Close reading of the data to identify parts that may be significant.
- ii. Note topics or categories to which data relate and which are relevant to the research focus. The researcher looks for recurrences that indicate patterns.
- iii. Gather segments of data from different parts of the data record that are relevant to the same category.
- iv. Categories produced in the course of coding may come from a variety of sources – e.g. ideas that sparked off the research, general knowledge background or from the data itself.
- v. Initially researchers generate as many categories as possible and not worry about their relevance. The aim of initial analysis of unstructured data is to generate categories, each which collects several segments of data.
- vi. Compare and contrast the items of data that have been assigned to the same category. The aim is to clarify what the categories that have emerged mean, as well as to identify sub-categories and relations among categories.
- vii. It is then necessary to go through the data samples again in case any data segments not previously identified as relevant have been overlooked.
- viii. Further data samples will be analysed, producing new developments in the categories and this will make it necessary to recode previously coded data.
- ix. There is an iterative process that generates categories and interpretations of the data in terms of these categories.
- x. Over time some of the categories will come to be integrated into a network of relationships – this forms the main core of the research report.

True analytic induction and grounded theory analyses is very demanding. Because it has such stringent requirements it has been used infrequently. Often the terms have been used to denote an approach to data analysis where theory has emerged from data. Grounded theorising is used more often and this process facilitates more rigorous definitions of categories through the process of analysis.

Grounded theorising leads to exploratory concepts. From a grounded theory approach one can generate patterns which can be tested later to see if they apply more generally.

2.1.4. Thick description in qualitative analysis

Clifford Geertz (1973) borrows the term ‘thick description’ (as opposed to ‘thin description’) from Gilbert Ryle and uses it to interpret culture in anthropology. Embedded in the notion of ‘thick description’ is a description which incorporates a “hierarchy of meaningful structures” (Geertz 1973:7) and a description which renders the context well, showing intentions and meanings, and how things developed over time. Thick description provides the meaningfulness of detail in the local cultural context.

Thick description is often misinterpreted to be observational rather than interpretive. Yet the data collected by any ethnographer is a multiplicity of complex conceptual structures, many of them superimposed upon or knotted into one another. Analysis involves sorting out the structures of signification and determining their importance. The researcher must first grasp the data and then render the data. The individual stories are thick descriptions of individuals’ pathways in proceeding towards a doctorate.

2.2. Explanations and causality using qualitative data analysis

Explanations involve making the descriptions intelligible. Huberman and Miles (1994, 1998) provide a comprehensive analysis of issues around causality and suggest some features of causality. Firstly, causality necessarily brings in the question of time as part of the explanation. Prior events are assumed to have a connection with later events and we are concerned with finding out what led to what. Secondly, causality is local. The immediate causal nexus is always in front of us, in a particular setting and at a particular time. Therefore we must be concerned with the validity of our findings in a particular setting. Thirdly, the determination of causality cannot be rule bound. The

classical notions of causality proposed by Hume are temporal precedence (A precedes B); constant conjunction (when A, always B) and contiguity of influence (a plausible mechanism links A and B) (quoted in Miles and Huberman 1994). In the human and social sciences a useful approach to determining causality is suggested by the medical statistician Hill (1965, quoted in Miles and Huberman 1994) who, when discussing the environmental causes of diseases, uses the notion of *association* to represent a causal link. Examples of associations are: strength of association (much more B than A than with other possible causes); consistency (A is found with B by many studies in different places); specificity (a particular link is shown between A and B); temporality (A before B, not the reverse) and biological gradient (if more A then more B). A fourth feature that is important is causal complexity. The cause of any particular event is always multiple (Abbott 1992) and 'conjunctural' i.e. causes combine and affect each other as well as the effects (Ragin 1987). The effects of multiple causes are not the same in all contexts, and different combination of causes can turn out to have similar effects. Causes themselves are deeply affected by local context and change over time. Fifthly, assessing causality is of necessity a retrospective manner. Polkinghorne (1988) indicates that the report is "...a retrospective gathering of events into an account that makes the ending reasonable and believable..."

Researchers like Lincoln and Guba (1985) have expressed concerns about explaining human behaviour causally. It is acknowledged that establishing causal relationships for human behaviour is not straightforward (it is sticky and disorderly), but it is still useful in research to try and say something about it. Causality can be determined for a single case or by other cross-case analytical methods which can provide an explanation that is applicable to wider range of cases.

In research which attempts to provide an explanation of why something occurred, I feel, it is important to consider causality. The causal relationships do not have to be explained in Humean terms. Hill provides a useful way to look at causal relationships for human and social phenomena.

3. CROSS - CASE ANALYSIS

In Movement Two, I wrote individual stories to describe and explain the academic trajectory of black South African scientists. In Movement Three there is a cross-case analysis from the individual stories to provide an explanation for why this group of individuals succeeded in gaining a doctorate in an unequal South African society. In this study I am using the term case to be a phenomenon of some sort occurring in a bounded context. Normally there is a focus of attention and a more or less vaguely defined temporal, social and/ or physical boundary involved. Each of the stories can be considered a case.

The aim of cross-case analysis is two-fold: Firstly, cross-analysis enhances generalisability. In research we would like to know something about the relevance or applicability of our findings to other similar settings. Secondly, cross-analysis deepens the understanding and explanation. In multiple case research we can say when a given order of events is more likely or not to occur. Multiple cases help researchers find negative cases to strengthen a theory, built through examination of similarities and differences across cases. Multiple cases not only pin down the specific conditions under which a finding will occur, but also help to form a more general category of how these conditions may be related (Miles and Huberman 1994:173).

There are concerns about the compromises to be made in cross-case analysis. In generating theory in cross-case analysis, the tension is reconciling the individual case's uniqueness and the need for more general understanding of generic processes that occur across cases. There is a tension between moving to a higher level of abstraction (that will incorporate more concepts) and compromising the authenticity of the data. Another concern regards the process of presenting data according to categories as this could lead to the loss of contextual issues. In this study I am presenting both the unique, individual, contextualised accounts (Movement Two) as well as an abstract account (Movement Three).

3.1. Strategies for cross-case analysis

In cross-case analysis one could use case-oriented analysis, variable oriented analysis or mixed strategy analysis (case and variable oriented). Ragin (1987) explains the differences. A case-oriented approach considers the case as a whole entity, looks at configurations, associations, causes and effects within the case and then subjects them

to comparative analysis of a (usually limited) number of cases. In these comparisons underlying similarities and systematic associations are sought out with regard to the main outcome variable. From there a more explanatory model can be explicated. Case oriented analysis is good at finding specific, concrete, historically grounded patterns common to small sets of cases, but its findings remain particularistic. The variable-oriented approach is conceptual and theory-centred from the start casting a wide net over a (usually large) number of cases. The building blocks are the variables and their intercorrelations, rather than cases. Details of any specific case recede beyond the broad patterns found across a variety of cases. Variable-oriented analysis is good for finding probabilistic relationships among variables in a large population, but is poor at handling the real complexities of causation and its findings are general. A mixed strategy integrates case-oriented and variable-oriented approaches.

Miles and Huberman (1994) list some of the types of strategies used for cross-case analysis.

1. Yin (1984) advocates a replication strategy. A theoretical framework is used to study one case in-depth and then successive cases are examined to see whether the pattern found matches the one found earlier. [case-oriented strategy]
2. Grounded theory approach (Glaser 1978) uses Yin's principle but builds the framework inductively, then tests and refines it with recourse to multiple comparison groups. [case-oriented strategy]
3. Forming types or families. Inspect cases in a set to see whether they fall into clusters or groups that share certain patterns or configurations. [case-oriented strategy]
4. Look for themes across the cases. Case dynamics are underplayed. [variable – oriented strategy]
5. Interactive synthesis. An example of this type of study is writing individual cases; then cross-case narrative with themes; then a general explanation and then going back to the individual cases to see how the explanation works there. [mixed strategy]

The use of a mixed strategy of a case-oriented strategy within the variables is an attractive option in life history research.

4. LIFE HISTORY DATA ANALYSIS

The concern about the dearth of information regarding qualitative data analysis is shared by researchers who use life history data. With life history data there is a concern about a lack of information to move from “individual accounts to social interpretation” (Lummis quoted in Perks and Thomson 1998:269). Bozzoli (1991) also cautions that raw oral history or transcripts will appear to be anecdotal unless there is some interpretive structure.

Plummer (1983) indicates that both analytic induction and grounded theory methods are rather formal and not used in life history analyses. Often life history analysis proceeds in a more intuitive and hidden way and the analysis is not explained. As I reviewed the literature on analysis of life history interviews I noted the following. Firstly, the process of analysis of data leading to theory was not always made explicit. This is also reflected in the very small number of books and articles on life history data analysis. On reading a study, one has to infer the data analysis procedures. Secondly, in some studies when the life history data is analysed the findings are presented as a series of ‘uni-dimensional’ themes or patterns. This seems to be in contradiction to the essence of the life history work, which is to move away from the uni-dimensional aspect to a ‘configurative’ understanding. Thirdly, not all studies that use the life history data link the individual experience to a socio-political context. Fourthly, not all researchers present the analysis in a developmental manner.

In this study a life history perspective and interviews and grounded theorising work together to generate theory. Using the concerns I have raised above about life history analyses (e.g. to present a configurative, developmental analyses) and grounded theorising which does not approach the data with apriori constructs I have generated the theory that is presented in Chapter Twelve.

5. REVIEW OF LIFE HISTORY STUDIES WHICH GENERATE SOCIAL INTERPRETATION

I reviewed a number of studies (Casey 1992; Bozzoli 1991; Etter-Lewis 1993; Lawrence-Lightfoot 1983; 1994; Keegan 1988; Truth and Reconciliation Commission Report 1998) that used life history data to develop theory. I categorised the studies I reviewed into the following:

- i. Interpretation of experiences using both quantitative and qualitative techniques (TRC Report);
- ii. Interpretation of experiences using qualitative techniques with the individual still present in the analysis (Casey, Lawrence-Lightfoot, Etter-Lewis);
- iii. Interpretation of experiences using qualitative techniques with the individual removed from the analysis (Keegan, Bozzoli).

5.1. Interpretation of experiences using both quantitative and qualitative techniques

The Truth and Reconciliation Commission (TRC) was constituted in South Africa after the first democratic elections in 1994. Its purpose was to investigate and document gross human rights violations committed within or outside South Africa in the period 1960-94. The Commission based its work on the assumption that objective knowledge (or knowledge that is inter-subjectively reliable) about the social world is possible (TRC Report Vol. 1 1998: 161). The mandate to the commission was to determine who did what, when, why, where to whom? The commission listened to the human rights violation experiences of individuals and took about 20 000 statements. Once the statements were perused, the details of each violation were entered onto a database. “The data processors identified the nature of each violation, its date and place, its consequences for the victim and the political context in which it occurred. They also noted the organisational affiliations of the victims and alleged perpetrators” (TRC Report 1998:142). Once the statements had been entered onto the databases, the team of investigators corroborated the basic facts of each matter according to a standard set of corroborative pointers (court records, inquest documents, death certificates, newspaper clippings).

The Act guiding the work of the TRC required an analysis of “systematic patterns” and of “context, motives and perspectives which led to such violations.” The first level implied a quantitative treatment, and the second necessitated historical or ethnographic reflection (TRC Report 1998: 162). For the purposes of illuminating the use of data I will refer only to the quantitative analysis. The study reports that the comparison of patterns of violations – among regions, across time, between types of victims, and among groups of perpetrators – was the basis for the quantitative analysis presented in the report. An excerpt of the quantitative part of the TRC Report:

Close to half of all statements reporting gross human rights abuses received were from the KwaZuluNatal region. This makes the proportion of submissions relative to the population almost four times higher for this province than for the rest of the country. It was noticeable that the KwaZuluNatal submissions tended to have a lower number of violations per victim (1.4 compared to the national average of 1.8 –2.0), reflecting the large number of ‘single incident’ violations, mostly political killings and arson attacks. (TRC Report 1998:157).

The Commission’s sample was not a probabilistic sample, so one cannot make generalisations to the population. However in these kinds of studies one could say that “there were *at least* 21 000 gross violations” (TRC Report 1998:163).

5.2. Interpretation of experiences using qualitative techniques with the individual still present in the analysis

The works of three researchers are reviewed. Each of the works illuminate different issues relating to the analysis of life histories.

In her study *Why do progressive women activists leave teaching?* Casey (1992) indicates that “the analysis creates a dialogue between the teacher attrition literature and a set of life histories narrated by thirty-three women who have been teachers and progressive activists” (pg. 189). Casey indicates that the political relations of research are designed so that the voice of the teacher is given equal status to that of the academic researcher. “Thus the act of interpretation is largely relinquished to the subjects themselves, while the researcher concentrates on discovering the patterns of priorities in the narrative texts” (pg. 189).

This research uses the life history interviews that Casey conducted for her doctoral study and it extends our present understanding about teacher attrition. The analysis is presented in two forms: one part where the analysis generated from the data is juxtaposed against the literature on women teachers attrition from the profession and the second part where Casey presents themes which emerge from the data that are not found in the literature.

In the analysis Casey draws out themes suggested by the data and these issues are discussed. There are excerpts from the interview transcript to illuminate the various dimensions of the theme. In the analysis Casey shows an allegiance to teachers and presents the teachers who leave teaching as ‘victims’ of the system. Although Casey indicates that there is equal status between the teachers and the researcher she does not indicate how the two groups negotiated the analytical framework and analysis. An excerpt to illustrate the analysis of why teachers leave teaching.

According to these narratives, the trouble with American education is not its teachers, but the oppressive system within which they work. In conjunction with the larger social structure, the educational organisation generates problems which are then blamed on its victims. The same hardworking Black teacher quoted above analyses the reasons why she regrets becoming a teacher in this way:[Researchers voice]

I wouldn't encourage my child. I wouldn't do it again myself. There are so many negative things. The harder you work, the less you are appreciated by some people. There is nothing to be proud of. I don't tell people I am a teacher. Maybe society has a lot to do with it. And too much politics. I don't dislike kids. Even the worst ones. I dislike the system. [Narrators voice]. (page 192).

The discussion of the themes generated from the data is not located within any larger socio-historical-political context. Nor are the themes discussed developmentally.

In her studies, Sara Lawrence-Lightfoot uses life history data to generate knowledge about social phenomena. In *The Good High School* and *I've Known Rivers* the analysis is in the form of both individual stories and a group story. In the *Good High School* (1983), Lawrence-Lightfoot calls the final chapter a 'group portrait.' In this group portrait she presents the main themes from the individual stories. Although each story is unique, there are themes that emerge in all the settings, "often in different forms and with different levels of success and purposiveness." In presenting the analysis in the final chapter, Lawrence-Lightfoot indicates that the chapter is "rich with vivid and textured examples of how the themes get expressed through personality, structures, interactions, ideology, habits, rituals and symbols" (pg. 26)..

Within each theme Lawrence-Lightfoot uses the data to develop a theory about how this issue contributes to success in a school. She then discusses what these ideas mean for each school – there is a discussion of both the abstract and particular level. An excerpt to illustrate the analysis is given in the theme of Feminine and Masculine Qualities of Leadership:

In each of these dominant principal images, authority is centralised; power is hierarchically arranged with the principal poised at the top of a steep pyramid; the metaphors are strikingly masculine; and personal characteristics combine with institutional role to produce a bigger than life size figure....[later in the paragraph].....A deputy of Brookline's principal talked about the discomfort many faculty feel with Headmaster McCarthy's attempts to be an "ordinary person".....[later in the paragraph].....In Milton, some reluctant faculty complain about the broad distribution of power. (pg. 324 & 325)

The school portraits are developed from ethnographic rather than life history data, so there isn't a historical dimension to the explanatory constructs.

In *I've Known Rivers* (1995), Lawrence-Lightfoot tells the story of six African-American achievers. Here identity is examined as a dynamic intersection of race, gender, class and culture (pg. 9). The final chapter is a cross-case analysis from the individual stories and in this chapter Lawrence-Lightfoot "traces the common currents

running through these lives.” She reflects on the experience of telling and listening to life stories; the effect of the relationship between the respondent and researcher and on issues of race. In this synthesis section, having identified the theme, Lawrence-Lightfoot discusses the theme in a general manner and then indicates the experiences of each of the six respondents with respect to the theme. An excerpt to illustrate the analysis is given in the theme of Rage and Love: On Race.

All of these storytellers will not be defeated by the abuses of racism that echo through their ancestry, their family histories, and their daily lives. Though they bear the scars of racist assaults and can vividly recall moments of humiliation and terror, they refuse to be bowed; they refuse to be passive...[later in the paragraph]...Charles Ogletree, for example, has learned to embrace the discomfort of living on the periphery of Harvard while refusing to become part of it...[later in the paragraph]...Katie Cannon not only lives the contradictions; she purposefully emphasises them in her life and her teaching. (pg. 642 & 643)

Lawrence-Lightfoot comments that in these stories, where the explanatory constructs are discussed over a historical period, the ingredients of identity are dynamic and changing.

Etter-Lewis in the second part of her book, *My Soul is My Own: Oral Narratives of African-American Women in the Professions*, entitled ‘Interpreting a Woman’s Life’ interprets across the eighty stories to provide a theoretical understanding of African-American women’s lives in the professions. Etter-Lewis examines all (80) the women’s stories and draws themes from the data. A further aspect that is examined by Etter-Lewis is the structure of the narrative. Etter-Lewis, who specialises in socio-linguistics, and is interested in discourse analysis, finds it important to also look at the structure of a narrative as “the very words and phrases selected by a narrator gives a distinctive shape and meaning to her story.” In the section on Interpreting a Women’s Life, Etter-Lewis discusses the issues of writing and the relationship between researcher and respondent and the importance of discussing this aspect in relation to developing life stories.

In discussing these themes that have been drawn from the data Etter-Lewis locates the discussion in a broader socio-political, historical context and links the issue of the theme to the literature. Excerpts from the interview transcript are juxtaposed against the literature to illuminate the issue. An excerpt to illustrate the presentation from the cross-case analysis: (page 79,80)

There were some actions at other campuses that were even more conspicuously biased. Elmira never forgot a talk with one of the deans: [Researcher’s voice]

All the [black] girls were called in...to the Dean’s office and we were all told that we should be as unobtrusive as possible on the campus. That we were members of the subject race, the university did not really want us, but as it was a city university it had to take us. (36:1,p.23) [Narrator’s voice]

Singling out women in the first group of African American students to enroll at this university sent a clear message. African American women were the most undesirable of the undesirable. They were expected to be grateful for being there and to be quiet. They did neither: [Researcher's voice]

Etter-Lewis does not indicate the process of grounded theorising. In her analysis Etter-Lewis theorises about the experiences at different times, but she does not examine any of the constructs over a time period. Although Etter-Lewis interviewed about 80 women, there is a possibility of also including a quantitative analysis but she does not indicate the frequency with which any of the issues occur.

5.3. Interpretation of experiences using qualitative techniques with the individual removed from the analysis

In the book *Portraits of Black Lives in Rural South Africa*, Keegan (1988) presents the individual stories of black (African) South Africans who lived and worked in the countryside. In addition the book investigates “wider themes of social and economic change by examining the lives of a handful of individuals” (Preface). Although the author asserts that the book is not intended to be scholarly it presents a chapter of interpretation (Social Transformations on the Highveld) from the individual accounts.

In developing theory from individual stories Keegan does not directly refer to the individual experiences. The theory is presented in the form of a seamless narrative rather than a discussion around a series of themes. In generating theory, the constructs employed are examined over a period of time. Keegan locates the theory generated within the historical period to give meaning to the experience. An excerpt to illustrate the generation of theory from the data is:

But it was not directly the Land Act that caused the traumatic experiences of dispossession and displacement amongst black farm families at the time. Legislative intervention was a reflection of heightened public awareness, alarm and debate over these issues amongst whites; but it did not of itself initiate the rural upheaval. Informants remember that during these years, they were obliged to sell off their ‘excess’ livestock, to render increased labour to white landlords, hand over a larger proportion of their crops in rent, and generally to place themselves and their productive resources more closely under white control. White landlords were flexing their muscles and asserting their dominance at the point of production. In 1913, these forces culminated in a mass dispersal of resistant and ‘unproductive’ blacks off the land, the first ‘forced removal’ on a large scale from the white-owned farms of the highveld, and as such the forerunner of much human tragedy that continues to this day. (page 140 & 141).

In the study blacks are not presented as “defenceless” victims, but as individuals who are also able to “shape the reality of their lives, individually and collectively” (pg. 155).

In the book *Women of Phokeng: Consciousness, Life Strategy and Migrancy in South Africa, 1900-1983*, Bozzoli (1991) uses a life history approach to understand the formation of consciousness among a group of rural, black African women from Phokeng. This study uses life stories of twenty-two women, who were around 70 to early 80 years when they were interviewed, to explain the historical and structural development of consciousness. Bozzoli uses an apriori explanatory construct of ‘life strategy’ (i.e. each woman views herself as a decision-making existential being, who pursued a strategy of her own) to explain the development of consciousness.

The analysis is two fold: it is presented in a chronological manner and there is a concluding chapter which explores the explanatory construct of life strategy and shows how it changes over time. The cross-case analysis from the stories is presented chronologically over different time periods. It starts with Peasant Daughters, 1900 - 1915 and ends with Grandmothers and Pensioners, 1980–1983. The concluding chapter of Life Strategy and Social Identity is an analysis of how the different dynamics impinged on a life at a particular time and how a particular decision was taken.

In the analysis, Bozzoli was careful not to treat the women either as victims or as romantic heroines. The study also rejects the false dichotomies of race, class and gender but rather suggests an analysis which incorporates African Marxism and Africanist thought and incorporates a gender dimension. The study treats the interviewees as historical subjects and attempts to confront the question of the historical and structural formation of consciousness. How and when it is formed is seen as a process, located within time, place and material reality. An excerpt to illustrate the writing up of the analysis:

It was the period of their adolescence – and particularly the period discussed in the pivotal Chapter 4, which coincided with the period during which pre-capitalist expectations were loosened – that saw the formation of the basic life strategies of the women. They appear to have adopted what may be called a “life stance” during this time, one shaped by the changing and contradictory institutions through which they passed in their youth – church, school, family and cash economy... [later in the paragraph]... They sought freedom from certain pre-capitalist controls; but they were out to use this freedom to establish themselves as active participants in and creators of households that embodied some of the values drawn from their youthful upbringing. (pg. 237).

Bozzoli (1991:15) views the book as “more a source of insights about people than about theories.”

6. ISSUES IN THE ANALYSIS OF LIFE HISTORY DATA

A review of the literature involving qualitative and life history data analysis suggests a number of issues. I will formulate these issues in the form of questions.

1. What type of data sources does the researcher use? Does the researcher use only life history interviews or are other sources also used?
2. Is the analytical framework made explicit in the study i.e. are we told how the researcher moves from individual accounts to social interpretation?
3. Is the data subjected to a case or a variable analysis or a mixture of case and variable?
4. In which disciplinary or theoretical framework is the study contextualised?
5. Is the approach to the analysis inductive or deductive?
6. Does the researcher analyse the data from a qualitative, quantitative or qualitative and quantitative framework?
7. Does the study present individual lives as either victims or romantic heroes or heroines or, are the individual lives presented as human lives with its ups and downs which shape and is shaped by the contextual dynamics?
8. Are the explanatory constructs in the study presented in a developmental manner?
9. Is the explanation located in a socio-historical context?
10. Is the explanation from the data linked to current literature?
11. Is the analysis presented as a single theme or as configurative understanding?
12. Is the analysis an abstract account where the individual is lost, or is it an account in which the individual still appears or both?
13. What is the relationship between the researcher and participant in the analytical process?

7. HOW I DID THE CROSS-CASE ANALYSIS

In this research I constructed stories from the experiences of ten black scientists along their pathways to gaining a doctorate in South Africa. The purpose of the study is to explain how and why this group succeeded in gaining a doctorate in this unequal society. The stories illuminate how individuals negotiated their pathways towards gaining a doctorate. In the cross-case analysis I examined the ten stories (six of which

are presented in the thesis) for patterns that would tell us how the participants negotiated their pathways.

In analysing the data across the cases to develop an explanation I was guided by the issues raised in the section above. To make sense and contextualise the experiences in society I have included a chapter (chapter two), written from the analysis of other documents, about the political, social and educational landscape in South Africa during the period 1948 to 1994.

The study is based on the assumption that their lives unfolded as a result of the interplay of political, social, economic, institutional and individual dynamics. My first attempt at the analysis across the stories was case-oriented. I wanted to write a collective story that would illuminate the similarities and differences of how their lives unfolded over time. Because of the volume of data, I found it difficult to manage that process. My next attempt at cross-case analysis was to characterise the political, social, economic, institutional and individual dynamics as variables. As I explored this categorisation I found that there was a great deal of overlap among the categories. These lives were lived in the political context of apartheid South Africa and the political dynamics permeated all aspects of life. A more useful set of categories for analysis was social, institutional and individual dynamics. These dynamics are embedded in the political and economic realities of South Africa. Within the social I will examine the variables of family, gender and class. The institutional will encompass both educational structures and cultures.

I approached the analysis inductively. I did not want to approach the data with apriori constructs to impose on the data to measure its fit. This analysis would be exploratory. Using a grounded theorising approach I wanted to generate explanatory constructs from the data as to why this group achieved academic success.

In order to make sense of the data I had to immerse myself in the data and search for patterns. In looking for patterns as to why the group succeeded I did not want to just tell a nice story. I did not want to see the individuals as either romantic heroes or heroines or as victims of the system. I wanted to present them as individuals whose academic pathways were shaped by the context in which they lived and that they also shaped their contexts. I wanted to critically examine the opportunities that individuals had, the constraints they met, the contradictions present in the decisions they took and the compromises they made in reaching their final outcome.

I examined each of the stories in relation to each of the variables and the outcome i.e. how did that variable (social, institutional, individual) contribute to the outcome of gaining the doctorate. I examined the variables at different stages of the persons career: early childhood, school, undergraduate and postgraduate studies. I looked for patterns (both in terms of coherence and divergence) across the ten stories. Within each of the variables the analysis was case-oriented.

The first part of the analysis is presented as, what I have called a 'composite thick description'. In this composite thick description or what Bozzoli calls a "thicker description" (1991) there is an analytical description of the ways that the participants experienced that dynamic. Themes relating to sub-categories like gender, race and disciplinary focus will also be presented. In the composite thick description of the variables I discussed the issues and referred to individual cases to illuminate a point.

From the variable analysis I asked a second level of questions. Given that the individuals experienced these dynamics (social, institutional and individual) in the apartheid political and economic context, how did they negotiate these dynamics to achieve academic success. In other words, what are the over-arching explanatory constructs from the data which suggest why this group achieved academic success at a particular time in South Africa. Given that this is a life history approach, the explanatory constructs must have a developmental dimension and could express itself differently in different time periods. These explanatory constructs must be located within the political-social-educational context of South Africa.

In order to come to these overarching I developed a causal network, in relation to the research question, for each of the participants. A causal network is a display of the most important independent and dependent variables in the field of study and of the relationships among them (Miles and Huberman 1994:153). These relationships are multidirectional and it assumes that factors exert influence on each other. Miles and Huberman (1994:154) provide examples of causal networks. Cross-case causal networking is a comparative analysis of all cases in the sample and asks questions around variables that are assumed to be most influential in accounting for an outcome. A series of iterative questions around why did this group succeeded in gaining a doctorate suggested various explanatory constructs. These constructs were constantly refined and combined to produce the explanatory constructs in the thesis.

The next step was to examine how the different categories contributed to providing an explanation. This explanation is not in the form of a linear causality but more as influences and associations.

This study is about explaining why participants achieved academic success in an unequal society. I did not review the literature relating either to career theories or achieving academic success in unequal societies. I started the study with the assumption that there are different dynamics that shape a life; that these dynamics shape the life differently at different periods. These dynamics are not static constructs but interact with one another. By using a grounded theorising inductive approach, explanatory constructs were generated from the data. For the purposes of this study I will stop at this point. It will be the task of future studies to further investigate the exploratory constructs that this set of data generated.

8. ISSUES FROM THE ANALYSIS PROCESS

8.1. Participant on the shoulder

As I analysed the data and began to postulate explanations for academic success, I became aware that I was providing an explanation for people who were in the public domain and who had analytical skills. As I attempted to make sense of the data a voice in my head constantly asked what each of the participants would say to that analysis. This caused a pressure to be extra careful with the interpretations from the data. This could be seen as a positive where the analysis process enforces integrity and validity.

8.2. Relationship between researcher and participants in the analysis process

One of the political advantages of life history work is that it narrows the gap between researcher and participant. I sent the individual stories back to the participants for review and comment. I decided not to send the chapter on the cross-case analysis to the participants for review. As the researcher of the study I had developed the analytical framework. The framework had not been negotiated with the participants and I felt it would not be fair to the process to ask the participants to comment on the findings. If they were invited to comment then I would have to devise a mechanism to incorporate their comments into the analysis. In life history research the data is the lives of individuals, but the life is not data until it is articulated.

8.3. Tension between the particular and the abstract

In the cross-case analysis process I had to move from the intimacy of the individual stories to an abstract level. In the process of writing I acutely felt the criticism of analysis of life history work that in that process, the individual is lost. In order to keep the intimacy of the stories I included both the abstract discussion as well as quotes from individuals.

8.4. Issue of representativeness

In this study there are ten participants, five men and five women. Racially there are seven Africans, two Indians and one Coloured. This study does not make the claim that the sample is representative of the South African population. For the purposes of this study the participants were chosen for what they would illuminate about issues rather than representativity. However the cross-case analysis with the limited sample does illuminate patterns which are suggestive of common and uncommon factors that affect the progress of the group. From this we can learn something about probable reasons for academic success. Later we can create the opportunity for others to test whether this applies more generally.

All hypotheses generated must be seen in terms of its illuminative, exploratory value. Later studies can test these hypotheses in larger samples.

9. KEY ISSUES FROM THIS CHAPTER

Analysis of the ten stories will provide a more useful explanation as to how and why this group achieved academic success. The analysis will incorporate variable and case oriented strategies and causal relationships will be postulated in terms of influences.

CHAPTER TWELVE

GAINING A DOCTORATE IN AN UNEQUAL SOCIETY: *How and why this group of black scientists gained doctorates?*

1. INTRODUCTION

The individual stories illuminate the interaction of the dynamics of gender, race, ethnicity, social status, economics, religion, schools, universities, workplace, family, significant others, intellectual culture and individual characteristics to produce the academic pathways traversed by each person. Each of the stories is unique, but across the stories there are patterns that emerge which can explain why this group achieved academic success.

This study is about ten people in a very particular and extreme socio-political situation during a unique period in history (apartheid South Africa). However, the knowledge generated from this study is useful. Firstly, it contributes to an understanding about how individuals succeed in academia in unequal societies. Secondly, while one cannot generalise from ten stories, the study does suggest themes that can be studied further using larger samples in different contexts.

The purpose of this chapter is twofold: Firstly, it is to provide a composite thick description of how different variables shaped the academic pathways in apartheid South Africa for this group of scientists. The variables that I have chosen to provide the composite thick description are the social, institutional and individual dynamics. The second purpose is to develop constructs that explain how and why this group succeeded in gaining a doctorate in an unequal society, which discriminated against black South Africans.

2. ACADEMIC PATHWAYS AND THE VARIABLES OF SOCIAL, INSTITUTIONAL AND INDIVIDUAL DYNAMICS

In this section the stories are examined in terms of how each of the different variables (social, institutional and individual) shaped educational life histories and academic pathways for this group of ten scientists over a period of time. Each of the variables is discussed separately. I recognise that the dynamics interacted in shaping the academic pathways, but for the purposes of analysis it is convenient to discuss them separately. I will present a cross-case analysis under the categories of social,

institutional and individual dynamics. The social will encompass issues of family, gender and class. The institutional will encompass both educational structures, cultures within the different institutions and the ways that people act. The individual dynamics will refer to those individual characteristics that affect the academic pathways.

The discussion will be presented as a composite thick description of the ten stories around the unfolding of the academic pathways. The stories suggest three distinct periods (pre-university years, undergraduate years and graduate years) in the individual's academic life and the discussion will be framed around these periods.

2.1. Social experiences and the academic life

2.1.1. Family

In the early years, families played a major role in shaping and directing their children's lives towards their academic pathways. Parents were academically ambitious for their children. In later periods families offered support (including financial and childcare) to pursue academic studies and careers. The family is an enduring support mechanism in the lives of all participants.

The group came from warm, stable, hardworking, two-parent (except Prins Nevhutalu who lost his father when he was at primary school) families. Religious and moral values were part of the family culture. Most came from big families with eight families having between five and nine children. Two families (Tembi Magi and Ahmed Bawa) had two and three children each. Five of the participants are the eldest in the family and two (Romilla Maharaj and Zola Vakalisa) are the youngest. All participants have at least one sibling who has a tertiary education or a profession. This phenomenon, of a tertiary education for the children, differentiates these families from the education level of their relatives or the community around their homes.

Both parents of three participants (Botlhale Tema, Nozi Mjoli, Phuti Ngoepe) had professional qualifications (their fathers' were teachers with a Bachelor of Arts degree; two mothers had a teaching qualification and one was a trained nurse). The mothers of three participants (Tembi Magi, Prins Nevhutalu, Zola Vakalisa) had teaching qualifications or had taught after high school. Four participants (Ahmed Bawa, Khotso Mokhele, John Volmink, Romilla Maharaj) had one parent with at most a standard eight education. In three of these four cases the mother had a higher level of school education than the father. The parents were educated in the 1940's or before – a time when very

few blacks would have gained a secondary education or training for a profession. In this milieu there was a strong expectation from parents for their children to have a higher education than themselves. In addition to parents and siblings the grandparents, the extended family and friends formed part of the circle of academic influence. The influence of the extended family was especially significant in cases where the parents did not have a high level of education.

The families valued education very highly and this was inculcated as part of the family's value system. The children were brought up with family stories about struggles in difficult circumstances to gain an education. These family stories become internalised and some felt that if their parents had struggled under difficult circumstances for an education, how, under relatively easier circumstances, could they not succeed. Many saw education as an obstacle course and a struggle. When they met with difficulties they accepted it as the way things would be and found ways around them.

Education was not linked to a career but was a value. For me it was part of character. It went deep, even when you got married and chose a husband, my mother would say: 'when I got married I was faced with choosing a rich man (someone who had a shop) or an educated man.'...In society it [education] is more respected and more valued. [Botlhale Tema]

If you have father like mine who got his education through struggle, it would be a shame not to get anything. [Nozi Mjoli]

Most participants did not recount or make sense of their experiences in political terms during the early years. Their lives were experienced within the family, community and school. They lived 'normal' family lives without explicitly challenging the political structures and its injustices. Families were aware of the political injustices. The National Party Government came into power in 1948 and parents had direct experience of the introduction of the apartheid policies but politics was not discussed openly at most homes. In many families the strategy to deal with the powerful state was to outwardly, at least, accept the policies and continue with one's life. The mode of contesting issues was by subtle rather than full-on confrontation. Perhaps parents saw gaining an education as the contestation and a way to upward mobility.

He [her father] was political in the sense that when I left for boarding school he would say 'don't bother what they (meaning white people) feed you. Just know why you are there. Just learn and get what you want'. [Zola Vakalisa].

Participants from rural areas with less political awareness were less inclined to contest political issues than their urban peers. The greater political awareness in the

black townships was another competing force along the academic pathway for those who went to township schools. About half the participants were brought up close to cities and the other half in rural settings. Mokhele and Bawa, because of their interactions with their activist uncles, experienced a greater awareness and involvement in political activities during their growing up years.

When the participants went to primary school, most parents and elder siblings assisted with homework and supplemented the work done at school. This was especially useful for those who attended rural African primary schools. Without the extra support from the parents the children may have found it more difficult to achieve exceptional performance. It was this early exceptional performance of these individuals that brought attention, encouragement, expectation of success and a belief that they could be educationally successful.

At the end of primary school families expected their children to go to high school, although most did not express any preference for specific curriculum choices. The fathers who were teachers seemed to have seen the advantage of science and mathematics in the high school curriculum and ensured that their children went to schools that offered these subjects. Families with more resources and access to information were able to make decisions with more foresight.

Families provided support but they also had to deal with crises and traumas. At the onset of the teenage years there was conflict between parents and their children. Participants now established their own agendas and relationships and there was some strain on family relationships. The pathways through the school years were not smooth and it was not guaranteed that on starting primary school all the participants would complete the matriculation examination. There were many counter forces to completing a school education. For example, Bawa experienced competing pressures from different sides of the family to either go into the family business or continue an education. Fortunately his parents' foresight to steer him towards education shaped the academic pathway. Women (Magi, Vakalisa) experienced pressure from their school peers and the community to enrol at a nurse's college after the Junior Certificate examinations but again their parents encouraged them to complete the matriculation examination and go to university. There was pressure to give up school to supplement the family income (Nevhutalu); but because he was an academically exceptional student the other siblings gave up their studies to work and provided an income. Tema's family provided support

when she fell pregnant in high school and took care of the baby while insisting that she complete her schooling.

The families strongly supported schooling and had an expectation that the participants would go to university. When a parent did not have the aspiration for a university education for their child, relatives convinced parents about the importance of the university route. In seeking a university education for their children most families did not have an explicit idea of where the degree would lead, although some families had aspirations for their children to proceed to medical degrees. Parents saw the bachelors' degree as providing better opportunities for their children.

During the university days parents and siblings continued to provide a strongly supportive role. They provided finances for university. Family stories of struggle in education helped sustain some participants to continue in the face of adversity. The home provided a safe place to come to when the university world was turbulent. They provided encouragement and alternatives when failure was experienced. Families (Tema, Mjoli, Vakalisa, Magi, Bawa) assumed full childcare responsibilities so the participants could continue with their studies. More generally families provided support to their children's families.

Because of the family influence and support in their lives, there were times that individuals felt pressurised to make decisions which pleased their parents more than themselves. Sometimes these parental decisions worked out and at other times they did not.

At that point my father laid down the basics. I had to do exactly what he wanted and was not exercising a choice. I had made such a bad choice of schools and he had wanted to send me to a good school. Now I just had to do the right thing. The right thing was doing a Bachelor of Science.
[Botlhale Tema]

Family still provided stability and support when the participants married and had their own families. All the men, except Mokhele, were married and all had children during their graduate years. All the women, except Maharaj, had children. Magi was married with two children, Tema was widowed with two children and Mjoli and Vakalisa were unmarried with two children each. For the women with children their parents or siblings provided childcare and took responsibilities for the children during study periods. The women without partners (Tema, Mjoli, Vakalisa) felt secure that their children were part of their parents' families and this gave them the freedom to explore their academic and working lives away from their children. In addition, parents

provided financial support and a safety net when participants took risks in choosing to forego an income for their studies.

Partners were supportive of the participants' involvement in studies even though this decision meant a loss of family income and a deferment of structural and financial security for a few more years. Several partners were involved in their own studies and had their own professional lives but were supportive of the participants academic pathways. Those who went overseas to study took their partners, and in some cases, also children with them. Having families during study years must have created pressures to give up studying, to get a secure job and income (structural and financial security) as well as a pressure to complete the studies in the shortest period of time. In addition participants felt a pressure from parents and siblings to provide financially for others in the family.

The family was a very important shaping influence in their academic lives. It provided stability in participants' lives and resources to access education and opportunities. Parents inculcated the value of education and supported the participants throughout their academic lives.

2.1.2. Gender

The participants in this group consisted of five women and five men. The mothers of the four African females had trained as teachers or taught after secondary education (i.e. their parents had encouraged them to study post high school and they gained a teaching qualification). After marriage and a family their husbands discouraged them from teaching. Fathers displayed what appears to be ambivalent behaviour of discouraging their wives from working but encouraging their daughters' education and pursuit of science. The women saw their fathers as the key influence on their education in their early years. This early support from their fathers was important in shaping their belief that their gender status was not a constraint to success in the academic field.

When I went to university and did a B Sc., my father had no problem. I am saying my father because at that time going to matric was a big thing. Many fathers would say it is a waste of time. Why are you taking a girl to matric? After standard 8 let her go to nursing.... My father. I would safely say that he was the first feminist I knew. [Tembi Magi]

Mothers saw a profession for their daughters as giving structural and financial security but they would have also preferred those (professional) roles to be integrated with their roles of wives and mothers.

The mothers of four men worked (two professional and two domestic workers) during their formative years. Most of the men acknowledged their mothers as the strong, motivating force with the vision to encourage education for them. They saw mothers as the persons who provided the family with stability.

During their time in school the women experienced very little gender discrimination from fellow students or staff. Most had experiences, at least for part of their school career, of studying in a girl's only environment. Mjoli, a very good student, was not given permission by a nun to study physical science in the senior secondary phase because she [the nun] did not like 'girls from the Eastern Cape.' Her response to the obstacle was to comply with the decision of the person in authority and seek an alternative subject.

The women experienced gender discrimination at universities. While the women were encouraged by their families to follow a science career this was not fully endorsed by their undergraduate experiences at black South African universities. At university they experienced subtle discrimination. Afrikaner lecturers questioned the logic of black women studying mathematics. A lecturer who did not take his students on excursions blamed it on the presence of a woman (Magi) student (she discontinued the course the following year). A woman student, Mjoli, was encouraged to do a Masters in science education rather than the natural sciences. The biological science courses had equal numbers (if not more women) of men and women, but the mathematics and physical science courses had very few or no women. A male student taking physics commented how (retrospectively) he realised that the female students who did start the course were subtly harassed and discriminated against by lecturers until they discontinued.

In first year our professor would come in and say, '...gentlemen'..... and later say, 'Ladies'. He would always forget ladies. I remember there were a number of women in first year and the professor would focus on one woman and ask her all the difficult questions until she disappeared from the class. Then he would ask the next woman student until she disappeared. At the end of the year we were left with only two women in class. When one thinks about that one realises how much pressure was put on women at that time. [Phuti Ngoepe]

It seems that because of institutional discrimination the women strategically chose the biological rather than the physical or mathematical sciences (although they had

attempted courses in mathematics or physics or chemistry) because this was where they felt they had a better chance of passing.

During their undergraduate days none of the women studying at South African universities were encouraged by lecturers to think about studying further. Most of the men received that encouragement. Romilla Maharaj, who studied at an overseas university for her undergraduate degree had a different experience; on performing well she was encouraged by lecturers to think about further studies. These women made decisions on their own to pursue their graduate studies and when they went to overseas universities they were encouraged (often by male lecturers) and offered bursaries to continue their studies.

When the participants were asked about how their sex affected their pathways, the men acknowledged advantages. At home they indicated that their sisters experienced more pressure to stop school and start earning. The family applauded their good performances and they were protected and expected to continue performing well in school. In school the girls had to conform to the stereotypical images of docility and choosing careers like nursing and social work. Men did not experience that pressure. In their own families they acknowledge they do not 'lose' time because of child bearing and child rearing. They recognised that the work environment was very male dominated and women had to deal with feelings of alienation from their co-workers.

The women did not explicitly indicate that their pathways were affected by gender dynamics and yet my analysis of the interviews indicated subtle ways in which gender dynamics did affect their pathways. Child bearing affected academic pathways of women. The women were fortunate that their families assisted in child rearing responsibilities and thus women were able to continue with their studies. The women did postpone studies, more often than men did, to spend time or re-establish contact with their children after a separation.

Families encouraged the women to follow academic pathways. If the father was supportive it facilitated a better entry for the women to this world. Continuation on these academic pathways was reinforced by their own performances and some support from the school level. This was not reinforced by their experience at South African universities at the undergraduate level. It was the women's own disposition towards pursuing academic work, support from parents in assuming child care responsibilities and affirmation from overseas lecturers that facilitated their pathways. In South Africa

during this period, race politics was the primary dynamic shaping academic pathways of black people. As one of the participants indicated, “In the high days of apartheid the issue was more about being black than being a woman”. (Tema)

2.1.3. Economic Resources and Cultural Capital

In attempting to categorise the families in terms of class, I found a Marxist definition where class is treated as an economic phenomenon inappropriate for this sample and study. Weber (as quoted in Giddens 1973) critiques a Marxist position that fails to recognise the part played by status affiliations through processes which are not directly dependent on economic relationships. The notion of social status embodies more than wealth or professional status. The two signifiers which seemed most appropriate to the participants of this study were social status (perceived or real) and financial resources. This could be linked in an overarching concept of class. For the purpose of this analysis I have chosen to retain the twofold grouping.

Six of the participants had at least one parent who was a teacher. Maharaj, Mokhele and Volmink’s parents had what are classified as working class jobs (driver, domestic worker, tea-lady, clerk) and Bawa came from a family of subsistence storekeepers. Parents with degrees provided more intellectual capital to their children and encouraged them towards a university education. There were direct role models of graduates. For those households without that intellectual capital it was the school (especially high school) that provided the intellectual capital.

In the earlier years all the families had or perceived themselves as having a higher social status than others around them. This sense of difference came from attributes like parent’s professions, wealth or position in relation to the community in which they lived, caste, isolation from the rest of the community, skills gained from being part of slavery, social contacts as a result of having a shebeen or moving from a big town to a village.

We could be middle class in terms of imbibing Western ways and Christian dogma....On my mother’s side where I grew up, they had very little contact with the African culture because they were brought up in a slave relationship and they came up with this idea that there were things that were heathen...they had made butter, kept bees, poultry and planted trees. [Zola Vakalisa]

Khotso’s father Kenosi quit school when he was in standard 7 and his mother quit in standard 8.... In the township there were people more educated than Kenosi, yet by virtue of his worldliness he “socialised upwards.” ...Kenosi became a bootlegger, “Not only did he have the worldliness that made educated people want to be around him, but he also had the commodity that educated people could afford to buy.”... The family did nothing spectacular. “I honestly grew up believing that there was something special about us.” [Khotso Mokhele]

Although the family were subsistence shopkeepers in a little hamlet, “there was a certain complication with regard to my particular nuclear family. My mother came from Durban and she actually thought she was different from others in Greytown.” [Ahmed Bawa]

These families had a sense of being better, different and above others. This sense of social status contributed to the social and cultural capital of the individuals and this enhanced social and cultural capital probably contributed to shaping their aspirations and confidence. They felt they could explore and pursue areas that others had not or could not do before. This confidence encouraged them to explore uncharted territory and prompted them to start and continue in a science career when all around them they saw people who had failed or they were told about people who had failed science. They were not discouraged.

Education costs money. The paths of their lives were shaped within the availability of financial resources. There were three levels of economic conditions that shaped the pathway of the group. Firstly, because of the Job Reservation Act of 1956 the families of participants did not have access to high level jobs. Secondly, the African group, unlike the other racial groups, had to pay for their education and only those families who could afford it were able to continue. Thirdly, there were a limited number of bursaries available which facilitated further studying.

In keeping with the apartheid policies black families, even professional ones, had limited financial resources. In addition most were big families so there were strong competing pressures between continuing with education and earning money. Schooling was free and books were provided for the Indian and Coloured children. African families had to find the financial resources to pay for education (fees, uniforms, books). Primary school did not place major financial burdens on parents. At the high school level, most African families knew that a boarding school would provide a better education than the local high school. Although the families experienced different degrees of financial difficulty all the African participants attended boarding school. Prins Nevhotalu had a very good academic record but he could not afford to attend a boarding school that had a reputation of producing good results. Rather he attended another boarding school where his mother could get a job as a matron. Sufficient financial resources for access to boarding school do seem to have given individuals a better chance of academic success.

During the 1970's the business sector and economists indicated the adverse consequences of apartheid policies for the labour market. Consequently businesses, which were keen on the creation of a small black middle class, created a limited number of scholarships and bursaries for those who could not afford university education. In addition during this period more state loans and bursaries became available (Badat: 1999:62). Many of the participants applied for these loans and bursaries. The financial assistance came from big corporations or teaching bursaries or loans from a homeland government. There were contradictions in that while the participants saw big business and homeland systems as part of the apartheid machinery they accepted these monies to continue their studies.

The availability of financial resources shaped the career that individuals followed as well as the time taken to complete their studies. Nevhutalu was unable to follow a medical career (for which he was accepted) because of a lack of finance. Volmink and Vakalisa followed teaching careers because they took teaching bursaries to fund their science degrees. Bawa studied part of the degree part-time and Volmink and Vakalisa left university for a few years so that they could earn money. Nevhutalu failed two of his first year subjects because he did not have the money to purchase textbooks. The participants knew the financial pressure the family experienced because they were at university and they responded by being determined to complete in the shortest period of time to ease the financial burden and allow siblings a similar opportunity.

Schooling was number one with my mother. She would rather that we do not have a good pants but she would make sure that we had books and go to school.... We all strived to do well at school. We knew that there was an army coming behind and someone was making a personal sacrifice. [Prins Nevhutalu]

Parents were the sole source of finance during the schooling years and the quality of schooling that participants received depended on parents their financial position. Participants experienced the greatest financial vulnerability during the undergraduate years, as there was limited access to other funds. Financial dynamics were negotiated during this period with parental and sibling support, bursaries and loans, working for a few years, part-time studies and knowing that you need to complete in the shortest time as there were no resources to take extra time with studies. Supporting one family member, with the limited financial resources, either at school or university, sometimes meant that other siblings lost educational opportunities. First-born children or those with an outstanding academic performance were more likely to be privileged. Another

financial consequence of individuals being at university was that they were not earning and contributing to the family income.

Participants experienced financial constraints differently during the masters and doctoral programmes. Six studied the masters and nine the doctorate on a full-time basis. Bursaries facilitated full-time study with the family providing additional support. The availability of bursaries was a critical factor in the decision to study overseas. Without that overseas opportunity, the route towards a doctorate would have been much more difficult.

During the masters and doctoral study periods, many of the participants had their own families and they experienced concerns about home loans and other financial responsibilities. Full-time study meant a loss of income. It seems that the belief that the doctorate will lead to greater career and social benefits motivated them to continue.

University education is expensive and most families experienced this pressure. This group managed to attend university because they were able to mobilise the requisite financial resources and they had social capital. Many others did not have the opportunity for a university education because they had no financial resources.

2.2. Experiences at educational institutions and the academic life

2.2.1. Schools

All the participants went to the local, state, primary school and lived either with their parents or grandparents. Most enjoyed their early years at school. The Indian primary schools (attended by Bawa and Maharaj) had good facilities. The teachers were good, dedicated, knew their subject matter and those who saw ones potential nurtured it. The state provided books and schooling was in English. During this period English was also the language spoken by children at home. The Coloured primary school (attended by Volmink) was also a warm place with teachers and the principal being positive, encouraging and supportive. Students could choose to go to an Afrikaans or English medium school. The physical conditions in African primary schools differed. Schools in rural areas were in a poorer state than schools in the townships. Schools were overcrowded, there was no electricity or running water and facilities were minimal. The state did not provide books for African students. Teachers were caring and interested in the students, but there were authoritarian relationships with recitation, rote learning and

memorisation as the main mode of instruction. There was corporal punishment in the classrooms to ensure discipline and encourage learning. Some of these students were singled out as special (either because of performance or family connection) and this attention spurred them to further improve their performance.

I was ahead of the other children who did not have parents who could help them. English was supposed to be the medium of instruction from standard 3 upwards; but in reality instruction was a mixture of Xhosa and English and when it came to writing the exams, everything had to be answered in English. The textbooks and notes were in English. In this environment teachers encouraged students to memorise the books. That is the only way to deal with a situation where people have to adapt from using the mother tongue to English. [Nozi Mjoli].

The medium of instruction in the African primary schools was mostly in the mother tongue with English introduced later except in the American mission school, which Tema attended, where it was English. Afrikaans was introduced as a school subject in the senior primary years. Most of the participants could not clearly remember their proficiency in English, but they knew that neither their nor their teachers' proficiency in English was good. By the end of primary school, most African learners were proficient in at least one African language (one had proficiency in 2) and English and knew a bit of Afrikaans.

Irrespective of the physical, material or social conditions of schools most participants indicated that they enjoyed primary school and learning. It was not seen as onerous and they felt privileged to go to school. These participants had a higher than average academic ability and performed well in primary school examinations. Many African participants had their primary school education supplemented at home. Parents who were had an education, especially those who had taught, assisted with homework, reading, writing stories or participating in competitions. Participants whose parents had a limited education did not receive assistance from home with homework. It seems that the Indian and Coloured schooling system provided enough inputs for students to succeed and perform well at school. In the African schools with fewer resources and poorer teaching, students needed to have exceptional academic ability or have a mechanism to supplement (either parents or older siblings) school inputs at home. Three participants (Magi, Vakalisa, Tema) were in school when the Bantu Education Act of 1953 was introduced. Magi and Vakalisa remembered this change because of the introduction of Afrikaans in the school curriculum. Bothhale Tema's father removed her from the state school and enrolled her at a Catholic Mission school. Those who started school in the 1960's were not explicitly aware of the meaning of Bantu Education. They

remembered being told, in a superior voice, by parents and family friends who quoted their “Royal Readers and Chamberlain Readers” that they had had a better education.

There was no doubt among parents that the group would go to secondary school. Even in households with limited financial resources, parents believed in the value of education. Secondary education at the local Indian schools was good. The schools buildings were in good condition, there was reasonable (but not exceptional) facilities, classes were not overcrowded and teachers had the requisite subject matter knowledge, interest in their students and passion for teaching. Schools emphasised results that would allow entrance to university. One school offered physical science and the other did not. Although Bawa travelled 17 km to high school he did not see the need to travel 40km to a school which offered physical science. He saw no great need nor was he told of the value to take physical science. Parents were interested that the children received a ‘good education’ and physical science was not an explicit choice. When Bawa and Maharaj completed their matriculation they performed well and had some conceptual understanding of the subjects.

The Coloured high school that Volmink attended was characterised by a combination of different types of teachers. There were those who were drunks, abused girls and taught poorly. There were also teachers who inspired and appeared as intellectual, but did not necessarily have the depth of subject matter knowledge. The good students enjoyed a privileged relationship with the teacher and that special relationship spurred them to work harder and perform better. The good teachers invoked the aspiration in Volmink to be like an intellectual. Parental motivations and aspirations for their children were to gain an education, especially in English which was perceived to have high currency. Science was not an explicit choice by either individuals or parents. If someone performed well in junior secondary school they were put in the A class in senior secondary school. These classes automatically offered mathematics and science subjects. Students coped with their subjects by working on their own or assisting each other. At the end of high school Volmink felt they had little conceptual understanding of the sciences.

One of the effects of the political situation in the country was that the government provided an inferior education for blacks and Africans were the most severely disadvantaged group. All the African participants attended boarding school for all or part of their high school. This was either because there was not a senior secondary

school in the area in which they lived or they recognised the limitations of the local high school for a quality education.

For most, boarding school meant a separation from family because boarding schools were a distance from the family home. The family needed to have money to pay for boarding school. Catholic boarding schools were more expensive because they did not get a subsidy from the government, but the other boarding schools would still cost more than that for the local school.

The staff of five of the seven boarding schools was mostly white and in the other two boarding schools they were African. The quality of instruction varied in these schools. Two (Shawbrey and St Augustines attended by Vakalisa and Magi in the 1960's) had limited resources and poorly qualified teachers or no teachers for mathematics and science in standard 10. The peer group in school was influential in the choice of subjects and for the formation of study groups to teach each other.

Tema and Nevhutalu attended boarding schools staffed by Africans. These schools had poor physical and material conditions. One school, though staffed by teachers who were often drunk and often absent from school still offered an education which embodied the principles of critical awareness and critical thinking. Tema had these contradictory experiences at the school. Nevhutalu attended a school that had just begun to offer a senior secondary education. The Principal was motivated to make this an outstanding school in the area and attempted to recruit good teachers. The school had an outstanding mathematics teacher and students had a good grasp of mathematical knowledge. This input contributed to Nevhutalu getting the second highest mark in the matriculation mathematics examination.

They brought in a new mathematics teacher. He was a dropout from Turfloop and he was outstanding. The English teacher was doing English 3 at UNISA and he used to tell us about things he was doing....We were the cream of the crop and teachers would find time to sit and talk with us.[Prins Nevhutalu]

Mokhele and Ngoepe attended boarding schools staffed by mostly Afrikaners and Mjoli attended a boarding school staffed by mainly German nuns. In these schools the medium of instruction was either English or Afrikaans so at the end of high school students were bilingual or multilingual. The participants saw these changes in the medium of instruction as part of their schooling career. They did not contest it, but developed strategies to cope with the changes in language. This group obviously developed successful strategies. In these schools there were good facilities, good

teaching and students generally understood the concepts. Students studied on their own or had peer group interaction. There were contradictory relationships with the Afrikaner and German teachers. On the one hand they had a good grasp of the subject matter, but on the other hand teachers either still espoused the government's ideology or asserted unjust authority over the students. When participants met with racism or nastiness from teachers most recognised the power differential in the situation and negotiated around this to achieve their main goal. They seemed to have taken the view that achievement of the long-term goal (school success) was more important than the short-term confrontation. They recognised that they were exposed to better teaching and learning conditions than in the township or village school and that could use that situation to their advantage. Maintaining this perception required them to have a strong belief in themselves and an ability to appear unaffected and undeterred by attempts to undermine their self-confidence and commitment. It seems that it is largely their ability of focussing on the goal and feeling the pressure, especially from family, to succeed, that enabled them to continue. In addition they learnt to internalise and redirect anger rather than confront the people in authority in the unequal society. The skill of negotiating around racism and with people who did not have their best interests at heart was acquired. It proved to be very useful in their undergraduate years at the black universities. These participants (and their parents) saw education as a strategy to change the economic and social conditions of their lives. Achieving that goal meant that often they had to live within and comply with aspects that were unfair.

White Afrikaners who most probably espoused a Nationalist political ideology staffed Moroka. The students were exposed to and imbibed SASO principles of Black consciousness. How did they reconcile these two aspects? Khotso says they ignored where these teachers came from. Some teachers were caring. Other teachers did not want to teach concepts like Pan Africanism that was in the syllabus because they were worried that it would make terrorists out of students. The students absorbed the self-empowerment messages of Black consciousness. "We understood essentially that our fate began and ended with us." [Khotso Mokhele]

In the Indian, Coloured and African schools there was an acknowledgement of the role of the Principal as a strong motivating force driving the students to work hard and perform well. During the high school period the school and teachers played a very influential role in shaping academic careers. Teachers who had science degrees and who displayed competence and confidence in their subject, engendered interest in the subject and the participants. Those who became first generation university goers, wanted to be like them.

Had I not in standards 7,8,9 had some indication from the teachers that I was good at math, I think that would have had a dramatic impact on my life. There was no one in my family who was good in math. That realisation that I was good at math was an important one and set me out from the rest of the class. There wasn't someone saying that academia was a good thing to get involved in or to get involved in or to be a lecturer. [Ahmed Bawa]

Teachers also contributed by promoting critical thinking, driving students to do extra work, brilliant teaching and affirming their performance. Participants used their peers as a resource in the learning process. Study groups made up of peers was an important part of the learning process. The performance of individuals also created expectations from the principal and teachers that they would continue to university.

During the years of schooling, parents encouraged the use of the English language because they perceived it as having high value. Some parents, in direct contradiction of the state's policy for black education, saw mathematics and science as significant school subjects. The apartheid educational system had tiny cracks of educational opportunities (like some schools offering mathematics and science) but access through those cracks was facilitated by those parents who could see the potential value of these subjects and had the financial resources to create the opportunities for their children.

Success in the schooling system seemed to have occurred through different pathways. If someone had a fair amount of interest and academic capability and the school system had good facilities, resources and dedicated teachers who knew their subject material (as in the Indian schools) there was a good chance of her succeeding in the system. In other situations the school system did not provide the same set of resources. In these cases it appears that what was important was that schoolwork was supplemented and extended in the home (by parents or siblings). This means that the home must have had the intellectual, social, cultural and financial capital to enhance schooling. For most, success in secondary education required a boarding school route. Access to these schools required the family to have financial resources. If there were good teachers at school they primarily provided the basis for a successful education. If the teaching was poor, then peer group interaction was essential. At the high school level it is unlikely in most cases that the home could have provided the extra to supplement the poor schooling.

During this period some participants had serious discussions with some teachers, family and people in their community about broader societal issues. Mokhele and Bawa started the formation of a political identity during their high school period.

2.2.2. University

The university sector was strongly differentiated by race and ethnicity like other parts of the South African society. The politics of race is therefore an important aspect of university experience.

Had I been a white South African and gone to Wits University in 1972, I would have simply slipped into the system and it would have been plain sailing. I think I was sufficiently bright to have worked the system and have come out with a first class degree. All the [prison] detentions were on the basis of being black in South Africa and being involved in all those struggles. I have never let the impediments in the research process which come from being a black South African bother me. I am quite sure, had I been at a white university, my nuclear physics research would have been quite different, because there might have been more facilities than those at the University of Durban-Westville. I am not sure whether that would have altered in any substantial way the quality of my work. [Ahmed Bawa]

Participants knew which 'tribal'(determined by race and ethnicity) university to apply for undergraduate studies, in keeping with the Extension of University Education Act of 1959. Four applied to universities that were not their 'designated' universities. Bawa, the top matriculation student in the Indian Education Department, was granted Ministerial (and Parliament) permission to attend the University of Witwatersrand. Volmink did not gain ministerial permission for entry to University of Cape Town. Magi was refused permission to register at the University of the North which was closer to her home and was directed to go to the University of Zululand. Mokhele, a MoSotho, was allowed to attend the University of Fort Hare, designated for Xhosas. This was only because he agreed to register for a degree in agriculture (not his career choice) since this was not offered at the other black universities. Many participants indicated that they did not even think of applying to the white universities because they knew they needed ministerial permission and because they had met students who had gone to white universities and had failed.

For the purpose of analysis in this study the institutions that participants attended for under-graduate and graduate study can be categorised into the following:

- Black South African universities (Fort Hare, North, Durban-Westville, Western Cape, Zululand);
- White English speaking South African universities (Wits, Natal, Cape Town);
- A distance learning university (UNISA);
- Overseas universities (United States of America and Britain).

All participants had experience at a *Black university*. A part of Vakalisa's university experience was at the University of Fort Hare in the 1960's and all the participants had experience at a black university administered under the Extension of University Education Act of 1959. With the implementation of this Act, the apartheid state appointed academic staff who had graduated mainly from the Afrikaans speaking institution and were adherents of the government's apartheid policies.

Vakalisa enjoyed most of her undergraduate university experiences. She saw the science degree as a possible route to medicine. Many of the lecturers had been employed pre-Extension of University Education Act and were therefore not wedded to the apartheid ideology. The lecturers, mostly White (English and Afrikaans speaking) with one or two Africans at the junior level, were helpful, supportive and encouraging. The language of instruction was English. Vakalisa attributes her failure in her courses at university to her poor background in the subject area (she had not gained good results in her matriculation examination), poor study methods and concerns about funds for her studies. She persisted at university and passed a few courses at a time. She found passing her major subjects easier than passing her first year subjects, because on returning to university after teaching for two years she felt she now knew how to study. Vakalisa did not get involved in political activities on campus at the time. In an environment of no disruptions and where lecturers are competent and want to assist students, success will depend on other factors like students' financial resources to access university and their academic capability and interest for the subjects chosen to be studied.

The experiences of participants post – Extension of University Education Act was different. When participants registered for a B Sc. there was discouragement from the university administration and lecturers who expected them to fail. This was because of their images of the school system from which students came and because of their prejudices. Staff were part of Afrikaner apartheid ideology which did not encourage black students to take science and mathematics. There was also discouragement from senior students who had seen high failure rates at the university.

The participants met racism head on at the black campuses. At the lecture-room (individual) level they met people who attempted to intellectually under-develop them. Often they succeeded because first year science failure rates were very high. Most lecturers, on walking into lecture rooms, would blatantly say that half or two thirds of

the students would fail and that blacks could not cope with subjects like mathematics. Most participants took the threat of failure as a challenge and decided to prove the lecturers wrong and be part of the 30-40% that passed. But lecturers had a powerful effect on students' subject choices. For example, Nevhotalu with the second highest matriculation mark for mathematics in the Department of Bantu Education, did not want to continue with mathematics and computer science after the negative comments about pass rates from lecturers. Students knew the reputation of subjects like chemistry, physics and mathematics and many were influenced to take the biological sciences.

In the 1970's first year science classes were very large (from 400 to 700). Lecturers would walk in, read their notes and not notice (or care) whether students were present or not. Students would try to write notes while the lecturers read their notes or erased what they had just written on the board. Lecturers spoke in Afrikaans or in "their horrible English." Students were not aware of research being conducted at the university.

I have blurred memories of my first year at university. I came there ill prepared for university work and I was taught either by people who clearly did not understand what they were talking about or those who did not care....I wanted to study math and science, in that order. Developing a conceptual understanding in the different subjects was difficult because the language was Afrikaans. I had been there one semester and done a test in Applied Mathematics and got 26%! This was the first time I got a mark like that. But it was soon to be repeated in chemistry....My math lecturer was Gonin of Gonin and Archer fame. He was driving an old car, he walked at the same speed everyday and he had his books in exactly the same place everyday. I would fall asleep, because he talking in Afrikaans with this droning voice. [John Volmink]

Students realised that the only way to cope was to teach themselves and seek support from fellow students since they were in an environment where staff worked in deliberate ways to under-develop them. They formed study groups to assist each other with conceptual understanding as well as supporting each other regarding the negative attitudes of lecturers. Students needed to develop the skill to make sensible notes from their textbooks. Participants who had attended boarding school had developed skills of self-sufficiency, studying away from home, working in groups, having appropriate study methods, coping with an impersonal culture and negotiating racism. These gave them tools to cope better at university.

There was difficult with adjustment from the safety of the local school (especially if this was in a rural area) under the nurturing and supportive eye of parents and teachers to the big world of the university where there was little support. This transition was even more difficult for the first generation university goers. Half the participants did not pass enough subjects to proceed to second year. First year university was seen as the

major hurdle to overcome. Second and third year classes were much smaller (around 15) in size. Lecturers at this level were more competent in with regards to subject matter. Although in many cases the antagonism between students and lecturers was still present, the students who had managed to proceed past first year achieved academic success in the subsequent years.

Political activities on the campuses grew in the 1970's. The students collectively protested the political and social conditions in the country. There were confrontations (in the form of boycotts, strikes, mass meetings, disruption of the university work programme, closure of the university and even violence on the campuses) between students and the university management. However the university administration had the backing of the state and its security forces and students paid a high price for their involvement in politics. Bawa had several spells in jail for his political activities and lost many years of study. Mokhele challenged the vice-chancellor at a mass meeting and the following year was refused admission to the university. Nevhutalu made changes to subject choices when they knew that lecturers would fail them without reason. Even those who were not directly involved still experienced the anger of the institution in the form of lecturers attitudes to students after a boycott or the way an examination timetable was drawn up after the examinations had to be shifted because of student boycott. With the closure of campuses students were often unsure whether or not they would complete their studies. During these periods of disruption some participants were able to continue working on their own while others found the atmosphere unsettling. Some participants failed some of their subjects because they could not focus on studies during the disruptions.

The state and institutional administration had tremendous power over the students. These participants had to negotiate the limited intellectual skills and racist attitudes of lecturers who tried to under-develop them and an institutional culture that tolerated no opposition from the students. During the 1970's and 1980's black South African universities had a more political than intellectual culture.

In most cases there were one or two black lecturers on campus (not necessarily in science) who inspired students to go further and made them want to pursue further studies. There were other black lecturers who, maybe, feeling that they would lose their feeling of specialness if there were more blacks in their domain, also did mean things and tried to discourage students from studying further. There were a few white lecturers

who saw potential in individuals and encouraged them to think about furthering their studies. The white lecturers who encouraged students were themselves professionally competent in their subject areas. Having this attention from individuals made students actually believe that they could succeed.

Most participants were not clear what they would do after obtaining their B.Sc. degrees. When they had started university their goal was to gain a Bachelor of Science degree. They did not have a clear career choice and thought of the possibilities of teaching or medicine. In keeping with the government's policy of the role of black universities, lecturers also encouraged students to pursue a teaching career. With the exception of Bawa all the other participants either studied for a teaching qualification or flirted with the idea of teaching.

Our mathematics teacher used to ask us, 'Gentleman if you pass mathematics 3, what are you going to do?' We were forewarned that we should all indicate that we would do the UED [a teaching qualification]. If you said that you wanted to do the honours you would be in trouble. So we used to say, 'UED Sir.' He would say, 'Beautiful gentleman - you have to help your own people.' He asked us this question quite frequently. [Phuti Ngoepe]

Mjoli and Ngoepe completed the degree in the minimum time. These two participants are religious; have a strong ability to stay focussed on their goal and work on their own; had parents with a degree who could give guidance about strategies for studying at a university; and had access to financial resources for fees and books. While being aware of political issues and participating in mass action activities these students were not in the forefront of political action and they were able to continue working in the disrupted environment.

Three participants (Bawa, Mokhele, Maharaj) developed a passion for their subjects during their first degree. They met brilliant and motivating lecturers, performed well and were affirmed by these lecturers. They were turned on by intellectual activity and knew that they wanted to proceed to research.

At the end of their undergraduate degrees some students attempted Honours and Masters degrees at the black universities. Attempting a science Honours degree at the end of the 1960's proved to be difficult for Magi. Initially her registration was accepted but six months later the botany department at the university placed obstacles, like changing the requirements for an Honours degree. She attempted to challenge this, but found the institutional culture too overwhelming and left. Her career route also changed. She abandoned further studies in science and enrolled for a teaching diploma. Mjoli and Ngoepe successfully completed their science Honours degrees at their universities.

Mjoli had a combination of intellectually stimulating and boring lectures. The university did not have the appropriate equipment for experiments and she had to travel to a white university (Rhodes) about 80km away to conduct her investigations. She realised the intellectual and resource limitations at the black university and decided that it would not be able to offer her a stimulating Masters programme. Ngoepe had a stimulating honours programme. The head of department, realising the limitations of the department, invited lecturers from an Afrikaner university about 300km away to travel weekly to the black university and provide lectures. These lecturers were very competent in their subject matter and Ngoepe found the interactions very stimulating. He developed a passion for the subject and performed very well in the examinations (which were also written at a white university). It seems that when there is a strong sense of professionalism from lecturers in the subject matter, the issues of ideology become secondary.

Two students aborted their Masters degrees at South African institutions. Ngoepe (who had completed the Honours degree at the university) was the first black appointee in his department. When he attempted a Masters at his institution he found his experiments had been tampered with. He “realised that things were not going to work there” and decided to register at UNISA. He passed his Masters degree in physics with distinctions. Volmink unsuccessfully attempted two Masters degrees at South African institutions before proceeding to gain a Masters degree at an overseas institution. He found that one of these two Masters’ programmes was a totally individualistic activity and in the other found the lecturer (white) unhelpful and unsupportive. It seems that part of the strategy of succeeding in an academic climate which attempts to under-develop students is to determine the different routes that are available if you want to achieve your goals. If one route does not work use a different route.

Bawa and Nevhutalu completed their Masters at universities (black) while working there. Working at the university provided the opportunity and incentive to continue with academic studies. Studying on a part-time basis, within the constraints of political activities on black campuses in the 1980’s, they adopted the strategy not to get involved in the frontline of political activity. They were fortunate in that while the institution still did not have a research profile, the departments and individuals that they worked in supported and promoted research.

Magi completed a doctorate on a part-time basis at a black South African university. During this period she had to balance the roles of wife, mother, lecturer and student. Although there were factors along the way (totally beyond anyone's control), that impeded her pathway, she found the institution supportive and willing to assist in developing the research questions in which she was interested.

The undergraduate years at a Black university in South Africa were the biggest obstacle that the participants met along their academic pathways. Those who had acquired educational and cultural resources from their pre-university days were in a better position to succeed in this phase. Most black universities were not equipped to offer graduate programmes. Those that did register for graduate programmes found the nature of the experience varied in different departments.

The university experience at South African universities shaped the political awareness and identity of most of the participants. They were not fully aware of the issues of apartheid and their own political identity was ill formed when they had left school. They had come from either protective homes or isolated communities and had been shielded from apartheid. The mass meetings and activities of the student organisations (SASO, NUSAS, SCM) as well as the experiences of racism from white lecturers shaped their political identity.

In the 1970's blacks could not register for a degree at a *White university* without ministerial permission. The white universities had more resources than black universities and were in a better position to offer graduate programmes. The black universities had been set up as teaching rather than research universities and did not have good graduate programmes or resources.

Bawa attended an English speaking white University, for undergraduate-studies, in the early 1970's, after receiving ministerial and parliamentary permission. This was a decision that he found difficult to explain and seemed contradictory to his political affiliations. He found it a difficult experience and stayed only for a term. We can hypothesise about possible reasons for the difficulty: being an 18 year old away from home for the first time; as a young political activist angry with the apartheid system and racially aware of the situation he was oversensitive and perceived the behaviour of lecturers as racist; being in this white environment he experienced real acts of racism from staff and students and, experiencing a feeling of alienation in the white

environment. Six years later he attended another white university close to his home but with a different emotional and political maturity. Here he enjoyed and thrived on the intellectual interactions with lecturers who recognised his ability and potential in physics.

Maharaj, Ngoepe and Tema gained graduate degrees from South African white universities in the 1980s. Maharaj thought she was accepted into the white institution because she had completed her initial training at an overseas university and not a South African black university. Her experiences were that not many students from black institutions were accepted to white institutions to pursue science graduate programmes. They then went to overseas universities to complete their doctoral programme.

In these white universities all three experienced good intellectual stimulation, a good research training and access to resources, but, they also experienced problems with aspects of institutional culture. The institutions' response to apartheid policies was to accept black students on the graduate programme and give them the same excellent training but not to get involved in issues like accommodation – an aspect that is critical for an individual's success in the graduate programme. Interactions with staff varied at the white universities. While some were very supportive and collegial, others made them feel invisible or saw them as 'a bundle of disadvantage.'

I would get the same excellent training as everybody else. But he [the supervisor of the research] could not help me with accommodation. He was not to get involved in politics. As a scientist I respect him highly, but there were choices you had to make. If I wanted this degree I had to deal with the issues of accommodation..... The first six months were very traumatic living in Rylands and having to travel [by bus] to the laboratory. Because of the nature of the research I sometimes just needed to get to the laboratory for 15 minutes to set up a culture on a Sunday so that I could get cracking on Monday morning. Or I needed to come in for 5 minutes to take something out of the incubator and put into the fridge or look at my data. The nature of the discipline was that it was far more effective to work 6 or 7 days a week even though it might not be full days. I really dreaded the transport and accommodation problems. [Romilla Maharaj]

In order to overcome the problem of accommodation participants attempted to gain accommodation near the university and laboratory. This meant seeking government permission or living illegally and having the threat of a police swoop at any time. Gaining the degree at the white universities involved making decisions that compromised political principles.

UNISA is a distance learning university. Bawa registered for part of his undergraduate courses and Ngoepe and Vakalisa completed their Masters programmes

here. This university was a useful alternative avenue when someone was working full-time and needed flexible arrangements. This mode of learning without personal interaction required the student to have self-discipline and an ability to work alone. All three who continued with their studies at UNISA passed their degrees with distinctions.

When Vakalisa and Magi registered for graduate programmes in Education the lecturers requested they make changes to their topics. Vakalisa renegotiated and Magi decided that rather than change her topic she would de-register.

The experience at an *overseas (US or UK) university* was a crucial part of the route towards a doctorate. Nine of the ten participants had completed at least one degree (one undergraduate and eight graduate degrees) at an overseas (US or UK) university. During this period there was an increasing number of scholarships available for black people to study overseas. Many foreign governments and international aid agencies adopted the strategy to contribute to a change in South Africa by investing in the graduate education of blacks. All the participants who studied overseas were able to do so because of scholarships offered. Some of the participants were aware of the political dilemmas surrounding overseas scholarships.

Maharaj completed her undergraduate degree at a British university. She drew a sharp difference between her experience at a South African Indian University and the British institution. The South African experience was perceived as an obstacle course designed to encourage failure. In contrast her experience at a British institution was how best to assist the individual to pass in the system. The British experience was characterised by small class sizes; competent lecturers; warm, affirming relationships with lecturers; stimulating lectures and an environment of intellectual discussion. It provided an introduction to research so that towards the end of the degree there was a shift from wanting the qualification for a job to being involved in research and analysis. This was an environment that was designed to support passing and if a student did well enough it encouraged a research career. Within this environment success depended largely on agency.

Eight of the participants completed a Masters or Doctorate degree at an overseas university on a full time basis. They performed very well in their studies. In the UK and US institutions participants had the necessary support and resources. They had competent lecturers and interactions with lecturers were perceived to be trustworthy

(they did not judge the comments or criticism on the basis of colour). There was also a collegial atmosphere amongst like-minded students (mostly foreign with a target to complete and return home and the common point of their interaction was their subject area). The foreign students did not feel a responsibility for social issues at the institution and country. The students were located in research environments and cultures; met with experts in their fields, listened to seminars from other researchers and then developed their own approach to thinking as a researcher. They experienced difficulties with the research process where experiments went wrong and there were blocks in their conceptual understanding. Being in this dynamic intellectual environment contributed to making the group feel that their fate lay in their hands. If they failed in an environment like this then they had only themselves to blame.

The interaction with the different lecturers was so different. The traditional people were traditional – teach their statistics and walk out. But even then there was a level of interaction that was not here in South Africa. But not all were equally friendly. Those on my committee were extremely encouraging. They made me feel like a genius. They made me feel that I was doing far above what they expected me to do. They encouraged me. They took me to conferences. It opened a whole new world for me. [John Volmink]

In this environment they had reduced responsibilities but experienced a pressure to complete in the quickest time. They had grants for a specific number of years and had jobs and family awaiting their return. Those who studied overseas experienced trepidation that having studied through Bantu Education they would not be able to cope in an international arena. They put tremendous pressure on themselves to succeed because they felt that they were representing their race and gender and had a responsibility to eradicate stereotypical images of people from Africa. They were initially overwhelmed by the confidence of international (especially American) students. As they progressed in their studies, doing better than the whites in the class, they shattered the lies of apartheid and boosted their own confidence.

Students studying at overseas universities enjoyed the intellectual and research culture in the form of seminars, scientists presenting cutting edge work and just the buzz of being in an intellectual environment. Exposure to an intellectual culture contributed to shaping the aspirations of individuals towards an academic trajectory. Being in this environment also meant being separated from their children; missing their families; tolerating the very cold weather and feeling a sense of alienation in this society. They knew that this opportunity to gain a higher qualification was crucial in their academic pathway. They were determined to succeed and endured the difficulties.

2.4. Individual dynamics and the academic life

There are social and institutional dynamics that affect academic trajectories, but there are also individual dynamics that are necessary. In any society there are differences among individuals and there are debates about whether these differences are innate or socially constructed. This discussion does not discuss these debates. What is important in this discussion is to recognise that individual characteristics exist, and to survive in this unequal society, one needs to have certain characteristics.

When participants were asked about the kinds of qualities they possessed which contributed to their success in the academic field they answered that they were curious and wanted to be involved in knowledge production and enquiry; they persevered through whatever conditions they faced until they had succeeded; they had determination and ambition; they were stubborn and did things against the odds; and, they took risks. Chance was also a contributory factor towards their success. They thought they were at the right place at the right time and their lives intersected with others who significantly contributed towards their academic pathways. One aspect of chance for some of the participants was that they worked at institutions which valued gaining a higher qualification. This raises the question of whether one needs to be located at an institution to develop an interest in an academic pathway or whether one gains research training first and then gets a job at an institution where research is valued.

From a study of the participants' transcripts I would like to add the following which contributed to their success. They had qualities like high academic capability; an aspiration to succeed; confidence in their ability; and, a passion for learning. They also felt special and better than others around; an ability to internalise an injustice and redirect the anger to something positive; and, an ability to focus on the goal (sometimes to the exclusion of everything else).

[I think [I succeeded] it has been a combination of opportunities, support and self-determination. Without the self-determination, the support and encouragement would have not helped. There had been a number of times when I considered quitting – like when you spent a month on the experiment and you don't get a result. However when you get to the stage where you feel the end is something you can attain, then the frustration is reduced. The special strengths and qualities: I think it is passion for the subject, the drive, the determination, the ambition and the dedication. Academia is an environment I enjoy. I enjoy intellectual interaction with colleagues and students. [Romilla Maharaj]

All the participants performed at about the top third of the class throughout their schooling career, completed school with a matriculation exemption and this gave them

access to university. Some participants had performed excellently with Bawa being top student in the Indian Education Department, Nevhutalu gaining the second highest mark in mathematics in the Department of Bantu Education and Mjoli gaining a first class pass. Some participants were disappointed with the final, especially mathematics, matriculation results. The performance of the group at the undergraduate level varied, with about half the participants experiencing failure. As the participants proceeded to graduate studies their performances improved. The high performance in graduate studies was a liberating experience and shattered the lies of apartheid and gave them intellectual confidence. Their academic performance in the matriculation examination allowed the participants access to a university. Given the improved performance as they proceeded under different circumstances, one tends to think that the academic capability and performance at school are not strongly linked. While these participants were lucky to gain access others who may have been academically capable may have not performed well enough at school to gain access to university.

A significant quality of the participants was their determination to succeed despite the obstacles they met along the way. During their formative years the families told them stories of education and struggle. As they proceeded along their educational pathways they met with obstacles. They seemed to have been socialised to accept that their pathways would not be smooth and to succeed they would have to be determined to reach their goals. Sometimes reaching that goal took longer than expected and one had to follow different routes to obtain a doctorate.

The participants in this study had a sense of being smarter and different from their peers. In their family they saw themselves as being different from others around them. In school their performance and choice of subjects set themselves apart from others. They were quite brave in wanting to venture into the sciences although they were told it was difficult and many others had failed before them. They had confidence and even a bit of arrogance and believed that science and research was the superior field. They were impressed with people who were or appeared to be intellectuals.

The value of it [graduate studies] was that black people had to think about more than medicine. Graduate work and research work was a direction that black people had to start considering seriously as career options. Further the choice to go to graduate school was a superior and enlightened choice. It was a choice that meant black people were getting unshackled. That was what I wanted to do and wanted to be. [Khotso Mokhele]

Learning and inquiry were a passion for the group. The passion for learning developed at different points – for some it was at the Bachelors level, others at Honours

or Masters level. With passion for the subject was a shift from rote learning to critical thinking about their subject. As soon as the passion for the studies was evoked they decided to study further. Their passion in the subject was evoked when they met with teachers and lecturers who were brilliant and passionate about their subject matter.

The participants came across situations where there was unfair treatment. Accepting authority, even if it was unfair, did not mean that the participants were unaware of the injustices. They were increasingly conscious of being in an unequal society where there were no mechanisms and structures for a fair hearing. The unfairness was discussed among peers, but knowing the limitations of their powers and remembering the messages of the family, most did not go for a head-on confrontation with authority. It seems that in an unequal society where there were no mechanisms and structures to deal with unfair practices, a strategy adopted by the participants was to work around the obstacle. Coping with that strategy at a personal level required them to internalise the anger and refocus that anger towards something that could be positive.

3. EXPLANATORY CONSTRUCTS FOR ACADEMIC SUCCESS IN UNEQUAL SOCIETIES

The first part of this chapter, the cross-case analysis, provides an analytic description of the various dynamics that affected individual's academic success. From this composite thick description I want to propose the following explanatory constructs, which emerge from the data, as to why black scientists managed to proceed along their educational pathways and completed a doctorate in an unequal South African society. Some of these explanatory constructs are predictable, self-evident and widely cited in literature. There are other constructs that have less prominence in the life history literature and it is these constructs to which the study will highlight.

In order to pursue and achieve academic success it is necessary that participants demonstrate (i) academic capability. The other necessary condition is that they have (ii) access to resources (material and information). There seems to be three new explanatory constructs in this research plus a fourth one which is not unanticipated but expresses itself in unusual ways in the South African context. The three constructs, which I am proposing and are not found in the life history literature about academic success, are (iii) academic role replication and expectation; (iv) strategic compliance and (v) deferred gratification. The explanatory construct, (vi) coherence of roles and support

mechanisms, had a particular characteristic in South Africa during this period and might be different in other places and at other times.

In developing these explanatory constructs I want to highlight three aspects. Firstly these constructs are linked to a socio-political-historical context. Secondly they are dynamic and express themselves in different forms at different periods of the academic trajectory. The presence or absence of each of these constructs has an effect on the pathways to academic success. Thirdly, not all constructs are used to explain every part of every person's academic success. Explaining success involves configuring a number of explanatory constructs with different emphases and different orientations at different times.

3.1. & 3.2. Academic capability and access to resources

By definition students that do achieve academic success are good students. They are academically capable and motivated. From this cross-case analysis we see that the results confirm what many studies about academic success show. The literature on academic achievement also indicates that the children of educated, wealthy people do better than children from uneducated, poor homes. Because of their backgrounds individuals are likely to have qualities like motivation and confidence, which are related to social capital and wealth. These allow them to proceed along academic pathways. It is not surprising to anyone that a disproportionate number of this group come from a background of greater social capital and wealth than the rest of their communities. There are many studies which show, especially for students from unequal societies, that those who have social and financial capital have more access to education and do better than students that do not have them. These observations are not really new and one does not have to labour the point. This research confirms the significance of social class background and academic capability.

3.3. Academic role replication and expectation

Parents, teachers and lecturers were academic role models and the expectations of family, teachers and lecturers who affirmed the performance of the participants shaped the academic trajectory positively. The nature of role replication and expectation is linked to the historical context and changes over time.

Educational aspiration and expectations had their origins in the family, which then provided the resources and support to facilitate their development. The participants came from families who valued education and in most cases the educational level of the family was higher than others in the community around them. It was in part the family's belief in an educational pathway that overcame the competing pressures from other significant people around for the participants to follow other routes. The extent of the family's educational expectation for the participants was to gain a first degree. A Doctorate was not part of their educational vision. This is not surprising since none of the families had members educated above the first degree level. Families saw education as leading to social and economic mobility.

Families modelled ways of behaviour that were useful later for attaining educational success. The family also modelled ways to negotiate with authority and power in an unequal society. Families with less overt political involvement adopted strategies of compliance to achieve their goals. Participants whose family members were involved in political activism were exposed to strategies of contestation with the system more openly.

In this group three participants are second generation university attendees. Where parents had a degree there was a strong expectation that their children would gain an education that was higher than their first degree. In the school years the academic expectation was from family and teachers. Teachers with good disciplinary knowledge and degrees were role models to which to aspire. In families without graduates the school experiences of meeting graduate teachers and people who seemed intelligent strengthened the formation of academic aspirations. The participants performed well in school and this caught the attention of the principals, staff and family and set up an expectation for further good academic performance.

During the undergraduate university years there were competing academic expectations. There were positive expectations from family and academically competent lecturers for students to succeed in their degrees, and negative expectations from lecturers who were influenced more strongly by the apartheid ideology than academic professionalism. There was the challenge of overcoming these lecturers' expectations of failure and focussing on the expectation of parents, peers and positive lecturers to achieve success. These participants seem to have succeeded in part because the sum of the positive expectations was greater than the negative expectations. Most participants

started their university studies with an instrumental view of getting a degree. Their main motive seems to have been to qualify no matter what. They were not necessarily driven by a passion for science. Some participants were stimulated to want to role replicate and be an intellectual when they met lecturers who affirmed their performance, expected them to continue with their studies, had impressive disciplinary knowledge and were passionate about their subject.

During the undergraduate period most participants experienced both academic and political role models and role expectations. These were competing forces. When the political role became the main one, individuals found their academic path was longer.

Participants started graduate work for different reasons. For some it was about the passion of knowing. For others it was the instrumental reason of institutional expectation. Some saw graduate work as a political tool. However, as soon as they developed a passion about their studies, academic success and proceeding towards the doctorate became a more internalised expectation.

It seems that there is a greater chance of choice in favour of an academic route if there are strong messages surrounding its value. Parents or other significant relationships create role models in the formative years emphasising what is important and valued and what ways exist of trying to achieve that goal. The educational institutions are powerful places for presenting academic role models and academic expectations for individuals. In the earlier years external forces and expectations shaped the pathways toward the academic. Later it was personal success and self-expectation that kept participants on academic pathways.

3.4. Strategic compliance

There were contradictions and cracks in the apartheid system. Participants, either consciously or unconsciously, exploited these contradictions to achieve their goals. There were also contradictions in the way that individuals acted and again, either consciously or unconsciously, they complied with aspects of the system to achieve their goals.

Living in an unequal society without mechanisms and structures to appeal to for fair treatment, it was important for individuals to balance challenges to the system with the level of power they had in the situation and with their long-term goals. They sometimes had to comply with events that were unfair and contest in a way that would

not remove them from the academic pathway. The apartheid state was also not impenetrable. In an attempt to uphold the apartheid structures the state sometimes unwittingly created opportunities and participants exploited these cracks to their advantage. The degree of the compliance and exploitation was linked to the level of political awareness and formation of the political identity of participants.

The families of most participants did not contest the political situation directly but displayed a combination of compliance, compromise and subtle resistance in dealing with the power of apartheid. The messages given to their children were that they needed to focus on achieving the (long-term) goal and this would sometimes require accepting (short-term) unfair treatment. In families and communities with a higher level of political awareness, there were messages of alternate, less complaint, ways of dealing in an unequal society.

Some participants replicated the strategy of compliance and subtle challenges to authority in their later years and found this strategy useful to succeed in the system. Boarding school years, with white teachers, were characterised by the contradictory relationship of good teaching and learning environments but also patronising and racist attitudes and behaviours. In order to maintain their places at these schools participants sometimes had to accept unfair treatment and comply with the conditions of the system.

The state supported higher education for blacks because the intention was to create a professional middle class that would uphold the homeland structures and act as a buffer between whites and the masses of black workers. The existence of universities presented an opportunity for blacks to exploit to pursue higher education

There was contestation at the university. The participants with strong political identities contested the unequal society vigorously and had to pay a price by losing years of study time. Others, with less of a political identity, contested the system as part of a group and experienced less loss to their study time. Success in gaining a degree was only achieved when individuals made strategic decisions to reduce overt contestation and focus on their studies. There was an unequal power balance between students and lecturers and many times students received poor lectures. The strategy used by students was to ignore the lecturer and use the peer group as the resource for learning.

In supporting scholarships for graduate education for blacks the state, again, unwittingly created opportunities. Individuals who performed well in their undergraduate degrees saw scholarships as the opportunity by which to pursue their

quest for further knowledge. Participants more or less fell into a path set by the family for the school and undergraduate education. They took more active decisions in pursuing graduate education. The reasons and strategies used to pursue graduate education can be classified to different categories. Those with stronger political awareness and identities made conscious decisions that gaining a post-graduate degree was political. They made use of the opportunities present to pursue that goal and strategically complied and dealt with the contradictions inherent in proceeding along this path. With this decision they concentrated on achieving their academic goals and deferred their political activities until later. Those participants who proceeded to graduate education because they wanted more knowledge, were passionate about the subject may have unconsciously complied and accepted and worked around the barriers along the way. They were internally driven and focussed on achieving their goal. Some participants had jobs at the university and as a condition of their employment undertook graduate studies. They accepted the need to satisfy external conditions and displayed an instrumental version of strategic compliance.

Strategic compliance can be classified as an unconscious strategy in the earlier parts of their lives. With an increased political awareness, compliance becomes more of a conscious decision. There is also strategic compliance for instrumental purposes when one wants to satisfy external conditions. Strategic compliance is more unconscious when the key motive driving one along the academic trajectory is an internal reason of studying for the sake of a love of knowledge. In exploring aspects of compliance, the reasons are never purely political, unconscious or instrumental. In proceeding along the way participants displayed different amounts of each. Strategic compliance also means living with contradictions.

In the pursuit of their degree students made compromises to their aspirations, beliefs and principles. Some chose subjects at university because they perceived they had a better chance of passing them, rather than because they wanted to study that subject. Thus many chose biological rather than physical or mathematical sciences. There were compromises to principles when individuals applied for permits to live in 'White' areas which were closer to the university or when participants accepted a loan from the despised homeland government or when, despite their political affiliations, they applied for Ministerial permission to attend a white university.

3.5. Deferred gratification

Gaining a doctorate requires many years of studying. It is a very focussed, individualistic activity. Under 'ideal' conditions someone could complete a doctorate in South Africa about eight years after the last examination at school. The participants in this study completed their doctorate between 12 to 31 years after their matriculation examination. In pursuing the doctorate degree individuals made decisions to defer gratification in the economic, career, political and personal arenas. Although there was deferment of gratification the participants still felt a pressure to complete their studies in the shortest time period, as they knew there were others depending on them earning a salary.

Nine of the ten participants studied their doctorate on a full-time basis. For many that meant that for all or part of the period of study they were without an income. During their doctoral study eight participants had their own families and there were responsibilities linked to having a family. During the period of the doctorate study those in full time study suspended career opportunities. Those participants that studied outside the country withdrew from the centre of political activities. The decision to forego immediate structural, career and economic security meant that participants somehow believed there were long-term benefits in achieving the doctorate. These individuals must have been risk-takers because they gave up or suspended many aspects of their lives on the way to gain the doctorate. They believed that the benefits that would be achieved at the end of the doctorate outweighed the short term costs.

3.6. Coherence of roles and support mechanisms

Individuals had roles other than that as an academic as they proceeded along academic pathways. They had roles and responsibilities as family members, political activists, workers and students. Academic success at any point depended on the number of roles individuals had at any one time and how the student's academic role was negotiated in relation to the others.

In the pre-university years, the individuals did not have roles that competed with the student role. During the under-graduate years the main competing role with the academic was the political. The length of time taken to gain the degree depended on which role was considered the most important. During the undergraduate years four

participants also had the role as parents. Because of the support their parents offered for childcare they were able to devote time to their academic role.

As they proceeded to graduate studies the participants had roles as spouses, parents and workers as well. When the participants went to study at an overseas university, it meant a decrease in the number of roles a person had to play. That helped the participants focus on their academic role.

The group had strong support systems all along the way. These support systems meant that the participants could balance the different roles. The family provided the basis for education by inculcating it as a value and providing resources to pursue this goal. The family provided support when participants had their children and family. This support meant that they could concentrate on the academic role. Another source of support for participants was from the peer group. This support was especially useful in the high school and undergraduate years in situations where there was poor instruction by teachers and learners. Participants were able to overcome this obstacle by using their peers as a resource.

4. CONCLUSION

These participants succeeded in gaining a doctorate in an unequal South African society because different things came to together at different times of their lives. Some of these are structural and others are more dependent on the individual. Some of the ways that they achieved this goal was through conscious decisions, shaped and moulded by political influences or the family. Others achieved their goal through less conscious career oriented decisions. They all ended up in the same place.

They had academic capabilities and motivation to succeed and there was the availability of resources to access education. They received support from parents, teachers and caring lecturers. The South African society was hostile to blacks pursuing an educational trajectory. However there were a few opportunities available when the state decided to provide some education as a means to entrench their own power. These stories clearly indicate that these individuals seized these opportunities. They pursued these opportunities to a level further than the state expected them to.

Access to economic resources is important to explain success throughout the individual's academic pathway. For the group this is facilitated by support from family and accessing bursaries and loans. The opportunity to access bursaries for their studies

at an overseas university was a very important part of the academic trajectory. Almost all the participants studied overseas. Existence of scholarships study at overseas universities meant that they were removed from the hostile environment to one which supported their academic ambitions.

A critical ingredient in explaining the academic success was the family. The family provided resources for schooling and shaped the educational aspirations of the participants. The influence of the family and the school institutions are related in explaining academic success. The Indian and Coloured school systems offered a better quality education than the African school system and those participants had a better chance of a quality education. For Africans the chances of gaining a quality education were increased if the parents were professionals and were able to supplement the inputs from schools and if families had the material resources to send their children to a boarding school. If the educational institution was good and provided quality education the academic support given by the family does not seem to have been as critical as when the educational institution provided poor inputs. The family was especially important in the lives of the single mothers. Families assumed childcare responsibilities and this provided an opportunity for the women to continue along their academic pathways.

Stronger academic aspirations were formed when individuals were exposed to positive academic role models in their early years and there was an expectation of their academic success. If the parents are professionals there are strong possibilities that the academic aspirations are shaped in the home. In cases where this is not so, then the school, teachers and the principal are strong influences shaping academic routes. In this case teachers with good disciplinary knowledge and who have degrees are very important agents to shape academic pathways.

The issue of role replication and expectation highlights the relationship between the social and financial capital of the family and the quality of inputs from educational institutions. The higher the social and financial capital of the family the higher the degree of educational expectation from the family. With financial resources opportunities can be created to ensure that children are exposed to institutions which value educational success. In families where there is less social and financial capital it is less likely that the family will set up these educational expectations or be able to realise them. Therefore the responsibility is with the educational institutions. If these are poor then the cycle of educational disadvantage is repeated.

In South African society academic success was not only dependent on the individual and their academic capability and motivations. Far more needed to happen to ensure that there was academic success. Within an unequal society there had to be compromises and compliance with aspects that were unfair and unjust and exploitation of cracks in the system that allowed individuals to progress.

EPILOGUE

CHAPTER THIRTEEN

End of the journey...

Methodological, theoretical and process reflections

The story of this thesis is the story of the participants' journey towards a doctorate and it is the story of my journey as a new researcher in life history work. As an organic chemist this was a journey into uncharted territories. Being a journey into new terrain it provided me with an opportunity to explore aspects differently and exposed my lack of knowledge in certain areas. At the end of this journey are reflections about what I learnt on my journey as well as what I would do differently the next time.

To reflect on this journey of four years, I read my journal of the research process and my writings from earlier on in the project. This was a walk down memory lane and brought both smiles and grimaces. The journey on this research study began just over four years ago. In the early '90's I had begun a doctorate relating to cognition in organic chemistry at the University of Western Cape. Due to a series of events I abandoned that study.

Early in 1995 I wrote an empirical paper on the status of science and mathematics education research in South Africa. Professor Jonathan Jansen of the University of Durban-Westville assisted me with the conceptualisation of the study and thereafter the writing of it. I enjoyed the process of interrogating data and telling a story from the data. Towards the end of 1995 I felt ready to start a doctorate. I wanted to do a doctorate for a number of reasons. I enjoyed the process of generating knowledge from data. Career wise I had moved from the delivery of Inservice programmes to the evaluation of programmes. I knew that I lacked all the requisite analytical skills to be an effective evaluator. I had been the Chairperson of SAARMSE and within that forum had discussed the under-representation of blacks in knowledge production. I had completed a Masters degree in 1985. At that time that degree had high currency. In the 1990's a doctorate had high currency. I now also wanted to be Dr Reddy.

I approached Jonathan Jansen about studying for a doctorate with him. I wanted to continue the kind of research work that I had started in SAARMSE. I proposed a doctorate along the lines of a survey relating to science and mathematics education in South Africa. He agreed to be my supervisor but suggested writing the biographies of black South African scientists. Me write! Never. I had never visualised myself as a

literary person. I was most comfortable when expressing something in the form of an equation or in a diagram that could be captured on one page.

Jonathan encouraged me to read (auto) biographies written by Evelyn Fox Keller, Nelson Mandela, Ellen Kuzwayo and Mamphela Ramphele. I had not read biographies before. For some inexplicable reason I became half-interested in writing these biographies. It could be exciting and I would learn. I started reading. I started with Nelson Mandela's *Long Walk to Freedom*; Evelyn Fox Keller's *Feeling for the Organism*, Mamphela Ramphele's *A Life*, Ellen Kuzwayo's *Call Me Woman* and Kenneth Manning's *Black Apollo of Science: The Life of Ernest Everett Just*. In my initial readings I was more interested in the story and what happened next.

But what was I going to do? I could not see myself producing ten stories in the form and length that I had read. I looked through literature on biographical writings. By chance I came across a book by Frank Langness which describes the use of a life history approach in anthropology. This was the first time I had seen the words 'life history approach'. The book describes the life history approach as a researcher conducting an in-depth interview with an interviewee about her experiences on some specific topic. Using the interview data the researcher could then write a life story. This seemed a more manageable task within the confines of a doctoral programme.

Armed with the discovery that there was a life history approach and this was what I wanted to do, I proceeded to learn more about it. My undergraduate degree was in the sciences with chemistry and mathematics as my main subjects. In my masters degree, half my credits relate to organic chemistry. I had studied educational issues. I did not have a background in the social sciences or in literary studies. Studying the life history approach took me into the social science, humanities and literary worlds. This was a very exciting but also very scary journey. I did not have the tools to differentiate the use of the approach in the different social sciences and humanities fields. I did not know the history of the approach or the assumptions under-pinning the use of the methodology in the different fields of study. I read everything that had a suggestion of life writings. In the readings I was confronted by both the theoretical issues relating to the field of study and the approach used in the study. There were studies that seemed deeply personal and looked at issues of identity. There were studies where participants related stories in terms of what happened and studies about how someone said something. I flitted from one reading to the other. I was unable to chart a course for myself along any particular theory or field of study. Oftentimes I experienced lengthy arguments with complicated

discourse structure. I came across terms like post-modern and post-structural. I had been quite comfortable reading the autobiographies of Mandela, Kuzwayo and Ramphela. Now I was feeling very anxious.

As I thought through the study, I knew that I wanted to develop the stories of a few black scientists. Would that count as a doctoral thesis? I thought of a thesis in a conventional manner. The first chapter would be a literature review of the theory in which I was embedding my work. The second chapter would be the methodological chapter, i.e. about life histories. What was the theoretical framework in which I was locating my work? I was interested in issues of research capacity building and thought about locating the study in that field. I read articles about research capacity building, but could not find a theory underpinning research capacity building. The issues raised in the articles were about programmes promoting research capacity building. Jonathan had indicated that I should not stick to the conventional way of presenting a thesis but could explore different ways. Nevertheless he still asked me questions about the theoretical underpinnings of my work.

The word theory confused me. Did it come before? Or after? Or was it everywhere? What theory was I locating my work in? What were the gaps in the theory? How was I going to contribute to the body of knowledge? I thought about a number of possible theories. Some of the theories related to research methodology, research capacity building, resistance and reproduction, structuration and the interaction of agency and structure. None of these seem to be right. I mumbled phrases like, 'I am locating the work in a life history approach.' I began to see life history research as both a perspective and a methodology. While that sounded erudite enough I could not say further what I meant by life history as a perspective.

In the beginning I did not have a clear map of where I was going with the study. I did not produce the usual 20- page research design plan but rather an outline of five pages. I had not comprehensively reviewed the literature in any particular area. I proceeded along with the study and the theoretical and empirical parts developed side-by-side. The issue of theory in the study troubled me all along the way. My supervisors constantly reassured me that the work was theoretically grounded and the different aspects were grounded in different theories. I had misgivings and would have felt more secure if I had a 'theory' that set the parameters for the study. One approach to life history research is that the unfolding of lives is shaped by the interaction of different

dynamics. Because this was not couched as a theory I was familiar with, I did not take it seriously.

Because I could not go further with formal theory, I concentrated on the empirical side of developing the life histories and life stories. I still wanted to know about research capacity building and achieving academic success. I wanted to write stories. I vacillated along these theoretical lines.

As I thought about developing the stories I had to work out how the interview would be structured. What was I going to ask the interviewees? As I was involved in the issues of research capacity building and, coming from a science background, I thought about stories of the research process, i.e. what did you do in your laboratory. My initial possible questions were around the research itself (what was the process of doing the doctoral research?). Since these were stories about black scientists I included questions about how, being black or a black woman impacted, on the life of a researcher. The questions were very formal. I was still not clear about the purpose of writing the stories. Were these stories a documentation of individual lives? Or were these stories to be used to devise better programmes to promote research capacity building. I asked myself whether a story would count as research. Trapped in my disciplinary background, I thought there should be more. The theoretical location of this study was still problematic for me. The scientist in me wanted the more conventional aspect of some grand theory, rather than a research that illuminates.

I shared my concerns about the research with Jonathan. Jonathan role-played an interview with me. The interview was structured around my educational experiences and experience of writing a research paper. I began to think about the study as more than a documentation of the research projects.

As I re-read the biographies I became more aware of the structure of the stories. I observed that the main character of the biography did not only present a series of events of what happened next in their lives. Rather the events were juxtaposed against broader contextual issues. In reading a biography I learnt about the main character's life and the life of the community that touched her life. The stories reflected an interplay of personal and societal dynamics. I realised that the individual experiences could be better understood against a contextual background. I now structured questions around the influences that shaped the scientists' path towards academic pathways and the constraints they had experienced. There were now questions about the role of family, institutions and significant others. I began to shift from questions about the research

process itself, i.e. what did you do in the laboratory, to look at the social conditions that affected the process. The actual research conducted by the participants now diminished. The biographies I had read suggested various questions I could ask, but I still had no thread to link them – it was more a medley of questions.

I considered whom I would interview for the study. What did I mean by a scientist or a researcher? Was it someone who worked in a laboratory and published? As my understanding about the interview schedule shifted from the research process to the social conditions that affected the process of becoming a researcher, I saw that I did not only need to interview practicing scientists. I was interested in those that had completed a doctoral programme in the sciences or in science education. The life story would be about the outcome of gaining the doctorate.

As I worked through the doctoral research project there were three areas of conceptual issues that I had to study. Firstly, what theory was I locating this work in? Secondly, what is the life history methodology? And thirdly, what questions should be included in the interview schedule. Not for me the linear process of theory, methodology and method!

In the academic stories of the participants, we read how meetings with significant individuals and chance affected academic pathways. So too with me. I discussed my research project with Professor Keith Lewin of the University of Sussex when he visited the University of Durban-Westville. He mentioned the work of Dr Alistair Thomson, from the University of Sussex. Through this introduction Al sent me the reading lists for life history courses that he taught at the University of Sussex. This set of references was very useful. Out of these meetings the idea of a split-site doctorate took shape. I would spend three months a year at Sussex University working with Al Thomson. I was fortunate that Dr Kopano Taole, of the Schools Division at the Foundation for Research Development (now National Research Foundation) believed in the project and that it would be a split site doctorate. I was awarded a research grant to spend three months at the University of Sussex for each of the four years of study. This opportunity to be away from South Africa and working closely with a specialist oral historian was vital to the completion of the project.

To prepare for my first visit to Sussex University in April 1996, I decided to pilot the interview schedule that I had prepared and conduct a life history interview. I had structured the interview schedule around the dynamics of family, social, political, cultural and individual. A colleague, Dr Renuka Vithal (who at the time of the interview

was in the midst of her doctoral studies) agreed to be interviewed for the pilot study. In the interview, I started with the question, “You have achieved a Masters degree and are studying for a doctorate in a country which set up an education system underpinned by the philosophy that ‘natives should be labourers...’ Talk about how you overcame the constraints and, knowing the South African situation, why you decided to follow an academic route in a country which you knew would not be supportive.” I cringe with embarrassment as I now see the question. In the interview Renuka answered the questions I asked. As the interviewer, I channelled to her answers and pushed the interview in different directions. In the interview I did not follow any central theoretical idea nor was there a chronological structure to the questions. The interview conversation skipped from politics to family, from the doctoral programme to high school teaching.

I had not conducted a life history interview before, nor had I seen a life history transcript. Somehow I expected a stilted, academic account of experiences. Listening to the interview I was pleasantly amazed with the richness of the discussion. I certainly did not expect the participant to open up to the questions and answer with the honesty that she did. There was a flow in the interview and there were times that were very personal. The first interview convinced me of the power of the method. The interview revealed many facets to traversing the academic pathway. Without that life history interview I would have continued to be unaware of these facets.

At the start of the second interview session, I asked Renuka what she had thought about the first interview. She remarked, “I was surprised at how concentrated it felt. In the end it felt like the end of an exam. It did feel a bit like a confession. I did feel OK about that because we have a relationship and I can trust you. I didn’t feel any anxiety about the confidentiality aspect of things. I also became aware of the contradictions of what I was saying...[later] I must be really honest and admit there are some things I still cannot talk about. There might be reasons for those decisions. There are some things [in my life] that I have worked through and can talk about.” I replied that I had also felt very exhausted listening to the story. But I was also fascinated with her story and the richness of the data that the interview had elicited. I had also been aware about the personal nature of aspects shared and the times when she had stopped a thought. As a researcher I was not sure how far to probe for further personal details. My instinct was to respect the boundaries she had set.

During the interview process I was aware that I was not holding all the parts of the interview together. We were jumping around to different topics and different times. Renuka also commented that there wasn't a flow in the interview. I didn't think that the interview schedule I used worked. As I had listened to Renuka's story I attempted to make sense of her academic pathway and the decisions she had taken. She attributed reasons for decisions she had taken. I listened to her story and attributed a different explanation. This set up a dilemma for me as a researcher. Should I accept Renuka's interpretation or did I (the researcher) have a right to make an interpretation? Whose life is it? Whose data is it? Whose interpretation is it? These issues troubled me. I realised that there would be many issues to be resolved when using the life history methodology. Yes, it was the participant's life, but the life only becomes data when it is elicited in the interview process. I was the researcher with a particular analytical framework and I could make an interpretation about the unfolding of the life. During the course of the project I did feel intimidated about whether I had a right to place my analytical framework on the participant's life. I had to constantly remind myself that I was the researcher. It was later in the project that I read about 'interpretive authority.'

Knowing snippets about life history research and having conducted one real live interview (this experience was invaluable to shift me from a theoretical and abstract understanding to a grounded understanding of the methodology) I went to University of Sussex. The three months away from South Africa and being in a place where I could be a student with the minimum responsibility and the maximum of resources facilitated my growth as a researcher. I enjoyed the lectures and seminars. I was immersed in a place where the common discourse was about life histories. In the life history groups there were people who were involved in community projects and there were researchers. Their approach to life histories depended on their area of study. Each of us grappled with the theoretical, methodological and re-presentational issues differently. I listened to descriptions of many interesting oral history projects but also yearned for more theoretical and academic discussions that would assist me in completing a doctoral project. I began to see the use of oral history for different purposes.

I read everything I could see about life history research. I enjoyed the sane and grounded discussions with Al Thomson. Initially I wanted this research project to do everything. I wanted to write stories, understand the construction of memory, determine how the participants overcame the apartheid structures to succeed. My research question varied with whatever I was reading at that time. Fortunately Al kept me on a track

which ensured that I completed the project within a reasonable amount of time. I have been very fortunate in the combination of supervisors I had for this project. Jonathan constantly challenged the boundaries of my approach and afforded me the opportunity to explore further and differently. Al assisted me with finding the tools to proceed on that exploration. I was also fortunate to interact with Keith Lewin. Keith's probing and incisive questions put me on guard to provide a rational justification for what I was doing. In return, by the end of the project, I had introduced Keith to the life history approach. At the end of my first stay in England, I was fortunate to attend a week long life history research training workshop with Paul Thompson and Rob Perks at the University of Essex. This workshop provided me with the skills to plan and conduct an effective life history interview. There were two important learnings for me from that workshop. The first was being reminded that I am the researcher in the project and therefore have the responsibility for analysis. The participants in the project would share their experiences and as the researcher it was my task to create an analytical framework to analyse the experiences. I was also introduced to the chronological interview schedule developed by Thompson with Perks and felt very comfortable with it.

On returning to South Africa I proceeded to refine the interview schedule. I identified the ten participants to interview. I felt more confident about the data collection process than I did about my theoretical orientation. I enjoyed the interviews and listening to the stories. I listened to stories in awe and amazement. Every participant tried to be as helpful as possible and related stories of their lives honestly. I was surprised at how open and forthcoming participants were about their lives. In conversation I am careful about what personal details I include about myself. I am not sure that if the tables were reversed and I was being interviewed if I would be a good participant. Writing this chapter is a way of my being honest with the readers and taking you into my story.

In the interviews I sometimes got drawn into the participants' stories and wanted to share my resonant experiences with them. I had to pull back and shared some of my experiences at the end of the interview. The stories were rich in detail and meaning and I felt the same way that I did at the end of the interview with Renuka. The life history interview had elicited a rich data source and gave insights which I would have not gained with any other methodology. The participants also seemed pleased to tell their stories. Many saw in me an attentive and interested listener (even if it was for research purposes). For the participants this was the first time that they had coherently put

together the events of their academic lives. Many were surprised at the pathways that they had traversed. One of the participants remarked, "You are so busy going from one event to the next, that you do not have the time to think about it all."

I listened to the stories of lives lived in the family, school and various other contexts. These were the stories of lives. When I had started the interviews I expected the participants to relate their stories in political terms. I expected to hear stories of family resistance and being brought up in homes where the main discussion was political. But participants told stories of 'ordinary' family life with the daily routines and activities. It was not a romantic story, but a story of parents trying to protect their children from the harshness of the apartheid world. I reflected on my life and wondered why I was surprised. I had a similar upbringing with my parents 'accepting' the political conditions in the country and urging the children to get on with their lives by making the least number of waves. My father would say to us children, 'We must be thankful that we have a roof over our heads. The best you can do is get an education.' My political awareness came later (mostly at university). Although every aspect of South African life was determined by racial politics, not every decision was made as a political decision. My assumptions about participants' early lives was challenged.

The concerns about tape recording a person's life affected the quality of the interview. There were times when the tape did not record, when I tape recorded over a side that had already been taped or the tape recorder malfunctioned. During the interview I had one eye on the tape recorder and was always conscious of Murphy's Law. I felt the story that I was hearing was so rich and I really hoped that everything was captured on tape. Because I was concentrating both on managing the tape recording process and interviewing, I did not always give full attention to listening to the interview. Listening to the tapes later I realised there were many times when I could have probed deeper.

I had the transcripts and had to decide what to do with them. Early in the project I had decided to represent the data in the form of individual stories. I transcribed the tapes and then went back to Sussex University. I then experimented with ways of writing the stories. Chapter Four gives those details. The writing of the life stories took me to the literary world. I now flirted with literary theory and realised that could be a directions of take study. I was fortunate to come across the writings of Polkinghorne who describes the process of story construction. I had to remember my identity as a life history researcher. I am not in the field of literature or a literary theorist.

I shared the stories I had written with other researchers. I needed validation that this was a research story. While many commented that the stories were illuminative and research stories they also indicated that I had not indicated to the reader what to look for in the story. I had not made the plot (or theory) of the story clear. The story writing period was initially a very difficult time for me. I had never thought of myself as a 'writer' and yet now out of the interview data I had created a story. I felt proud of my achievements.

I realised that though I had written the stories from interview data collected at a particular point in my and the participant's life, this was not the final story. With time and different experiences, participants would attribute different meanings to events. As my understanding of the writing process and interpretation of the data increased I realised I could write the story differently. When participants related their stories I did not have resonance with every aspect of their lives. I was not able to attribute full significance to all aspects of their story. For example, Tema had told me that she had come from a Bafokeng Village near Rustenburg. The significance of that did not strike me until about two years later when I visited the region on another project. People from the area told me about the Bafokeng people: they were wealthier than the other African groups, they had negotiated for a share in the profits in the mining companies when they allowed them mining rights in the area. The social status of the Bafokeng, and therefore of Tema, became clearer to me after that visit to the area. I had not lived in an African township and therefore could not appreciate that cultural experience. Places like UmZimkulu or East Griqualand had a different meaning when I visited after the interviews. Some biographers retrace every step of their subjects before writing about them. I now recognise the importance of that step.

I also gained information about participants after an interview and had to make decisions about how to deal with that information. Ahmed Bawa had related his academic life story to me. He had been involved in political activities against the apartheid state. After I had written Bawa's story, there was a story in the newspaper that during the political trials in the 1970's Bawa had turned state witness. Colleagues asked how I would write Bawa's story in the light of that information. I grappled with this issue. Should I mention that he had turned state witness (he had not mentioned this in the interview)? If he had not told me about this had he been truthful in his interview? How does this information affect my interpretation of his academic life story? I wrote to Ahmed, as a colleague, expressing my sympathy over the newspaper articles. I re-read

the story in the light of the new information and questioned whether I should or should not include that information. I had to separate my role as a researcher from that of a voyeuristic reader. I was writing the academic life story of Bawa. The information of being a state witness would be pertinent if I was writing the political life story of Bawa. I felt that including that information was enticing but would not contribute to understanding why he achieved academic success.

During the interviews I had to separate my research curiosity from my voyeuristic curiosity about the participants' lives. When women told me about their children, I wanted to ask about the father of the children and their relationship with the men. I was curious as to why Khotso Mokhele, an obviously eligible bachelor, had never married. I had to ask myself why I wanted to know. In the interview I had to separate my research curiosity from personal curiosity. I also had to be aware that if the participant had wanted to share those aspects of their lives they would have.

I had to re-present the data in the form of individual stories. I later came across other forms of re-presentation of interview data (Randall; Bozzoli). Bozzoli divides the life history interview of her participants into different time periods. Each chapter in her book is presented chronologically: (Peasant Daughter, 1900-1915; Church, School and Tribe, 1910-1925; Leaving Home, 1920-1935; etc). In these chapters the interpretation presented involves an interplay of written documents of the period and excerpts of the women's interviews. If I were to do a similar project again, I would like to use Bozzoli's structure. This structure is reflective of the life history approach which I have used, i.e. that experiences are located historically.

Having written the individual stories I had to do the cross-case analysis. What was my framework for the cross-case analysis? What theory would I generate? What was my theoretical orientation to the analysis? I could look at patterns that emerged from the data. There were patterns about schooling, family, undergraduate years at university, overseas study and so on. I needed to look for patterns on the basis of some purpose. Was this going to be a political analysis, a gendered analysis, about institutions and the cultures they generated? It became clear that I was looking at achieving academic success in unequal societies. I could have approached this thesis by a literature review about achieving academic success in unequal societies and then have examined what information the study generated. But I had not approached the study this way. I took the less secure path and meandered along many paths. Not having the theoretical constructs about academic success to ground the study meant I that explored more.

the theoretical constructs about academic success I was as theoretically grounded. Theory did not appear as a separate section but informed every part of the study. There was the theory about the method, firstly the study enabled one to understand human and social phenomena in its excitement, struggles, contradictions, specialness and ordinariness. Secondly it enabled me to look at the human and social phenomena as linked to particular social and historical contexts. Thirdly, the approach would illuminate how individuals change at different times of their lives. This theoretical orientation provided me with the framework to do the cross-case analysis.

The cross-case analysis was again an uncertain but exciting process. In chapter eleven I have discussed the different approaches used for the cross-case analysis. Using the grounded theorising approach meant that I examined the data fairly unencumbered by apriori theoretical constructs. The grounded theorising approach suggested the construct of 'strategic compliance' as a way to achieve academic success in unequal societies. When studying the data and I came up with the idea that for participants to succeed in this society they sometimes needed to play the system and exploit the cracks, I felt a little uncomfortable. Being a romantic at heart I wanted to generate this valiant theory of heroes and heroines and slaying of the dragons. In a society with oppressed groups, one always expects the extraordinary. It took me some time to accept this as a strategy used and write about it. I now realise it was a common sense strategy in a situation of unequal power. Shortly after writing about strategic compliance I remember listening to a BBC interview (Hardtalk). A white British interviewer was interviewing an African-American who had left America about 40 years ago and had settled in Britain. The African American had been sentenced to a term in prison for not wanting to serve in the army. Rather than go to jail, where he knew the conditions for African Americans and his chances of survival, he chose to leave the country. The interviewer commented that leaving the country might be seen as defeating his principles. The African-American disagreed. He knew the conditions that would face an African American going to jail in America. It would be different for a white person going to jail to uphold his principles. There is a different racial power balance in the two cases and the strategic decision for the African American was to leave America. Having generated the construct of strategic compliance, I understood Phuti Ngoepe's reply so much better,

when I had suggested that his decision to abandon his masters studies at the University of the North was throwing in the towel. His reply to me was that it was not throwing in the towel, but he recognised how far he could go in this particular context. He needed to choose another route to achieve his goal.

The advantage of a life history study is that it is exploratory and allows one to generate new constructs. The disadvantage was that I appreciated the power of some of the ideas in the end and was unable to pursue with the construct in the interview.

I had generated constructs which provided an explanation for academic success in unequal societies. Was this enough for a thesis? Did I need to review the literature about academic success or about strategic compliance? Would the final chapter be this literature review? I realised that the thesis has theory throughout and the strength of the work is the empirical study. As I reviewed the literature in the field of life history I also found that there was much written about methodology and the approach and there were very few empirical studies. This empirical study is a contribution to that dearth in the life history field. It will be important for me to link the constructs that I generated in this study about academic success to existing literature, but for the purposes of this study I need to stop. This was an exploratory study and it is the task of future studies to test the applicability of these constructs in wider audiences. The work in the project of understanding academic success in unequal societies will continue in future studies.

How was I to end this thesis? I wanted a neat closure. I wrote the final chapter as recommendations from the study. Looking at the study I had done, I felt that was inappropriate. I needed to end in a way that reflected the nature of the study. My personal reflection was more appropriate. During the course of writing up this thesis, Jonathan constantly urged me to write the chapters as “seamless narratives.” He remarked “You write like a chemist, dispensing exact measurements of powder into vials. Try to write with the free-flow of the literary person in you.” I could not write the previous chapters as seamless narratives.

Since the issue of theory troubled me throughout the thesis, I would like to expand. A life history approach does not claim to generate any grand theory. The approach allows one to create exploratory frameworks which can be tested later. My anxieties about theoretical frameworks for the study came from two sources. The first was from my background training. The second is that life history work is political and I was aware that in South Africa the work could make some people uncomfortable and they would try to discredit it as atheoretical.

As I reviewed the life history literature I observed studies that were political, studies that were theoretical and studies that were both political and theoretical. The power of many of the political studies was lost in the academic domain because it was not theoretically and methodologically rigorous. This was a political study in the academic domain and I wanted it to be theoretically and methodologically rigorous.

In this study I identify myself as a life history researcher. I have also conducted research studies using survey methods. As a researcher I do not want to fall into the trap of classifying myself as 'qualitative' or 'quantitative' but rather as a researcher driven by a problem and finding the best way to answer that problem. As an organic chemist using a life history approach, the study was enriched because of the cross-disciplinarity and eclecticism. I was not committed to the life history methodological framework and was willing to explore using the tools from my disciplinary background. At the end of this research process I can say that my own analytical skills are increasing. As a result of doing a life history study, every time I do a survey study I am influenced by my learnings from the life history approach.

This thesis is the story of black scientists achieving academic success during a particular historical period (in the '70's and '80's) that no longer exists, i.e. apartheid South Africa. The stories and the analysis across the stories contain insights into why they succeeded. These stories are aspirational stories of success in adversity. But the historical context has changed. There is a new political order. While some of the parameters have changed there are new challenges for black students trying to succeed in these newly structured systems. There are new groups of black middle class emerging alongside marginalised groups in townships. While race was the primary point of differentiation in apartheid South Africa, in this new society class is becoming an important determinant. We have not yet achieved an equal intellectual order in the country. Stories of other groups need to be written.

This thesis was exploratory and from the ten stories has produced exploratory constructs and hypotheses about academic success in unequal societies. As a continuing part of this work I will review the vast set of literature, from the different disciplinary backgrounds, on educational disadvantage and career theories. In addition I want to explore the usefulness of the explanatory constructs I have developed with a larger sample. The extended literature review and survey will allow us to take theory construction from an exploratory level to a more generalisable level.

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APPENDICES

APPENDIX A

PARTICIPANTS IN THE STUDY

Name	Sex	Institution	Discipline
1. Ahmed Bawa	Male	University of Natal (Durban)	Physics
2. Bothale Tema	Female	South African National Commission – UNESCO (Johannesburg)	Biology education
3. John Volmink	Male	University of Natal (Durban)	Math education
4. Khotso Mokhele	Male	Foundation for Research Development (Pretoria)	Microbiology
5. Nomathemba Magi	Female	University of Zululand KwaDlangeza)	Biology education
6. Nozibelo Mjoli	Female	Water Research Commission (Pretoria)	Microbiology
7. Ntombizolile Vakalisa	Female	UNISA (Pretoria)	Biology education
8. Phuti Ngoepe	Male	University of the North (Pietersburg)	Physics
9. Prins Nevhutalu	Male	Foundation for Research Development (Pretoria)	Physiological chemistry
10. Romilla Maharaj	Female	Medical Research Council (Cape Town)	Microbiology

APPENDIX B

17 Palm Glen
2nd Avenue
Malvern
Durban, 4092
29 July 1996

Prof John Volmink
Vice-Principal
University of Natal

Dear John

I am currently studying for a PhD at the University of Durban-Westville. Prof Jonathan Jansen is my supervisor. In the PhD I am developing the Life Histories of Black South African Scientists. My sample will be 10 Black scientists. I have defined a scientist as someone who has gained a PhD in either a science/math or science/math education discipline. I would like to include your Life History in the study.

In this research I want to move beyond the statistical data on under-representation of Blacks and Black women in research and academia to examine in fine detail the complex processes, experiences and struggles among successful Black women and men researchers en route to gaining their doctorate and their subsequent work history. The table attached to this letter gives you an indication of the scope of the project.

The essence of the Life History approach is to conduct an in-depth interview about the experiences in your life and how they have shaped your academic life - it incorporates an historical and biographical stance. In the interview I would like to talk about your family background and growing up, primary and secondary schooling, university experience and your work experience as related to your academic life.

I envisage the interview would take between four and six hours. This will not be done in a single stretch, but will be broken into, possibly, two or three hour sessions.

If you are agreeable to the idea, could you let me know and we can discuss the issue further.

Thank you

Vijay Reddy

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fax: (031)-815070
e-mail: REDDY@SUPERBOWL.UND.AC.ZA

APPENDIX C

INTERVIEW SCHEDULE

LIFE HISTORIES OF BLACK SOUTH AFRICAN SCIENTISTS

1. BACKGROUND AND FAMILY

Background of the scientist, universities attended and the motivation to become a scientist.

1.1 Date of birth:

1.2 Place of birth

1.3. GRANDPARENTS

Do you remember your grandparents?

What were their names?

Where did they live?

What had been their occupations?

How often did you see them?

What part did they play in your upbringing?

Were you close to them?

1.4. PARENTS AND SIBLINGS

Can you describe your father to me.

What was your fathers occupation?

Can you describe your mother.

Their names

Did your mother work before she was married?

Did she work after marriage?

Do you have any brothers and sisters?

What are their occupations?

Was there any one you felt particularly close to?

Was there anyone else that lived in your house?

What was the home language?

Did you or anyone around speak any English?

Can you describe you house at...?

How much contact did you'll have with neighbours?

How much contact did you have with people in the neighbourhood?

Can you describe your community set up

Did your parents consider certain qualities important in life?

(E.g. Hardwork, schooling, punctuality, discipline.)

Did your parents expect you to achieve certain things in life? What were they?

What do you remember as the significant events in your early childhood (up to the time you went to school).

1.5. RELIGION

Were your parents members of the church/ mosque/ temple.

How often did you attend services?

Was religion important to you?

What part did the church play in shaping your future?

1.6. POLITICS

Did your father take an interest in politics

Did your mother take an interest in politics

What was the community's involvement in politics.

What did you think about politics at that time

1.7. SOCIAL CLASS

Within the Black/ African community what social group or class would you say your family belonged to?

1.8. LEISURE

Describe some of the things you and your family did for enjoyment when you were a child.

Did you have any close friends.

1.9. ATTITUDES TO EDUCATION AND ACADEMIA IN THE FAMILY

Did any member of the family/ community have higher education/ a profession?

What was your interaction with this person?

2. EDUCATION

2.1. PRIMARY SCHOOL

How old were you when you first went to school?

Name of school and distance from your house.

What sort of school was it (describe the school)

How would you describe the primary education you received?

What was the language of instruction in school?

Did your family have the finances to support you in school?

Were there any major obstacles you remember?

Payment for texts.

2.2. HIGH SCHOOL

When did you go to high school?

Name of school and where was the school

Describe the school

How would you describe the secondary education you received

What subjects were you taught?

Describe the teaching of science and mathematics at high school.

How many female students were in your science group

Were there any teachers that influenced you

What type of student were you

What was a typical school day like

Any hobbies?

Language of instruction

Any obstacles?

Results of matric exam.

Do you think your parents had enough money to support your school education.

What plans did you have for when you finished high school.

Which universities did you apply for?

After high school did you go straight to university or were you involved in other studies/ jobs.

2.3.UNIVERSITY

When did you start university?

Why did you want to go to university?

Describe your university days.

Was you study full time or part time?

Did you have a part time job?

If working as well, how did you cope?

Why did you want to do a science degree?

What career did you consider with the degree you were getting?

Did you ever consider another career?

Where did you study for your undergraduate degree

What made you study there

Would you have liked to go to another university

What was life as a university student in those days.

Language of instruction

What was the interaction with lecturers like

How would you describe your education at the university

What was a typical university day like

Did you have much time for social activities.

Did you get involved in student politics.

Did university change you in any way

Were you influenced by any particular person during this period

How long did it take you to complete the undergraduate degree

How much did it cost

How was it paid for

Was there a tension about paying for university or going out to work to support the family

When you were an undergraduate student, did any lecturer take a special interest in you and suggest academia?

As an undergraduate did you have any jobs as a research assistant?

How many Blacks were there in your science undergraduate classes. How did you experience that?

How many Black woman were there in your science undergraduate classes. How did you experience that?

Any major obstacles during the years as undergraduate

After undergraduate degree, did you go straight to honours or went to work

When did you decide to do graduate studies in your subject.

What did your parents/ lecturers/ friends think of your decision.

Why did graduate studies appeal to you.

Did you have a particular career -course planned
Was there pressure to take a full-time job?

Where did you do your honours degree
Was it part time or full time, or did you have a part time job when studying.
How did you cope?
Did you have your own family by this time?
How did you balance all -study, work, family
Why did you choose to study there
Language of instruction
What were your impressions of the honours course
What was a typical day like
What was the interactions with lecturers like
Did you have much time for social activities.
Did you get involved in student politics.
Did this university experience change you in any way
Were you influenced by any particular person during this period
How long did it take you to complete the honours degree
How much did it cost
How was it paid for
Was there pressure on the use of finances for studying
Did you know where to apply for funds.
How many Blacks were there in your science honours class. How did you experience that?
How many Black woman were there in your science honours class. How did you experience that?
Any obstacles during this time
Did you take on a full time job at the end of this?
Any opportunities that came along?

When did you decide to do a masters degree in your subject.
What did your parents/ lecturers/ friends think of your decision.
Why did graduate studies (masters) appeal to you.
Was there any pressure to take on a full time job.?

Where did you do your Masters degree
How did you come by scholarships to do it
Part-time, full time, what work were you doing
Family
How did you cope with all of it
Why did you choose to study there
What were your impressions of the Masters course
What was a typical day like
Language
What was the interactions with lecturers like
Did you have much time for social activities.
Did you get involved in student politics.
Did this university experience change you in any way
Were you influenced by any particular person during this period
How long did it take you to complete the Masters degree

How much did it cost
How was it paid for? Did you manage financially?
How many Blacks were there in your science Masters class. How did you experience that?
How many Black woman were there in your science Masters class. How did you experience that?
Obstacles
When did you decide to do a doctorate degree in your subject.
What did your parents/ lecturers/ friends think of your decision.
Why did further graduate studies (doctorate) appeal to you.
Prior to doing the doctorate were you commissioned to do any pieces of research or evaluations.

Where did you do your doctorate degree
Why did you choose to study there
How did you get bursary, scholarship?
Was it part-time full time?
Did you have a family
How did you cope?
What were your impressions of the doctorate course
Language
What was a typical day like
Did you have much time for social activities.
Did you get involved in student politics.
Did this university experience change you in any way
Were you influenced by any particular person during this period
How long did it take you to complete the doctorate degree
How much did it cost
How was it paid for
How many Blacks were there in your science undergraduate classes. How did you experience that?
How many Black woman were there in your science undergraduate classes. How did you experience that?
What was the research question that you investigated in your doctoral work
How did you come to that question
Were you happy with the research question
With hindsight is that still the research question you would have liked to investigate.
How did you experience the relationship with your supervisor
Did you and your supervisor share a similar world view? Did it matter?
Obstacles

What has gaining a PhD meant to you
Why do you think you succeeded in gaining a doctorate when many others (from your community, school, university) did not?

What special strengths/ qualities do you think you have to make you a success in your academic career.

What do you like about doing research and the research experiences?

What were your biggest frustrations and failures you experienced in your academic pathway?

3. INDIVIDUAL and WORK INSTITUTION JOB 1

What were your career plans when you completed the doctorate.

Where did you work when you completed the doctorate

What were the responsibilities of this job

Why did you accept this job

How many members were there in the group

How many Blacks were there in the department. How did you experience this.

How many Black woman were there in the department. How did you experience this

How did you get in with others in the department

What was it like in the university

Were you able to undertake any research activities

What kind of research were you doing ?

Did you and your colleagues meet formally to discuss research issues

Do you work on projects alone or are you involved in joint projects

Are there any significant research groups that you worked with.

Where do you get funds and support to continue your research

How do you experience the research culture and research ethos at your work institutions?

Does your work environment enable research

Did you ever suggest changes to the department

In your research set up, who do you talk to about research and research ideas?

What kind of teaching were you doing at the university and how does it fit into research career?

Who do you teach?

Are you involved in any research projects with your students

Have you received invitations to be involved in joint research projects

Since PhD have you been requested to prepare lead papers or conduct evaluations or do pieces of evaluations.

Are you a member of any professional organisations

Repeat questions for subsequent jobs.

Why did you change jobs

Post-docs

Did you do any post-docs

Where

Present job

What is your present job.

In your present job , are you involved in any research

How do you keep in touch with issues in your field.

Do you still keep in touch with your academic discipline.

4. RESEARCH /ACADEMIC COMMUNITY

When was the first time you presented a paper at a conference.

Why did you want to present a paper

What are your experiences about the first time you presented a paper at a conference?

How was the paper received.

When was the first time you had something published

What motivated you to write a paper
What are your experiences of the first time you had something published?
How do you feel when your ideas are not accepted?
What was the biggest disappointment in the public research forum

What has been the impact of your work?

How have you experienced the South African academic world?

How have you experienced the international academic world?

5. REFLECTIONS

How do you think your race shaped your life in academia?

Both positively and negatively

How do you think your sex shaped your life in academia?

Both positively and negatively

In looking at your path in academia, what constraints do you ascribe to race, gender, culture issues and what problems do you ascribe to the nature of the research process?

6. RESEARCH OPPORTUNITIES POST ELECTION

Have you noticed anything different in research culture/ opportunity to do research post election (1994)

What do you see as the role of the contemporary Black intellectual?

How have you created spaces and opportunities for others wanting to do research and a PhD?

What solutions do you see for Research Capacity Building in South Africa.

7. YOUR FAMILY

When did you marry

What was your husband/ wife's occupation

Do you and your husband/wife work together on research projects

Do you have any children

Will you encourage them to go into academia

Did marriage affect your career

Are you presently involved in any community projects.

How do you spend your spare time

How do you combine the various aspects of your life (academia, committee, community work, family life).

8. SUMMING UP

What would you say you are most proud of in your life as a whole

What have been the worst and best things in your life.

What are your future plans

9. TELLING PROCESS

How did you experience the telling process?

How did they feel about talking to me i.e. ME conducting the interview.

I (VR) need to document the process of listening for each person.

APPENDIX D

LENGTH AND PLACE OF INTERVIEWS

1. Ahmed Bawa: A total of 4 hours in 3 sessions over two weeks. These interviews were held at the end of the day, just before he left for an hour drive back home in Pietermaritzburg, in his office.
2. Romilla Maharaj: A total of 5.5 hours in 3 sessions over a weekend (Friday, Saturday, Sunday). One session was at the office and the other two were at her home.
3. Phuti Ngoepe: A total of 4 hours in 2 sessions at his office. The first interview was on a Sunday afternoon/evening after I had driven four hours from Johannesburg. The second interview was the next day around midday.
4. Zola Vakalisa: A total of 5.25 hours in three sessions. Two were held on consecutive days at her UNISA offices. The third was a few weeks later in her home.
5. Prins Nevhutalu: A total of 7.5 hours over a number of months. There were 3 sessions and all were held in his office. In one session I taped over 45 minutes of tape. I had to redo that part of the interview.
6. Nozi Mjoli: 5 hours in three sessions. Two sessions were in December and one in January. All interviews were in her office during the day.
7. Botlhale Tema: A total 4.3 hours. The first interview was in her office and the other two were at her home a few weeks later.
8. Khotso Mokhele: 10 hours of interview in three sessions. The interviews were conducted a few weeks after Khotso had a car accident and was recuperating at home.
9. John Volmink: A total of 6 hours in three sessions. The interviews were conducted during the day in his office
10. Tembi Magi: A total of 6 hours in three sessions. One interview was conducted around the University of Zululand and the other two were conducted at her home in Durban.