TOWARDS WIDENING ACCESS TO UNDER-REPRESENTED GROUPS IN THE BIOLOGICAL SCIENCES: A CASE STUDY OF THE UNIVERSITY OF PRETORIA

by

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In memory of George Lekwapa Mathekga

1935 - 2011

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This study will not have been a success without the guidance, wisdom, strength, perseverance and resilience that I received from God and my ancestors.

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DECLARATION

I, Abbey Mokwape Mathekga the undersigned, hereby declare that the thesis for the Doctor of Philosophy degree in the study field of Education Management and Policy Studies or any version of it was not previously submitted for assessment to the University of Pretoria or any other university or institution of higher education. I declare that this is my own work and all sources have been properly acknowledged and referenced.

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INVESTIGATOR(S)	Abbey Mokwape Mathekga
DEPARTMENT	Education Management and Policy Studies
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EDITOR'S CONFIRMATION LETTER

John Kench

Editor, proofreader and overwriter

LETTER OF CONFIRMATION

26 November 2012

To whom it may concern,

This is to confirm that I have edited Abbey Mathekga's doctoral dissertation, `Towards widening access to under-represented groups in the Biological Sciences: A case study of the University of Pretoria'.

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ABSTRACT

Since the dawn of democracy in South Africa, significant progress has been made with regards to access to higher education. However, widening participation to under-represented groups in science and technology fields, with special reference to Biological Sciences, still remains a challenge. Despite the growing number of black students in this programme, there is still a substantial gap in terms of the enrolment numbers of student from this racial group in the Biological Sciences.

This research is a case study carried out in the faculty of Natural and Agricultural Sciences at the University of Pretoria, which is a historically white institution with a strong Afrikaans culture. The study used Osborne and Gallacher's (2004) framework of *getting in* and *getting through* to explore access policy at this institution in relation to widening participation in Biological Sciences.

The findings showed that, while there has been progress with regards to physical and epistemological access, *getting in* to Biological Sciences still proves difficult to attain, especially for black male students from under-represented groups, including those from township and rural areas. The challenges related to *getting in* are compounded by various factors. These include inadequate preparation of learners for university studies such as limited preparation for natural science studies, limited exposure to science laboratories, inadequate career guidance resulting in wrong subject mix, late submission of application forms and the 'walk–in' phenomenon.

Funding is crucial for facilitating access to Biological Sciences but it is hard to come by and insufficient for students from low socioeconomic groups. The government initiated funding have potential to help needy students with talent but it is not sufficient to cover both tuition and residence fees. In addition to the financial assistance that the university offers, it also provides a strong academic and psychosocial support to students, particularly in first year in Biological Sciences. Both academic and psychosocial support are factors enabling access and widening participation in Biological Sciences. They also underpin *getting through*. However, students in residences tend to benefit more from these support initiatives.

Key words: Access, Biological Sciences, higher education, under-represented groups, widening participation

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ABBREVIATIONS & ACRONYMS

ANA	–	Annual National Assessments
ASSAf	–	Academy of Science of South Africa
APS	–	Admission Point Score
BS	–	Biological Sciences
BSc	–	Bachelor of Science
CHE	–	Council on Higher Education
CSC	–	Client Service Centre
DBE	–	Department of Basic Education
DfES	–	Department of Education and Skills
DHET	–	Department of Higher Education and Training
DoE	–	Department of Education
FET	–	Further Education and Training
FTE	–	Full Time Equivalent
HAI	–	Historically Advantaged Institution
HDI	–	Historically Disadvantaged Intuition
HE	–	Higher Education
HEI	–	Higher Education Institution
HEMIS	–	Higher Education Management Information System
HESA	–	Higher Education South Africa
IT	–	Information Technology
OBE	–	Outcomes Based Education
MEDUNSA	–	Medical University of Southern Africa
MoE	–	Ministry of Education
NBT	–	National Benchmark Tests
NFF	–	National Funding Framework
NSC	–	National Senior Certificate
NSFAS	–	National Student Financial Aid Scheme
NPHE	–	National Plan for Higher Education
PIRLS	–	Progress in International Reading and Literacy Study
QL	–	Qualitative Literacy
SAT	–	Scholastic Aptitude Test
SET	–	Science, Engineering and Technology

TIMMS	–	Trends in International Mathematics and Science Study
UCT	–	University of Cape Town
UK	–	United Kingdom
UNISA	–	University of South Africa
UoT	–	University of Technology
US	–	United States of America
UP	–	University of Pretoria
UWC	–	University of Western Cape
Wits	–	University of the Witwatersrand
WP	–	Widening participation

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CHAPTER 1

RESEARCH PARAMETERS

1.1. Background of the study

Access to higher education is a contentious issue, not only in South Africa but also across the world (Crozier, Reay, Clayton, Colliander and Grinstead, 2008). In South Africa, during the apartheid era, racial discrimination was practiced, and access to education and other amenities was limited to a minority of the populace, while the majority, namely blacks and women, were left out. In post-apartheid South Africa, access to education in general and higher education (HE) in particular is aimed at redressing the inequalities of the past, giving equal opportunities to people from under-represented groups and in particular endeavouring to empower women.

While the higher education system in South Africa has experienced a substantial growth, participation rates remain low. The gross participation rate, defined as the total HE enrolment expressed as a percentage of the 20 - to - 24 year age group, was 15% in 2001, rose to 16% by 2005 (Scott, Yeld and Hendry, 2007), and increased to 17% in 2009 (CHE, 2009a). This needs to be viewed against the benchmark of 20% gross HE participation rate for countries at a similar level of economic development to South Africa (Foxcroft, 2009). Participation rates are particularly low for black[1] students. According to Scott, Yeld and Hendry (2007), the following 2005 participation rates were reported: 12% for African, 12% for Coloured, 51% for Indian and 60% for white students. There was a slight improvement in participation rates in 2009 for African (13,3%) and coloured students (14,8%), and a drop in the participation rate for Indian (44,9%) and white students (56,9%) (CHE, 2009a). The participation rate of blacks in general is particularly low in the natural sciences and technology (SET), even though there has been a gradual increase in the proportion of black students in these fields as well. “Black students are heavily under-represented in career fields in which sciences and mathematics are firm entrance requirements, e.g. Information Technology, Engineering, Natural Sciences and Medicine” (Jansen, 2010:132). This assertion is also made by the Council on Higher Education (CHE) (2009b:15) as it states that “all fields of study, other than education, continue to attract disproportionately more white students.” This has a

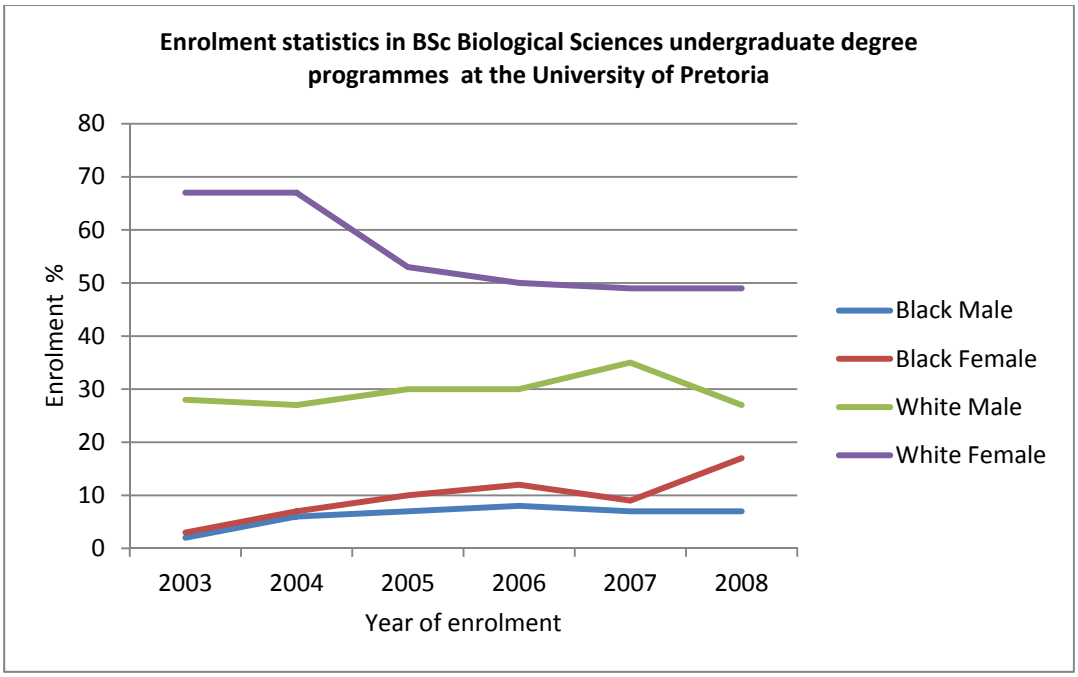
[1] The term black is used to denote Africans, Coloureds and Indians.

critical impact on the occupational and social mobility of blacks and on their entry to programmes with a high exchange value in the labour market. The purpose of this study, therefore, is to explore issues of access and retention in the natural sciences.

According to higher education management information service (HEMIS) data of 2010, women made up 58% of all graduates in first-degree courses (3 years and 4 years combined) nationally, and 60% of all graduates taking first-degree courses at the University of Pretoria. It was for this reason that I only looked at blacks as under-represented. Blacks are in majority in South Africa but under-represented in relation to their representation in the population.

The headcount statistics of students enrolled for Bachelor of Science (BSc) in Biological Sciences (BS) at the University of Pretoria (UP) from 2003 to 2008 is an illuminating example of this trend (Figure 1.1). Although there has been a significant improvement with regard to enrolment in this programme, the statistics show that a gap still exists between white and black students. For example, the enrolment of black female students increased from 3% of total enrolment in 2003 to 17% in 2008. At the same time the enrolment of white female students declined from 67% of the total enrolment in 2003 to 49% in 2008. Nonetheless, this still left a wide margin between black and white female students who were enrolled in this programme. These figures translate to white female registered students making double the percentages of black female students registered for this programme in 2008.

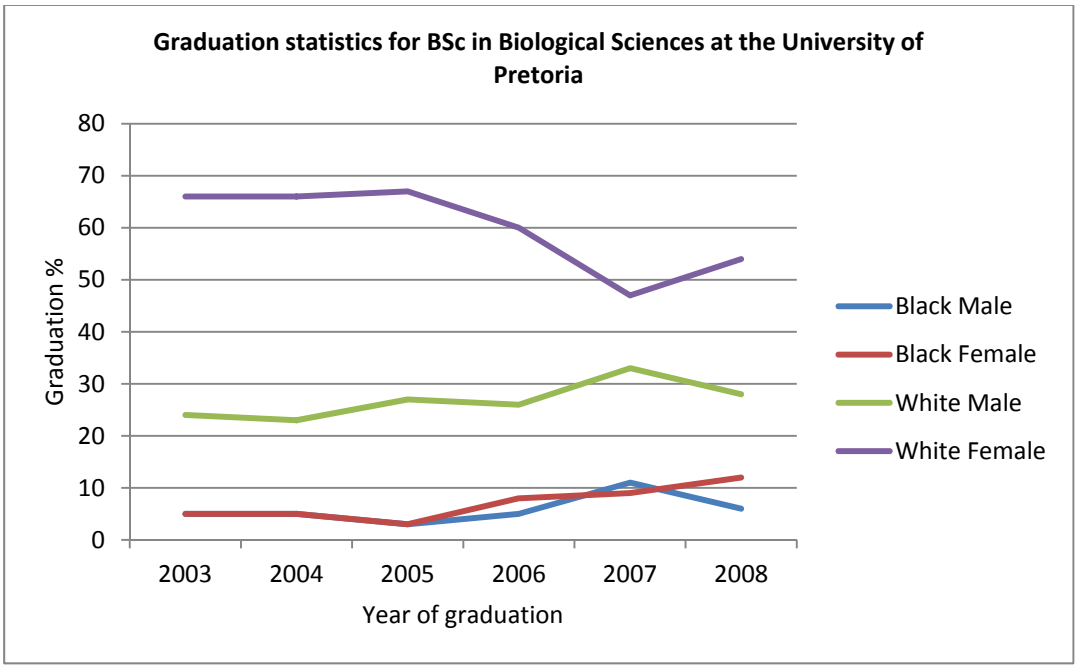
Figure 1.1



Source: Higher Education Management Information System (Department of Higher Education and Training), 2010.

The gap is even wider when one considers graduation figures. Figure 1.2 indicates the graduation statistics in the same programme for the academic years 2003 to 2008. The data clearly show that white female students have a propensity to high completion rate, as compared to both white males and blacks. This is demonstrated by the fact that more than 50% of white female students graduated from this programme in 2008, while only slightly more than 12% of black female students and fewer than 28% of white males graduated from the programme. The graduation rate of black male students is significantly lower, at under 10%. It should, however, be borne in mind that not all students who register for this programme pursue it for the full duration of three years; some, for example, use it to access other career tracks such as medicine. This could offer an explanation for the low graduation rate, but not for the gap between black and white students.

Figure 1.2



Source: Higher Education Management Information System (Department of Higher Education and Training), 2010.

The disparity in access numbers between black and white students at the University of Pretoria confirms that, despite democracy and the lifting of the admission barriers which once prohibited people of colour from accessing certain amenities and institutions, blacks in South Africa are still under-represented in terms of participation in some fields of study in higher education institutions (HEIs). Against this background, the democratic government of South Africa introduced policies with a view to redressing these glaring inequalities, among them the National Plan for Higher Education (DoE, 2001a), the White Paper 3 of 1997, and the Higher Education Act of 1997. However, as Morrow (1994) asserts, formal or physical access to institutions of higher education differs from epistemological access. The former refers to gaining admittance into institutions of higher learning or being allowed access to the physical space of a university, whilst the latter refers to how knowledge is distributed and obtained within the institution itself.

While physical/formal access can provide entry to a HEI, the main challenge is to give students access to the knowledge in these institutions, thus allowing them to succeed in their studies. That is, access with success.

In order to explain students' access to and success in BSc in Biological Sciences at UP, this study will make use of and expand Osborne and Gallacher's (2004:11) view of access as a process comprised of three stages. These are "getting in", which refers to the period prior to entry into higher education, including the years of schooling; "getting through", which refers to the period of time spent in higher education; and "getting on", which denotes the subsequent outcomes of higher education. The intellectual puzzle which underpins this study is the question why, regardless of its importance and after almost two decades of progressive post-apartheid policy development, access, particularly to science and technology programmes, continues to be a challenge in different ways in South African higher education institutions (Gamede, 2005).

While each university has its own specific challenges with regard to access, generally relating to its history and context (CHE, 2010), this study sets out to unravel how a historically white university understands access and how it implements its policy of access to Bachelor of Sciences (BSc) in the Biological Sciences (BS). It explores how different stakeholders understand and practice access, focusing on the experiences of first-year students from under-represented groups enrolled for a BSc in Biological Sciences. The first-year student cohort was chosen as relevant since they are still trying to adapt, learn, and understand the institutional culture.

The main research question is:

- What are the possibilities and limitations of widening access of under-represented groups to the Biological Sciences at the University of Pretoria?

Sub-questions:

- How is access policy to the Biological Sciences understood and implemented at institutional and departmental levels?
- What are the challenges faced by students from under-represented groups with regard to access to Biological Sciences at the University of Pretoria?
- How do students from under-represented groups negotiate access with success within the Biological Sciences at the University of Pretoria?

This is a case study of widening access for students from under-represented groups in the Biological Sciences at the University of Pretoria. It aims to identify possible barriers to access, as well as their impact on widening participation in the Biological Sciences. Face-to-face semi-structured interviews were conducted with six policy-makers and six first-year lecturers in the Biological Sciences. Three focus groups with twenty-nine first-year second-semester students were also conducted, as well as analysis of 193 questionnaires administered to the first-year second-semester students in Biological Sciences during the 2011 academic year.

1.2. Rationale for the study

In this study, I chose to explore various concepts (such as student recruitment, readiness, support, including both academic and psychosocial support, and the admission process encapsulating policy and funding) that impact on access of under-represented groups to higher education. The inclusion of these numerous concepts increased the breadth of the research, whilst focusing on one concept increased the depth of the study.

I was interested in the topic on both professional and academic levels. As an employee of Higher Education South Africa (HESA), my portfolio relates to advising university personnel who implement the relevant access policies from the Department of Higher Education and Training (DHET), as well as constantly scanning the environment to identify any legislative changes relating to such access policies. The constant engagement with policy and discovering the challenges around access issues that are experienced by higher education institutions (HEIs) intrigued me. Most of all, I was interested to find out if there was a link between access and throughput rates or success.

On the academic level, there seems to be general agreement that few students from under-represented groups in South Africa register for programmes which require mathematics and science taken as school subjects (Jansen, 2010; Downs, 2010; Scott, Yeld and Hendry, 2007; Walters, 2004). However, in Britain the Department of Education and Skills (DfES, 2006) argues that potential students from low socioeconomic backgrounds, and particularly those from under-represented groups,

are less likely to apply for HE programmes that require mathematics and science, even if they meet the admission requirements for such programmes. The report suggests that this could be attributed to lack of finance and perhaps the need to register for less demanding programmes with a view to complete studies within the allotted time and join the labour market. This argument underscores the importance of determining how access can be broadened in science and technology programmes. The relationship between access and science-related fields always poses a challenge, and there is thus a need to understand the complexities that surround this relationship.

Because fewer black students access and complete programmes in science and technology, ensuring access and retention of under-represented groups in the sciences and science-related programmes has become a national imperative. This study was deemed necessary since it related to one of the national priorities.

The study focused on the BSc in the Biological Sciences in order to explore both the opportunities and limitations of widening access for the under-represented groups in South Africa, with special reference to black students. This involved identifying barriers to access and making recommendations as to how to deal with them. The project is a case study of a former Afrikaans-medium historically advantaged institution (HAI), namely, the University of Pretoria. It was chosen because students from under-represented groups seem to still choose the erstwhile white higher education institutions (Jansen, 2010).

There is paucity of literature on access to higher education (HE) in South Africa. The available studies focus on access as a transformational tool and argue the access related issues through strategies such as academic development with a view to achieving access with success (Akoojee and Nkomo, 2007; Boughey, 2003; Naidoo, 1998) and support for under-prepared students in the form of foundation programmes. Ntshoe (2003), Cele and Menon (2006) focus on the economy of access by unpacking the impact of finance and of policy shifts on access. Koch and Dornback (2008) focus on the language issue and its impact on access to higher education. Cross and Carpentier (2009) postulate the concept of ‘new students’ in South African higher education and explore the institutional culture, student performance and the challenges of democracy. These authors also illuminate the

challenges of language in higher education. Nel and Kistner (2009) highlight the implications of the National Senior Certificate (NSC) for access to higher education; Mdepa and Tshiwula (2012) examine student diversity in South African higher education, while Walters (2004) focuses on the concept of access from a lifelong learning perspective. Gamede (2005) looks at the biography of access within the context of social justice in South Africa.

Despite this background of research, Scott (2004) claims that this phenomenon has not been sufficiently studied, because few universities have dedicated research centres that focus on access. This is particularly significant in this context, as black students from rural and township areas try to access urban, formerly white universities.

The aim of this study was therefore to contribute to the general discourse on access and widening participation in HEIs, with particular reference to the Biological Sciences. Specifically, it sets out to analyse the complexities involved in student access in the context of widening access in the Biological Sciences at the University of Pretoria.

1.3. The notion of access

The notion of access is understood and interpreted differently by different scholars. In this chapter I first consider the definition of access in order to develop a deeper understanding of the concept. Rowan et al. (nd, cf Gamede, 2005) argue that access to education refers to the entry of a candidate into an institution following the removal of any barrier which might deny access to such a candidate. In South Africa, the main concern is to expand access, desegregation and the redress of inequality (Samoff, 2001). Access is important in a social transformation context, since it may result in massification of higher education through the admission of a diverse group of students, including those from under-represented groups. The thrust behind widening participation is therefore to combat social exclusion and improve the economic situation of the historically under-represented groups (European Commission, 2001; OECD, 2003).

Woodrow (1999) defines access broadly as widening participation in higher education so as to include under-represented groups, encapsulating both successful completion of studies and equal opportunities. Admission is perceived as a process, which includes equality and the opportunities that higher education and the world of work can potentially offer students.

However, Goastellec (2008a) points out that there are trends in access, and that access is no longer focused on massification *per se*. But there is also a need to scrutinize widening participation, particularly in programmes that are highly selective in terms of good performance in mathematics and science subjects at school level. Goastellec (2008a) argues that discussions and concerns around access are no longer on increasing the enrolment numbers (expansion), but focus on broadening participation. This means the removal of structural and institutional barriers to progression (Gorard, Adnett, May, Slack, Smith and Thomas, 2007) and increasing the numbers of under-represented groups in those programmes where their enrolment numbers are lagging behind, due to factors such as socioeconomic backgrounds which lead to attendance at poor schools. The concern about participation is no longer on increasing the numbers of students who enrol at higher education institutions but has shifted to providing equal opportunities to all, including the under-represented groups, through increased enrolment numbers in the highly selective mathematics and science programmes.

In this study, access is understood as a means of entry into an institution of higher learning and as a form of participation in HEIs, and includes post-enrolment access with success that is reflected in the outcomes. Against this backdrop, this research endeavoured to unravel the concept of access from the perspective of widening participation.

For the purpose of this study, access was also understood in terms of both formal access or physical and epistemological access (Morrow, 1994). Physical or formal access refers to gaining admittance to a HEI, whilst epistemological access refers to access to the knowledge which is disseminated within the institution and thus questions the academic practice of the institution (Morrow, 1994, 2009). It presupposes various levels of access, with the epistemological being the higher level, attained through interaction with the curriculum and the way the curriculum is

delivered (ibid). Both physical and epistemological access are "inextricably intertwined and it will be difficult to realise one without the other" (Gamede, 2005:8). Physical access was not only limited to accessing the institution as the study also sought to focus on widening access, that is, affording equal opportunities for students to access university programmes, particularly those students from under-represented groups.

1.4. Conceptualizing access

Access has been conceptualized in different ways in different periods. How it is practiced also depends on the specific country's history and politics (Clancy and Goastellec, 2007).

This study used Goastellec's (2010) categorization of access, which gives three types of norms that govern the development of access: inherited merit – which is parallel to higher education (HE) in South Africa during the apartheid era, where HE was elitist, mostly white and male; equality of rights – where access addresses issues of social justice, democratization, massification or expansion of higher education and equality of opportunities – which argues for equal opportunities for students from various backgrounds, including those from under-represented groups and low socioeconomic backgrounds. Thus widening participation (WP), particularly to black students in the sciences, becomes imperative, as the niggling question remains: Why are black students still under-represented in the Biological Sciences?

Boud (2004) reminds us that the very notion of widening participation implies that the doors of learning are not completely open, and questions the significance of such a notion. However, it does underscore the importance of access being open and equally available to those candidates who meet certain admission requirements. In the South African context, these requirements are, *inter alia*, the minimum admission requirements (DoE, 2008a) and the university's admissions point score (APS). Whilst physical or formal access usually refers to entry into HEI, in this study it was used to unravel the interpretation of access policy and admission policy, and their implementation by the policy- makers, the first-year lecturers and first-year students (as policy implementers, curriculum mediators and policy consumers), and how

students from under-represented groups receive and interact with these policies in Bachelor of Science in the Biological Sciences at the University of Pretoria.

Widening participation (both physical and epistemic) was explored within the context of “getting in”, “getting through” and “getting on” (Osborne and Gallacher’s, 2004:11) as a theoretical framework underpinning this study. It focused only on ‘getting in’ and ‘getting through’, because these first two stages have a direct link between school and university. Furthermore, ‘getting on’ occurs in the world of work and as such refers to the outcome of the student of having participated in HE studies, in terms of his/her experience of the labour market, the work readiness of the graduates who are employed, and of society in general (Osborne and Gallacher, 2004).

1.4.1. *Getting in*

“Getting in” refers to the diversified admission criteria and access routes that assist in widening access for disadvantaged and under-represented groups (Foxcroft, 2009:2). It focuses on the interface between schooling and higher education. This concept requires higher education institutions to consider what kind of preparation the students entering through their doors have received. Does the school system adequately prepare learners for the rigour and challenges of higher education?

1.4.2. *Getting through*

“Getting through” refers to how the institution responds to the changing student body and the programmes, services, approaches to curriculum development, teaching and learning that it has in place to assist students so that they persist in their studies and graduate (Foxcroft, 2009).

“Getting through” conjures up Bourdieu’s (1977a) concepts of ‘habitus’ and ‘cultural capital’, as they are linked to the socioeconomic status of students and impact on their university experiences. Habitus is referred to as “a system of dispositions that is of permanent manners of being, seeing, and acting and thinking or a system of long-lasting perception scheme or schemata of perception and action” (Bourdieu, 2005:43). A group of people sharing a similar or neighbouring position in social

space tend to display common elements of behaviour and a similar style. Habitus is thus a product of social conditions which may be changed by history, since it is itself the product of history (Bourdieu, 1990, 2005, Reay, 2004b). Furthermore, the concept of habitus is perceived by McDonough and Calderone (2006:1704) as a "common set of subjective, internalized, class-based perceptions that shape an individual's expectations, attitudes, and aspirations." The issue of habitus is particularly pertinent to this study, since it explores the experiences of black students in a previously white Afrikaans university in the context of its language, symbols and artefacts. These depict the history of the Afrikaners, with which white Afrikaans students can identify, but alienate students from black and under-represented groups (Jansen, 2009). Such students feel little sense of belonging in this historically advantaged institution (HAI).

Reay (2004a) argues that cultural capital cannot be attributed to academic success or failure of an individual's aptitude, but to what is inherited from the family milieu. Goastellec (2008a:74) holds that "higher education (HE) remains elitist by principle and advocates for a selective dimension of access." She postulates that many still consider academic performance to be a result of "natural intelligence" and deny the influence of socioeconomic determinants on scholastic achievements.

Hiller and Rooksby (2005:24) argue that the concept "capital" should not only be limited to economic nuance but could also be applied to resources which are pertinent and imperative in social contexts, such as status, power, personal contents and formal and informal systems of knowledge. The assumption by HEIs is that students, regardless of their socioeconomic backgrounds, should be able to navigate the library, switch the computer on, and have the know-how to use the internet. A further assumption is that the students should be at an appropriate level to critically engaging with a text and be able to ask for and find assistance from home. However, students from low socioeconomic backgrounds are less likely to have this kind of know-how and support, so may not have the cultural capital required for the robust university studies, even more since they may be the first generation of graduates from their families.

The concept of habitus will be explored in order to assess the impact of the sense of belonging on widening participation of black students in Biological Sciences at a formerly white Afrikaans university.

Soudien (2010) underscores the importance of creating a space for the under-represented groups within HEIs. He argues that elite HE produces social class in terms of new racial demographics, that race takes a sublimated form and can manifest itself overtly as intolerance of other peoples' cultures and languages. He sees institutional culture and character as the key to making students feel at home, giving them a sense of habitus within an institution, and therefore the potential for *getting through* by succeeding in their studies. Whilst HEIs in South Africa offer a self-transformation experience, racism remains a challenge in South African higher education institutions.

The imperative of widening access does not only bring new groups of people with new voices into HEIs but also ensures that they have a reasonable chance of success. As the non-traditional students gain access to HEIs, they will need specialized support, and this will change the way such provision is made (Boylan, 2004).

According to Scott (2010a:229), "getting through" "is measured in terms of graduate outputs". There is a need to reform the curriculum in such a way that it does not only enable HEIs to accommodate diverse students, including those from the under-represented groups, but also to attain the requisite outputs. Scott (2010a:233) further notes that "3-year degree programmes are completed in 5 years at contact universities in South Africa". There are several postulations in this regard; the question of a poor schooling system, as well as the kind of curriculum offered to students, could be cited as among the myriad reasons why students do not complete their degree studies in the allotted time.

Another critical question to be considered is whether the curriculum and HEIs adequately prepare students to meet the needs of the South African labour market.

"Getting through" therefore seeks to attain a balance between equity of outcomes and a curriculum which addresses the labour market of South Africa.

1.4.3. *Getting on*

*"*Getting on*"* focuses on the opportunities that HEIs offer students with a view to preparing them for the labour market and general citizenship. The critical question according to Scott (2010a: 230) is how well HE is meeting South Africa's need for high-level human resources. In other words, are the graduates produced well prepared to respond to the needs of the labour market?

This suggests that widening access goes beyond entry into HE, taking into account the sustenance of students, their perseverance throughout their studies, and the actual throughput. The throughput rate is also relevant to the kind of the graduate that is produced by HEIs. Therefore, it is not only about the numbers but also about the need to unpack the "graduateness", that is, the calibre of the graduates in terms of their readiness to enter the world of work. This is what is referred to as "getting on".

This study will not deal with 'getting on', given that only students who 'get in' and `go through' will be able to reach this final stage.

1.5. Research design

This research was a case study of widening access in the BSc in Biological Sciences at the University of Pretoria in the faculty of Agriculture and Natural sciences. A case study is used to zoom in on a specific site where in-depth study of a single institution is conducted (Creswell, 2008).

My study was located in the Faculty of Natural and Agricultural Sciences, which offers several scientific and agriculturally-related programmes. The focus was on widening access to Biological Sciences. The BSc in BS is a three-year generic degree for which a student can register with a view to diverting to other career tracks calling for a professional degree, such as medicine, veterinary science or dentistry.

In 2011, 764 first-year second-semester students were registered for BSc in the Biological Sciences undergraduate degree at the University of Pretoria. The staff complement within the faculty includes a dean, two deputy deans, heads of

departments, professors and associate professors, senior lecturers and lecturers, who share the teaching and research responsibilities of the faculty. It should be noted that the teaching personnel share the teaching responsibilities according to their specialities. A lecturer may teach part of the module in a subject at various levels in the school. There are no lecturers set aside to teach BS only. This case study thus offered a glimpse of how that faculty was organized.

According to Creswell (2008:214), purposive sampling occurs when a researcher intentionally selects individuals and sites in order to learn about and understand the central phenomenon. The University of Pretoria was purposefully chosen because it is a historically advantaged institution (HAI) and accessible (Maree and van der Westhuizen, 2007). A homogeneous purposive sampling was used to select individuals in the first-year second-semester programme of Biological Sciences. The underpinning principle of homogenous purposive sampling is the common characteristic that the participants share (ibid). In this study, common characteristics included the fact that the subjects were all in the second semester of their first year of Biological Sciences and that they were all from under-represented groups.

1.6. Significance of the study

Access is one of the key challenges of higher education is South Africa. This led to the crafting of what became the leading step towards policy intervention in the form of Education White Paper 3 and later Higher Education Act of 1997. The Education White Paper 3 articulates its vision as:

> [P]romote equity of access and fair chances of success to all who are seeking to realise their potential through higher education... (DoE, 1997a:7).

Against this background, this study seeks to unravel the access related issues such as access policy and access processes with a view of developing a deeper understanding with special reference to under-represented groups. The focus is mainly on the natural sciences and technology since career tracks in these fields require a firm grasp of mathematics and science and lead to careers that are high in

demand. But students from under-represented groups are very few in such careers and this curb both their occupational and social upward mobility (Jansen, 2010, Goastellec, 2008a). This study was also intended to enhance the existing literature and contribute to the body of knowledge in the field of access to higher education studies with special reference to Biological Sciences in a South African context. It is also the central aim of this to provide useful knowledge that needs to be taken into cognisance by university policy-makers when crafting access policy.

1.7. Limitations of the study

The study acknowledges that under-representation cannot be limited to race, gender or social class. There is a current debate about whether a race-based policy could be used for access to a formerly advantaged university, such as the University of Cape Town (Bitzer, 2010; Favish and Hendry, 2010; Price, 2010). While being black may not *per se* be an indicator of under-representation, given the growing black middle class in South Africa, it is still a valid indicator for under-representation, since most black students come from disadvantaged backgrounds and attended poor schools.

The study does not intend to analyse the policy formulation process, nor does it seek to analyse all the conceivable issues regarding access policy. Nonetheless, the in-depth analyses of the implementation of access policy raise pertinent questions, both nationally and internationally, about such implementation in HEIs.

Since a case study is inherently limited, the findings of this study cannot be generalized (Ensor, 2001; Anderson, 2002; Leedy and Ormrod, 2001; Creswell, 2008; Yin, 2003). However, such findings can be extrapolated.

1.8. Organization and layout of the study

Chapter 1 (Research parameters)

This chapter provided the introduction to the study, and introduced the research questions and the rationale for the study. The chapters that follow have been assembled in accordance with specific organizational themes:

Chapter 2 (Literature review)

This chapter gives a review of the literature pertinent to the study. It further delineates the concept of widening participation using the three stages of access, namely inherited merit, equality of rights, and equality of opportunity (Goastellec, 2010; Clancy and Goastellec, 2007). Widening participation is further unravelled through a brief history of the establishment and a prolegomenon on higher education in United Kingdom (UK) and in the United States of America (US). In addition, the study explores issues of access and widening participation in one of the Latin American countries namely, Brazil. The African dimension is explored through an examination of access and widening participation in higher education in Tanzania and in South Africa.

Chapter 3 (Conceptual framework)

This chapter provides an in-depth discussion on the concepts that underpin this research. Osborne and Gallacher's (2004) concepts of 'getting in' and 'getting through' were adopted as the conceptual framework. These concepts are explored and developed using the stages of each main concept. 'Getting in' is explored through student recruitment, student readiness, the admission process and funding. On the other hand, 'getting through' is explored through the orientation period, student support, epistemological access and institutional culture.

Chapter 4 (Research design and methodology)

This chapter provides a detailed strategy of the research design and methodology, and explains the qualitative research approach taken in this case study. The chapter

also explains the scope of the research, the sampling, and the data collection techniques.

Chapter 5 (Data analysis and findings)

This chapter gives a detailed data analysis. It explores how the different stakeholders understand and experience the various policy instruments employed in the processes of 'getting in' and 'getting through'. It shows that the University of Pretoria (UP) is able to recruit and enrol students not only from urban areas but also from rural and township areas. However, lack of residence facilities and poor transport are barriers to widening participation. Problems among the students include lack of preparation, work overload and failure in examinations, despite a well-accepted support system of mentorship. Other findings indicated the ambivalence of the university towards its role in widening participation and the impact this has on its finances, on the work load of its lecturers, as well as on its goals and prestige as research university.

Chapter 6 (Interpretation and discussion)

This segment presents a detailed interpretation and discussion of the findings of the study. It highlights the key policy instruments that have been put in place to widen participation in Biological Sciences. It was evident that 'getting in' was facilitated by student recruitment and the promise of support, but was hindered by inadequate preparation for university studies from the schooling side, and that 'getting through' was facilitated by the student support offered by the university through mentorship programmes, but was hindered by insufficient residences and poor transport.

Chapter 7 (Conclusions and recommendations)

The study draws several conclusions showing that, whilst strides have been made in the provision of access to under-represented groups, more still needs to be done, especially in the provision of academic and psychosocial support, residence accommodation and transportation, if widening participation were to be achieved.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

The literature review seeks to explore the relevant literature which addresses the concept of access, with a view to developing a deeper understanding of the phenomenon under investigation, both locally and internationally. The study is about widening access to under-represented groups in the Biological Sciences in a former white and Afrikaans-medium university.

Whilst it is important to widen participation, it is equally important to ascertain that such access is fair. It is therefore important to find out the social backgrounds of students who enter higher education (Goastellec, 2008a). The question is: How can a fair access policy to higher education be organized, so that higher education does not reproduce social inequality but instead promotes social mobility? Fair access, according to Goastellec (2008b), can be organized by widening participation and giving equal opportunities to students from diverse backgrounds, as well as by paying attention to funding. The national student-funding framework, as well as the way higher institutions are funded, has a decisive role in widening participation.

The chapter continues by analysing three successive trends of access which are common to a number of countries, namely the shift from “inherited merit”, through a commitment to “equality of rights”, towards the application of some modes of affirmative action described as “equality of opportunities” (Goastellec, 2010). It continues by exploring crucial factors which have impacted on access to higher education in recent years, and particularly in South Africa, among them the massification and globalization that have impacted on the need to widen participation to students from under-represented groups. It continues with the analysis of widening participation using as an example, a Latin American country, namely Brazil. Widening participation is further explored in the African context using Tanzania as an example, and ends with the exploration and analysis of widening participation in South Africa.

2.2. Inherited merit

The concept of inherited merit refers to the notion of access which is the identification of academically selected students mostly on the basis of being born to a certain social class. Often it means being male from an upper-class family and living in an urban area (Clancy and Goastellec, 2007). In the South African context during the apartheid era, this privilege was bestowed mostly upon those who were white and male.

In this sense, higher education was traditionally established mainly to serve the elite and perpetuate elitism in society. Examples of such elites were political authorities, religious leaders and/or colonizers, who required higher education to provide them with specific professionals such as lawyers, doctors, clergy and civic leaders. Thus higher education and its privileges were closely associated with the elite (Goastellec, 2010). This approach to higher education inadvertently created a chasm for low socioeconomic groups who did not have the means to access higher education.

Since access to higher education was meant for a few elite individuals, it rejected any understanding of “otherness”. This suggests that those who ordinarily did not access higher education would not be understood, and might be mistreated by the ruling groups who were made up only of the elites (Goastellec, 2010; Clancy and Goastellec, 2007). Inherited merit also implied that lack of inclusive access to higher education could be excused by an interpretation of some of the “social inequalities as legitimate, justified or `naturally fair’” (Goastellec, 2008b: 74).

Access as inherited merit was prevalent in the early modern universities in the United Kingdom (UK) and United States of America (US).

The establishment and the prolegomenon of higher education in the UK was closely linked to Christianity, with both lower and higher education offered in monastic and cathedral schools. Thus universities in the United Kingdom and other European countries arose from the cathedrals and/or churches (Previté-Orton, 1971, Backhouse, 2009). One of the oldest universities in the UK is Oxford University which began as an Anglican University around the twelfth century. The purpose of the university then was to train clergymen and clerks to become erudite leaders for both church and the state. In 1871, the sons of middle-class families were allowed

access for the first time to Oxford University. The fact that access was granted to the sons of middle-class families underscores the notion that it was mainly granted to those who subscribed to the prevailing religious ideology, were of a certain class and as such reinforced the principle of inherited merit. The steady increase in the demand for higher education led to the establishment of other universities, such as Cambridge University. These universities perpetuated the notion of access as inherited merit, since they remained institutions reserved for the elite.

The UK universities had strong roots in the church and operated “under the jurisdiction of a distant pope operating in uniform cultural milieu, which allowed them to combine practical learning with a search for universal truths” (Florea and Horvat, 2009:482). During those nascent stages of the university whoever was not aligned with the church might be excluded from participating in higher education, therefore perpetuating the notion of access as inherited merit.

In the modern era, however, the authority of the church was replaced by that of the secular nation states. As a result, the church lost its dominance over the universities, which were now able to exercise a measure of independence (Florea and Horvat, 2009). This autonomy was maintained as long as state funds were not involved and the universities were able to maintain their elitist character.

The next section further examines the notion of access as inherit merit by exploring this notion from an American higher education perspective.

The history of American higher education began in 1636 with the founding of Harvard College, followed 60 years later by the William and Mary College in Virginia. Yale College and the University of Pennsylvania were founded in 1710 and 1740 respectively. Princeton, Columbia, Brown, Rutgers and Dartmouth Universities were established between 1746 and 1769 (Cadozier, 1987). These university colleges were developed with one main purpose which was to train the clergymen, though the curriculum was later extended to include civic and business leaders.

Along with community colleges, land grant universities were also established. These mainly offered study programmes of one to two years. The first few junior colleges, however, were not successful, due to lack of students, shortage of money and poor locations.

In 1901 in Joliet, Illinois, a junior college was established with the purpose of offering preparation courses for university studies. The undergraduate programmes were organized into lower and upper divisions, with the lower being offered for two years at college level and the upper for a further two years at university level. However, most students did not transfer to universities to complete the remaining two years, for which they could be awarded a baccalaureate degree, since they had already attained an associate degree which could open employment opportunities for them. According to Cadozier (1987) and Levine (1993), the establishment of the community colleges was prompted by the need for trained workers in the new expanding industries. These community colleges opened up opportunities for farmers' sons to access higher education (Cadozier, 1987; Levine, 1993). The land-grant institutions were also an attempt by the US government to compel inclusivity in higher education. Despite the discriminatory practices the introduction of community colleges and land-grant universities represented the desire to expand post-secondary education and shift from the limiting effects of inherited merit as it had a detrimental effect on the economic growth and development. Nonetheless, despite these lacklustre efforts, the majority of people from under-represented groups were still excluded from higher education.

The colleges or universities realized the importance of research. The universities seized the opportunity, as they saw a need to differentiate themselves in terms of their names and curricula, and used research as leverage. The extended university curriculum included the liberal arts. In 1950, Pennsylvania and Michigan State Colleges renamed themselves as universities, and gradually other colleges followed the name change trend. In a way this phenomenon heralded the birth of higher education in the USA. Congress passed a law in 1890 for small funding for teaching in land-grant colleges and specifying that African-Americans who had been freed from slavery could not be excluded from participation in education including higher education (Cadozier, 1987; Levine, 1993).

Thus the history of access in the US, which is inextricably linked with the history of higher education, demonstrates that access to institutions of higher learning was granted mostly to white males in accordance with the inherited merit principle (Noftsinger and Newbold, 2007). Nonetheless, the community colleges seemed to

offer alternative routes to higher education and the introduction of a differentiated higher education system.

However, problems with finance made it difficult for many individuals to access higher education, so access was limited to those who could afford to participate. The rise of the Civil Rights movement in the US characterized the period from 1955 to late 1960s. The history of access in US, particularly for African-Americans and other minorities was linked to the Civil Rights movement in one way or the other. Whilst the political circumstances have changed, resulting in a differentiated higher education landscape in the US, the principle of inherited merit remains highly contested in some elite universities. Several court cases compelled the US government to offer equal access to minority students with talent. A case in point was Brown vs Board of Education of Topeka of 1954, which overturned Plessy vs Ferguson of 1896, which had endorsed the 'separate but equal doctrine' (Jones, 2006:887; Noftsinger and Newbold, 2007; Bestey, 2008). The case managed not only to overturn racial segregation practices but also to open the doors of learning for all people of colour who qualified to go to HEIs.

Levine (1993:10-11) identifies some of the efforts that the federal government implemented to improve access of the under-represented in higher education during the nineteen hundreds. They include: "funding for new initiatives such as financial assistance, outreach and mentoring programs. In addition, assessment of incoming students for diagnostic purposes, programs to compensate for poor student preparation and collaboration with public schools." The colleges and universities were also held accountable for improved access and achievements of students from under-represented groups. However, Levine (1993) points out that, despite all these efforts, the gap between minority and majority college participation and degree attainment has not narrowed.

The 'big three' US universities (Harvard, Yale and Princeton) experienced uneasiness and serious challenges in the early nineteen hundreds with respect to access for Jewish people. These immigrants seemed strange and different in terms of language, appearance, religion and customs. The Jewish community had identified higher education as a vehicle for upward mobility and therefore wanted to enrol their children at such institutions. Although these universities valued

homogeneity and the tenets of the Protestant faith, the enrolment of the Jewish students created anxiety and fear amongst the administrators and trustees of these universities. In order to address the 'Jewish problem' a quota system was instituted (Florea and Horvat, 2009).

To give effect to the quota system, the admission offices were empowered with 'expanded discretionary authority'. The universities also introduced admission policies which were replete with ethnic bias. Further, the admission criteria underscored the family background of the potential student, photographs became compulsory and the student's 'character' was investigated through interviews. The admission office turned their attention on what they called 'geographical diversity' and institutional 'discretion' was exponentially increased. Thus, the final decision lay with the institution, and the admission policies were implemented to ensure that the number of Jewish students was limited (Florea and Horvat, 2009: 485).

Such admission policies and the accompanying non-academic considerations continue to exist in the current higher education landscape both in the US and elsewhere, demonstrating the tension between institutions' self-interest and meritocracy (ibid).

However, Bickel (2008) points out that, while social equity initiatives in the UK are linked to class issues as determined on economic basis, the US has a history of racism and its access policy is linked to both race and class. This means that policy relates to the history of both the country and the institution.

In the twentieth century, as demographic, economic and political pressures increased the demand for higher education, the elitist notion of access as inherited merit lost favour and was replaced by a more democratic approach, that of equality of rights, as it was felt that higher education should be accessible to everybody, whatever their social origin. This equality of rights approach presented an opportunity to introduce diversity to higher education (Clancy and Goastellec, 2007).

2.3. Equality of rights

Equality of rights means that the formal barriers to access to higher education have been removed for women, people of different race and social groups.

“The norm of equality of rights is affirmed by the changes in higher education roles and changes in political principles sustaining social organisation” (Goastellec, 2010:285). Concomitant to the affirmation of the equality of rights are the critical questions: Why the need for higher education? What drives access to higher education?

The demand for higher education is impelled by various factors. First, the economic factor, that is, the need to expand the workforce and to build a knowledgeable and skilled workforce to drive the economy. Technological changes and increased international competitions implied that the skills of the workforce needed to be sharpened (Clancy and Goastellec, 2007; Goastellec, 2010). As knowledge supplanted capital, people developed a strong need to acquire knowledge (World Bank, 2000). Both knowledge acquisition and skills honing are mostly done at institutions of higher learning. Universities are a critical component of education for the development of any nation, because they play a critical role in capacity development of highly skilled human power, technology transfer and knowledge production. Thus universities are placed at the centre of a country’s economic development and become the engine of economic development (Kariwo, 2007).

Second, the expansion of access to primary education through the principle of universal access helped to increase the numbers of people who completed this phase of schooling and wished to further their studies at the next level and ultimately reach higher education (Goastellec, 2010). The World Bank (2000) argues that the increase in widening access at primary and secondary education levels contributed to the increase in higher education enrolments, particularly in developing countries. This phenomenon was impelled by the increase in the number of people at the traditional age for attaining higher education and by the increasing number of secondary school graduates who wanted to progress to higher education. In this sense, education seems to be offering equality of opportunities.

Third, according to Goastellec (2008b) there are three issues that weigh heavily on higher education, namely demographic pressure, which refers to an increase not in the population in general but specifically in the cohort in the higher education age group, economic pressure, which refers to the efficacy and efficiency of higher education systems, and political pressure, which calls for diversification of the student body. Furthermore, “the level of access to higher education is often presented as an indicator to the economic and social development” of a country (Goastellec, 2008b:71). Countries therefore find themselves in an untenable position of supporting the increase of access in higher education which leads to massification.

Massification, that is, the increase in the number of students, has been perceived as an imperative for higher education. This perception had its roots in the US in 1944, with the signing of a bill that gave access to higher education for World War II veterans. In 1957, as a reaction to the launch of the Sputnik, the National Defense Education Act was passed by the US Congress. This Act entitled universities to federal funding which was aimed at increasing the number of researchers in America, inevitably massifying the higher education system as its enactment led to an enlargement of access to higher education (Goastellec, 2010).

The process of massification in the US increased significantly after 1960 and continued to see a steady growth as the total number of students increased from 14.8 million to 17.5 million between the years 2000 and 2006 (Scott, 2009; cf Goastellec, 2010), as compared to worldwide student enrolment figures which astronomically increased from 13 million in 1960 to 100 million in 2000 (Grandstein and Nikitin, 2004; cf Goastellec, 2010). There has also been an increase in student enrolments in various countries, such as Kazakhstan, with an increase of 62% from 272 700 to 442 400 between 1995 and 2001, and Bangladesh, from 801 733 to 962 567, which translates to 20% increment between the years 1998 and 2001. The Republic of Korea experienced an increment from 2 950 826 to 3 500 560, which translates to 19%, between the period 1998 to 2001, and Australia had an increase from 671 253 to 726 418, or 8%, during the period 1998 to 2001 (UNESCO, 2003).

According to the World Bank (2000), in 1995 more than 47 million students were enrolled in higher education in the developing countries, which marks a major increase from the approximately 28 million students enrolled in 1980.

The rise in enrolment numbers could partly be attributed to what Goastellec (2010:284) calls the “mechanical phenomenon of the demographic augmentation”, induced by the governments’ economic and social policies aimed at increasing the enrolment figures in higher education systems (Clancy and Goastellec, 2007). This suggests that the role played by demographic pressure in the massification of higher education system cannot be overemphasized. It is for this reason that Goastellec (2010:284) argues that “the rise of mass of higher education is one of the main universal dynamics of the second half of the twentieth century.”

Interestingly, whilst Asia experienced a 24% increase in enrolment figures during the period 1991 to 2005, Sub-Saharan Africa only recorded 5% increase in enrolment to higher education between 1991 and 2005 (Mohamedbhai, 2008). This slow increase could be attributed to the lack of funding. Because of various competing priorities, governments may be compelled to allocate insufficient funds to education in general and higher education in particular (World Bank, 2000). Such funding shortfall will have a negative impact on the infrastructural development of higher education.

The massification of higher education goes hand-in-hand with the increase in the female share of enrolments in higher education in the developing countries. This is underscored by the fact that between 1965 and 1995 higher education in developing countries registered an increase in female enrolments from 32% to 45% (World Bank, 2000). This looks positive, as female enrolments seem to be driving the demand for higher education and thus will promote gender equity in education. The lower mortality rate also contributes to massification because greater numbers of pupils enrol for primary education and continue to secondary schools (Mohamedbhai, 2008). Upon completion of secondary education, the natural progression is to advance to higher education, which encompasses all other forms of post-secondary education, such as colleges and universities.

Massification has had a major impact on higher education institutions. Scott (2010) argues that it cannot be limited to the increase of numbers alone or to the quantitative growth that universities experience, but stems equally from the social

equity and economic utility which erode the traditional cultures of studies in local campuses and encourage student mobility and alternative models of teaching. With massification, higher education has experienced a substantial qualitative transformation, as it changes the values and ethos of the universities. In this process, traditional institutions have undergone major and in some cases painful changes.

Altbach (2007) maintains that massified higher education may lead to the need for a differentiated higher education system, one which might be used to channel students from lower socioeconomic status and under-represented groups and by so doing promote greater social class integration differences and the achievement of social injustice.

On the positive side, massified higher education provides opportunities for greater access and more diversity of gender, social class and ethnicity among students. It can encourage social mobility, expansion of the knowledge economy and an increase in skills levels. Furthermore, mass higher education also opens opportunities for private higher education and the privatization of public post-secondary institutions (Altbach, 2010).

Massification fuels the thrust for globalization, as the increase in student enrolment stimulates and encourages student mobility, since the students may not be catered for by their local higher education institutions. In this sense, the demand for access to higher education has implications for student mobility and its corollary impact on the national higher education systems in various countries (Goastellec, 2010). Thus the demand for access to higher education not only expands the system in terms of exponential increase in the number of enrolments but this expansion also has the potential to put a strain on higher education systems.

Economic globalization has spurred various processes in education. It has increased the demand for higher education, particularly in developing countries and transitional countries which are trying to integrate into world production and trade schemes and often have a growing young population (van der Wende, 2003). The neoliberal economic policies and managerialism inhibit expansion and emphasize efficiency, while the minimal government investments have a negative impact on students from under-represented groups and thus also impact negatively on widening participation

(McGrath and Akoojee, 2009). Globalization has benefits for people who want to pursue global careers and offers opportunities for faculty mobility and for researchers to interact with like-minded researchers in other parts of the globe. The negative side is that globalization encourages economic migration, which has the potential to destabilize traditional communities and societies as well as their support system in the form of family and friends. This occurs as the researchers move to the other countries to pursue research and share experiences with like-minded colleagues in those countries (Scott, 2010b).

It is further argued that "traditional HEIs are not responsive sufficiently to the demand for more diversified and flexible forms of higher education" (van der Wende, 2003:194). Education across frontiers provides a means to satisfy this growing demand for higher education. Thus the development of transnational education has the potential not only to widen participation in higher education but also to contribute to the meaningful massification of higher education (ibid).

Obanya (2004) argues that massification has compounded the problems of funding in higher education because most universities, especially in Africa, rely heavily on government funds and these are inadequate. The corollary effect is that the universities become subsistent and struggle to survive. In these circumstances, it is perhaps the students who are most affected by massification, as the quality of student life is negatively impacted by this phenomenon (Mohamedbhai, 2008). In support of the poor students' quality of life Mohamedbhai (2008:14) argues:

> They [students] have to contend with overcrowded classrooms, unavailability or insufficiency of academic facilities including accommodation, reading materials, research equipment, computers, etc. .... These frustrations usually lead to students becoming more ungovernable and usually taking to the streets in demonstrations against either the management of the university or the government in order to improve their lot. Students complete higher education without having gained the necessary skills to make them employable. They spend most of their time just trying to survive and pass their exams and therefore do not have much time for self-development.

The main question is therefore whether expanding the education system "reduces inequality by providing more opportunities for persons from disadvantaged groups or

magnifies the inequalities by expanding opportunities for those who are already privileged" (David, 2009:5). This misgiving is echoed by Clancy and Goastellec (2007) as they point out that when access is massified, inequalities are reproduced within the higher education structure which becomes differentiated in terms of sector or institution, college or field of study. So expansion of enrolment does not necessarily result in widening participation since higher education remains stubbornly elitist in principle and promotes selective access despite the implementation of the universal access principle and meritocracy.

Corsini (2002) defines meritocracy as a social system which gives opportunities and advantages to people on the basis of their ability rather than their wealth or seniority, thus reinforcing the importance of the principle of equal rights. Florea and Horvat (2009:486) identify two types of meritocracy, namely aristocratic and democratic: "In the former the people at the top of the system make decisions about who wins or loses the competition, in the latter form of meritocracy, decisions are made by means of uniform tests and other impersonal criteria, who wins and who loses becomes simply a matter of personal achievement." In this regard, higher education plays a significant part in the promotion of emerging meritocratic knowledge by affording individuals an opportunity to succeed in it and by legitimizing their success.

It is against this background, Goastellec (2010:285) points out that higher education is elitist and that "academic performance is considered the results of 'natural intelligence'; the influence of socioeconomic determinants was therefore denied."

The notion of access as equality of rights is somewhat interrelated with the transformational issues described as social justice. This links education to social transformation and equity (Samoff, 2001). Education by its very nature lends itself to issues of social transformation because it is perceived as having the potential to act as an equalizer in an otherwise unequal society. Cultural diversity and educational equity are fundamentally consistent with social justice, thus the pursuit of such policies is justified and worthwhile in the long term. Social justice could be an option in addressing the anomalies which exist in society and are mirrored by societal institutions such as HEIs (Benjamin, 1996). In this sense, social justice as a phenomenon could help HEIs to reflect on their practice with regard to access, and this practice could help attract the critical mass to higher education. Clancy et al.,

(2007) concur that social justice emerges as a new tool for reducing divisions and fractures where racial identities have hitherto been dominant, as in South Africa.

Clancy and Goastellec (2007) and Goastellec (2010) hold a view that the social justice agenda is not quantitative; that is, it is not about increasing the enrolment numbers in higher education but is rather concerned with widening access to the previously under-represented groups, with a corresponding and the corollary impact on equality of access. This phenomenon resonates well with the history of access in the new South African context.

The 1994 elections heralded the dawn of democracy in South Africa, and with it a shift in access policy from the notion of inherited merit, whereby higher education was the privilege of mostly white students, to the notion of equality of rights. This shift was based on the new constitution, which was anchored in the Bill of Human Rights advocating social justice, equity and redress as the key principles for social transformation (DoE 1997a, 2001a). The perception of access from a social justice point of view presupposes the inequalities based on the segregation policies of the apartheid era. According to Nkomo, Akoojee and Motlhanke (2005), transformation in higher education is considered an indicator of social progress. It refers to a process of absolute overhaul of social thinking and results in meaningful social transition (Akoojee and Nkomo, 2011). Transformation in the South African context refers to the need to ensure that the barriers to access are completely removed so that the higher education system becomes more inclusive, achieving widening access, improved throughput rates and participatory outcomes. Access, from a social justice perspective, could be understood to refer to inclusion of those students who were deliberately and systematically denied entry into higher education through the traditional exclusive education system.

One of the barriers to access in South Africa is lack of funding. This is supported by international experience; for example Woodrow (1999) and Boud (2004) are of the opinion that the socioeconomic status of parents and their level of education contribute to the success or failure of the students at a higher education level. Furthermore, low socioeconomic status may lead to economic barriers which in turn may become an impediment to student retention (Boud, 2004). In an attempt by the South African government to assist disadvantaged students with funding, former

President Mandela launched the National Student Financial Aid Scheme (NSFAS) in 1996. This financial aid scheme is essentially a loan scheme, and a portion of the loan can be converted into a bursary on condition that the recipient demonstrates satisfactory academic performance, which translates into achieving success in registered courses (Akoojee and Nkomo, 2011; DHET, 2010). The challenge with this scheme is the small amount of money allocated to universities for this purpose (DHET, 2010; Wangenge-Ouma, 2010).

Despite the intractable challenges of access to higher education institutions in South Africa, at undergraduate level women seem to have overcome the barriers and are in the majority in higher education institutions (CHE, 2010; Goastellec, 2010; Woodrow, 1999). However, the substantial increase in numbers is mainly reflected in the humanities and social sciences, with fewer being registered in the science and technology fields (Jansen, 2010; Scott, Yeld and Hendry, 2007; Walters, 2004). There is therefore a continuing need for equality of rights and widening access at university level.

In South Africa, policies and regulations that encourage diversity in HEIs are set by the government and by the university management, with the approval of the university governance structure, generally known as the university council. Attaching incentives or rewards to induce desired behavioural practices and punishing failure to comply with policy can also encourage HEIs to implement access policies leading to diversity and increase the number of students from low socioeconomic backgrounds (Benjamin, 1996).

Despite some degree of success in Britain in increasing the number of students in higher education, Woodrow (1999:343) identified four myths that stood in the way of European higher education institutions achieving equality of rights.

Firstly, it is not the responsibility of higher education to promote inclusion. It is argued that higher education is detached from society, and it is therefore not the mandate of higher education to address any issue of poverty alleviation or discrimination that might exist in the society. This implies that higher education should focus only on issues such as teaching and learning, rather than be concerned with promoting inclusion. This kind of approach leads to governments developing

policies making it mandatory for institutions to consider promotion of inclusion (Woodrow, 1999).

Secondly, it is argued that equity is the enemy of academic excellence; students of lower socioeconomic status will lower standards. This myth is a blow to the inclusion of students from under-represented groups in higher education. When institutions increase numbers and enrol students from low socioeconomic groups and from under-represented groups, it seems to be expected that academic excellence will drop and that standards will be lowered, as these students may not have the cultural capital to handle the rigours of higher education (Woodrow, 1999; Altbach, 2007, 2010; Wangenge-Ouma, 2010).

Thirdly, access and widening participation is seen not as an investment but is perceived as problematic, as most higher education institutions do not seem to see the value of inclusion, particularly of students from under-represented groups. However, some institutions of higher learning do see the recruitment and inclusion of such students as adding value to the ethos of the university (Woodrow, 1999).

Fourthly, higher education institutions claim not to be able to afford widening participation. This myth persists, despite there being no correlation between the money spent on higher education and the support for widening access. The phenomenon could be perceived as purely a question of priorities. That is to say, higher education institutions choose to spend their money on other issues, relegating widening access to the periphery as something not worth spending money on (Woodrow, 1999).

The opposing argument is that claiming to be unable to afford widening participation demonstrates a lack of commitment by some HEIs. Several HEIs in the United Kingdom have attempted to widen participation, focusing particularly on students from low socioeconomic backgrounds (DfES, 2006; David, 2009).

Promotion of inclusion needs active participation and support by higher education institutions, not merely compliance with government regulations. If higher education continues to see itself as prevented from leading this process, it will not be fully

involved; instead, it will only be seen as complying with government regulations. In addition, it is also important to disaggregate the fact that admission of students from low socioeconomic backgrounds lowers the standards or the quality of education HEIs provide (Woodrow, 1999).

The university as an institution of higher learning is perceived as a community in which people of different cultures and classes have equal opportunity for access to higher education, have an equal voice in shaping institutional aims, and engage as equals by bringing divergent views into a rich conversation of respect (Benjamin, 1996). The emphasis here is on HEIs seeing all students as being diverse but equal, in terms of their potential to contribute equally to general social welfare by drawing from their various cultures. The fact that these cultures are diverse enriches the classroom discussions in institutions of learning. However, this is an idealistic view, as “equality” is understood and applied differently in different societies and in different HEIs.

The shift in educational policy in Britain refers to access as widening participation (WP), which seems to go beyond just entry to higher education, instead of attempting to increase the spread of enrolments across the spectrum of different academic programmes, particularly those which lack a diversified student population. Widening participation is therefore about attainment, and about “helping more people from under-represented groups, especially those from low socioeconomic groups, to participate successfully in higher education” (DfES, 2006:3).

The main reason for widening participation is to invest in high-level skills by increasing the percentage of people with degrees, as this has the potential to deliver high economic benefits. Furthermore, the British government hopes that this kind of endeavour will narrow the social class gaps through educational achievement, to create a society with equality of economic and social opportunities, given that the extant social divisions are unjust.

A study on recent trends in widening participation in Britain, conducted in 2006 by DfES, measured the percentages of higher education students from state schools, lower socioeconomic groups, and low participation areas. The study sought to demonstrate the progress made by the higher education system in Britain with regard to diversifying participation. It showed that there was a steady progress

towards achieving diversity as students from various walks of life were given an opportunity to participate in higher education. However, the study (DfES, 2006:4) acknowledges that “although progress has been made, it has been slow.” The key strategy for achieving success in widening participation was underpinned by four principles: attainment, aspirations, applications, and admissions.

Educational attainment not only entails the outcomes at school level but also encapsulates the need to narrow the social class achievement gap and encourage parental involvement at school level, in particular to help learners from low socioeconomic backgrounds to achieve good grades which will enable them to gain access to higher education. Parental support, provision of information on what higher education can offer, and the general support of government for the school system through programmes such as feeding schemes, childcare and early childhood education ensure that there are enough learners from low socioeconomic backgrounds and under-represented groups who qualify or meet the admission requirements, thus increasing the potential for widening access to higher education.

The narrowing of the social achievement gap was achieved by encouraging 16 year-olds from lower socioeconomic groups to remain much longer in school, at least until they had attained the advanced level subjects. Improving levels of attainment needs to be accompanied with raising the level of aspirations. There is a difference of about 25% in the likelihood of high and low socioeconomic groups staying in school for longer, ultimately to achieve the advanced levels (DfES, 2006:11). This suggests that if learners have in mind which career to follow and what is required to obtain it, they are more likely to remain in school in order to achieve their dreams. Dissemination of information to schools about career guidance and what higher education has to offer helps potential students to build mental pictures of what they may become once they have completed higher education. In addition, gifted children from low socioeconomic groups and under-represented groups are spotted early and given the necessary support so that their potential to reach higher education is increased.

The application process entails “knowing enough about the alternative universities and courses to put in an application to an institution which can satisfy the potential student’s aspirations and for which the student has the appropriate qualifications and

qualities" (DfES, 2006:5). In order to widen participation for people from under-represented groups and those of low socioeconomic status, they need to be shown how to select and apply to institutions of higher learning. This requires critical career guidance knowledge.

Admission is the prerogative of the universities, as they set the criteria which need to be met in order to gain admittance to a particular programme. Ideally, "admission should always be based on merit – irrespective of class, background or school attended" (DfES, 2006:2). However, this is not always possible, as there are people from lower socioeconomic backgrounds who may not have been adequately prepared for higher education. As a result, they will be at a disadvantage when they have to compete for places in universities, particularly the elite universities.

Hoare and Johnston (2011) point out that the competition among students, particularly at the so-called elite universities, put pressure on selectors and involve public scrutiny of the social profile of the undergraduate programmes. The competition for available spaces in the courses ensures the highest entry standards, and this fierce competition is likely to turn against students from educationally disadvantaged backgrounds. For example, in the UK students should normally be able to access higher education courses with two Advanced level subjects, but the competition pushes the entry threshold to three Advanced level subjects with at least an A symbol (ibid).

According to the World Bank 1995 review, as cited in Samoff (2001:17), "qualified potential students should not be denied access to institutions because they are female, are from ethnic minorities, live in geographically remote regions, or have special education needs."

The World Bank thus associates equity with equality, by defining equity in terms of access. Samoff (2001) cautions against this approach, as it devalues the connection between discrimination and injustice and fails to explore measures which could address injustice.

2.4. Equality of opportunities

Equality of opportunities is about levelling the playing fields and making access to higher education possible for people from diverse groups, regardless of their socioeconomic backgrounds, where they live or the schools they have attended.

According to Clancy and Goastellec (2007), the equity principle is defined as equality of opportunity as it emerged from the social struggle. Equality of opportunity operates from the premise that intelligence is spread among all social groups. The dearth of students from working-class backgrounds in top or Ivy League institutions is a cause for concern and raises a critical question "as to whether individuals have equal opportunities to succeed where success is largely defined in terms of achievement of wealth and power" (Florea and Horvat, 2009:486). Equality of opportunity thus shifts the focus from higher education systems of massification to the distribution of students within higher education institutions, which is achieved through changing the focus of access policies from expanding access to widening participation. In this sense, equality of opportunity is about widening participation.

Clancy and Goastellec (2007:139) argue that:

> Increasingly it is recognised that it is necessary to go beyond formal equality of rights and take account of differences in the opportunity structure. It is acknowledged that merit-based admission needs to be augmented by some form of affirmative action. The rationale is that since access to higher education is, to varying degrees, competitive, it will always privilege those with superior economic, social and cultural resources.

Higher education institutions introduced "sociotechnic tools" (Goastellec, 2010:286) or "socio-technical instruments" (Florea and Horvat, 2009: 489), such as the various admission tests conducted in elite institutions, as a way of augmenting the competitive access to higher education (Goastellec, 2007). The promulgation of these sociotechnic tools is an indication that school exit qualifications alone are not sufficient to determine access, particularly for people from under-represented and disadvantaged groups. The universities in the US use the national entrance examination, the Scholastic Aptitude Test (SAT). The SAT is intended to select the most intelligent individuals, regardless of their social backgrounds. That is to say, it is

one of the determinants for entrance into an Ivy League institution or elsewhere (Florea and Horvat, 2009). It is important to note that the SAT is used in combination with the high school results.

Florea and Horvat (2009:489) argue that these regional entry tests to some extent perpetuate inequalities in access:

> ...[B]ecause reducing an individual's accomplishment and potential to a number have compelled institutions to ignore motivation, competence, maturity and many language qualifications, not or hardly reflected by any high school graduation standardised test scores or grades. But the selection of individuals through the SAT revealed collective inequalities in access to higher education (e.g. regarding socioeconomic and ethno-racial belonging) and in many ways reproduced social inequalities.

The opposing argument, against the introduction of the sociotechnic tools, is that they are used by the elite universities and thus perpetuate inequalities as far as access to higher education is concerned, since higher education is naturally competitive and thus will always advantage those from backgrounds with superior economic, social and cultural resources (Clancy and Goastellec, 2007; McCowan, 2007).

Having identified the problematic nature of the SAT as a socio-technical instrument, some measures, such as affirmative action, were put in place to compensate the historically disadvantaged groups. Goastellec (2010:288) argues that:

> The diffusion of alternative admission practices (quotas, specific selection processes for minority students) is aimed both at correcting bias in the measure of academic competences (considering that admission tests favour students with certain type of culture) and resolving the problem of legitimacy in higher education by improving diversity and hence the societal representation of the elite. These processes translate the idea that access to higher education or at least access to the most elitist institution, should offer equitable representation to the various groups composing the society.

However, these alternative admission practices also fell out of favour, as Goastellec (2004) argues: "this formula was abandoned and holistic admission processes were

organised to measure the academic merit of an individual regarding all the handicaps s/he had to face to reach this level" (Florea and Horvat, 2009:489). Even though these alternative admission practices have some inadequacies, it should be noted that they have opened a window of opportunity to students who otherwise would not have accessed higher education.

In conclusion, it is equally important to identify categories of social inequality that need to be addressed. In South Africa and the US, the ethno-racial dimension is the dominant category used for identification of social category, hence the metaphor of the 'melting pot' (Clancy and Goastellec, 2007). It is, however; equally important to note that identification of the dominant category does not suggest it is the only measure that could be used to define diversity.

2.5. Access and higher education in Brazil

In order to develop a deeper understanding of the three categories of access to higher education, namely inherited merit, equality of rights and equality of opportunity, it is imperative to find out how these issues are played out in other countries. On the one hand, the South African experience somehow reflects developments in countries such as the US, UK (as explained above) and Brazil. On the other hand, Tanzania provides another window of opportunity to perceive access issues in higher education from an African country. This demonstrates development or lack thereof in access related matters. However, the South African experiences, just like in other countries, are driven by its own particular circumstances and history.

Brazil provides an opportunity to explore issues of access to higher education as it share some similarities with South Africa (Maassen and Cloete, 2006). In the recent past, these two countries, together with India, formed cooperative arrangements for trade, economy and the other related mutually beneficial projects (Akoojee and Nkomo, 2011). In this context, a critical review of the education system and access issues in Brazil becomes relevant. Furthermore, Brazil is classified as a developing country with inequalities similar to those in South Africa; getting a Latin American perspective on access to higher education thus adds value to this study.

Higher education institutions are the microcosm of the society within which they are located. These institutions cannot be looked at in isolation from society in general. McCowan (2007:583) points out that “equity is not a word associated with Brazilian society. The country is one of the most unequal in terms of income distribution and the educational opportunities are distributed in a similar unjust way.” The education system in Brazil displays an extreme inequality that is mirrored in the country as a whole, in which access is to a large extent restricted to people from high socioeconomic groups. This perpetuates the notion of access as inherited merit. Furthermore, the problem of access is compounded by the highly selective nature of the entrance examinations for public universities, which have become very competitive (McCowan, 2004 and 2007).

The intake in higher education is dependent on the number of candidates who enrol for secondary education and successfully complete this phase of their schooling. The successful candidates must also meet the university entrance requirements. Unesco (2001), cf McCowan (2004), states that primary school enrolment has reached 97%, albeit there are high dropout and repetition rates. Although the secondary school enrolments reached 71% in 1999, the quality of education in public schools in Brazil is impeded by underfunding in poor areas. Gandin and Apple (2002) argue that there are a number of noteworthy initiatives by the government to address the deeply rooted inequalities that face the education system as a whole, from primary education to secondary and higher education.

The Brazilian school exit qualification is determined through successful completion of the National Examination of Secondary Schools. However, access to higher education is decided through the `vestibular’. This is an examination taken by candidates who want to go on to higher education. In order to make sure that one succeeds in this entrance exam, thorough preparation needs to be undertaken. These preparations include candidates attending a special preparatory course called the pre-vestibular, either during the final stages of secondary school or after completion (McCowan, 2004). The inequalities in the schooling system become very discernible or apparent at this stage, more indeed than at any other stage, because these courses (vestibular and/or pre-vestibular) are expensive. It is reasonable to conclude that chances are low for students from poor families in low socio-economic communities to pass the vestibular and thus to qualify to study at higher education

institutions. Students from poor families in most cases attend schools in rural areas and some of these schools tend to offer inferior pre-university schooling (ibid).

Neves, 2002; cf McCowan, (2004) identifies three categories of higher education institutions in Brazil. The first category is universities, which are required to conduct research, community engagement, and to teach. These institutions have the highest level of autonomy. The second type of institution is university centres; these offer multi-courses and could be said to be teaching universities since they are not required to carry out research. These first two types of institution do not require authorization from the Ministry to introduce and offer new courses. The third category is the integrated faculties and institutes or schools of higher education. These are smaller institutions with little autonomy and their course offerings have to be approved by the Ministry. Whilst they make a meaningful contribution to access and widening participation, they are viewed as less prestigious and thus are less preferred institutions.

The majority of the institutions are public universities, with administration divided between government, federal state and municipality. The national government control 61 universities; with a further 61 run by the federal state or provincial government, and the municipality runs 75 smaller higher education institutions, providing mainly technical courses (McCowan, 2004; Maassen and Cloete, 2006). Regardless of the huge number of institutions of higher learning, access poses a challenge, especially for people from under-represented groups or of low socioeconomic status.

The private higher educational institutions also play a significant role in the provision of access to higher education in Brazil. According to McCowan (2004), the private sector has succeeded in bringing a rapid expansion to higher education in Brazil. The success of private higher education institutions in increasing the enrolment numbers could be attributed to the government's initiative in giving tax rebates and cheap loans for infrastructure development for these institutions when they offer free places in higher education. Nonetheless, the majority of free places is filled by students from affluent families, since they can afford private schooling and the expensive pre-vestibular. It seems therefore that the expansion of private higher education institutions perpetuates inequalities.

In summary, the case of Brazil demonstrates an example in which expansion perpetuates elitism and a differentiated system, thus illuminates the notion of access as inherited merit, since access is attained mostly by affluent people.

2.6. Access and higher education in Tanzania

Tanzania provides yet another opportunity to explore the access related issues of higher education with special reference to widening participation. These issues are seen through African lens and therefore enrich this study.

Tanzania is an Anglophone country, where enrolment to higher education is subjected to a rigorous selection process so that access becomes restricted. The reverse seems to apply in Francophone countries, where any holder of the secondary school leaving qualification, the 'baccalaureate', can enter higher education without having to go through the "sociotechnic tools" or other means that determine access to such education (Mohamedbhai, 2008).

Tanzania is one of the few African countries where research in widening participation is ongoing, through collaboration with the University of Sussex in the United Kingdom (Morley, Leach and Lugg, no date). This makes Tanzania an interesting case to consider and explore.

In Tanzania, higher education is a component of the broader tertiary education sector, which is defined as all post-secondary education. Higher education refers to institutions which offer and award advanced diplomas or degrees (Benjamin and Dunrong, 2010). The tertiary institutions in Tanzania include eight public universities, twenty two private university colleges, and fifteen additional public institutions (ibid).

The birth of higher education in Tanzania followed a trajectory similar to that of most African countries. The establishment of institutions of learning was inextricably linked with the colonial rulers of those African countries. As Tanzania was a former British colony, its first university was established in 1963 as part of the University of East Africa, which served three neighbouring countries in east Africa namely, Kenya, Tanzania and Uganda. The University of East Africa itself was established as a college of the University of London. A split with the University of East Africa led to

the establishment of the University of Dar es Salaam in 1970 (Morley, Leach and Lugg, no date).

Higher education in Tanzania was expanded, as three more universities were established, namely the Sokoine University of Agriculture[2], established in 1965, Tumaini University[3], founded by the Lutheran church of Tanzania in 1993, and Mzumbe University[4], established in 2006. Private higher education institutions were also established alongside the public universities, in order to address the gap that arose due to the high demand for skilled labour.

Benjamin and Dunrong (2010) argue that participation rates in higher education in Tanzania are very low. In 2005, the gross enrolment in higher education was 1% (Unesco, 2007; cf Benjamin and Dunrong, 2010). According to the Tanzania Education Authority (2011), the participation rate in higher education increased from 37 667 in 2004/05 to 95 525 in 2008/09. Despite this increase, participation rates for female students remained almost level, at 31,4% in 2004/05 and 36% in 2008/09. Therefore, access to higher education in Tanzania is still male-dominated, particularly in the sciences and science related programmes, in which female participation rates are less than 10%. This underscores the need to widen participation in Tanzania, especially in the sciences, including in the Biological Sciences.

Male dominance in higher education participation rates and in the sciences in Tanzania suggests that the country is still faced with the challenge of access as inherited merit.

However, the situation seems to be changing, as there has been a steady increase in enrolment of women in higher education. Morley, Leach and Lugg (no date) assert that participation of women was lowest in Commerce, Science and Engineering, and highest in Law, Education and Medicine.

[2] See University website http://www.suanet.ac.tz/
[3] See University website http://www.tumaini.ac.tz/
[4] See University website http://www.mzumbe.ac.tz/

The question of gender-biased access invoked the following assertion:

> Questions have arisen about the representation of various social interests in key public institutions. Elite social institutions have increasingly been required to consider the democratic challenge. In the policy field of higher education, the concepts of access and widening participation have become condensates for discussion of diversity, equity and disadvantage, and a form of critique of public universities (Morley, Leach and Lugg, 2009:56).

Access to higher education in Tanzania could not continue to be limited to certain groups only; the universities' access policies have had to be sensitive to intersect with gender and low socioeconomic status.

This brief analysis of access to HE in Tanzania sought to demonstrate that the challenges of access are not confined to South Africa, but are also an African issue.

2.7. Historical background of access in South Africa

2.7.1. Prior to apartheid era

The issue of access to higher education and concomitant performance or lack thereof of the first year students has been a concern in South Africa as early as nineteen thirties (Malherbe, 1977).

In 1936, prior to introduction of the apartheid government, a survey of about 8 000 predominantly white male matriculants entering South African universities was conducted. This survey aimed at identifying the cause of the excessive failure in the first year of university studies as well as the transition between schooling and university. At that stage the poor performance at university level was attributed to 'youthfulness' of the students. Since South Africa was one of the British colonies early universities in South Africa used English as a language of instruction. The survey found out that at least half of all first year students failed in at least one subject. The subjects failed by first year students were mainly the sciences, i.e. engineering, Biological Sciences and other science related bachelors' degree programmes. Furthermore, the majority of first year students failed individual subjects when compared to the overall first year aggregate.

Amongst others, the underlying factors of poor performance in first year studies were the question of the medium or language of instruction and institutional culture. For example, prior to its incorporation into University of Pretoria, the veterinary faculty in Onderstepoort used dual-medium method but after incorporation into University of Pretoria Afrikaans became a dominant medium of instruction (Malherbe, 1977).

The implementation of this dual-medium method was inconsistent and varied:

> [F]rom time to time and subject to subject. Sometimes English and Afrikaans were used on alternate days sometimes they were used alternately in the same lecture (Malherbe, 1977:128).

The medium of instruction and institutional culture were inimical to the Afrikaans speaking students in English medium universities such as University of Cape Town (UCT). Mandew (2003) points out that campus life during the formative years of UCT like in other institutions of higher learning in South Africa reflected the dominant culture of the country.

> Afrikaner students felt a deep sense of alienation and they resented the overly English character and the ethos of the institution, especially the medium of instruction. For blacks the climate was fundamentally as hostile and racist within the university as it was outside the institution (Mandew, 2003: 7).

These findings together with other lopsided government imperatives of that time have led to the proliferation of Afrikaans-medium universities in South Africa. Furthermore, the foundation year was also mooted as one way of reducing failure rate at first year degree studies which seemed to be emanating from the transition from school to university (Malherbe, 1965). The proposal was that foundation year should offer courses that will broaden the students' scope of general information with a view of developing a well rounded graduate. This kind of graduate will be knowledgeable in variety of subjects that inculcated the white population's social and political roots as well as subjects that could ramp up the students' inductive and deductive reasoning ability and communication skills. In order to achieve these lofty objectives, an in-depth study of certain courses such as literature, social science, natural science or physical science and communication will have to form the core of the foundation year curriculum. In this way, the envisaged foundation year will also

eliminate premature specialisation but strengthen the first students' intellectual knowledge and in the long term reduce wastage in higher education (Malherbe 1965; 1977). That is to say, the envisaged foundation year was not intended to be neither an extension of the first year university curriculum nor the remedy of the deficiencies experienced at university level as a result of poor schooling.

In addition, the foundation year was intended for all first year students and the purpose was that:

> Students should be in contact with broad culture of the university. Every student will be brought in contact with what should be the common denominator in the academic experience of a university trained person regardless of the speciality and profession he is ultimately going to follow (Malherbe, 1977: 491).

Whilst the foundation year then was intended for whites it became compulsory for blacks students because their education was perceived to be inferior.

> Such a scheme seemed to be needed *a fortiori* in the universities for blacks since their education has been limited (Malherbe, 1977: 493).

Subsequently, black students who enrolled at Medical School of University of Natal were the first cohort of matriculants to be subjected to such a 'preliminary' university year.

2.7.2. The apartheid era

During the apartheid era in South Africa, access for blacks did not feature as a policy option in the same way and degree as access for white students (Akoojee and Nkomo, 2007). There was only one residential university for Africans, the South African Native College at Fort Hare, established in 1916 with 343 students. Africans were also enrolled at the University of South Africa (UNISA) (which was established in 1946 to offer distance education), making up just over a quarter of the total enrolment at this distance learning institution (Nkomo, 1984). During the heyday of apartheid, there was only a very limited enrolment of blacks at English-medium universities and no blacks were admitted at Afrikaans-medium universities.

The apartheid South African government introduced the Extension of University Act in 1959, which led to the establishment of separate universities based on race or ethnic identity (Nkomo, 1984). This legislation established universities for Indians and Coloureds as special groups, while the universities of Fort Hare, the North and Zululand were created for Africans.

The promulgation of the Group Areas Act led to the establishment of homelands or Bantustans[5]. These were regions to which people of a particular ethnic group were relegated, and were situated in barren areas with no meaningful economic activities. Some of the Bantustans established institutions of higher learning, such as the University of Bophuthatswana. Founded in 1980, it changed its name to North West University in 1994. The University of Transkei was established in 1977, but merged with the Border Technikon to form the Walter Sisulu University in 2004 (Bunting, 2006). These universities, like all the other historically disadvantaged institutions (HDIs), offered courses/programmes in the humanities, teacher education and limited courses/programmes in science and technology. The Medical University of Southern Africa (Medunsa) and Vista University were established in 1977 and 1982 respectively, under a special purpose provision. In 1998 all the historically disadvantaged institutions in South Africa enrolled a total of 89 309 students, compared with historically advantaged institutions (HAIs), which enrolled a total of 148 976 (Cooper and Subotzky, 2001).

Whilst these HDIs offered blacks access to university education, the quality of the education they received was questionable. Furthermore, these institutions were unstable, since they were at the forefront of unrest and political protest against the apartheid laws and the social injustice that prevailed in the country during that era.

After the transition to democracy, black students preferred to enrol at HAIs, as they were perceived to be stable institutions where students were more likely to complete their academic programmes and degrees within the stipulated time; and where the degrees had a higher status (Ntshoe, 2003; Soudien, 2010). Jansen (2010:129) adds that many black students who attended the former segregated Model C schools chose to join HAIs after the shift to democracy, since their secondary schools were

[5] There were 10 Bantustans/Homelands, namely Bophuthatswana, Ciskei, Gazankulu, KaNgwane, KwaNdebele, KwaZulu, Lebowa, Qwaqwa, Transkei and Venda.

the traditional feeders for these HAIs and they may have come to know about them via the institutions' recruitment campaigns. This, according to Jansen (2010:134), resulted in the emergence of a "two-tiered system in South Africa, i.e., an upper tier being the well-resourced, urban and former white universities that are racially integrated, and a lower tier of under resourced, mainly rural universities that remain black."

According to Ntshoe (2003), the higher education landscape in South Africa came under review immediately after 1994, which was the historic year when all South Africans of voting age went to the polls to elect a new government. The main concern in the review was the elitism of the HE sector, which offered only limited access to the major section of the South African society, namely blacks and women. One of the strategies chosen to redress this situation was to develop a massified higher education system that would widen access and accommodate people from the under-represented groups, namely blacks, women and mature students. In addition, the rationale behind massification was to meet social demands and address issues of equity and redress.

Akoojee and Nkomo (2007:385) argue that "the concern for greater participation is not new to South Africa but it has become an urgent imperative after the demise of apartheid." Whilst access was massified, it was equally imperative for HEIs to provide support, particularly to those kinds of students who are from previously under-represented groups, in order to ensure that such students successfully completed the degree studies for which they were registered. Foundation programmes and academic development programmes are examples of the kind of support HEIs could offer these students (ibid).

2.7.3. The democratic era

South Africa earned its hard fought for democracy in 1994. The country moved with celerity to set up new government departments and various structures that would help to give effect to the new democratic state.

In 1997, the Higher Education Act was put in place, and among other, aims to address the acute need for the new government to create a single, national, integrated higher education system (Hall and Symes, 2005:202; DoE, 2001a). The implementation of this and other related legislation led to incorporations and mergers which reduced South African universities from a total of 36 universities and technikons to 23 HEIs. Three types of university were established, namely universities (offering mainly degree programmes and steeped in research), comprehensive universities, and universities of technology (which emerged from the technikons which had been created to promote technical and vocational education). The comprehensive universities came about as a result of the merger between universities and technikons. Some of the traditional bachelors' degree-awarding universities remained intact and were not affected by the incorporations or mergers. The merging of universities and the establishment of Universities of Technology (UoT) was an attempt to bridge the gap between 'head' and 'hand' and to make these institutions inclusive.

The National Plan for Higher Education (NPHE) (DoE, 2001a:6) articulating the vision of Education White Paper 3 (1997) identified one of its goals as "to promote equity and access and fair chances of success to all who are seeking to realise their potential through higher education, while eradicating all forms of unfair discrimination and advancing redress of past inequalities."

At the implementation level, access to HEIs is informed by several legislations and the admission point score (APS), as determined by the senate of each HEI. Access to higher education in the South African context is regulated and managed through government legislation. The main piece of legislation governing access is the Higher Education Act of 1997, which repealed the University Act of 1955 but precluded Section 74, which governs access and admission to higher education institutions. This legislation spells out the admission requirements for students with Senior Certificate (SC).

In 2008, the Senior Certificate was replaced by the National Senior Certificate (NSC). The NSC is a new school exit qualification at Grade 12. This qualification uses a completely new set of admission requirements for higher education, as set out in the DoE policy. Whilst the SC used endorsement for access to HEI, the NSC uses a selection of credits from 20 designated subjects. In this policy, four designated subjects must be passed with adequate achievement (DoE, 2008a).

The NSC[6] does not use symbols to indicate a learner's performance but an achievement rating denoted in numbers ranging from 1–7. This qualification came into being following the introduction of the Outcomes Based Education (OBE) system in South Africa that sought to replace the apartheid government's Bantu Education system (ibid).

At university level, access is managed through enrolment planning, which is a three-year long-term plan agreed between university and the government. The plan spells out the projected numbers that the university envisages enrolling, based on their resources. Further, the university also considers the subject mix when determining student selection for various programmes. For example, mathematics and science are essential if one needs to pursue science-related programmes.

Access to HE in South Africa is, therefore, conducted on two levels. Firstly, the applicant has to meet the minimum admission requirements set by the state (DoE, 2008a), that is, the NSC with the correct subject mix. Secondly, HEIs are entitled to overlay these minima with additional faculty-specific requirements, mostly determined through the M score or APS and admission tests, as well as other selection criteria in cases where supply exceeds demand.

[6] The NSC as a school exit qualification uses the following achievement ratings, represented by numerals which translate to certain range of percentages: **1** (Not achieved) = 0% - 29%; **2** (Elementary achievement) = 30% - 39%; **3** (Moderate achievement) = 40% -49%; **4** (Adequate achievement) = 50% - 59%; **5** (Substantial achievement) = 60% - 69%; **6** (Meritorious achievement) = 70% - 79%; and **7** (Outstanding achievement) 80% - 100%.

2.8. Researching access in South Africa

The most significant recent study on access in higher education was undertaken by the Council on Higher Education (CHE) in 2010, *Access and throughput in South African Higher Education: Three case studies*. The study was an attempt to develop a deeper understanding of access and students' success and experiences in the universities as social and academic institutions, focusing on three case studies, the University of the Western Cape (UWC), the University of Witwatersrand (Wits), and the University of Pretoria (UP).

The CHE report identified three generations of research on access. The first research generation was the 1970s to the mid-1980s period. During this period access to education was elitist in nature, and most studies included liberal or critical critiques of the HE system in which the demise of the apartheid system was a precondition for access to education. The second generation of research, from the late 1980s to the 1990s, dealt with the way the South African higher education system needed to transform to accommodate a diverse student body. This period of research introduced the concept of epistemological access (Morrow, 1994), discussed earlier in this thesis. The third generation of research, into the 2000s, dealt with issues of expansion, throughput and retention. These topics have been studied by measuring the efficiencies or inefficiencies of the higher education system via sets of indicators. At the same time, an increased attention to the impact of culture on access resulted in a proliferation of qualitative studies explaining students' academic performance from individual or institutional perspectives. The CHE study adopted a critical culturalist perspective which sought to unravel the access issue by understanding students' experiences through the crosscutting issues of class, gender, language and physical ability, within the framework of a higher education system that encapsulated culture. It argued that:

> When considered in isolation, student enrolments, dropout rates, failure rates, throughput rates, resource allocation and institutional renewal strategies sometimes seem trivial and meaningless (CHE, 2010:39).

For instance, the study at UWC aimed at providing an explanation of the students' academic performance by exploring the relationship between the students' everyday life experiences and the institutional practices such as rules, processes, ideas and

meanings (Ravjee, Hames, Ludwig and Barnes, 2010). In other words, it explored the relationship between cultural experiences and students' academic success. It should be borne in mind that talking about students' academic success assumes the prior attainment of access.

The study points out that:

> Students are a heterogeneous group because of different home cultures, high-school cultures, teaching and learning cultures and intersecting identities of race, class, gender, ideology, ethnicity, language, sexuality, nationality and specific historical experiences (Ravjee et al., 2010: 129).

This seems to be a positive factor for UWC, since it draws on different cultures, enriching the students' learning by bringing together different experiences from these cultures.

Ravjee et al. (2010) argue that students' success is positively correlated with the ability to build a supportive academic community, one which has the potential to provide them with the armaments they will need to increase their chances of success in the challenging academic life.

The questions of student performance and low throughput rates are the twin challenges that are underpinned by students' academic under-preparedness, financial challenges and lack of the skills needed to manage the transition from school to university and academic life. The study underscores that 'academic success depends largely on the ability of the individual students to successfully negotiate their way through the institutional space' (Ravjee et al., 2010).

The University of the Witwatersrand was established mainly to cater for the white middle class population of South Africa during the apartheid era. Murray (1997) opines that prior to world wars few blacks trained as medical doctors outside the borders of South Africa. However, war in Europe meant that training has to be conducted locally and Wits opened the doors of its medical school to blacks by admitting them to the clinical years. Hence Murray's (1997) view that:

> The war years at Wits were the most dramatic period of advance for black students – prior to the transformation of 1980s (Murray, 1997:27).

In the 1980s Wits university chose to be liberal and committed itself to the ideas of an 'Open University', which allowed it to enrol the students of all races (Cross, Shalem, Backhouse, Adam and Baloyi, 2010). Thus more students from the working class were enrolled, implying that students without the social or cultural capital required to meeting the challenges and the rigour of an elitist academic and institutional culture had now been enrolled. The university had opened itself up and would have to adapt its teaching and learning practices to accommodate students from low socioeconomic backgrounds who were now swelling its ranks.

The University of the Witwatersrand struggled to realize its mandate of developing "students to become independent individuals" because many students continue to feel alienated and marginalized when their efforts to succeed are not met with an equal amount of institutional support (Cross et al., 2010: 91). This leads to the perception of Wits as a "harsh, cold and unforgiving environment where many do not fit the mould of excellence and independence and struggle to survive" (Cross et al., 2010:92). Although the university has progressive policies and strategies, lack of synchronization and synergy of policies and strategies at implementation level render them ineffective, and this is evident in the low graduation rates. So while Wits has made giant strides in the transformation process, this process is experienced differently at different levels by different students in the same institution.

Jansen, Tabane and Sehlapelo (2010) explored how students at the University of Pretoria encountered and experienced academic life at a large urban institution. It was discovered that "unlike Wits and UWC, the University of Pretoria has comparatively high progression and pass rates in the undergraduate programmes based on the study cohort" (Jansen et al., 2010:96). This could be attributed to its ability to recruit and attract top students, since there seem to be strong links between graduation and completion rates and the high school grades' matriculation scores (M scores). These M scores, currently known as APS, determine eligibility to study at the university. In addition, just as in the case of both UWC and Wits, the study also identified students' academic under-preparedness, language challenges, financial difficulties and lack of computer skills as some of the impediments to their academic success. There is a chasm between high school performance and tertiary academic demands as well as the high expectations of the university. That is to say, the

schooling system does not prepare learners adequately to deal with the challenges and the rigour of university studies.

At both Wits and UWC, language is stable and is not a contested terrain, as is the case at the University of Pretoria. This contestation emanates from perceptions of betrayal both from the white students, who expect to be taught in Afrikaans only, and black students, who feel left out when a lecturer decides to give a detailed explanation in Afrikaans. The situation is even worse for the international students, who have never been exposed to Afrikaans before (Jansen et al., 2010). This occurs despite the language policy being very clear that the university offers tuition in Afrikaans and English. At the practical level, this policy is implemented differently throughout the university. For example, "teaching in English, with class notes in Afrikaans or teaching in Afrikaans, with class notes in English or teaching in both English and Afrikaans at the same time" (Jansen et al., 2010:116; DoE 2008b).

Jansen et al. (2010:110) also identify "the persistent negative expectations of the students" chances of success on the part of university lecturers' as one of the key factors that need to be urgently addressed. These negative expectations trap the students and when compounded by challenges such as the language issue, become a huge mountain for some of the students to climb, often resulting in low throughput rates and students curtailing their studies.

The three case studies illuminate the challenges that students from under-represented communities have to deal with in higher education institutions. These challenges underscore the need to open the doors of learning, by removing the barriers to access as well as widening participation, including in the Biological Sciences.

A number of studies on access, commissioned by the University of Cape Town (UCT) in 2009, explored the issue of access following a debate on its race-based access policy. One of the critical questions raised was how to define disadvantage (Smit, 2012). The issue of widening access brought to the fore the complexities of social identity and the question of which social category could be used to define disadvantage. The chosen social category was national-specific (Clancy and Goastellec, 2007); for instance, in the UK social equity issues lean more towards

social class, while in the US such social equity issues are linked to both race and class (Bickel, 2008).

Hoare and Johnston (2011:25) highlight the following issues in an attempt to unravel what educational disadvantage means:

- Personal circumstances – such as age (mature age students) or a disability - which affect studying;
- Family/household circumstances – may place little value on educational attainment, progress in academic study or post-school progress, with lack of resources, monetary or otherwise;
- Neighbourhood/community – a student's local environment may accord a similarly low priority and peer-group status to education and academic attainment and a dearth of counter-balance from local role models; and
- Schooling – attendance at poorly resourced or poorly performing schools, lacking material resources, but also lacking enthusiasm, experience and advice to support university applications, with no collective value attached to academic achievement by student peers.

In South Africa, because of its political history, the question of disadvantage somehow gets conflated with race. As Bitzer (2010: 298) points out, "the concept of affirmative action and the issue of 'race'-based student admissions have always been closely related to the complexities of equity and access in higher education." Thus, in its attempt to address the question of equity and access, as mirrored by South Africa's unfortunate history of inequality in institutions, e.g. UCT, it tends to use affirmative action through a race-based access policy (ibid).

The Vice-Chancellor of UCT acknowledges that the race-based policy poses problems, as "it reinforces paternalistic relationships between the different groups and it is arguably harmful to the self-esteem and confidence of black students." However, this does not deter the university from using race-based criteria because it "is a good proxy for disadvantage" (Price, 2010:11).

The admission policies of higher education institutions in South Africa are largely grounded in legislation and governmental regulations. The legislation sets the minimum admission requirements, whilst HEIs overlay those minima with their own specific admission requirements. The Higher Education Act enjoins university's autonomy by allowing the university council to determine and publsih access policy. This policy may use various proxies, for example race as a proxy for disadvantage. Favish and Hendry (2010) argue that there are still challenges which need to be addressed in order to achieve redress of past inequalities at the University of Cape Town. The issue is how to get away from using race as a sole criterion for defining disadvantage and look at social background and other criteria. According to Waetjen (2006), race-based affirmative action is a poor proxy for disadvantage, when compared to socioeconomic status. Using race as proxy for disadvantage could create inequalities within racial groups, as affluent people from a disadvantaged race group would benefit, while the needy members of that racial group would remain marginalized.

The analysis of UCT's enrolment data from 1994 to 2009 does not provide sufficient empirical evidence to argue against using race as a proxy for disadvantage. However, UCT academic Benatar (2010:258-260) disagrees with the use of race as a form of criterion for affirmative action in admission. Whilst he purports to "endorse the imperatives to redress" the injustices of the past, he argues that using race to give preference to one group of learners over others at admission is "morally wrong and indefensible", despite good intentions, such as to ensure diversity. He proposes the use of a race-free classification such as "moderately disadvantaged" students. This argument resonates with the fact that not all blacks in South Africa are indigent following the increase of the so-called 'middle class'. The lingering question, though, is in defining the ''moderately disadvantaged''.

The challenge that besets access is the ongoing inequality in the schooling system. UCT does not consider poverty and schools attended as the only factors that impel this affirmative action process. Price (2010) postulates that there are several 'intermediate determinates' which need to be taken into consideration concomitantly with poverty and the school attended. He highlights the following factors: home language, parents' educational level and ability to support their children's learning, and the timing of the provision of educational toys, as well as creating a stimulating

and conducive environment for learning. Encouragement early in the child's life and the assurance that he or she could go no to university upon completion of school would inspire ambition and self-confidence.

One of the arguments in favour of keeping the race-based nomenclature as an integral part of UCT's access policy relates to the need to change the student equity profiles. Furthermore, UCT's academic development programmes seem to have been successful in increasing the enrolment numbers of black students. From this, it may be concluded that a race-based access policy also requires the university to strengthen its academic development with a view to improving both equity of access and outcomes for black students (Bitzer, 2010). The counter-argument to the inclusion of race in access policy is that this approach may lead to a racial taxonomy which by its very nature is subjective and morally unacceptable. Alternative measures to address the inequality of the past should therefore be explored. There is also a school of thought which argues that race-based categories are rooted in the apartheid philosophy, and new ways of looking at admission criteria should be considered.

The other argument locates access within the role of the university. This takes the view of university as "a mirror of local society, university as a reflection of a global society and the university as fundamentally a site for knowledge production" (Bitzer, 2010:300). It is imperative, therefore, for the university to execute its duties within the context of public good and espouse the expansion of knowledge by allowing individuals from society to access it and its resources.

Bitzer (2010:304-306) argues that myths have collected around the issue of student equity and access. He identifies six myths which beset the issue of student equality and access in higher education:

- Expanding participation will improve equity;
- Free or low-cost higher education will improve equity;
- Improving equity involves the removal of barriers to access;
- The onus is on universities to resolve the equity problem;

- Widening participation will lower standards or lower retention and completion rates;
- Students can be selected for higher education on academic merit.

The expansion of participation gives access to university studies to more people from low socioeconomic backgrounds. However, “expansion can lead to greater social inequality as mass higher education systems become highly stratified and access to elite universities and highly sought after programmes becomes heavily skewed towards higher social classes” (Bitzer, 2010:304).

Bizter (2010) argues that a race-based access policy has a place in the university admission criteria. However, it should be coupled with other criteria, such as the socioeconomic status of the students, which seems to be a better proxy to address equity and access. This is more relevant because the advent of democracy has seen the emergence of a black middle class who can afford affluent schools in the leafy suburbs of South Africa. However, Price (2010) argues that race-based admission criteria in this case compensate for the intermediate determinants (educational disadvantages) which still serve as barriers to access for blacks, regardless of their middle class status and their children’s attendance at private schools. By the same token, white students from poor households who may have attended poor schools should not be disadvantaged by the selection process. Nonetheless, Bitzer (2010:299) cautions that “the university reputation is inextricably linked to equity and access.”

UCT is not the only university debating the issue of access and the disadvantaged. Foxcroft (2009) reports on the development of a framework for access at a comprehensive university, aimed at unravelling the issues around access and admissions in the context of such a university. Foxcroft’s framework was based on Osborne and Gallacher’s (2004) concepts of ‘getting in’, ‘getting through’ and ‘getting on’. This study adopted this framework and develops it further in the chapter on the conceptual framework. In addition, the report also focused on the access imperative in higher education.

Foxcroft (2009:3) identifies four critical components of access which invoke these questions: “Access for whom? Access based on what criteria? Access to what? And access paid for by whom?”

The first question calls for philosophical models, such as the eligibility-based model, which are underpinned by a philosophy such as entitlement (Morrow, 1994) and open access.

The second question suggests multiple entry possibilities. That is to say, access should ideally open up opportunities for students to be registered at an institution of higher learning. However, prior to admission such students should have demonstrated that they have the potential to succeed at higher learning. The potential is extrapolated from their secondary school academic performance.

The third question refers to available programmes and courses that institutions of higher learning can offer. In other words, such institutions have to consider factors such as their capacity in terms of both human and physical resources. The availability or lack of these valuable resources will determine the number of students to be registered. The mode of programme delivery also gives direction in terms of the numbers that could be enrolled. Matching the talents and interests of an applicant with the appropriate programmes is an additional factor to be considered prior to registration. It is evident that there are students who may have applied for enrolment in a programme about which they may not have had sufficient information (Foxcroft, 2009).

The fourth question is a critical one, particularly when higher education institutions have to widen access by considering applicants from low socioeconomic backgrounds. Potential students from this category need to find funding to cover the costs related to their studies. In South Africa, the government established the NSFAS to assist deserving students; however, the funding is not always sufficient to cover all the costs of their studies (Foxcroft, 2009; DHET, 2010; Wangenge-Ouma, 2010).

The report concludes that “access is not limited to focusing on opening up pathways for students to access higher education studies. It is also closely related to how an institution develops and supports students to persist and succeed at their studies

and to be work ready" Foxcroft (2009:8). In essence, this underscores the importance of the support higher education institutions need to give their students in order for them to be successful in their studies. They will then be ready to enter the world of work and compete in the global market.

It is also critical to reflect on access to higher education by considering access to student accommodation or housing which is equally import as it plays a critical role in students' success or lack thereof at university.

In 2011, *the Report on the Ministerial Committee for the Review of the Provision of Student Housing at South African Universities* was released by the department of higher education and training. This report sketched the various challenges and the impact of problems experienced by students, especially first year students with regards to housing at university level. Whilst the report acknowledges that "the demand for student housing currently tends to outstrip supply" (DHET, 2011: xiv) there is a sizable number of students accommodated in residences in various higher education institutions. In 2010, only 20% of the total number of full-time contact students registered at 22 public universities with residences throughout the country was accommodated in students' residences. Nonetheless, it is the first years who seems short-changed by the shortage of students housing because only 5, 3% of the first year students were in residences (DHET, 2011).

Furthermore, the challenges of insufficient residences are also compounded by insufficient funding. The other challenge that could be linked to student housing is the fact that despite residences having kitchens and self-catering facilities, "poor nutrition and student hunger are issues at all universities" (DHET, 2011:xiv). The report suggests that it is the poor from the working class and rural students that need to be empowered and accommodated into residences since they are disadvantaged based on the area they come from as compared to those from urban areas.

Whilst there are serious challenges regarding student housing, there are positives that outweigh the negatives regarding this issue. DHET (2011:130) identifies advantages of staying in students residences as:

- Access to libraries and other facilities and events;
- Provides a more conducive environment for studying; and

- The removal of the pressure to travel long distances.

It is succinctly clear that the need for accommodating first year students in residences essential. Such a move will not only enhance widening participation but it is likely to improve success rates in programmes such as Biological Sciences.

The report further identifies the advantages and disadvantages of living on and off campus as delineated in table 2.1 below.

Table 2.1

Pros and cons of living on campus

Factors impacting on studies	**Benefits of living on campus**	**Problems with living at home or with relatives**
Travel time and cost to get to and from classes	Less time and money is spent on travel, and more on studying	In many cases travel takes time which could be spent on studying
Living space conducive for studying	Students have their own space (however limited) and access to library and internet	Often students living off campus experience problems of finding space to study, they may have no local access to libraries or internet
Safety	Although safety is a challenge on campuses there are efforts to create a safe environment	The travel arrangements for getting back to townships at night can be dangerous (taxis and long walks to taxi ranks)
Building a support network	Particularly in the first year, study groups, mentoring and social activities are important	Very often students find it hard to build support networks when they live away from university

Source: Department of Higher Education and Training, (2011: 134).

It is clear that the first year students face an uphill battle if they are not in residences. It is for this reason that the report concludes that:

> Strategies and mechanism need to be established to allow new first year contact students in need of accommodation to be allocated to a residence for their first year (DHET, 2011: xvi).

It is therefore, reasonable to conclude that despite challenges related to students residences such as cultural adjustments, students in residences seems to enjoy overwhelming advantages that gives then extra impetus to achieve access with success. Therefore, if widening participation in sciences and Biological Sciences is to be achieved, first year students in these programme need to be prioritised when students residences are allocated.

2.9. Conclusion

Other studies in South Africa focus on access as a transformational tool to redress the inequalities of the past, through strategies such as academic development, with a view of achieving access with success (Akoojee and Nkomo, 2007; Boughey, 2003; Nadioo, 1998), and support for ill-prepared students in the form of foundation programmes. Ntshoe (2003), Cele and Menon (2006) focus on the economy of access by unpacking the impact of finance and policy shift on access. Koch and Dornback (2008) examine the language issue, whilst Walters (2004) focuses on the concept of access from a lifelong learning perspective. Gamede (2005) explores the biography of access within the context of social justice in South Africa.

My own study enters the debate on access by exploring the issue of widening participation in programmes/courses which were historically exclusive to certain groups in South Africa. Specifically, it will explore widening participation in science and technology, with special reference to the Biological Sciences and students from under-represented groups in the HAI.

CHAPTER 3

THE CONCEPTUAL FRAMEWORK

3.1. Introduction

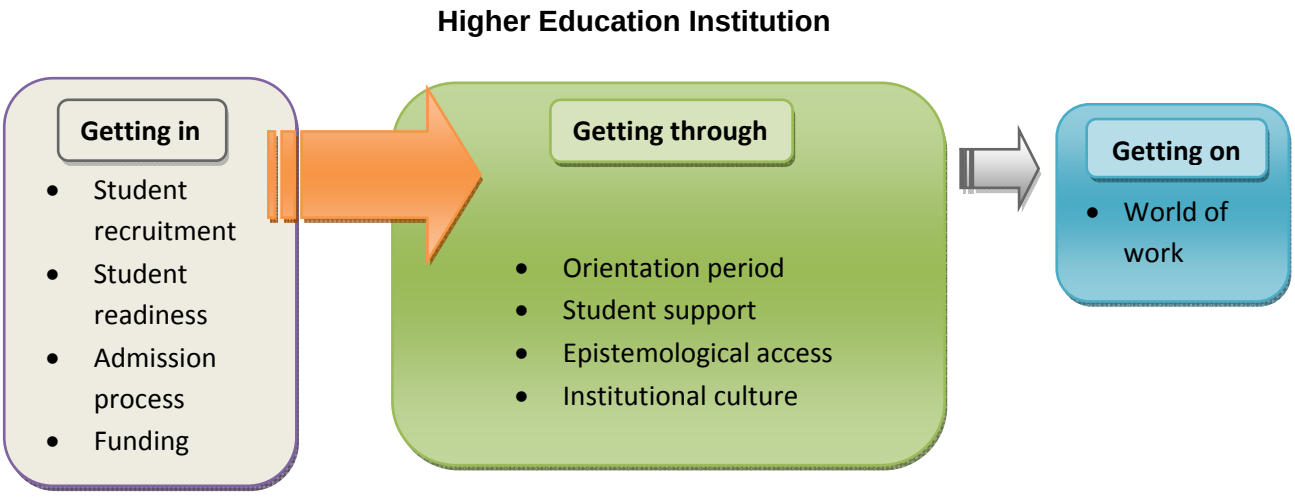
The purpose of this chapter is to explore, delineate and contextualize widening participation within Osborne and Gallacher's (2004) concepts of 'getting in', 'getting through' and 'getting on', which serve as conceptual framework for this study. Since the study explores the experiences of first-year students, I will focus on the first two stages, namely: 'getting in' and 'getting through'. In the first section, I will examine the process of 'getting in', which includes student recruitment, student readiness, the admission process and student funding. In the second section, I will explore the process by which students are 'getting through' the system, focusing on the orientation period, student support (academic and psychosocial) and the institutional culture.

I chose to examine the various concepts which underpin 'getting in' and 'getting through', rather than focusing on one concept, because they give a broader view and better way of exploring the question of widening participation in the Biological Sciences, with special reference to students from under-represented groups.

The schematic representation below (figure 3.1) gives an overview of the access framework for higher education, depicting the three key concepts which form the basis for this study.

Figure 3.1

A framework of access to Higher Education



3.2. Getting in

'Getting in' refers to the stages preceding the entry to higher education, such as student recruitment, student readiness, admission processes and funding. 'Getting in' is important, as it gives the potential students an insight into what is expected of them at the higher education level. The other important aspect is that 'getting in' edifies prospective students about the admission requirements that they need to satisfy in order to qualify for university studies, and what the costs will be of such a study programme at their chosen university. Furthermore, 'getting in' also explores the role that national and institutional policies play in widening participation. This stage in access therefore plays an important part in widening participation for students from under-represented groups.

3.2.1. Student recruitment

Student recruitment entails general institutional marketing and concomitant community enlightenment about the various available study programmes and the measures the institutions have in place for students (Osborne and Gallacher, 2004). It includes a number of related access initiatives, such as 'out-reach' and 'in-reach' programmes, with potential students from under-represented groups 'getting in' or university staff 'getting–out', that is, reaching out to them. Recruitment also has to do with flexible access initiatives, such as transformation, and the structural adjustment of both administration and educational programmes (Osborne and Gallacher, 2004).

The notion of recruitment encapsulates engagement with prospective students prior to them thinking about their higher education study choices. This engagement could be done through reaching out to the various communities or through strategic alliances with feeder schools. The purpose of such initiatives is to familiarize potential students with higher education exposing them to the opportunities that higher education institutions have to offer and preparing them for the experience of tertiary education. This kind of exposure helps them to choose a higher education institution and the relevant programme. The exposure to higher education could also be done through the university's open days (Grier, Cross and Oshun, 2010).

The awareness established during the recruitment drives conscientizes the potential students and school communities about the measures the university has in place to help students with access, such as financial assistance, psychological services, mentorship and tutoring programmes. Further, such deliberate efforts by various institutions of higher learning to reach out to communities and under-represented groups not only addresses the social and economic needs of potential students but also addresses the fundamental reason why the students need to register at such an institution in the first place (Osborne and Gallacher, 2004; Wangenge-Ouma, 2010).

Failure by an institution of higher learning to embark on this activity may result in the institution not being well diversified, since it will register a homogenous group of students, that is, students from similar backgrounds in terms of location, schooling and socioeconomic status. On the contrary, these endeavours, including the creation of awareness by the university through targeting under-represented groups and those people who believe that the 'university is not for them', go a long way to removing barriers to access and thus stimulating new demand for higher education.

Recruitment of students may be conducted because there are fewer applications than the available places in a programme. In this case, recruitment increases the pool from which the next phase can be implemented. Selection, on the other hand, means that the number of applicants for a specific programme exceeds the number of available places. It takes place therefore when demand exceeds the availability of places at a higher education institution. However, selection should provide students with fair opportunities and should not be based on factors such socioeconomic background (McCowan, 2007).

The recruitment and selection processes are not mutually exclusive, but occur in a sequence, that is, you first recruit and then select (Grier et al., 2010). For example, a university may experience an oversupply of applicants to the social sciences and humanities, but few well qualified applicants for science programmes. This occurs in South African universities where black students tend to enrol more in the social sciences and humanities than to science-related programmes (Jansen, 2010; CHE, 2009; Boughey, 2005).

Recruitment is crucial to reaching under-represented groups. However, the notion of equity does not preclude selection, as minimum of selection is necessary in order to

determine students' level of preparedness and their potential for success. Some of the more highly selective programmes may use additional tools such as interviews, essays motivating for selection and even performances in case of the arts and presentation of projects made by applicants. In some cases, selection tests are also used, for example, the vestibular in Brazil, the Scholastic Achievement Test in the US, and the National Benchmark Tests in South Africa (Goastellec, 2010; McCowan, 2007).

In the South African context, DoE (2008) suggests that higher education institutions should have a transparent selection process, one entailing clear criteria which are followed until a firm offer is made to the prospective students. The National Senior Certificate (NSC), representing the minimum admission requirements for bachelor's degree studies is the essential threshold for access to higher education. The next selection level is determined through the application of the admission point score (APS) system whereby students' scores are converted into points as per set criteria. Each university sets APS for each faculty and programme.

3.2.2. Student readiness

Student readiness refers to a student's preparedness for higher education. In an attempt to develop a deeper understanding of student readiness, Boughey (2010:5) identified four key issues which could explicate students' "under-preparedness":

- Lacking skills;
- Experiencing gaps in conceptual knowledge areas;
- In need of language development; and
- Lacking the ability to think 'critically'.

Students' under-preparedness for university studies may lead to poor throughput and high dropout rates. Thus resolving the above issues is basic to ensuring students' optimal academic performance at university level. Smit (2012:374) argues from deficit thinking and points out that under-preparedness should not be viewed as the students' issue alone, and that it is equally imperative to "acknowledge the university

as possibly an underprepared institution." She further argues that the use of the deficit theory as a dominant thinking mode within South African higher education frames students and their families as being short of certain academic and cultural resources that are essential for success in higher education (Smit, 2012). This highlights the fact that widening participation can also be hampered by institutions of higher learning which purport to be open and encourage diversity. Thus both the students' and the universities' under-preparedness can have a negative impact on widening participation.

In South Africa, impediments to student readiness include the inefficiency of the schooling system. For example, the Annual National Assessments (ANA) conducted in public schools in 2011 for the foundation phase (grades 1–3) and intermediate phase (grades 4–7) pointed out the sub-optimal performance of the schooling system in South Africa. In grade 3, the national average performance was 35% in literacy and 28% in numeracy. In grade 6, the national average in languages was 28% and for mathematics 30% (DBE, 2011). The ANA results confirm the Trends in International Mathematics and Science Study (TIMMS), and the difficulties with literacy and numeracy in South African public schools which were pointed out over the past decade in the international assessments, namely, Progress in the International Reading Literacy Study (PIRLS). The ANA results confirm the reality that many of our learners lack proper foundations in literacy and numeracy. As a result they struggle to progress from the school system into post-secondary education and the training system, including higher education.

Bradbury and Miller (2011:112) maintain that the lack of efficiency in the school system is rooted in the unequal "provision of education and schooling system in South Africa which creates multiple layers of disadvantages that require redress. These layers of disadvantage include low level of skills amongst teachers, inadequate infrastructure and paucity of equipment and books." These factors have negative implications for the general preparation of learners for university studies and the majority of learners who are negatively impacted by these adverse situations are blacks. The inadequate student preparation creates a dilemma for those institutions of higher learning who believe that access should be based on merit while concurring with the notion that education plays a critical role in social transformation.

Student readiness focuses not only on academic performance but also includes thorough preparation for higher education underpinned by career selection based on the student's interests and strengths. This phenomenon includes preplanning and carefully researching the university entrance requirements as well as making sure that the subject combination is appropriate for the student's chosen career path. In this sense, career guidance and counselling at school level play a significant role. Ideally, a student's readiness for university studies should be inculcated from the foundation phase of schooling and should follow the student's progress throughout secondary school.

3.2.3. Admission process

Cook (2009) argues that there are no best methods for admitting students to university studies. He identifies two ways of giving access to higher education. These ways seem to be sited at opposite ends of the continuum. At one extreme is open enrolment, which presents an opportunity for applicants who hold an appropriate school exit qualification to enter higher education studies; at the other end of the same continuum are highly selective systems which may be subject to state control. Measures such as admission point scores (APS), admission tests and interviews, are additional criteria used to select potential students. The latter suggest that the school exit qualification is not enough to grant access to higher education studies, perhaps because open enrolment can lead to attrition, since it implies that everyone could be enrolled to higher education studies.

In South Africa, access is regulated through legislation. As provided for in the Higher Education Act enjoins each higher education institution have to an admission policy which 'must provide appropriate measures for redress of past inequalities and may not unfairly discriminate in any way' (DoE, 1997b:20). However, universities remain autonomous and thus determine their own admission policies and the criteria for identifying students with the potential to be enrolled.

The inefficiency of the schooling system is further complicated by the obdurate inequalities that are perpetuated by the use of second language as a language of learning and teaching with learners whose first language is completely different.

Second language instruction thus hinders learners from reaching their full potential and achieving the requisite grades for university entry. Once enrolled for university studies, the second language becomes a further impediment to success. The majority of learners affected by this issue in South Africa are blacks and this has a negative impact on their enrolment numbers in HE (Bradbury and Miller, 2011; Cross and Carpentier, 2009). It is against this background that, in order to ensure a steady supply of diversified students, alternative ways to access institutions of higher learning need to be put in place. In this sense, the use of race in admissions is justified as a transitional measure while alternative admission routes are being sought.

The current alternative admission routes include admission tests or 'sociotechnic tools' (Goastellec, 2010), customized courses and other related measures which allow a second opportunity to students who otherwise would not access higher education, such as those from under-represented groups and adults. Alternative admission initiatives also involve the relaxation of entry requirements. Whilst these flexible admission procedures have the potential to attract diverse groups of students, the relaxation of entry requirements leads critics to question the quality of such students in terms of their ability to handle and survive the rigour of higher education studies (Osborne and Gallacher, 2004).

The use of admission tests could equally be viewed as a barrier to access, since to succeed in these tests, candidates need to be thoroughly prepared through additional tutoring and coaching. This suggests that candidates from low socioeconomic status, who are unable to afford the services of tutors and coaches will be less likely to do well in these tests and will thus be denied access (McCowan, 2007).

3.2.4. Student funding

Funding is one of the accoutrement which determines student's success or failure in higher education studies, since inclusion is directly linked to the ability to pay tuition fees. The financial challenges are critical for indigent students who come from disadvantaged communities and have inevitably been exposed to inimical school conditions.

How to fund higher education is a controversial issue. One option is large-scale public subsidies of university studies based on the principle of equal access (Asplund, Adbelkarim and Skalli, 2008). However, the empirical evidence to show that this route improves equity is inconclusive. Students from poor families remain under-represented in higher education because of various factors, including attending poor primary and secondary schools (Asplund et al., 2008; HESA, 2008; Wangenge-Ouma, 2010). Poor schooling, especially in secondary schools, fails to produce a critical mass of students from under-represented groups who can qualify for university studies. Furthermore, it is debatable who actually funds 'free' education. Revenue is collected through taxes from all citizens and this does not preclude the poor, as they too pay some form of indirect taxes. This tax is used by the state, *inter alia*, to fund higher education which is accessed by a high percentage of affluent people who can afford to pay the tuition fees. The poor will contribute to funding higher education, thus making the notion of free higher education problematic, since the very people it is intended to help are expected to make some form of payment. If this is the case, the second option would be to increase the financial participation of students by setting tuition fees. Supporting this argument is the view that the economic benefit for the students is high and mostly private. The counter-argument is that graduates are likely to pay back the costs of their studies from their earnings, thus making the equity argument more relevant (Asplund et al., 2008).

According to Asplund et al., (2008), there is a growing tendency in Europe to charge tuition fees, even though these are not enough to fund the universities. Such fees are often combined with various support mechanisms, such as grants, loans, family allowances and tax breaks. However, the tax breaks seem not to have been

successful in uplifting the socio-economic balance for those enrolling at university, thus validating the need for an increase in tuition fees.

In South Africa, funding for HEIs is divided into three main categories: first, an income stream made up by government grants, which are divided into block grants and earmarked grants; second, an income stream made up mainly of tuition fees; and, third, an income stream made up by partnerships between HEIs and industry, independent projects or service delivery modes, for example, law and health clinics (MoE, 2004; DHET, 2010). The focus of this section is on the first and second income streams.

In 2004, funding for higher education in South Africa shifted from being enrolment-driven to using a new formula that aimed at addressing the policy imperatives of the democratic government, namely equity and redress. One of the pivotal key features for this new funding formula was the link between higher education grants and both national and institutional planning (Wangenge-Ouma, 2010).

The national budget of higher education is divided into three components, namely block grants, earmarked funds, and institutional restructuring funds. The block grants are further divided into four parts, teaching input grants, teaching output grants, research output grants, and institutional factor grants, with the bulk of earmarked grants being allocated to NSFAS (MoE, 2004). The teaching input grant, which forms part of the block grants, "is generated through a formula which considers the approved full time equivalent (FTE) student places weighted against predetermined teaching input indicators or criteria, e.g. course material, course level and instruction delivery mode. A teaching output grant is dependent on the institution's actual number of non-research graduates and diplomats produced in terms of the national benchmarks" (Wangenge-Ouma, 2010: 483).

The other two key parts which form the block grant are the research output and institutional factor grants. Research grants are calculated using the sum total of the number of research outputs made up by research graduates and publications. Those institutions with a large proportion of disadvantaged students are awarded the institutional factor grant (MoE, 2004).

Wangenge-Ouma (2010) argues that there are some factors which hinder the achievement of the goals of the national funding framework (NFF). Firstly, there has been insufficient funding of the higher education sector, which has been declining. HESA (2008), DHET (2010) and Bunting (2012) echo the view that higher education funding has declined over the years, despite the 10,1% increase in government funding grants between the 2001 and 2009 financial years. Furthermore, "state funding for higher education as a percentage of total finance declined from 1999 by 3.08% to 2.45% in 2007" (HESA, 2008:17). Secondly, the institutional factor grant is calculated by totalling the amount of teaching input grants, determined by the number of disadvantaged students that the institution has enrolled. Since race is used as a proxy for disadvantaged, only Africans and coloureds are considered as disadvantaged, while South African-born Indian students are excluded. Furthermore, universities who enrol a large population of African and coloured students from affluent families who have attended high quality and expensive secondary schools will be equally rewarded through this grant (Wangenge-Ouma, 2010).

Thirdly, the NFF seems to reward institutions with a high success rate. The fact that the funding framework rewards success may be one of the reasons why most university programmes are highly selective. Even though the universities will benefit from the institutional fact grant, they seem to benefit more by having high output rates. Inevitably, they will select most learners from good schools and avoid those from poor schools and disadvantaged backgrounds, because the former have the potential for success, given their adequate preparation to university studies, whilst the latter have not. Slow study completion rate by students, especially those from disadvantaged groups, will deny the universities the benefit of government subsidies, i.e. teaching output grants, as they are heavily penalized if their students do not complete degree programmes within the stipulated time. It is therefore in the best interest of the universities to register few students from disadvantaged groups so that their completion rate is not negatively affected.

In line with resource dependency theory, which refers to the reliance on a person or institution for support, survival or enhancement (Ferraro, 2008), an organization which lacks resources will seek to survive by finding other sources, hence the need

for higher education institutions to consider other models of funding such as the cost-sharing model which is given effect by tuition fees.

HESA (2008) argues for the cost-sharing funding model, in which costs are shared between society and the students. The thrust behind this model is that higher education is perceived to be for both public good and private benefit. The proposed funding model should be underpinned by a strong partnership between government, parents and business in order to address this issue of student funding. The cost-sharing model could be in the form of tuition fees being introduced where they did not exist before or be increased to cover accommodation fees, books and other related costs. Tuition fees are vital to the economics of higher education in South Africa since tuition revenue is the second most important source of income after government funding conducted through the grants system. At the same time, in order to assist students from low socioeconomic families and enhance equity in higher education, a portion of the tuition fees may be set aside to fund university grants and student loans. Regardless of your socioeconomic status, once you complete university education you have the potential to earn a higher income which could be used to repay the loan (HESA, 2008).

Tuition fees translate to the price of education and could be looked at from point of view of the competitive market, where prices are determined on the basis of the principle of supply and demand. Demand is determined through the value of a product which may go down as the price increases. Supply, on the other hand, is determined by costs and may increase as the price increases. The markets are not always perfectly competitive, hence economies experience ‘market failure’. The market failure in higher education can be stabilized or corrected either through subsidies to higher education institutions (i.e. on the supply side) or through vouchers, bursaries and loan schemes (i.e. on the demand side) (HESA, 2008).

In the administered price approach, efficient pricing is a problem because when prices, that is, tuition fees, are too high, few students from indigent families will be in a position to ‘purchase’ higher education. On the other hand, low prices could lead to a dearth of critical resources in higher education which in turn will result in wastage or internal inefficiency highlighted by students taking too long to graduate (ibid).

Financial challenges in the form of tuition fees therefore compound the issues of access to higher education, especially for students from disadvantaged groups. Letseka and Maile (2008) point out that the dropout rate for South African first-year university students' stands at 40%. The main reason for this is finance, making this a major barrier to access (ibid). Tuition fees are high and are increasing on a yearly basis, mainly because of the decline in funding from the state. This decline in state funding in real terms has compelled institutions of higher learning, exercising their autonomous right to set fees, to steadily increase student fees in order to defray the ever-escalating costs of higher education. Unfortunately, this practice continues to make higher education inaccessible to students from disadvantaged backgrounds. The mere sight of these high tuition fees discourages those from disadvantaged backgrounds or of low socioeconomic status from participating in higher education.

The government's effort to inject funds into higher education through NSFAS is somehow obviated by the insufficient money allocated due to budget constraints resulting from government having to balance the apportioning of funds with other competing priorities. This reduction in government funding puts more pressure on the students to carry a bigger share of higher education costs. The money provided by the NSFAS is not sufficient to cover tuition fees, residences fees and books. The students who qualify for this study loan will have to find additional funding to cover other costs, such residence fees, because the NSFAS will have covered only tuition fees (Asplund et al., 2008; Wangenge-Ouma, 2010).

So far, the conceptual framework has focused on the stages which facilitate the physical access of students from under-represented communities to a higher education institution. This includes reaching out to non-traditional students through recruitment initiatives, the students' level of preparedness to enter universities, the admission process, and funding. The next stage deals with the question of "access to what?" How can students from under-represented groups achieve access with success? This will be discussed in the next section, "getting through".

3.3. Getting through

'Getting through' refers to the period spent within a higher education institution. It highlights the support that HEIs offer students in order to give them some leverage towards success in their studies.

The literature refers to two types of access, namely physical and epistemological. Physical access refers to gaining admittance and being registered as a student in a particular institution of higher learning. Epistemological access denotes access to the knowledge that the university distributes (Morrow, 1994, 2009).

During the interaction between lecturers and students in the learning milieu, some students may be found to be under-prepared for this engagement. That is to say, they may not have been well prepared for university studies due to the kind of school that they attended. If one has attended poor school, he or she is likely to lack some rudimentary skills required to negotiate the rigours of high education such as the use of the library, computer skills, as well as reading and writing skills.

CHE (2010) argues that the notion of under-preparedness is evolving and therefore applies not only to students but to lecturers as well. This occurs because the lecturers find themselves under-prepared to deal with under-prepared students. In other words, the lecturers also need to be attuned to dealing with under-prepared students. The lecturers' under-preparedness in handling such students may be manifested in the form of 'pedagogic distance' (CHE, 2010). The theory of pedagogic distance elucidates the interaction between the student and lecturer in an attempt to understand the nature of pedagogic and social mediation. Both the physical and the pedagogic distance may have a negative effect on teaching and learning, and thus may hamper learning. In order for effective learning and teaching to take place the cognitive space between the student and the lecturer should be reduced. Distance has a negative effect on under-prepared students, as it further precludes them from academic engagement. As a result, epistemological access will not be achieved, and this may lead to the student dropping out and leaving university.

A number of policy instruments have been introduced by universities to widen participation, for example, an orientation period and giving academic and psycho-

social support for students. The aim of these programmes is to help the students to adjust to the culture of the institutions.

3.3.1. Orientation period

The orientation or induction period is the first step in the transition from secondary school to higher education. It is during this period that a student's expectations might or might not be fulfilled by the institution. The manner in which students are received and inducted creates a strong impression of academic life. It is therefore imperative that higher education institutions have a clear understanding of students, their backgrounds, experiences and expectations, with consideration given to disparate cultural aspects, especially in heterogeneous groups (Hultberg, Plos, Hendry and Kjellgren, 2008).

Orientation normally occurs during the first week or two prior to commencement of the academic year. It is intended to help new students to settle down in residences, to find their way around the campus and the town, to enrol, complete administrative tasks, obtain timetables and course materials, and be introduced to a variety of services, including welfare, ITC and libraries (Brown and Morgan, 2010). This kind of orientation process is steeped in administration. At this stage, it is important to strike a balance between information overload and under-information. It is important not to reduce the orientation period to administrative activities only, but to focus the students on their academic task as well (ibid). Getting students focused on the study programmes as early as possible is not only essential for student retention but is equally critical for their success in their various programmes. Brown and Morgan (2010) suggest that orientation programmes should be more academic than administrative and should also be instrumental in helping students to become independent learners. They maintain that this could be achieved through group activities which engender cohort cohesion and foster independent learning.

Leese (2010) argues that the transition from secondary school to higher education is critical, as new students are generally nervous and anxious. The induction period should ease their nerves by providing them with skills and knowledge of what is expected of them. It is plausible that first-generation students especially will struggle,

as they have nobody in their families with university experience upon which they can draw. It is important for universities not to perceive this as the individual student's problem, but to accept that there is a dire need for HEIs to adapt their programmes to meet the needs of a diverse student population.

The orientation period should therefore be structured in such a manner that it caters for various needs of the student, because an unsuccessful transition from secondary school to higher education is likely to have an impact on her or his future achievements (Hultberg et al., 2008). The orientation period should not be a one-off event but a process which supports students throughout the first year of their studies, and especially during first semester (Leese, 2010).

3.3.2. Student support (academic and psychosocial)

Various forms of support, such as academic/instructional and psychosocial, are available for students. Academic support can be understood in broad terms as referring to academic development programmes, commonly known as foundation programmes as they are government funded in terms of the NFF (MoE, 2004), or in narrow terms as tutoring and mentoring programmes (Boughey, 2010). Academic support evolved first into academic development and then into institutional development (ibid). Student support is a critical element in optimizing students' learning experiences in any learning milieu.

The proliferation of academic support programmes in South African public universities came about as a direct consequence of the admission of African/black students by the erstwhile white liberal universities in the 1980s, following the relaxation of the policies of the then apartheid state. In the 1990s, the need to increase enrolment numbers of such students at HEIs, particularly in science, technology and commerce became a driving force behind foundation programmes (Boughey, 2005). Academic support occurs in three ways: (a) stand-alone foundation programmes; (b) infused or integrated foundation programmes; and (c) tutoring and mentoring programmes. The programmes in (a) and (b) above put students on a slow graduation trajectory, as a extra year is added to the normal

duration of the course, so that a three-year course would now take four years (Boughey, 2010).

The early academic development programme employed a two-pronged strategy. Firstly, it was meant to increase access and improve throughput rates, especially of students from disadvantaged and under-represented groups. Since universities were then enrolling students on the basis of academic merit only, this process invariably precluded these kinds of students. Foundation programmes were not only used to increase access and improve the throughput rates of disadvantaged and under-represented groups but were also designed to encourage equity and equality in higher education in general. Thus academic support in this context was a transformational tool. Secondly, they were also intended to enhance the quality of teaching and learning in higher education (Boughey, 2010).

Academic/instructional support could be provided through tutoring, mentoring, academic advice and counselling. This kind of support is not only meant for students who are battling with their studies but is also intended to provide a safety net for first-year students. It is designed to help them navigate successfully through their first year of studies by managing the transition from secondary school to university. The lecturers, therefore, need to narrow the gap created through pedagogic distance. This could be achieved by recognizing students for who they are and by appreciating the diverse backgrounds from which they come (Lee, Srinivasan, Trail, Lewis and Lopez, 2011). Student support can be closely linked to the student's motivation and learning. Thus a student who is demotivated and despondent will not perform optimally in his/her studies. Lecturers should endeavour to create a supportive learning environment since such an environment is critical to the students' academic success (Lee et al., 2011).

Psychosocial support is a further important kind of support which, though not academically based, nevertheless plays a significant role in the academic space. If a student is experiencing psychosocial issues, these are likely to impact on his academic performance. Psychosocial support encapsulates HIV/AID counselling, career counselling, psychological services and day-houses. Day-houses are places of sanctuary incorporated in the psychological services where students in distress

can go, not only for psychosocial alleviation but also for help with more general practical problems, such having no means of getting a meal for that day.

Peer support refers to peer-to-peer learning, whereby students support each other academically by forming study groups, discussing questions and generally helping each other with studies (Lee et al., 2011). Furthermore, such support can also be used in the psychosocial context, since it is a form of social interaction in the learning environment. Peer counselling could also be used to reach out to more students in need, and this forms a cornerstone of psychosocial support.

Favish and Hendry (2010) found that academic development programmes, especially extended curriculum programmes which incorporated substantial foundational provision, were the most effective tools to widen participation at UCT, as they offered opportunities for access and success to under-prepared students. However, it was suggested that it was necessary to extend the support also to students in the mainstream.

3.3.3. Institutional culture

One of the challenges facing new students is to adjust to the culture of the higher education institution. Culture is defined by Toma et al. (2005:1-6) as institutional norms, values, and beliefs, while institutional culture is perceived as the glue binding together those who work and learn at the same institution. It is institutional culture which fosters ‘a sense of oneness with or belonging to’ an institution or a university. It encapsulates tangible symbols, including the language, narratives and practices needed to express common understanding across an organization. Jansen (2009) adds that meaning and interpretations can be found in cultural artefacts; these include buildings and memorials, stories and myths, campus language, shared rules and norms, and social conventions and beliefs.

In the South African context, the concept of ‘institutional culture’ is used in various ways to signify various perspectives on higher education transformation.

> It is used to capture the differences in administrative and management styles between the historically white English-medium universities (described in terms

> of academic freedom, institutional autonomy, distance from the state, liberalism, less authoritarianism, etc) and the Afrikaans-medium universities (described in terms of centralised authority, anti-democratic approach, close relation with the state, authoritarianism, etc) (CHE, 2010:40).

In this sense, the concept of institutional culture aims to delineate different cultures as experienced in various institutions, classified in terms of the medium of instruction. One of the challenges with which students are faced is the language issue and the difficulty experienced in this regard in former Afrikaans universities.

In his seminal work, Thaver (2006:17) introduced the notion of "at home", which refers to *in situ,* that is, the physical place or site which includes symbols and practices. "At home" as a physical place provides shelter, warmth, love, food, security and acceptance. However, this physical place could also provide the opposite and become hostile, cold and insecure.

He argues that "there is in the duality of culture as process (the day-to-day routines) and as product (emergent reality) every chance that we may fall victims to imperceptibly shifting the object of knowledge from institutional culture to "at home" and thus blurring the divide between individuals being "at home" (their habitus) and an institution's culture (as an emergent reality) which is oriented to making its members feel "at home". In other words, we may establish who is at home (sites, symbols, practices and relations) and similarly, by contrast, who is not at home (locating emergent hostilities – disaffirmed identities, insecurities, and demotivation) in the institutions." Students' *habitus* and *cultural capital* could therefore play a critical part in terms of making them feel "at home away from home" (home in terms of both the physical space and the nation) (Said, 1983; cf Thaver, 2006). Once the student feels "at home away from home", he or she will have adjusted to the culture of the university and will be "fitting in". This "fitting in" and adjusting to university culture has potential benefits, including future success for the student in her/his studies. However, when students are unable to fit in with the institutional culture, the opposite may occur; they may not be successful in their studies and may drop out of the university. Institutional culture could therefore be perceived as bringing together in a relationship the physical space of the university (such as lecture hall, library, laboratory, etc) and the student's sense of identity, security and stimulation (ibid).

Thaver (2006) further asserts that institutional culture is a subset of a larger socio-historical process, and thus cannot be divorced from the societal microcosm. In the South African context, institutional culture is a highly contested terrain, since it is linked to the apartheid legacy. This assertion is underscored by Thaver (2006:25), who argues that in order to comprehend institutional cultures:

> ... we should be able to uncover various ways in which the racial "politicking" of the old has been transmuted and reconfigured (in other words, how it has been reinvented under the guise of "politically correct" rhetoric and demonstrates "democratic-speak" and even "nation-building" or alternatively, how the old has been challenged and negated and how new modalities are seen to emerge in their stead).

Institutional culture seems to have some relationship with the question of power and control in institutions of higher learning (Higgins, 2007); that is to say, those in positions of power have the opportunity to determine 'the way things should be done' and thus set the tone for the culture and, by inference, the institutional culture. The people who are supposed to imbibe the institutional culture are the students, administrative personnel, lecturers and the university community at large, who may not subscribe to the espoused institutional culture if they feel there is no link between it and their personal identities. Instead, they will feel alienated and will identify neither with such an institution nor with its institutional culture. It will then depend on the discourse between those in power and those who may not align themselves to the institutional culture to work together in developing such a culture. This makes institutional culture a contested terrain of power and authority (ibid).

In the South African context, institutional culture is perceived through the lens of a 'whiteness critique'. Higgins (2007:106) argues that "institutional culture is – above all - experienced by black staff and students as the overwhelming 'whiteness' of academic culture. 'Whiteness' here refers to the ensemble of cultural and subjective factors that together constitute the unspoken dominance in higher education of Western, European or Anglo-Saxon values and attitudes as these are reproduced and inflected in South Africa. This 'whiteness' is or can be experienced as an alienating and disempowering sense of not being fully recognised in or by the institution, and a consequent impossibility of feeling 'at home' within it."

The question is: Do students feel ‘at home’ when they are at university? How does a university foster ‘a sense of oneness and belonging’ in a diverse group of students with diverse cultures and languages?

3.4. Conclusion

This chapter described and contextualized Osborne and Gallacher’s (2004) concepts of getting in and getting through as the framework of the study of widening access to students from disadvantaged backgrounds, with specific reference to the Biological Sciences at the University of Pretoria. I intend to investigate how different stakeholders perceive widening access to students from under-presented groups through this framework, as I believe that only a full understanding of the various components of this framework can provide us with a comprehensive view of the topic. In order to explore these issues in depth it was necessary to employ a qualitative research design. The research design and methodology for this study will be discussed in the next chapter.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1. Introduction

The focus of this chapter is on delineating and explaining the research design and methodology used in this study. A research design is a blueprint or plan of how a study will be carried out (Nieuwenhuis, 2007; Mouton, 2004). The researcher's choice of design is determined by the research questions and the purpose of the study (Swanepoel and Erasmus, 2000). The main aim of this project was to describe, explain and theorize on the possibilities and limitations of widening access to under-represented groups in one of the science programmes at the University of Pretoria. For this purpose, I chose a qualitative case study research design.

4.2. Research methodology

Qualitative research is used when an issue to be explored calls for the study of a specific population group and involves listening to the voices of the participants. Epistemologically, as a qualitative researcher I accept reality as a subjective social construct that needs to be interpreted, rather than measured; this view locates this study within the social constructivism or interpretivist paradigm.

A case study research design offers a detailed description of a phenomenon characterized by specific parameters in terms of context, place and time (Stake, 2000). A qualitative researcher may thus study a small group of individuals, an individual, a programme or an activity in a single site (Creswell, 2007). In this inquiry, the focus was on one institution and on a particular programme, that is, the Biological Sciences at the University of Pretoria. Further, the purpose of the inquiry was to illuminate a specific issue, namely widening access to the abovementioned programme.

I chose to use a qualitative case study research design for the following reasons. Firstly, it allows for the use of inductive data analysis and reasoning (Maree and van der Westhuisen, 2007). Secondly, a case study has the potential for rich, thick and context-heavy descriptions of real people in real-life situations (Stake, 2000). Thirdly,

unlike in quantitative research, where researchers distance themselves from the research process, a qualitative inquiry allows for close involvement with the research subject, and thus encourages immersion in the field (Golafshani, 2003). In qualitative inquiry therefore the researcher himself is the primary instrument for data collection, analysis and interpretation (Patton, 2002; Huberman and Miles, 2002). Fourthly, the researcher can use the available methods, strategies or empirical materials to form a *bricolage*, that is, the confluence and use of several methods and strategies to collect data (Denzin and Lincoln, 1998). Fifthly, a qualitative research design is flexible and can be adjusted to accommodate new developments and leads.

Qualitative inquiry, therefore, gave me the opportunity to explore empirical data relating to the concepts of “getting in” and “getting through” and their relationship with access to higher education. However, while this was a qualitative study, some aspects of quantitative research were factored in so as to generate richer data and strengthen the argument.

Quantitative research which is mainly used in sciences is described as a kind of research that relies heavily on numerical data collection (Johnson and Christensen, 2012). This research inquiry uses an experimental and non-experimental research designs. The experimental research designs involve the manipulation of subjects. A non-experimental inquiry describes the phenomenon that has occurred or the relationship between subjects without suggesting the cause-and-effect. Furthermore, there is no manipulation of the conditions that the subjects are exposed to and the researcher makes observations or describes what has occurred including the description of the situation (McMillian and Schumacher, 1997; Ary, Jacobs, Razavieh and Sorensen, 2006; Slavin, 2007). A non-experimental quantitative inquiry design was also employed in this study. A questionnaire was administered to the first year second semester students in Biological Sciences.

4.3. The scope of research

The data collection for this research was conducted over a period of twelve months between 2010 and 2011. It began with thorough preparation, including seeking access to the research site. A letter was written to the faculty of Natural and Agricultural Sciences, requesting an opportunity to conduct research, and permission was duly granted (see appendix 1). My study was confined to three main stakeholder groups. The first stakeholder group were at policy level. These included policy-makers who were the personnel in university top management who crafted the policies of the university and policy implementers, who were personnel in middle management in the admission space of the university who had limited or no contact with students but had a direct link with the administrators at the coalface of policy implementation. The second stakeholder group were first-year lecturers in Biological Sciences. This group was engaged with first-year students who had been selected and placed as a direct consequence of the university's access policy. Thirdly, there were the students themselves, who represented the policy consumers or people in the university who were directly affected by the policy.

4.4. Sampling

One of the critical steps in the trajectory of assembling participants for a study is to identify the relevant persons through the process of sampling. There are two basic types of sampling, probability and non-probability. The former allows the researcher to generalize the results of a study from the population from which it was drawn. This is a characteristic of quantitative research. In qualitative research, however, non-probability sampling is the approach to be followed. This does not allow for direct inferences, but rather for the discovery of "what occurs, the implications of what occurs and the relationships linking occurrences." The most common form of non-probability sampling is purposeful sampling (McMillan, 2000:103-108).

This study used purposive sampling because it gave me the opportunity to select knowledgeable people with rich information related to the topic under investigation. Thus, I used purposive sampling to select the University of Pretoria as site for data

collection and the Faculty of Natural and Agricultural Sciences in which the programme of Biological Sciences is located.

The University of Pretoria is a former white university steeped in strong Afrikaner culture. University of Pretoria enrols approximately 40 000 students with more than 80% of them registered in undergraduate programmes. According to Jansen (2009:3) “the University of Pretoria was one of the key apartheid institutions for higher learning and one that fulfilled its white nationalist duty with considerable fervour for more than hundred years”. This university only registered its first black student in 1989. This categorisation makes the University of Pretoria an interesting case to explore. Hence the University of Pretoria was purposively chosen because of its convenient location. Therefore, purposive sampling was employed to reduce expenses and time associated with travelling and accommodation.

Since Biological Sciences is a generic programme, it has a variety of modules from which students can choose, including Mathematics, Science and World Views, People and their Environment, Medical Terminology, Botany, Zoology, Genetics, and Physics. I chose one of the popular modules for data collection, but in order to maintain confidentiality I used only the generic name of the programme, Biological Sciences. I specifically chose the Biological Sciences because I was trained as a biology teacher and taught it at secondary school level. I chose the first-year students because they were new in the university and still needed to find their feet. The first year of tertiary studies is a transitional period from secondary school to higher education and is where the largest dropout occurs (Marnewick, 2012; Schöer, Ntuli, Rankin and Sebastiao, 2010; Letseka and Maile, 2008).

The six policy-makers were made up of five whites and one black. While this was not by design, it reflected the composition of the senior personnel in admissions in the university. The policy-makers interviewed were high-ranking officials in the university, two of them being members of the university’s top executive management.

The second stakeholder group comprised of first-year lecturers in Biological Sciences. The racial composition of the lecturers was four blacks and two whites. They included junior lecturers, senior lecturers and a unit director. They had extensive first-year teaching experience ranging from one to ten years.

It is interesting to note that the gender composition of the participants was an equal number of males and females. Although this was not by design, it nonetheless made the study gender sensitive.

The third stakeholder group was the students. In order to identify individuals from under-represented groups as potential participants in a focus group discussion, I decided to administer a questionnaire to the first-year students. It aimed at identifying black students from various locations, such as urban, rural and township areas.

The University of Pretoria is a dual-medium institution and undergraduate degree programmes are offered in two languages, Afrikaans and English. The questionnaire was administered to the English group since it was expected that most of the students from under-represented backgrounds would be in this class. In addition, it was the language with which the students in this group and I were comfortable with. Access was facilitated by the lecturer of the group and I was allowed a generous 30 minutes to distribute and explain the questionnaire to the students. It was the first day of the second semester at 7h30 in the morning, and it was a chilly morning. The class was noisy, as the students were catching up with their friends whom they had last seen the previous semester. A total of 200 questionnaires were distributed; of these, 193 were diligently completed and returned. I used the questionnaires to access additional information such as the students' perceptions of their level of preparedness for university studies in general, as well as their particular experiences at the University of Pretoria. The questionnaires were collected at the end of the period as the students walked out of the lecture hall.

When I analysed the data I realized that the students' responses to open questions (such as: *How would you describe your experiences in BSc in Biological Sciences so far?)* gave me a richer data, beyond my original intention of using of the questionnaire merely to identify under-representation. Consequently, the questionnaires were used to supplement the interview data (Ary, et al., 2006). The questionnaires were analysed, both quantitatively and qualitatively. The University of Pretoria's Department of Statistics used SAS v 9.3 statistical programme to generate descriptive frequencies of the coded questionnaire and the results are presented in the form of graphs in Chapter 5.

4.5. Data collection techniques

This section describes the process of data collection and analysis employed in this study. Data were collected through semi-structured interviews with policy-makers and first-year lecturers, as well as through focus group interviews conducted with first-year second-semester students in the Biological Sciences at the University of Pretoria. The interviews were recorded and transcribed.

4.5.1. Interviews

An interview is a two-way communication process which occurs between two or more people. It involves both a message sender and a receiver, that is, someone who conveys the message and one who receives it. The interview format assumes that the message put across is clearly understood by the receiver. This implies that the questions should be clearly formulated and posed so that the participants will understand them and respond accordingly.

This study relied heavily on interviews and conducting them led to my immersion in the issues and processes of widening access in higher education, with specific reference to Biological Sciences at the University of Pretoria. Semi-structured interviews were used since they gave me more flexibility and an opportunity to probe more deeply for the participants' responses. Face-to-face or one-on-one interviews, as well as focus group interviews, were conducted.

4.5.1.1. Face-to-face interviews

This is a data collection procedure in which the researcher asks structured or semi - structured questions of one participant at a time and records the responses (Creswell, 2012; McMillan and Schumacher, 1997). The advantage of this type of interview is that it enables the researcher to gain the cooperation of the participants. This can be achieved by first establishing a relationship with them. It is vital that the participants should trust the interviewer. Once the relationship has been established,

there is a high probability of enhanced response rates (Leedy and Ormrod, 2001). The chance to probe is a further advantage of face-to-face interviewing, making it possible for the researcher to clarify the questions and to secure more information from the participants (Creswell, 2012; McMillan and Schumacher, 1997). The disadvantage of this type of data collection is that it can be time-consuming.

I conducted face-to-face interviews lasting for approximately 45 minutes to one hour with the policy-makers and the first-year lecturers in Biological Sciences. The interviews occurred at the time and place chosen by the interviewees, mostly at their offices and after hours. The interviews were preceded by telephone calls, emails and formal letters requesting the interviews (see appendix 2), and a consent form was forwarded by email normally a day before the agreed date of an interview. The consent forms were explained prior to the interviews, and confidentiality and anonymity were guaranteed. The interviews were then recorded, transcribed verbatim and later analysed using the qualitative data analysis software called Atlas.ti.

I began the interviews with some biographical questions and a general query about the participants' understanding of *what access to higher education is*. This helped to establish rapport with the respondents. I then proceeded to questions which were more direct and pertinent to the University of Pretoria. These were intended to seek a deeper understanding of the access issues at this institution of higher learning. The second set of questions explored under-representivity in the university, how it was understood by stakeholders in the university, and how the university access policy mediated this issue. The third set of questions was aimed at eliciting responses about the actual efforts of the institution with regard to widening participation. The fourth set of questions related to the participants' views on the institution's culture. These questions were intended to determine whether the institutional culture had an impact on widening participation.

In order to stimulate detailed and more exhaustive discussions on the topic, prompts were used. I pressed to get examples and additional explanations where I felt an answer was inadequate and also to narrow the gap between what was said and what was done in practice. Below is an example of an interview I conducted with a university policy-maker which demonstrates the principles outlined above:

Interviewer	*What does access to higher education mean to you?*
Interviewee	It has to do with the fact that we have to allow students into the university system who will be able to pass and add value to the country after they have finished their studies. So the most important thing is to have students who qualify, really comply with the university's entrance requirements by excellent performance in Grade 11 and 12.
Interviewer	*Picking up on your statement, what is your view on the examination processes of the National Senior Certificate and the final product that you get?*
Interviewee	The University system is developed to accommodate students who have the intellectual capacity and motivation to be successful. We need a senior secondary system which will ensure that we do get students who qualify exactly for that purpose. The present situation creates expectations with students who should not qualify. What we saw during the past two to three years was that with the inflation rate in marks - which ranges between ten and twenty percent - students may qualify for university entrance with very poor marks. For example, if marks for Mathematics were adjusted with 20% in order to pass, you might have obtained as little as 15% in your final exam and now you will still pass and get university exemption. The person with those marks will not be prepared enough to be successful at University level. However, the expectation is created that he/she does have exemption and then the University must accept the student so that he/she can further a career. There is an unbalanced view between the Department of Basic Education on the one hand and Higher Education on the other. If this gap or difference is going to widen in the future and it is not addressed, it will create a bigger problem for the universities.
Interviewer	*What does the University do to make sure that students that qualify and meet your admission requirements are assisted so that they succeed in their studies? Please*

provide examples.

Interviewee

It is very difficult for one simple reason – we are not sure if an A symbol is an A symbol any more. Is the C symbol that we receive at C symbol level or is it at E symbol level? It is very difficult for any higher education institution to rely on matric results for entrance purposes.

I think what we will see is that something like the National Benchmark Test may play an important role in the placement process of students in the future. Perhaps it is too early to predict in this regard. You can already see that more and more institutions are opting for information from other sources to add value to the enrolment process.

Interviewer

There seems to be a lack of trust in NSC as a predictor of success in the university studies? Am I right in saying that?

Interviewee

It is not necessarily true. We are talking about two different things now. We are talking about the enrolment process where results are used as a parameter for evaluation and we are talking about university success as another thing once the student is in the system. I can tell you that this university and all other institutions will do their utmost to put plans on the table and assist where they can to make sure that the students who enrolled will be successful but that does not really have anything to do with the matric results. In our Natural Sciences we have a 4-year BSc programme exactly for the purpose of assisting students who do not normally qualify as they do not meet entrance requirements. So we admit a cohort of students who we think will be able to qualify with a BSc degree, with assistance. Without assistance they will not be able to qualify. In the 4-year programme we actually make sure that we assist students with extra tutorials, extra work, and extra assistance upgrading their knowledge to a point where they can participate in a normal programme. So in the first two years of study a lot has been done to ensure that these students will also be able to pass. Whereas under normal circumstances they will not be able to be successful.

The interviews were followed up by a courtesy call and/or email to thank the participants. I also took this opportunity to clarify nebulous issues that I picked up while transcribing the recorded interviews.

4.5.1.2. Focus group interviews

Focus group interviews are an innovative and evolving strategy for gathering information from a group of people which might otherwise be difficult to obtain (Creswell 2012). There are several advantages of conducting a focus group interview. Firstly, the quality of information is enhanced as a result of interactions among the group members. Secondly, this kind of interview is cost-efficient; within one hour a lot of information can be collected from 6 -12 focus group members. However, bigger groups (that is, with more than 12 members) may become unwieldy and difficult to control for a novice interviewer or moderator. Thirdly, focus group members seem to feel safe and secure among their peers allowing them to volunteer information more readily (Patton, 2002).

However, focus group interviews also have disadvantages. For instance, dominant and talkative individuals may not allow space for others to contribute to the discussions. Some members may be too shy to speak in a group. A further major disadvantage of such interviews is that individuals may not share their more important experiences because they are embarrassed to do so in a group setting, thus reducing the researcher's chance of obtaining quality data (Bogdan and Biklen, 2003). It is imperative that the moderator be skilful in managing the disadvantages inherent in focus groups. This will provide leverage in terms of securing optimal contributions from focus group members.

Table 4.1 below describes the focus group participants for this study in terms of age and gender. Engagement in these interviews was voluntary. It was anticipated that the groups would be representative, but they were limited to blacks from urban, township and rural areas.

I conducted three focus group interviews, two with ten members in each group and one with nine members. The interviews lasted between 45 minutes and an hour. They were recorded, transcribed verbatim and analysed. Putting together the groups

using students was a challenging and often frustrating exercise which required much time and effort.

Table 4.1

Focus group participants' schedule

Focus group 1		Focus group 2		Focus group 3	
Gender	Age	Gender	Age	Gender	Age
Male	18	Male	19	Male	18
Female	19	Female	18	Female	19
Male	18	Male	18	Male	19
Female	20	Female	19	Female	18
Male	18	Male	19	Male	18
Female	19	Female	18	Female	19
Male	18	Male	18	Female	19
Female	19	Female	18	Female	18
Female	19	Female	19	Female	18
Female	19	Female	19		

While they were not insurmountable, the study did face challenges. One of the key difficulties was that the students were unreliable in terms of honouring appointments. They either did not respond to their emails timeously or gave no response at all. If they did respond and agree to meet for an interview at a specific time and venue, they often did not turn up. The mobile numbers given by the students were also not reliable. They either gave me wrong numbers or chose to ignore my calls. Their mobile phones were off most of the time. I then resorted to text messages, as I thought that I was perhaps calling them when they were attending lectures or were in the library. They simply ignored the text messages. I then went back to their lecturers

and pleaded for assistance. I was linked with the student assistant who was in charge of practical sessions. The assistant made an announcement during the practical session that I would be waiting for students in the adjacent room and that those who wanted to participate in the focus group interviews should go there once they had finished with their practical sessions. Once the sessions were done, those willing to be interviewed came through. They arrived in large numbers, so I chose a manageable group of 9 to 10 participants. I asked the others to wait outside the room until I had conducted the first focus group interview, but they did not wait for their turn and instead left. I had to repeat the process until I had the required number of participants.

Conducting focus group interviews was thus a learning curve for me as a researcher. Such interviews call for skill in managing the group dynamics in order to get optimal performance. Furthermore, you need to be ambidextrous, making sure that the tape recorder is working while simultaneously concentrating on asking questions and trying to take notes and crafting follow-up and clarity-seeking questions. So this kind of interview has many processes running at the same time. The lesson perhaps is that novice researchers should seek assistance so that they can focus on asking questions and taking notes, while someone else makes sure that the tape is recording and keeps the group focused.

4.5.2. Document analysis

Documents are a valuable source of data which also serve as a non-interactive way of procuring data from public or private records. Documents for analysis could include diaries, letters, minutes of meetings, memos, reports, emails and websites (Creswell, 2012; McMillan and Schumacher, 1997).

Documents are a rich source of data since they are in words and can readily be subjected to analysis with a view of answering the research question. However, the down side is that they may not easily be accessed (Creswell, 2012).

This case study was about an institution of higher learning, potentially offering an abundance of documents. However, it was vital to seek documents that would address the topic under investigation and help unravel the research questions. I did

not have access to all the documents I wanted, such as the minutes of the University Senate and of the Council, which approved the admission requirements and in essence anchored access to the university. However, I was able to use the university website as a main point of entry and downloaded some important documents, such as the mission and vision of the university, the strategic plan document of the university, its language policy, and its admission requirements, as well as general information. Some of the documents, such as brochures and faculty admission booklets, were procured during my interaction with the policy-makers.

The purpose of conducting document analysis is to corroborate the information gleaned during both face-to-face and focus group interviews, as well as information from the documents analysed. In the main, the documents were used to gain background knowledge of the university, while some, such as language policy, were used or quoted to support an argument or corroborate information.

4.6. Data analysis

Data analysis is a process of engagement which involves organizing, accounting for, and explaining the data. Such explanation can be done in short, noting patterns, themes and categories (Cohen et al., 2007). In qualitative research, the data analysis process typically begins during the data collection phase. Creswell (2012) points out that data analysis requires thorough preparation beforehand. This involves moving much deeper into understanding the data when representing it, as well as interpreting its larger meaning. Invariably, much qualitative data is in the form of words, so the transcriptions from the interviews need to be read and understood in order for the researcher to become familiar with their meaning.

The qualitative data of this study were managed and analysed using Atlas.ti. The first stage of the analysis was that of coding and recoding the recorded interviews line by line. This helped me to discover the recurring themes and to develop ideas and concepts. As an example, Table 4.2 below demonstrates how the question '*What kind of support does the university offer to students?'* was analysed:

Table 4.2 – Text analysis

Interview – policy- maker, 11 April 2011	Code
In addition, if candidates do not acquire the necessary basics in high school it means that Universities must spend substantial resources, including *finance*, to try and *prepare students for university academic life*. This is a very expensive thing to do at university level. In short, in addition to what we have to do at University, *we also have to do things that schools should actually take responsibility for*.	1:5 (67:73) University has to compensate for schools Support is a financial burden to university
Mentoring is applicable to first-year students only. *Tutoring* is presented more widely. However, we have found that some students coming from NSC need *support* in the second and third year also. This is very expensive and we don't have enough resources to do this on top of everything else that is required from us.	1:18 (214:219) Mentoring – first year Support (tutoring) is necessary for second year as well Reason – poor schooling system
Socio-economic and funding issues are big problems. *Support* from parents (emotional and otherwise) is also an issue, while *wrong career choices because of poor career guidance at school level* is a great obstacle to achieving success. In this regard I must mention that NSFAS is one of the best policy interventions in the immediate past. NSFAS is of *great assistance to students.*	1:23 (294:300) Challenges: Parent support Challenges: Poor career guidance Support - NSFAS

The numbers 1:5 (67:73) under the heading `code' above refer to the numbers generated by Atlas.ti. Here, it refers to document number 1, quotation number 5, and lines 67–73. This information is made available in footnotes corresponding with each quotation used, as well as the label, for example:.

Policy-maker 5, 3 March 2011. [Document 11:13 (119:126) Codes: Student recruitment].

Text analysis through Atlas.ti was both rewarding and challenging, as I had to learn the programme and put it to use almost simultaneously. I chose to learn only limited applications of the software as I had to spend more time in the field and the library. At the beginning of the text analysis, I accumulated several codes linked to "support" as a way of developing a deeper understanding of the kind of support the university offered students, especially those from under-represented groups. Figure 4.1 below illustrates the numerous codes associated with support. The number in brackets indicates the number of quotations associated with each code. The tilde (~) indicates that the comment was attached to the code or that this had been merged with other codes or ex-codes.

Figure 4.1: Family – support

Support – psychological assistance {4 – 0} ~

Support – career counselling and social activities {7 – 0} ~

Support – tutors and mentorship programmes {6 – 0}

Support – financial assistance {27 – 0} ~

Support – academic support and foundation programme {6 – 0}

Support – counselling and career support {2 – 0}

The codes were grouped into families, as indicated in figure 4.1 above. The families were then recoded in order to identify the emerging themes which were grouped into categories, as illustrated by figure 4.2 below.

Figure 4.2 – Categories and emerging themes

Academic support {16}

Admission process {15}

Funding {12}

Institutional culture {7}

Orientation period {15}

Psychosocial support {8}

Student readiness {18}

Student recruitment {10}

The categories and the emerging themes were interpreted and used to develop a deeper understanding of widening participation in the Biological Sciences and the concomitant access policies in the university. The numbers in brackets indicate the codes associated with each category. The additional codes addressing this emerging theme are grouped under ‘inadequate preparation’ for university studies.

4.7. Ensuring validity

Johnson and Christensen (2004:249) argue that “validity in qualitative research refers to the fact that such a research is plausible, credible, trustworthy and therefore defensible.” In addition, Janesick (2000) perceives validity in qualitative studies as relating to description and explanation, and building a cogent argument as to whether or not the explanation fits the description. In this study, I reported and described as accurately as possible the events, people, settings, places, times and information obtained from the participants.

According to Stake (2000:443), “triangulation has been generally considered a process of using multiple perceptions to clarify meaning.” Leedy and Ormrond (2001) underscore that triangulation plays a vital role in establishing validity, particularly in a qualitative study. In order to ensure trustworthiness, I used triangulation, employing multiple sources of data, such as policy-makers, lecturers and students, as well as

multiple methods, such as face-to-face interviews, focus groups, questionnaires and documents.

I also used member checking/ informants' feedback by giving the participants transcriptions of the recorded interviews. This gave each an opportunity to read through his/her transcription and confirm the accuracy of the record. Some made comments and in some cases made changes on the transcripts, while others indicated that the transcripts had captured and articulated their views accurately. The participants were also given an opportunity to comment on the categories which emerged from the data.

Reflexivity is a critical self-scrutiny by the researcher with a view to identifying any innate bias he or she may have. It operates from the premise that the researcher cannot be completely neutral, objective or detached from the subject of the research. It is therefore imperative to identify any personal bias in order to avoid or minimize it (Lincoln and Guba, 2004; McMillan and Schumacher, 2010).

My own potential bias was minimized by spending sufficient time in the field, approximately a year, as well as by employing multiple data-collection strategies, such as face-to-face interviews, focus group interviews and document analysis. Further, I kept a field journal in which I took notes during and after the interviews to record my thoughts. These notes were integrated with the transcriptions from the recorded data. As the data were managed through the use of Atlas.ti, codes and categories were used as part of the 'audit trail' to minimize any bias (McMillan and Schumacher, 2010).

Thick descriptions were also used to secure a comprehensive and vivid picture of the University of Pretoria and the details of the participants' opinions about widening participation in the Biological Sciences.

4.9. Ethical consideration

Babbie (2001) cautions that it is vital for all researchers involved in social scientific research to be conscious of what is ethically proper and good when conducting such studies. Bernard (2000) adds that the researcher must ensure that the subjects of the study or those being studied are not at risk.

It is therefore imperative for the researcher to obtain clearance from the ethics committee when human (or animal) subjects are involved in any kind of an empirical study. Ethical clearance should be procured prior to entering the research field and engaging with participants. For the present study, clearance was applied for and duly granted by the Faculty of Education's Ethics Committee of the University of Pretoria.

One of the key ethical considerations when human subjects are involved is the issue of informed consent and voluntary participation. The letter requesting participation in an interview and the consent forms were made available to the participants prior to the interview, giving them enough time to decide whether they wanted to take part in the interview or not. See appendix 3 for an example of such a letter. On the day of the interview the participants were asked to read the consent form again and were allowed time to clarify any issue which might not have been clearly understood. They were then requested to sign the consent form to confirm that they agreed to participate in a recorded interview. I emphasized that their participation was voluntary and that they were free to withdraw from the interview or request that the tape recorder be stopped if they so wished. I also guaranteed confidentiality and anonymity by using codes and generic descriptive terms for the participants, such as 'policy-makers', 'first-year lecturers' and 'first-year students'.

It is the researcher's responsibility to ensure that participants are not exposed to any undue physical or psychological harm (Leedy and Ormrod, 2001). I made sure that the interviews were conducted in a safe environment by using a clean, well lit and well ventilated room with chairs arranged in a circle to allow eye contact and easy control of the group. I was careful not to ask questions that sought personal or potentially embarrassing information, as this kind of question would have made them uncomfortable (McMillan and Schumacher, 2010).

4.10. Reflection and concluding comments

The study was not without challenges, as is to be expected with any research project. The main challenge was in gaining access both to the policy-makers and the students. The limited availability of the policy-makers who were senior personnel of the university, affected my data collections plans as I had to reschedule the meetings until such time as they were available. This required persistence, and in some cases I had to insist and refuse to take no for an answer. The students too posed a serious challenge as they were not readily available and did not honour agreed appointments. I have learned to be persistent as well as patient. I believe that these qualities are essential when one is conducting a qualitative research.

CHAPTER 5

DATA ANALYSIS AND FINDINGS

5.1. Introduction

This chapter provides both qualitative and quantitative data analyses, organized and discussed under the two main concepts that serve as the theoretical framework of this study, namely 'getting in' and 'getting through'. The qualitative data analysis is discussed using emerging themes, whilst the quantitative analysis is reported as a description of enrolment data of the identified and sampled students for this study. The following emerging themes are reported under 'getting in': student recruitment; student readiness; and admission process and funding; whilst under 'getting through' the emerging themes are: the orientation period; student support (academic and psychosocial), and the institutional culture. These themes will be discussed in relation to widening participation (WP) in higher education. I will begin, however, with a description of the Biological Sciences programme and the sample which provides the context of the study.

5.2. Biological Sciences programme and sample description

Biological Sciences (BS) is one of the 17 departments located within the Faculty of Natural and Agricultural Sciences, which offers several science- and agriculture-related programmes. The Bachelor of Science (BSc) is a three-year generic degree which can be registered with a view to diverting to other career tracks or professional degrees, such as medicine, dentistry or veterinary science. Alternatively, students can go all the way, complete the three years and be awarded a BSc degree in Biological Sciences. Since BS is a generic degree, students who register for this programme take a variety of modules, depending on whether they intend to divert to other programmes or to complete a BS degree. Once the student has decided on the area of speciality, he or she can choose from the following modules: Mathematics, Science and World Views, People and their Environment, Medical Terminology, Botany, Zoology, Genetics, or Physics.

In this study, the focus was on one of the popular modules in BS[7]. The module was chosen because of the large number of students who were enrolled and the willingness of the lecturer to provide access and support for this research project. Table 5.1 below gives detailed explanation of the enrolment data for the first-year second-semester students in this BS module at the University of Pretoria (UP) for the 2011 academic year. The purpose of the enrolment data is to provide a general sense of the numbers in this programme with a view to relating them to access and widening participation. This class was divided into English and Afrikaans groups, with 539 students registered in the English group and 225 in the Afrikaans group. This made a total enrolment of 764 for the first-year second-semester students in 2011 in BS. Table 5.1 also gives a racial and gender breakdown for the Biological Sciences first-year class. While the Afrikaans group was comprised mostly of white students, there were more whites than black students in the English class, as the total number of white students was 450 (58,9%), compared with the number of black students which was 314 (41,1%). Furthermore, the data indicated that there were more females in this programme than males, as they made up 64%, with male students only making up 36%. When intersecting gender and race, the enrolment figures indicated a dominance of white female students, since they amounted to 35,6%, compared to white male students, who added up to 23%. Black female students made up 28% and black male students 12,7%. It is evident that black male students were under-represented in this programme, as they made up only 12%, while their white counterparts made up almost double the percentage at 23%. In general, black students were under-represented, albeit black females were better off as compared to black males. In this study, therefore, 'black' will be used interchangeably to describe under-representation in BSc in Biological Sciences.

[7] In order to maintain anonymity and confidentiality, I will not name the module but refer to it as Biological Sciences (BS).

Table 5.1

Enrolment figures and gender distribution for 1st year Biological Sciences for the 2011 academic year						
	Females	**%**	**Males**	**%**	**Total**	**%**
Blacks	217	28,4	97	12,3	314	41,1
Whites	272	35,6	178	23,3	450	58,9
Total	489	64	275	36	764	

Table 5.2 below describes the participants from the first-year second-semester students in BS during the academic year 2011. The total number of respondents was 193, but 2 respondents chose not to disclose their racial group; the percentages were therefore calculated out of a total of 191. The blacks added up to 46,5% and the whites to 53,4%. The sample resembles the total population and is therefore representative of the population in the Biological Sciences for the 2011 academic year; however, the sample is slightly biased towards white females. The sample further confirms the trend that in general whites are dominant in this programme.

Table 5.2

Race and gender distribution of the respondents from 1st year second-semester students in Biological Sciences in 2011						
	Females	**%**	**Males**	**%**	**Total**	**%**
Blacks	66	34,5	23	12	89	46,5
Whites	67	35	35	18,3	102	53,4
Total	133	69,6	58	30,3	191	

5.3. Getting in

"Getting in" includes the processes that sit between the secondary school and higher education (Osborne and Gallacher, 2004). These processes are the precursor to entry into higher education studies and play a major role in widening participation. It is evident that in order to transform itself from a predominantly white Afrikaans university which served the privileged to a diverse institution which adhered to the principles of redress and equity, UP had to make a concerted effort to bring black students from under-represented groups into its gates. This was achieved through in-reach and out-reach programmes and student recruitment. However, as the following section indicates, these processes had their own challenges.

5.3.1. Widening participation through student recruitment

The university conducts 'out-reach' and 'in-reach' (Osborne and Gallacher 2004) recruitment programmes, such as career days and open days, which focus on making potential students aware of what is on offer at UP. The out-reach programmes are partnerships between schools and UP; they are intended to edify the learners about the university and are mainly about career-related information.

The data suggest that the university's out-reach and recruitment process, which is coordinated and managed by the client service centre (CSC), has the responsibility of recruiting students from both urban and rural areas to the university.

> We do have a client service centre with recruiters and they don't only visit big city schools but also visit the countryside.[8]

According to one policy- maker, during the recruitment drives, the university assures disadvantaged students that support is available for them.

> In our marketing, we do indicate that there is a possibility for you if you really want to study at the university, even if you did not go to the right schooling;

[8] Policy-maker 5, 3 March 2011. [Document 11:13 (119:126) Codes: Student recruitment]

> you still have the opportunity to get the right support to continue with education.[9]

Recruitment sometimes takes place during 'career days' at different schools around the country, where lecturers accompany the CSC recruiters and speak to potential students.

> ... [B]ut there are times when we go to Sasolburg [town outside Pretoria], I think during career day, so there are times we go there and talk to Grade 11 and 12 learners...[10]

During the recruitment drives, the university officials make presentations to various schools with a view to marketing the UP and encouraging potential students to consider enrolling at the university.

> At my school, we had different kinds of presentations from different universities, including UP.[11]

In the in-reach programmes, potential students come to the university on a particular day, usually Saturdays, in order to get information about programmes on offer, the support systems available at the university, such as financial assistance, and to have a tour of the university campus. Such an activity makes is called an 'open day'.

The data suggest that the recruitment efforts have a varied impact on students' decisions to enrol at UP.

Figure 5.1 shows that only 1% of students from both blacks and whites made the decision to enrol at UP via open day. Of course, to come for an open day presupposes that one already knows about the university. As one of the respondents who knows UP puts it: "How could you not know of the University of Pretoria?"

Figure 5.1 indicates that 37% of the sampled black female student respondents became aware of UP through their teachers/schools, compared with 26% of white female respondents. However, very few black and white male student respondents knew about UP from their schools or teachers; only 10% of black male respondents

[9] Policy-maker 5, 3 March 2011. [Document 11:13 (119:126) Codes: Student recruitment]
[10] First year lecturer 4, 3 March 2011. [Document 5:19 (262:267) Codes: Student recruitment]
[11] Focus group interview 1, 31 August 2011. [Document 13:10 (24:27) Codes: Student recruitment]

and 8% of white male respondents indicated that they had information about UP from their schools or teachers. Nonetheless, the significant number of both black and white female respondents who heard about UP from their school or teachers underscore the role that teachers play in facilitating access to higher education for students from under-represented groups. It seems that the collaboration between the university and the schools on projects could have exposed teachers and students to UP:

> I was also privileged because University of Pretoria was sponsoring some of the activities [career day] in our school. So I had to attend those activities at this university, that's why I chose to study at this university[12].

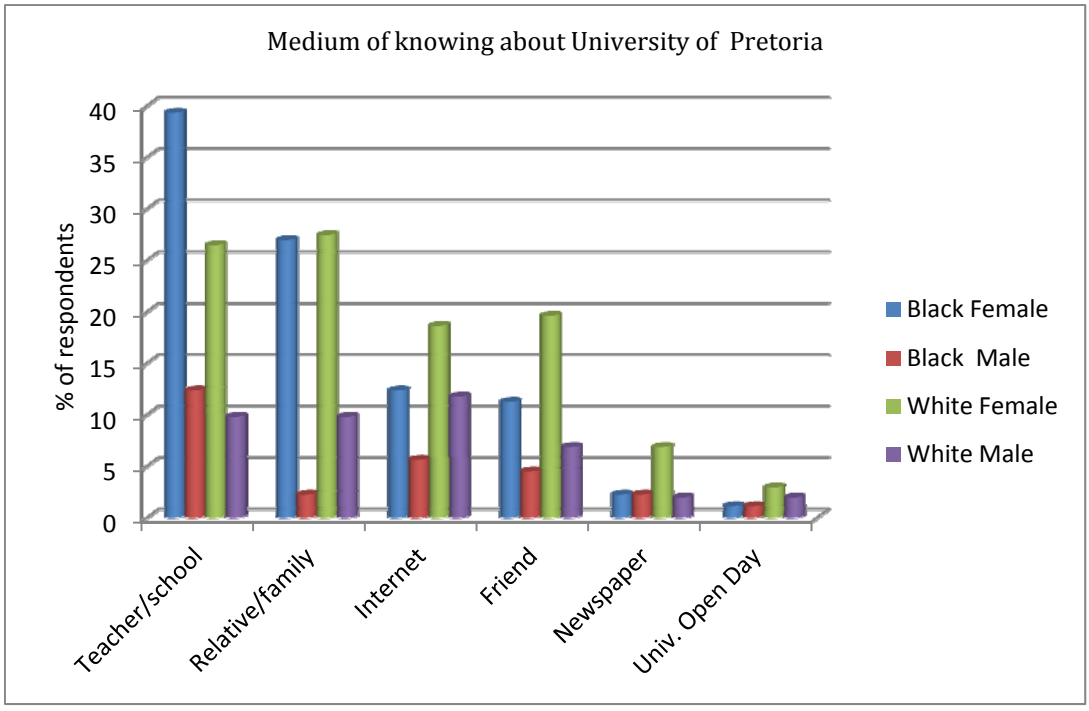
The quantitative data suggest that an overwhelming 25% of sampled black female respondents, compared to the same percentage of white female respondents, indicated strong alumni contacts, as they had become aware of UP either through their family members or relatives who had attended UP before. However, for black males the data suggest that the family or relatives did not influence their decision to go to university or to choose UP, since an insignificant 1% of black male respondents affirmed that they knew about UP through family or relatives. The same applied to white males; just below 10% indicated that they had heard about UP from family or relatives. This suggests that there is a form of communication within families, including black families, regarding their children furthering studies at post-secondary institutions or HEIs and even suggesting which university. The discussions about the choice of university underscore the importance of cultural capital (Bourdieu, 1977b). Being familiar with an institution also seems to encourage students to choose it.

Figure 5.1 indicates that recruitment through the internet is less effective in reaching under-represented students, as only 12% of black female and 5% of black male respondents learnt about this university and its programmes from the internet, compared to 16% of white females and 11% of white male respondents, i.e. 17% of blacks who came from township and rural areas, compared to 27% of whites who came predominately from urban areas, had access to computers and knew about UP from the internet. 5% of white females gained insight about UP from newspapers, as

[12] Focus group interview 1, 31 August 2011. [Document 13:10 (24:27) Codes: Student recruitment]

compared to less than 2% of black female and male respondents. This may be indicative of the lack of resources for black students, either at home or at the schools they attended. It further highlights the social inequality that is linked to the urban-rural divide.

Figure 5.1



Geographical area or location is another factor that affects recruitment of under-represented students. Figure 5.2 below shows the residential or home areas of the respondents. The data suggest that BS draws most of its students from urban areas, as 56% of white female and 28% of white male respondents came from an urban area, compared with 25% of black female students and less than 10% of black male respondents. Slightly more than 30% of black females and about 10% of black males came from township areas and 11% of black females and 5% of black males came from rural areas in and around Pretoria. The data indicate that whites came exclusively from urban areas, while the township and rural areas showed black dominance. This could be informed by the fact that the university has feeder schools which are mainly situated in urban areas, even though the university also recruits students from the neighbouring township and rural areas. Students from rural areas were more likely to have attended poor schools with limited resources.

Figure 5.2

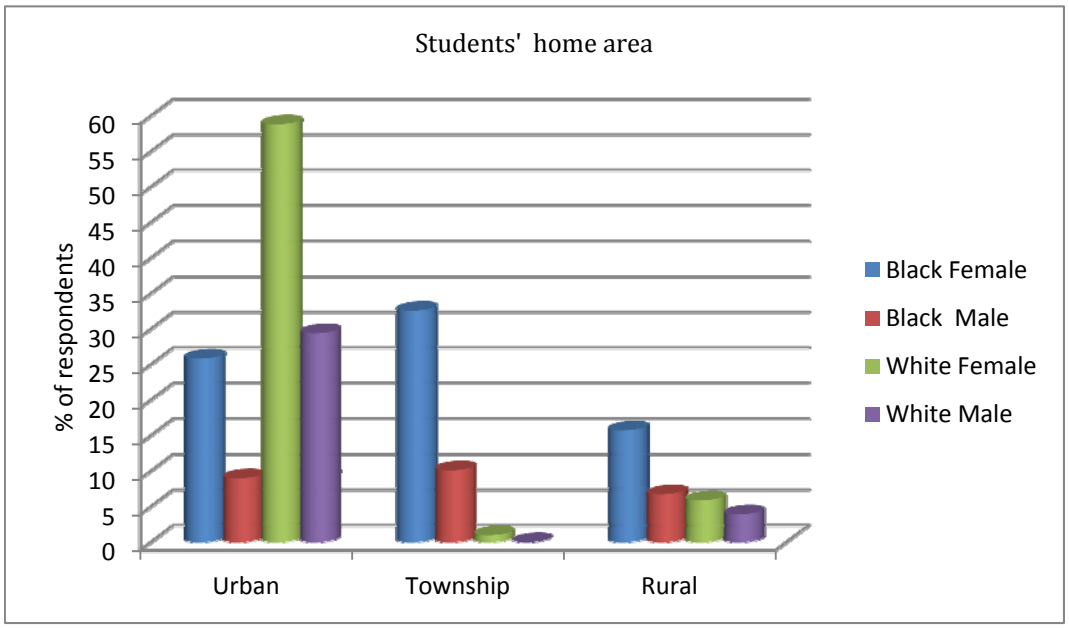
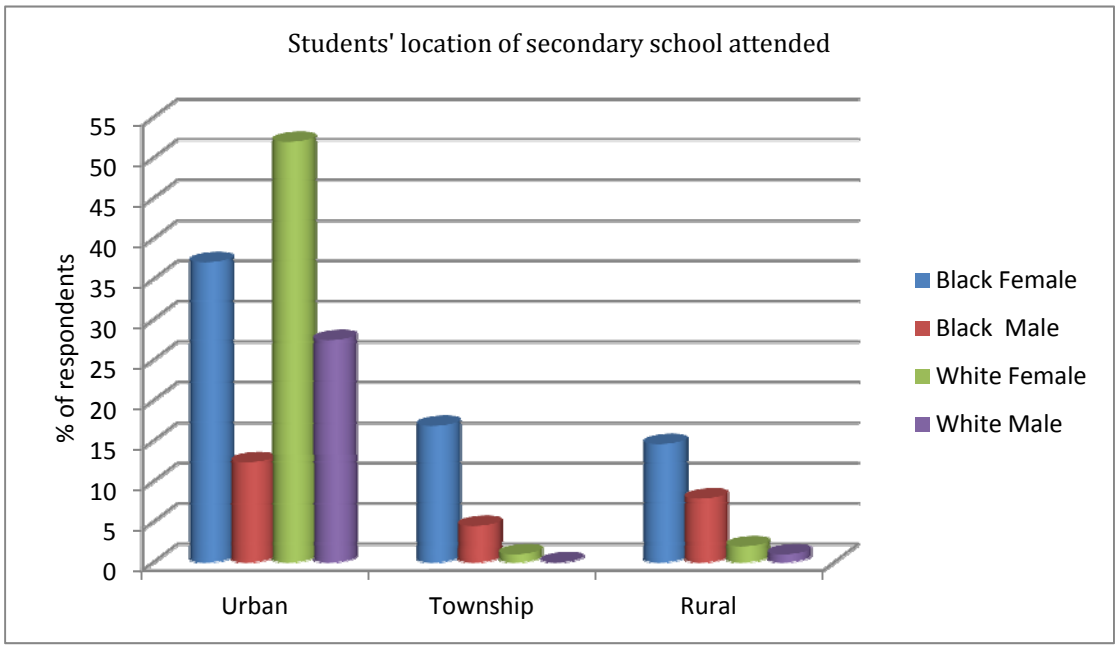


Figure 5.3 below describes the location of the secondary schools attended. The data suggest that the residential or home area and the school attended have a bearing in determining access at UP. Figure 5.3 shows that 50% of white females and 25% of white males attended secondary schools in urban areas and in most cases within their home area. Of black females, 15% attended schools in townships and 10% attended rural schools, while less than 5% of black males attended schools in township and rural areas. That is to say, 75% of white students in Biological Sciences attended school in an urban area, compared with 30% of black students who attended schools in township and rural areas. The data suggest that most students attended secondary schools in their home area. The black students from rural areas also attended secondary schools in their areas. This limited student mobility of rural blacks could be attributed to the exorbitant travel and school fee costs that are obligatory in urban areas. Thus poverty locks them in their area. Nonetheless, UP's recruitment drive was able to reach a small percentage of students from rural areas. On the other hand, township students commuted from their townships to town for schooling purposes. The data indicate that 35% of black female and 12% of black male student respondents from townships attended schools outside their residential areas, which could mean either that they were commuting to the city or were staying in boarding or lodging houses and were perhaps attending

better schools. This has a potential for widening participation because attending schools in urban areas could expose them to resources which might otherwise not be readily available in township and rural areas.

Figure 5.3



The geographical area or location has a major impact on access to higher education for students from disadvantaged backgrounds, especially given the shortage of residences at UP. The fact that UP is spread over six campuses in the city and its surroundings and the lack of reliable public transportation compounds this issue, which is described by a policy-maker:

> Housing is a problem, we don't have enough residences, and we don't have as much as we would like to have. Transport is a problem, because if people are living farther away then they need transport and the public transport system is poor after hours. So for example, you have classes in the evening, then it becomes a problem and it's usually the people that have problems with housing that get caught up with issues of transport in the evenings or when there are sporting events over the weekends. And it's very difficult to deal with all of those and the university is generally full. We are still growing and we

> intend to grow but we have to create facilities before we can grow; as you can see, we are building all over the place. We have huge building programmes but we don't admit students until we have places, so the university remains full, so the timetable is very busy and the tests will be in the evenings because the halls are constantly full. This university is also very diverse in its academic from sciences to drama and everything else in between, so the university is very complex and if there is a bus, where is it going to go, east or west or south? The university is spread over six campuses, one day it's this campus, the next it's that, so just the logistics will be problematic and we are trying to resolve them. The public transport system is not good enough to deal with these issues, so I think that things like that make it very difficult.[13]

The insufficient residences and the transport problems make studying at UP challenging for students, as due to the large classes, tests are sometimes written from eight to ten o'clock in the evening. Of course, all of these issues will have a greater effect on black students from rural and township areas who do not reside near UP.

> I sympathize with those students who live far from the university, especially those from townships like Soshanguve [one of Pretoria's township areas]. Sometimes we write tests from 20h00 until 22h00 and it is late and not safe for students to travel alone late at night, especially girls. But if we can all be accommodated in residence or if there was reliable and safe transport this will not be a problem at all.[14]

To sum up, student recruitment in BS at UP is conducted through the in–reach and out-reach programmes which are facilitated by both the CSC personnel and the first-year lecturers. UP's recruitment drives are not limited only to urban areas but reach the far-flung rural areas, albeit to a limited effect. This could be linked with lack of residences and transport which negatively affect black students in the BS. Data suggest that the most effective recruitment strategy to widen participation is working closely with teachers/schools, while the least effective is the open day.

[13] Policy-maker 3 , 18 March 2011.[Document 2: 27 (481:507) Codes: Student challenges]
[14] Focus group interview 1, 31 August 2011. [Document 1:1 (13:18) Codes: student readiness]

5.3.2. Student readiness and widening participation

This section analyses a crucial factor in widening participation which is raised by most respondents, that of student readiness. This is assessed in terms of the students' expectations and preparedness for higher education studies.

The general perception among the participants was that students are not adequately prepared for higher education studies, especially in BS.

The data indicate that university personnel have to deal with students who have obtained inflated marks in the matriculation examinations. This creates expectations of access to higher education, but the students are not ready and sometimes they do not have the capacity to succeed, despite their high expectations. The data in figure 5.6 (in section 5.3.4) showed that 17% of black female students were of the view that they were fairly well prepared for university studies, compared to 12% of white female students. The students' perceptions were based on their performance at secondary school level. This underscores the expectation created at school level that they will be able to manage the rigour of university studies. Furthermore, 81% of whites (56% female and 25% male) came from urban areas, compared to 60% of blacks (40% township and 20% rural) who came from township and rural areas and may not have been adequately prepared for university studies. Thus, they may not have had realistic expectations as far as their academic performance was concerned.

> The present situation creates expectations with students who do not qualify (sic). What we saw during the past two to three years was that with inflation in marks – which ranges between ten and twenty percent – students may qualify for university entrance with very poor marks …This is a dangerous situation for both Higher Education sector and the country.[15]

The inadequacies of the school system are pointed out as one of the factors that manifest themselves as barriers to access, particularly for students from under-represented groups.

[15] Policy-maker 2 , 31 March 2011.[Document 4: 23 (284:292) Codes: Student readiness – poor schooling]

> On the other hand, it's also challenging, especially sitting in this situation with the current state of education. The secondary school education and the students that we get out of the schooling system are not well prepared for university studies. I've been involved with first year students for many years, for over seven years and even more, and I've been teaching first years for about six years in this course...[16]

The assertion by the policy-makers (as quoted above) not only underscores the challenge regarding inadequate preparation of students for higher education studies but also questions the standards of the secondary school system in South Africa. It is evident that university policy-makers and first-year lecturers lack trust in the schooling system. For instance, they view the standardization process by the quality assurance body at the Further Education and Training (FET) level of schooling with suspicion. The standardization process purports to eliminate external factors which might negatively influence the learners' results. This occurs when the final Grade 12 learners' marks are statistically moderated and can result either in either acceptance of the raw scores or their adjustment downwards or upwards within the norm of 10% (DoE, 2001b). That is to say, the policy-makers seem to understand the standardization process in one way, i.e. in terms of positive adjustments only.

While the gap between school and first-year university studies is well documented (Boughey, 2010; Downs, 2010), there was a perception among the participants that it was up to the university alone to try and bridge this gap. One of the policy-makers made this observation and pointed out the inadequacies of the schooling and the chasm that exists between the secondary schools and first-year university.

> ... [T]he work expected at school level in grade 12 and university first-year level is widening. Unfortunately, the secondary school system is somewhat abdicating their responsibilities in this regard. This creates a huge problem for the university. It is now the universities' responsibility to ensure that students overcome the gap.[17]

Furthermore, the secondary school system does not provide students with sufficient intellectual capacity and motivation to succeed in university studies.

[16] First-year lecturer 1, 7 April 2011. [Document 10:3 (25:33) Codes: Student readiness]
[17] Policy-maker 2, 31 March 2011. [Document 4:28 (268:278) Codes: Student readiness]

> The university system is developed to accommodate students who have the intellectual capacity and motivation to be successful. We need a senior secondary system which will ensure that we do get students who qualify exactly for that purpose.[18]

Lack of preparation at school level is compounded by inadequate career guidance and counselling, which seems particularly to affect black students from township and rural areas. It is argued that many black students attended township and rural schools and consequently did not have sufficient information regarding career choices and university studies. It was maintained by one of the policy-makers that "wrong career choices because of poor career guidance at school level are a great obstacle to achieving success." As a result, students end up selecting whatever programme is available. Lack of information may mean failure to gain access to the programme envisaged as first choice career, because one may not know the admission requirements and the required subject mix. Prospective students need to know the correct subject mix and grades needed for university programmes as otherwise their application will not be successful; for example, to meet the minimum requirements for entry to BS, mathematics, physical sciences and English at secondary school level are essential.

The data suggest that students end up settling for second- or third-choice careers or even enrolling for any available programme.

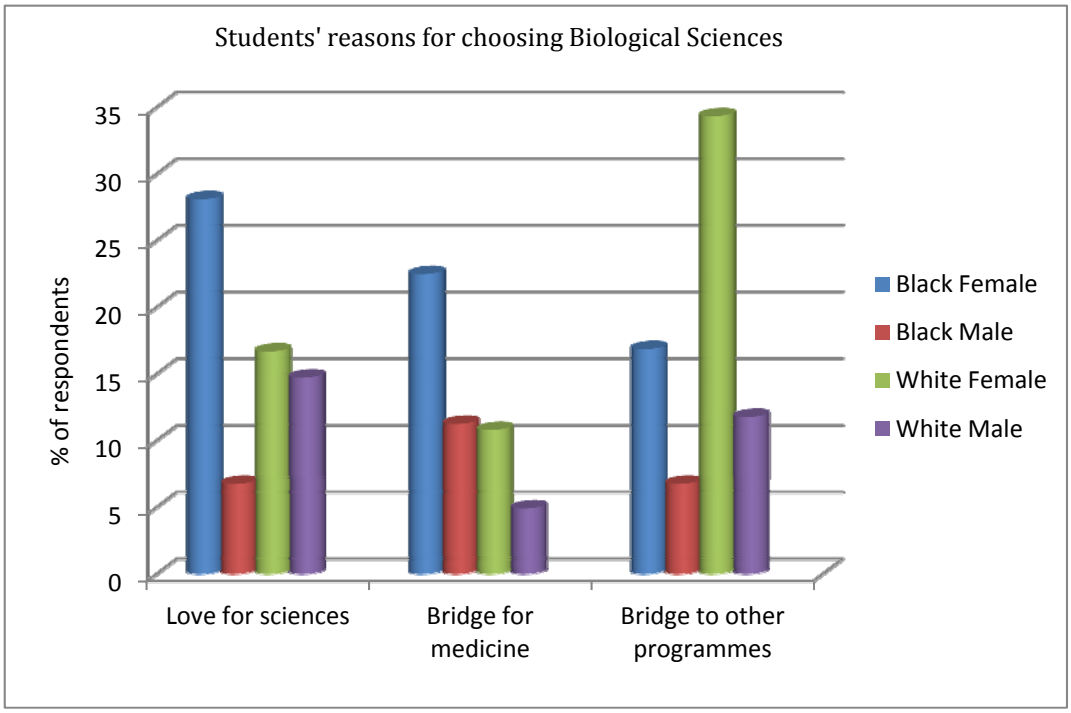
> Well, for me, the reason that I study Biological Sciences is the same as hers. I wanted to do Veterinary Science but my application was unsuccessful. So, in order to for me to get selected into it; I had to study Biological Sciences throughout the year and hope that I'll get selected.[19]

Student readiness includes among other factors the ability to ferret out information about the university programmes and other opportunities available at the particular institution of choice. Figure 5.4 describes the students' reasons for choosing Biological Sciences. The data indicate that 25% of black female students, compared to 16% of white female students, chose Biological Sciences because they loved science, and 6% of black male students and 14% of white male students chose the

[18] Policy-maker 2 , 31 March 2011.[Document 4: 23 (284:292) Codes: Student readiness – poor schooling]
[19] Focus group interview 2, 14 September 2011. [Document 14:7 (28:32) Codes: Admission process]

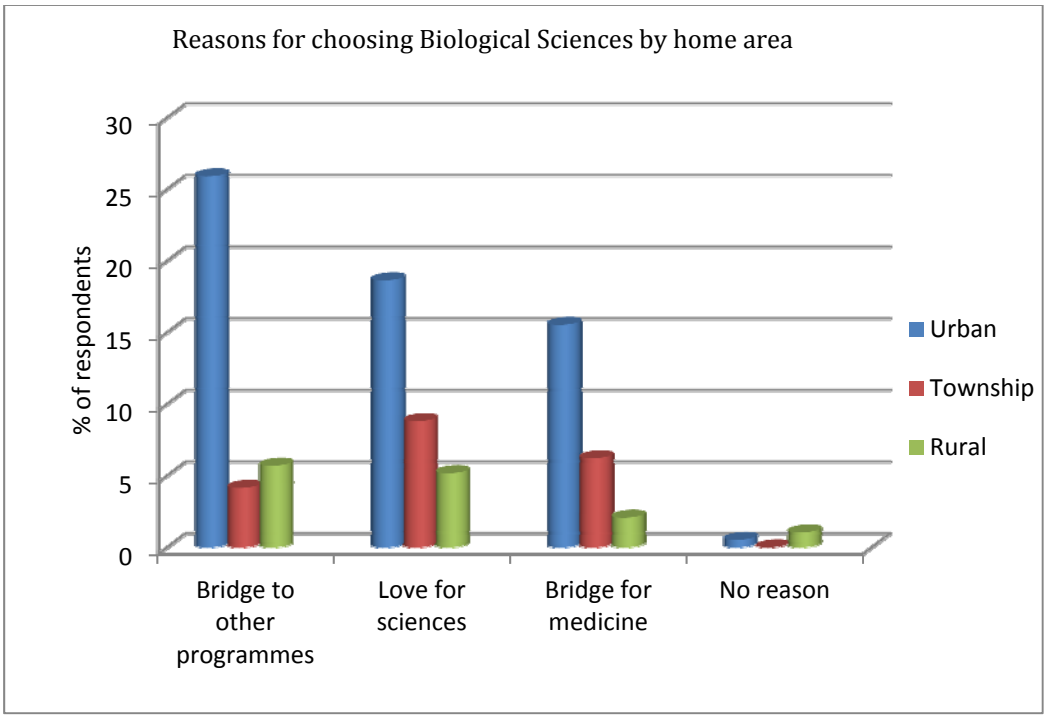
programme for the same reason. Further, 34% of black students (23% female and 9% male) registered for the programme with a view to bridging to medicine, compared to only 13% of white students (9% female and 4% male) who also wanted to bridge to medicine. While black students wanted to bridge to medicine, 45% of white students wanted to bridge to other programmes. The reasons given may indicate how knowledgeable the students were about the programme prior to registering for it; however, the opposite could also be true, that is, students enrolled for the programme, not because they had sufficient information about it, but simply because it was available.

Figure 5.4



The data show that about a third of the black and white students enrolled in the programme because they wanted to do science, while the other two-thirds enrolled for other reasons. Figure 5.5 below shows that the majority of students from urban areas (25%) registered for Biological Sciences in order to bridge to other programmes, compared to 5% from rural areas and 4% from township areas. This may have a negative impact on widening participation for under-represented groups.

Figure 5.5



The other challenge that potential students may face is their lack of adequate exposure to university and how the university operates. Some prospective students applied for admission late, as they were not aware of closing dates. Others indicated that they applied late because their parents did not have the application fees. Some waited for their final Grade 12 results and arrived at the university to make a self-application. These students who arrive at higher education institutions to make a self-application are known as 'walk-ins'.

> My mom did not have money so that I could apply to various universities. So I only applied here [University of Pretoria] and it was already late and then I took Biological Sciences.[20]

It is the role of the career counsellor to be armed with a wide variety of university material and be able to guide learners in general, including about fees and application closing dates.

[20] Focus group interview 1, 31 August 2011. [Document 13:14 (63:65) Codes: Funding]

> Now how do you write the final Grade 12 exam and your subject combination is not correct? The career guidance teacher in schools should be able to tell you that your subjects are not correct so you are not going to qualify for university studies. The students just come here and have heard that there is BSc IT and they do not know what it's about and I struggle to figure out whether it's the rural or township schools that don't have good career guidance teachers or what the problem is. But there is a huge problem with the preparedness of students even though we have recruitment officers from client services.[21]

The phenomenon of student readiness was lamented not only by policy-makers but by first-year lecturers as well. Under-preparedness was manifested by the inability of the first-year students in this programme to conduct the practical work which is an essential component of the BS course. It was suggested that schools tended to focus more on the theory part and neglect the practical component of the subjects. This correlates with the inadequate resources associated with schools in rural areas.

> It is an experience that I am not surprised of. It is an experience that poor students might know how to handle the questions and answers, in the course one situation but depending where they come from, most of them will not have seen a thermometer and let alone touch it, let alone some instruments. I know that the African students in particular would not have seen many of the equipments that we use here in first year of physics.[22]

For some students, the BSc course provided their first experiences with science equipment. It was exciting and enjoyable, as one of the black students pointed out: "The chemistry practical sessions are enjoyable, even if it's something that we had not done previously in high school."

The first-year lecturers who were interviewed were in accord that the problems of inadequate preparation lay in the secondary school system. This phenomenon was also highlighted by one of the aims of the national plan for higher education, that in order to transform HE and increase participation rates, the secondary school system should produce sufficient numbers of learners who qualify for higher education

[21] Policy-maker 4, 4 April 2011. [Document 12:18 (179:190) Codes: Student readiness]
[22] First year lecturer 2, 11 May 2011. [Document 9:3 (31:39) Codes: Student readiness]

studies (DoE, 2001a). The quality of the learners who manage to go through the secondary school system and meet the degree entry requirements, however, remains questionable.

Inadequate preparation was also confirmed by students in the Biological Sciences. Most of the black students interviewed, as well as the sample who completed the questionnaire, maintained that they were not prepared to deal with the amount of work in this programme. Figure 5.6 (in section 5.3.4) below indicates that 24% of black female students confirmed that their schooling had not adequately prepared them for university studies, as compared to 23% of the white female respondents. The question of inadequate preparation was further underscored by one of the black students, who indicated that "at the beginning I thought I was prepared for university studies but my first semester here proved me wrong."

Inadequate preparation is fuelled by insufficient exposure of students to high-level academic activities at school level. This was lamented by one of the university policy-makers:

> ... [I]f students are used to high level activities in their school work, they will be better prepared for University.[23]

Inadequate readiness led to a number of first-year student repeaters occupying space that could have been taken up by new entrants. This was compounded by students transferring from one programme to the other, i.e. those who discovered that they had registered for programmes they did not like or those who wanted to do something else for one reason or another. These students clogged the system, thus creating a barrier to widening participation.

> ... [B]ut we are experiencing a high degree of repeaters and transferring students impacting on our intakes because when we have so many students that transfer and repeat they take places in our first year classes.[24]

The data point out that under-preparedness applies not only to students but also to lecturers. Hence UP has established a unit for education innovation which aims at

[23] Policy-maker 2 , 31 March 2011.[Document 4: 23 (284:292) Codes: Student readiness – poor schooling]
[24] Policy-maker 6, 3 March 2011. [Document 3:22 (318:326) Codes: Student readiness – barriers to access]

preparing both students and staff to handle teaching and learning issues differently, such as using technology to mediate learning.

> We also have a department of education innovation which deals with trying to identify academic problems and it assists both students and staff in dealing with teaching issues that may be put to these students.[25]

However, the first-year lecturers were overwhelmed by the huge number of students that they had to teach. This phenomenon also related to the lecturers' preparedness for handling a large class.

> When I went to Mamelodi [township where UP has a satellite campus which used to cater for black students mainly for foundation programmes] and you stand in front of 500 students, it was a nightmare for me. I think you need some special skills for controlling large classes; and they have workshops here to give tips on how to handle large classes, some students will be sleeping and others will be on 'mix it' [social media network] on their cell phones; others will be going in and out disturbing the whole class and it's very difficult to maintain discipline in those large classes.[26]

The inadequate preparation of students for university studies not only has a negative impact on widening participation in BS but also affects the general role and mission of the university. The University of Pretoria perceives itself as a research-intensive university, with knowledge production as its mission. The question is how to balance widening participation with the primary mission of the university. The following quote indicates how a policy-maker vacillated between the two imperatives of equity and redress on the one hand and research and development on the other.

> Education at whatever level is never wasted. If the University can make a difference in the life of an individual by providing remedial teaching, we are fulfilling our mandate as an educational institution. However, this is a research intensive university and it is a fact that the lecturing staff must have time to do research. The more time they spend on teaching, the less time they have for research. We must be careful that our remedial teaching component does not

[25] Policy-maker 3, 18 April 2011. [Document 2:10 (177:188) Codes: Admission process]
[26] First year lecturer 5, 3 March 2011. [Document 8:8 (64:74) Codes: Admission process – challenges]

> overwhelm postgraduate teaching and research. That's why you need to have some sort of a balance and you need the school system to deliver. People ask whether research universities are not a luxury in a developing country like South Africa. Research skills enable people to solve problems. As a developing country we are confronted with problems in all sectors of our society. We need knowledgeable people that can address these problems. As a country we need people with the high level skills a research degree will give you.[27]

There are number of issues at play here, such as the time that university lecturers spend on remedial teaching, rather than on research. This has a negative impact on their research output; the university, on the other hand, pushes them to produce more publications. The financial burden that HEIs have to carry cannot be overemphasized.

It is perceived that, as a developing country, South Africa needs to develop research in order to solve its problems. However, by focusing on research it seems to neglect the same under-represented groups of people it is attempting to help.

Student readiness plays a critical role in widening participation. Inadequate preparation of students for university studies not only becomes a hindrance to WP at university level but also affects the mandate of the university. Furthermore, it has proved to be a costly exercise for the university. The exorbitant costs are not only in terms of the monetary value but also in terms of time, including the time lecturers spend on remedial teaching.

In summary, student readiness is affected by various factors, in the main emanating from inadequate preparation for university studies. The inadequacy of the school system is fuelled, *inter alia*, by the lack of highly trained career counsellors, especially in township and rural areas. Furthermore, 'grade inflation' (Govender and Moodley, 2012) that occurs at Grade 12 level not only results in raising the students' expectations but also has a negative impact on widening participation in BS.

[27] Policy-maker 1, 11 April 2011. [Document 1:23 (264:273) Codes: Student readiness]

5.3.3. Admission process and widening participation

An admission policy is a document that details how a university enrols its students, as well as how it intends dealing with the issues of equity and redress. In terms of the Higher Education Act, each institution of higher learning is obliged to conform to the country's call for equity and redress (DoE, 2001a). The admission process encapsulates the minimum admission requirements set by the government and is used by HEIs to determine entry into university programmes. The school exit qualification in South Africa is the National Senior Certificate (NSC), which translates into what is colloquially known as being matriculated.

Whilst asking about access policy, most respondents spoke about admission policy, and seemed to use the two terms interchangeably.

The data indicate that the UP has an admission process that is developed through consultations at the faculty level and approved by both the senate and the university council. The admission policy is then implemented at faculty level. This is in line with the prescripts of the Higher Education Act and the university statute.

> The access policies for the various programmes originate on faculty level and are dealt with by the respective faculty boards. In terms of the Higher Education Act it is then approved by Senate and Council. At UP we do not have a central admissions office. Faculties take responsibility for managing admissions in the faculties in accordance with the Higher Education Act, the UP statute and UP policies and institutional rules. Given the fact that it is in essence an administrative process, one has to take into account general principles of administrative law as well.[28]

The notion of 'policy as practice' (Levinson and Sutton, 2001) seems to be the basis on which UP develops and implements its admission processes in BS. These admission processes have been refined over the years and are thus steeped in years of experience and practice. Furthermore, the data show that access policy for BS at UP is very fluid and is adjusted every year on the basis of the lessons and experiences of the previous year. The lessons include those relating to changing circumstances, such as improvement in the learner cohort performance, and the

[28] Policy-maker 1, 11 April 2011. [Document 1:12 (154:248) Codes: Admission process – Access policy]

balance between available resources and demand for access, as determined through enrolment planning.

> Firstly, it [admission process] is a process that should be reviewed annually and it should be based on research of the previous year so we should continuously see how is UP doing in terms of the students that apply and the students that are actually admitted. That ratio should be taken into account and within that we should look at who are these students that we admit, are they representative, are they the best, how are they doing and based on the research of the current intake we should formulate a policy for the following year. Now it becomes a little bit of a short term process but in a dynamic environment like this you can't really work on a long broad policy, you have to review it annually.[29]

The other critical factor gleaned from the data that impedes widening participation in Biological Sciences is enrolment planning and its impact on resources. The university has to strike a balance between resources and student enrolment. That is to say, it has to have a clear growth strategy that will assist administrators to enrol the number of students that could be accommodated in the available lecture rooms and also ensure that there are sufficient resources including human resources.

> We have to negotiate the growth plan targets with the department of education and we are very much on the targets that have been agreed on... For first year admissions there were about 33 000 applications for 8 500 places. So reaching a target is not a problem, the problem is there isn't a room in the university... so we manage to make sure that the admitted students have a reasonable chance of getting into a lecture hall if they have. So we keep an overall control of admissions in that way, each programme has quota to make sure that it's maintained.[30]

The data suggest that there has been a general increase in enrolment numbers. The massification process lent a hand to the university in its quest to widen participation, but it brought with it issues and challenges which need to be managed, such as resources. Massification puts a huge pressure on resources, as was underscored by

[29] Policy-maker 6, 3 March 2011. [Document 3:29 (29:42) Codes: Admission process – Access policy]
[30] Policy-maker 3, 18 April 2011. [Document 2:39 (220:237) Codes: Admission process]

the first-year lecturers. Having more than five hundred students in a lecture at a time requires more time to assess their work or get extra resources for assistance. On the other hand, the students also feels the impact of massification; for example, one of the black students indicated that "the large amount of students and insufficient space to accommodate registered students make learning difficult as they do not get necessary attention from the lecturers."

Any organizational disequilibrium creates an undesirable situation within that organization or institution. The data point out that some first lecturers feel overloaded and challenged by large classes, while students feel that they do not get adequate attention from lecturers; they also experience limited reading space and insufficient books in the library. In this sense, the pressure on resources encourages the university to manage the numbers by balancing the student enrolment with the number of available resources, such as lecture halls and lecturers.

In order to encourage diversity, the University of Pretoria employs the carefully crafted quota system. This system is intended to ensure that the university reflects the diverse population, but not necessarily the demographics, of the country.

> We would like to have a diverse university. We think that is what the country is about and it's important that students should study together because they are going to work and live together. What we are trying to achieve is that there is at least 40% black or white students in a group so that diversity is maintained. Given the numbers that apply and the quality of applications, this tends to happen naturally in the university.[31]

This subtle quota system, however, does not reflect the demographics of the 20-24 year-olds in South Africa, as the blacks of this age cohort make up 9.08%, compared with 0.6% of whites of the same age (Statistics SA, 2011). On the one hand, 40% of white students may be interpreted as the university's deliberate attempt to reserve places for white students, since they are in a minority in the country; on the other hand, it could indicate the slow transformation of the previously white university into a diverse institution. Undeniably, most whites attend well-resourced schools and are likely to get good grades and meet the university entry requirements (Jansen, 2010).

[31] Policy-maker 1, 11 April 2011. [Document 1:22 (280:287) Codes: Admission process]

This could explain the over-representation of white students in the Biological Sciences, as they make up 59%, as compared to 41% of black students (see table 5.1). Black students make up fewer numbers than whites in the Biological Sciences, due to having been exposed to poor schooling, and thus cannot achieve the grades required to make them eligible to register for this programme.

The persistently dysfunctional school system is characterized by less than 50% of the learners who started Grade 1 in 1995 completing the full quota of 12 years of schooling, with about a third of them failing the Grade 12 examinations. Of the few who managed to pass Grade 12, only 16% met the admission requirements for university studies. Only 5% or less passed mathematics and science at the advanced level, allowing them admission into subjects with a high exchange value in the global economy, such as engineering, information technology, natural sciences and medicine. Most of the 5% were white students, with a small percentage from the black middle class, leaving most blacks in South Africa behind at this critical stage in their educational lives (Jansen, 2010; Yeld, 2010).

All prospective students who wish to enrol for BS at UP need to meet the minimum admission requirements for bachelors' degree studies, obtained by passing 7 subjects, including mathematics, physical sciences and English. The university ranks the applications from those with highest scores down to the lowest, and selection is done on the basis of the ranking order. As well as the NSC minimum admission requirements, the university uses the APS as additional criteria to select students. However, six 20-credit subjects are used to calculate the APS, so Life Orientation, for example, which is a 10-credit subject, is excluded. A student is required to have the correct subject mix and grades, which is at least 50% or more in Afrikaans or English, a first additional language (any of the indigenous languages), mathematics, physical science and two additional NSC subjects. The student must obtain APS scores of 30 and then write the National Benchmark Tests (NBT). Those who are successful in meeting the above requirements and are proficient in the NBT are enrolled in the extended programme. This programme is the slow path, since the curriculum is spread over four years for a three-year degree programme. It should be noted that the minimum admission requirements in this programme, as with all other university degree studies, is the NSC-reflecting qualification for degree studies.

> My APS scores were low, thus I had to write two NBT tests English and Mathematics. I had to travel from home and come to Pretoria to write the test because I'm not staying in the university residence. People who usually write these tests go into a four-year programme; otherwise I had no idea what the test is all about.[32]

The use of 'sociotechnic tools' (Goastellec, 2010) such as the NBT could also be seen as playing contradicting roles, both acting as a barrier and widening participation. It could be perceived as limiting participation when used as a selection tool, which implies writing the test prior to registration at HEIs. The test may disadvantage some students who may not be able to travel to the exam venue to sit for the test, while others may not have the means to pay the levy required prior to taking the test. One of the students pointed out that: "I had to travel a distance to come to the University of Pretoria to sit for this NBT test."

Furthermore, some learners may not have made the necessary preparations which could increase their chance of success in the test. Thus the test that was intended to widen potential access in BS may instead serve as a limiting factor, especially to this science programme. In contrast, when the NBT is used as a placement tool, which means that it is written when the student is already registered at the university, it may widen participation.

> We use the NBT and I mean it's easier to say that if you struggled in Grade 11 or if your marks for Grade 12 aren't good enough, then you can go write the NBT and if you are successful then you can be enrolled in the extended programme. So I think we have an access policy that works. [33]

This policy- maker suggests that the NBT may also be used as compensation for low marks, which would then give access to extended programmes. Furthermore, the NBT is also a tool that could be used to obtain additional academically-related information about the prospective students, especially those with low performance scores (Nel and Kistner, 2009). The significance and value of NBT are underscored by correlation of its qualitative literacy (QL) scores and first-year students'

[32] Focus group interview 2, 14 September 2011. [Document 14:22 (56:60) Codes: Admission process – admission test]
[33] Policy-maker 4, 4 April 2011. [Document 12:4 (18:23) Codes: Admission process]

performance (Marnewick, 2012). Whilst the application of the NBT has some challenges, and could be perceived in some cases as a barrier to widening participation, it does seem to assist students from disadvantaged and under-represented groups, since it offers them an opportunity to gain access to foundation or extended programmes which in turn could lead to entry into other science-related degrees.

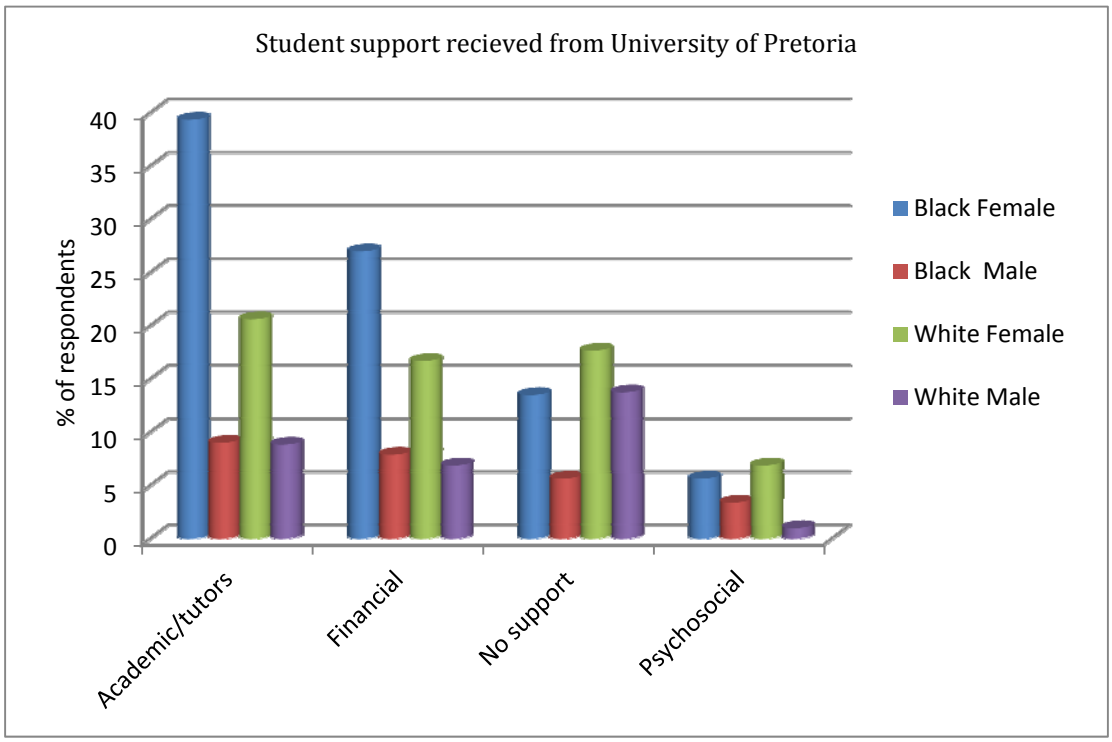
To sum up, the admission policy for BS at UP is flexible and fluid enough to adjust itself to current circumstances. There are some processes in place to widen participation, though they may be contested. Widening participation in BS at UP could be undermined by a deliberate 40% percent split between black and white students, albeit UP would perceive this effort as a way of encouraging diversity. This endeavour seems to circumvent the positive efforts of the institution of WP through the employment of NBT.

5.3.4. Student funding and widening participation

Student funding plays a critical role in success in their studies. This can be challenging with regard to widening participation, particularly for those students from under-represented groups. The funding model introduced by the government plays a role in alleviating the financial challenges faced by students. UP also assists needy students through waiver of admission fees and in this way widens participation.

Figure 5.6 below indicates that the percentage of black female students who received financial support from the university was slightly higher in comparison with white females, with 26% for black females and 20% for white females. The data indicate that a small number, slightly above 5% for black males and slightly below 5% for white males, received financial assistance from the university. 31% of black students and 23% of white students in Biological Sciences received financial assistance from UP. The data do not indicate the level of the financial assistance received from the university in the form of bursaries, loans and a government-sponsored financial assistance namely; National Student Financial Aid Scheme (NSFAS).

Figure 5.6



It is evident from the data that funding impedes widening participation in a number of ways. First, there is the lack of funds for application. Prospective students need to send applications to various universities in order to increase their chances of acceptance. These application forms must be accompanied by an application fee. For people from poor families, these fees are exorbitant and unaffordable. The prospective student may therefore have to wait for his or her parents to make ends meet, but when the money is finally received, the closing date for programmes may already have gone by. In this case, the application is accepted for programmes that still have some spaces available. In other words, the prospective student no longer has a choice but accepts what is available, as demonstrated in the excerpt below.

> My mom did not have money so that I could apply to various universities. So I only applied here [University of Pretoria] and it was already late and then I took Biological Sciences.[34]

[34] Focus group interview 1, 31 August 2011. [Document 13:14 (63:65) Codes: Funding]

In the second case, funds are insufficient to cover living expenses for students from low socio-economic backgrounds. This refers to students who are eligible to receive NSFAS funding. This mainly covers tuition fees, so that students have to source different funding to cover the shortfall for residences, books and other study materials.

> The NSFAS funds are not enough as they cover tuition fees. The university has to decide whether to cover full costs of few students or to divide the available NSFAS fund to a few more students but covering only tuition. We only consider people that comply with the NSFAS requirements, there are many more students who need this kind of assistance, but money is not enough and money is always needed.[35]

In spite of all these problems, the data suggest that the university's policy-makers were satisfied with the NSFAS funding model, despite its weakness. They also acknowledged that the financial problems are huge and that more is required to assist needy students to succeed in their studies at university.

> Socio-economic and funding issues are big problems... In this regard I must mention that NSFAS is one of the best policy interventions made by government in the immediate past. NSFAS is of great assistance to students[36].

The students themselves also seemed to appreciate the financial assistance offered by NSFAS via the university, despite the insufficient money received.

> Financial help from NSFAS is much appreciated. In fact any financial assistance I receive comes in very handy and it really helps me. The money pays for my tuition only and I'm not in residence because of that. But my mom is trying to make ends meet. I hope to get a UP bursary and things will be better.[37]

Often the problem with the NSFAS funds is in their administration by the university. One of the students repeating this module indicated that: "I applied for NSFAS in

[35] Policy-maker 5, 3 March 2011. [Document 11:16 (181:187) Codes: Funding]
[36] Policy-maker 1, 11 April 2011. [Document 1:23 (294:300) Codes: Funding]
[37] Focus group interview 2, 14 September 2011. [Document 14:15 (135:139) Codes Funding]

2010 and I did not recieve any reply. It is a struggle to get by every month and when I enquire, the administrators told me to wait and now it is 2011 and no response yet."

In order to lessen the financial burden, the University of Pretoria offers bursaries specifically to students who excel in academic performance. The government is aware of this funding challenge and is reviewing the NSFAS funding framework. It also offers students a bursary that waives the application fees, since the NSFAS can only be accessed once the applicant has registered as a student of the university. The data, however, indicated that this information was unknown to the target groups.

Funding plays a critical role in the students' success, as financial constraint with regard to living expenses is one of the key challenges in higher education (Mdepa and Tshiwula, 2012). The role played by NSFAS is essential and critical, but may impact negatively on widening participation since it mainly covers tuition fees, leaving students to find other ways of taking care of living expenses which can be high. Thus NSFAS allow students to "get in", but does not support them as they are struggling to "get through" their studies. Some of these difficulties are dealt with by the university by issuing bursaries that waive the admission fees for students, allowing them to register and become eligible for NSFAS. However, some of these efforts to widen participation are hampered by lack of information and students being unaware of the available resources.

5.4. Getting through

'Getting through' presupposes that admission to higher education has already taken place. It therefore addresses the processes and systems put in place to support students in order to widen participation and achieve access with success. Two of the main components of 'getting through' examined in this study are the orientation period and student support. The orientation period seems to be more compelling for both students and lecturers, particularly those lecturers who offer introductory lessons during this programme. In contrast, the least compelling component of 'getting through' is psychosocial support.

5.4.1. Orientation period and widening participation

During the orientation period new students are given a general introduction to the university. The orientation programme in BS at UP is designed to help students adjust socially, to equip them with study skills, including the use of the library, as well as to introducing them to the lectures. It is also used to conduct competency tests, such as computer literacy.

The two-week orientation is normally conducted at the beginning of the year at the University of Pretoria. It is open to all first-year students and is therefore not designed specifically for those from under-represented groups or for BS. The orientation is supposed to benefit all the students, since even some of the students from advantaged backgrounds have difficulties in adjusting to university life.

According to one of the policy-makers, the orientation programme for students enrolled at the Biological Sciences attempts to encompass the administrative, academic and social aspects of the first-year students:

> We have an orientation period programme where general information about the university and information on all sorts of academic issues is provided to first-year students. Study issues, time management, curriculum assistance and compulsory study hours are also addressed. We have all sorts of social activities and societies that students can participate in and belong to. Having friends at university is probably more important than formal support services[38].

The orientation period, therefore, helps to enhance the social networks of the new students, as they will need such support to survive at university and succeed in their studies.

During orientation, the first-year students are taught skills, such as how to study. In addition, assessment tests are conducted which could illuminate the kind of support that the students will require. These tests may lead to students taking programmes which might help them to succeed with university studies.

> ...[T]here are very different ways, depending on the student, what the course is, and these are not just for previously disadvantaged students, they are also

[38] Policy-maker 1, 11 April 2011. [Document 1:38 (316:323) Codes: Orientation period]

> for students from advantaged background, sometimes they have difficulties too. In principle, everyone has access to these measures, but they tend to be used more by people from previously disadvantaged backgrounds. There is a two-week orientation programme which is designed to give students a good introduction to university, how you study, how you choose your subjects, and if you have difficulty where to turn to for finance, for housing and pointing out all the different systems you can access, that's largely academically orientation for those two weeks. There are also tests that students take to see if they fit into programmes where there is specific assistance, so they will write a number of tests and according to those they could be required to take some of the programmes that offer this assistance.[39]

The lecturers have an opportunity to give an overview of some of the main courses during the orientation period. The purpose of such presentations is to whet the students' proclivity as well as to help them confirm that they have chosen the programme they really like. The lecturers were positive about the orientation period and supported it.

> The vice-principal started the presentation sessions as part of the orientation week for the first years, to have the introductory lectures in all main courses, for example, before we actually start with academic year classes, the BS students will all get a lecture on cell biology to explain to them what it is about, how does it link to what they are doing at university, and then also what's going to be expected of them to help them to bridge the gap between what happened at schooling and university.[40]

Some of the students acknowledged the introductory lessons, but were worried about finding accommodation, as not all of them could be accommodated in residence; as a result, they did not pay sufficient attention to the lessons. Nonetheless, the first-year students applauded the orientation period, regardless of their personal challenges.

> At the beginning of the year students were orientated around the university and attended the introductory lessons. These lessons seemed interesting,

[39] Policy-maker 3, 18 April 2011. [Document 2: 9 (164:177) Codes: Orientation period]
[40] First year lecturer 1, 7 April 2011. [Document 10:25 (361:371) Codes: Orientation period]

> but we were still trying to find our feet and get accommodation. The students in the residences had books that told you at this time go to this venue. We did not know anything by ourselves; however, when you are in residence you had people that would take you everywhere and showed you around the university.[41]

Students from outside Pretoria who were not in residences struggled a little to find themselves within the university during the orientation period. It was evident that in order to widen participation to students from rural and semi-rural areas more attention needed to be given to full access to the residences.

Despite the challenges with residences, those students who were in the residences seem to have enjoyed and benefited from the orientation week. “I live at the residences and therefore get exposed to several activities, including sports. The orientation week really opened my eyes and now I feel that am a university student, as I know where the library is and I enjoyed the introductory lessons.”

In this sense, the orientation period had achieved its purpose, as it managed to make some students feel settled and raring to get on with their studies. However, very few students mentioned the orientation week as a positive experience.

Indeed, those students who were already settled in residences benefited the most from the orientation programme. These were the same students who had planned their university year in advance and had not simply wandered off into a course. Those who were not accommodated in residences or did not have an alternative accommodation nearby found it harder to focus on the orientation programme.

[41] Focus group interview 3, 14 September 2011. [Document 14:16 (47:53) Codes: Orientation period]

5.4.2. Widening participation through academic support

The student support offered by the University of Pretoria is divided into three categories, namely academic, psychosocial and financial. The other forms of academic support that are offered by UP are foundation and extended programmes which play a critical role in widening participation in Biological Sciences.

Figure 5.6 (in section 5.3.4) illustrates the efforts of the University of Pretoria in offering general support to first-year students. The support not only aims at improving the lives of individual students but it is also part of UP's endeavour to widen participation. The graph indicates that academic support had a high uptake among first-year BS students. 36% of black female and 18% of white female respondents indicated that they received academic support and had benefited from such support. It is interesting to note that 16% of white female and 12% of black female respondents indicated that they had not sought any form of support from the university. These could be students who felt that they were already well prepared for university studies and did not need to solicit any form of assistance, particularly academic support. The other possibility could be that these students were not aware that this kind of support was available to them, and therefore had not tried to access it.

The data indicate that academic support was anchored in both the systems of mentoring and tutoring which were offered to first-year students with a view to facilitating their transition from secondary school to university. One policy-maker explained the difference between mentoring and tutoring:

> Mentoring is applicable to first-year students only. Tutoring is presented more widely. However, we have found that some of the students from NSC need support in the second and third year also. This is very expensive and we don't have enough resources to do this on top of everything else that is required from us[42].

Mentorship encompasses the kind of support in which a senior student in the same or a similar programme is assigned to mentor a first-year student in his/her studies. The mentorship programmes in some cases also includes variants on the buddy

[42] Policy-maker 1, 11 April 2011. [Document 1:18 (214:219) Codes: Academic support]

system, such as ‘big-sister-little-sister’ programme. This kind of relationship creates a form of safety net for the first-year student who finds him/herself in an urban university which in some cases is in a completely unfamiliar place. Thus the first-year student will know who to turn to in time of need or when seeking counsel about studies.

The mentors also encourage first-year students to participate in various university social activities, such as the float and fund-raising activity called ‘reach out and give’ (Rag). One of the students indicated that: “My mentor says life is not about books only and she encourages me to participate in various activities, but I cannot as I spent most of my time catching up with work.”

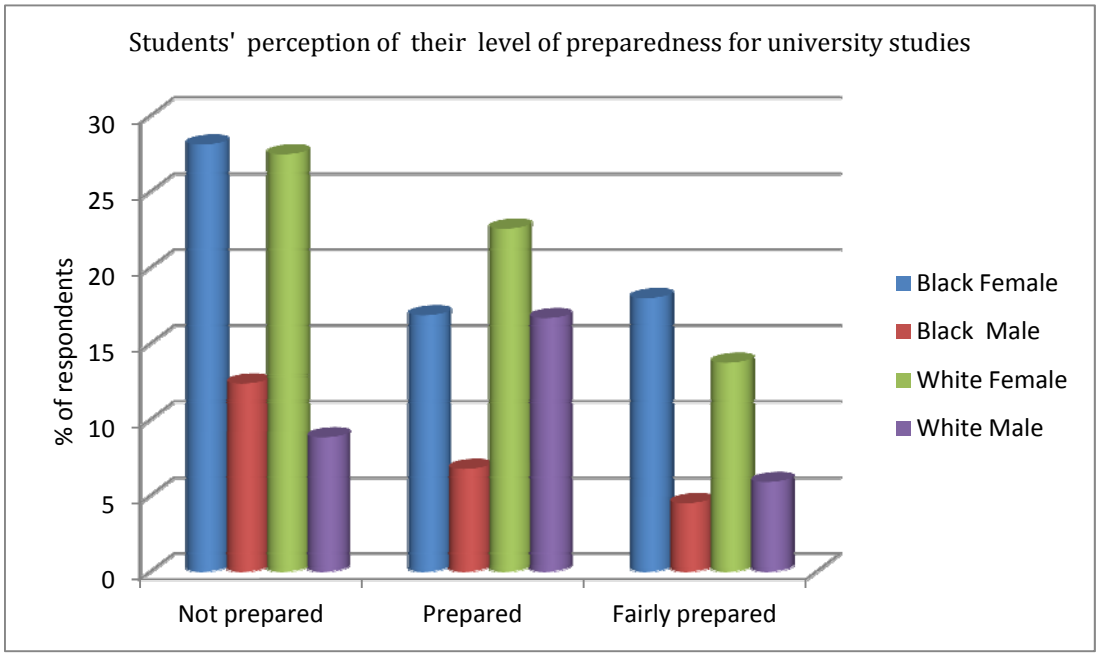
Tutorship is a subject-based kind of academic support. That is to say, students who are struggling with their studies or perhaps need assistance in a specific subject may solicit help from tutors. The tutors are senior students in the same programme who have successfully completed the relevant subjects and have sufficient grasp of the subject content to enable them to tutor the first-year students. There is a compulsory study period in residences for first-year students. This study period is monitored by the personnel responsible for the residences. This kind of support is essential, as it mediates one of the challenges facing black students. If this intervention is successful, it can lead to access with success in the Biological Sciences at the University of Pretoria.

Academic support in the form of mentoring and tutoring is experienced differently by first-year students in Biological Sciences. The majority of black students, who made up 63% (36% female and 7% male) (figure 5.6), compared to 27% (20% female and 7% male) of white students, appreciated this form of academic support but there were those black students who were not impressed either with the tutors or their tutoring skills. This may vitiate the good intentions of the tutorship and mentorship programme.

> The tutor comes there and just does five problems [subject-related questions, such as mathematical problems]. He just stands there and does the problems and then he leaves. He does not make sure that you understand, and then we keep on failing.[43]

The level of academic support offered by the university is determined by the level of student preparedness to deal with university life and academic demands. Figure 5.7 below indicates the perception of first-year students in BS on their own level of readiness to handle the academic rigour required at university level. The data show that 23% of the black female students believed that they were not adequately prepared for university studies. Only 16% of black female students, compared to 23% of the white female respondents, maintained that they felt prepared for such studies. About 13% of black male respondents, compared with 6% of white male respondents, felt they were not being adequately prepared. The data show that altogether 36% of black students were not adequately prepared for university studies. This resonates with the overall impression that many blacks feel they are unprepared for BSc studies which they relate to their attendance of low-performing schools.

Figure 5.7



[43] Focus group interview 1, 31 August 2011. [Document 13:21 (126:131) Codes: Student support - academic]

Another support mechanism used by the University of Pretoria is a sophisticated student-lecturer on-line communication computer programme called ‘click–up’. This is a platform on which lecturers can post study material, practice questions, and additional information that they would like to put across to students. This tool is a viable and efficient form of communication with students. The students use it because they know the lecturers post vital information there, for example, presentations, lecture notes, etc. Students at the university have access to computer laboratories where they can use internet and are thus able to use the ‘click-up’. Those who have access to internet at home can also use it but those from townships and rural areas without this facility can only access it when at the university.

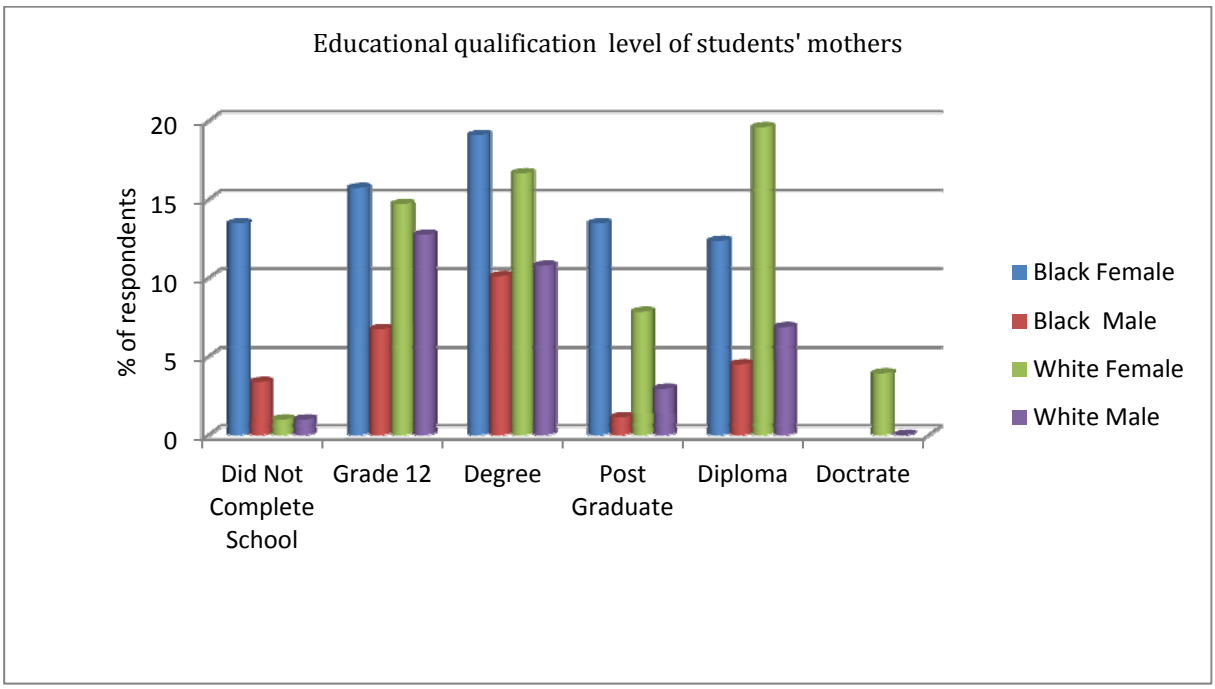
The foundation and extended programmes are additional mechanisms used by UP not only as forms of academic support but also as part of the attempt to widen participation in Biological Sciences. The foundation programme is a first-year programme that is designed to provide a strong anchor for those students who have potential but who have not met the required grades. It aims at narrowing the chasm between school and university studies as it covers some sections from the secondary school curriculum and introduces some curriculum content covered in BS at university. The foundation programme thus adds an additional year of study to a three-year programme. The extended programme also increases a three-year programme to four years. However, unlike the foundation programme, it is a slow programme. Students who have potential but missed the admission requirements by small margins are placed in this programme and their curriculum is spread over an extended period.

> ... [W]e have developed over the years a number of access programmes that are aimed specifically to try and address these issues. We have in the sciences, for example, but also in some of the other faculties’ programmes in which there’s an additional year where there are foundation programmes in the first year and then the students do a three-year degree. But also a slightly slower presentation of the first-year work in the extended programme that is spread over 18 months, and then in the middle of the second year they will

> join the main stream... So these programmes are designed to facilitate access by students that aren't fully prepared but that have potential.[44]

Parental support plays a critical role in education. Parents play a crucial role in providing a stimulating home environment and 'cultural capital stock' in the form of books, the computer and internet (Jaeger, 2009). Their own educational level is also important. Figures 5.8 and 5.9 below describe the educational level of parents or guardians of the sampled first-year students in BS for the academic year 2011. Figure 5.8 shows the educational qualifications of the mothers. The data indicate that 19% of the white female student respondents' mothers had obtained diplomas and 16% of the same respondents' mothers had degrees. In comparison, 12% of the black female respondents' mothers had diplomas and 18% had degrees. Furthermore, 5% of the white female mothers had doctoral degrees while none of the mothers of the black female respondents had a doctoral qualification. The data suggest that fewer South African black females pursue studies until doctoral level (ASSAf, 2010). The dearth of black females who pursue studies to doctoral level could be attributed to the fact that females carry the burden of family responsibilities.

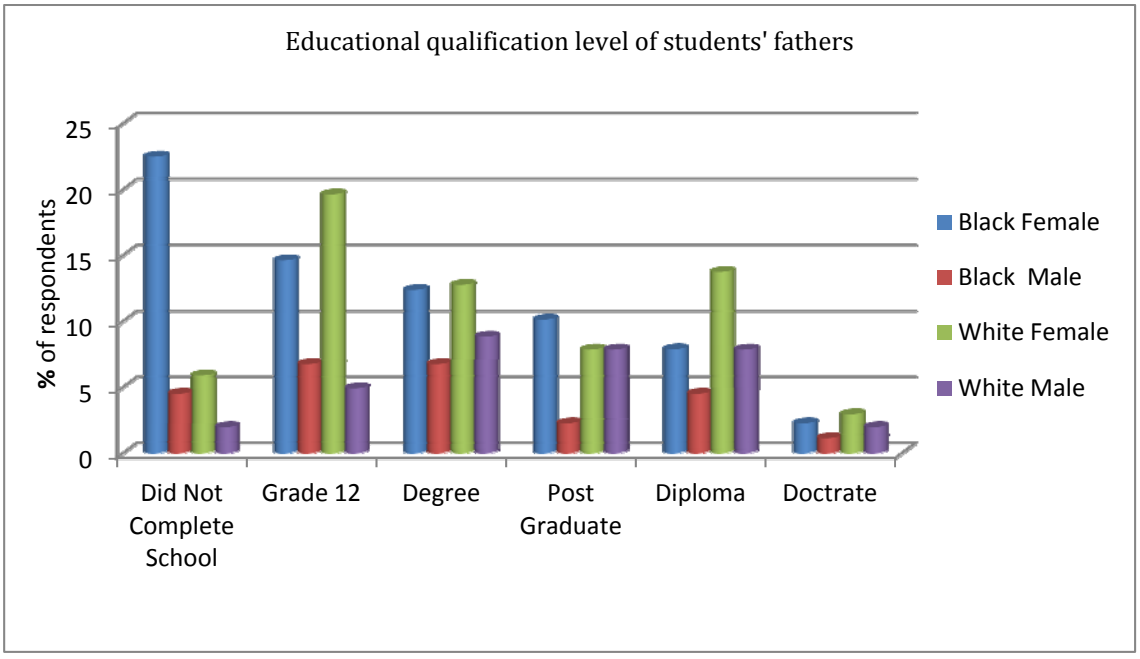
Figure 5.8



[44] Policy-maker 3, 18 April 2011. [Document 2:5 (85:103) Codes: Admission policy]

The educational level of the fathers of the sampled first-year students in BS is shown in figure 5.9 below. The data show that 25% of the fathers of black females did not complete school, i.e. they did not have a Grade 12 school qualification. White fathers who did not complete school made up less than 5% from the sampled white female respondents. About 14% of black female respondents' fathers had Grade 12 school qualification as compared to almost 20% of white female students' fathers. Although both black and white female respondents' fathers made up 12% an equal percentage of white females' fathers had diplomas. This gave them an advantage in terms of having information about higher education. Almost 1% of black females' fathers had doctoral degrees, as compared to black females' mothers, who did not have doctoral degrees. It is clear from this data that mothers of white female students had better access to schooling than mothers of black female students.

Figure 5.9



The data showed that mothers of both races had better qualifications than the fathers. The educational level of the parents suggested that they knew the value of education and in some cases had been to higher education institutions. Thus they could serve as point of reference and provide 'cultural capital' to their children and reinforcing the need for them to go to university and in so doing widening participation. Given this background, it is clear that support for student success comes not only from the university but that parental support also plays a critical role.

Despite of all the academic support available to them, students still seemed to struggle with academic demands. The data suggested that there was a deep-rooted challenge with students expressing displeasure at their poor academic performance and claiming that one of their main problems was the workload. According to the first-year students the workload was unwieldy, often overwhelming for them, and this resulted in poor academic performance. Despite their hard work and a significant amount of time spent on studying, they did not score good grades and those who passed just barely made it.

The students gave various reasons for their poor performance. These included firstly, the schedule of exams and not having enough time between classes, examinations and practical sessions, overwhelming workload and long days, i.e. classes from morning until late in the evening.

> Here [at UP] I always get 56% and I seldom get 60% or above. When you are at varsity you need to work harder and you will reap what you have sown. But here is the problem: if you have a semester test on Wednesday and had another one on Tuesday and then a practical session in the afternoon you will not perform well due to this enormous workload. We attend lessons from 7h30 to 17h30, there's simply no time to study during the day.[45]

Secondly, there are differences in study approaches between school and university. For instance, volume of the work, the rhythm of progress and the degree of independence in relation to work and the departure from the secondary school pastoral approach were some of the domains that created difficulties for new

[45] Focus group interview 1, 31 August 2011.[Document 13:24(133:141) Codes: Student readiness – academic performance]

students in coping with university studies (Cross and Carpentier, 2009). The teachers at school level, however, followed up learners and gave them extensions.

> I was so good at high school, you know. I know this is not high school but I'm just comparing. However, I now realize that my teachers always pushed me and gave me additional time to complete my work. They made sure that you submitted your work, but here at varsity the lecturers do not follow you up, they just issue assignment and due date and if you do not submit you suffer the consequence thereof.[46]

To recap, it seems that academic support is considered by the policy-makers as the main policy instrument to widen participation to BS at UP. The mentorship and tutorship programmes offer students assistance and the foundation and extended programmes also help alleviate pressure on students who are already struggling. Thus academic support plays a role in widening participation. Whilst there are challenges with regard to the academic support programmes offered at UP, the data point out that more support in terms of time management, extended time between examinations and practical sessions could ease the transition between school and university and thus encourage widening participation, especially in Biological Sciences.

5.4.3. Widening participation through psychosocial student support

In order to cater for the wellbeing of the students including those from under-represented groups, the University of Pretoria has psychosocial student support facilities. These facilities are available to registered students and include both psychosocial and medical support.

> After registration; within faculties there is support staff who help to run the tutor programmes. We have these processes of trying to identify the students that have difficulties and then the Dean's office is there to provide comprehensive student support services. This is their purpose, to help students with medical, psychological [problems], and can even help them with

[46] Focus group interview 3, 14 September 2011.[Document 13:15(35:46) Codes: Student readiness]

> where to go when they have financial problems, so it's really a central place for them to go to in terms of support.[47]

The data show that this kind of support encapsulates various structures that are available to students, ranging from counselling (career, life skills, HIV, etc) to 'day-house' and recreational clubs. The day-house plays a significant role, as it provides one decent meal a day for students who do not have the means to buy meals. The support, however, always comes with the word 'but'.

> We have a large number of support systems and programmes. We also have support structures in place in the residences. We also have a special unit for students with disabilities. There are social workers, psychologists, etc. available at the Student Support Centre for registered students. But in the end the University unfortunately is not a welfare organization and the problem is that, whatever you do, it's never enough. We have to deal with capacity and resource constraints. In the process, we must not lose sight of our primary mission. [48]

The University of Pretoria uses specialist professionals such as psychologists and social workers to provide the psychosocial service support to students. This service aims at helping students, particularly those from disadvantaged backgrounds, to succeed in their studies.

> ... [T]here is a whole range of systems in terms of psychological help and social work help and the financial aid and all of those sorts of things. So, they [students] are given assistance on those things and such as how to use the library, etc ... The services that I mentioned earlier, like psychological help and medical services, those are in the department of student affairs, so they are specialist groups that are there to address these sorts of issues.[49]

Figure 5.6 in section 5.3.4 indicates that an overall 8% of black students (5% female and 3% male) used these services. The uptake rate of the psychosocial services by white students was also low, as only 7% of these students (6% female and 1% male) used them. This lack of popularity could be ascribed to a stigma which may be

[47] Policy-maker 6, 3 March 2011. [Document 3:21 (303:312) Codes: Academic support]
[48] Policy-maker 1, 11 April 2011. [Document 1:21 (264:273) Codes: Psychosocial support]
[49] Policy-maker 3, 18 April 2011. [Document 2:10 (177:188) Codes: Student support]

attached to such services. One of the students pointed out that "it is difficult to go to psychosocial services because people look at you differently if you are seen going in there."

Regardless of the low uptake, psychosocial support played an important role. Although not directly linked to academic studies, it contributed significantly to the students' success. The kind of help they receive in this support system was like water in the oasis. One of the black students, for example, recalled that he had been given a psychological counselling to help him deal with personal issues that were affecting his academic performance:

> I got a letter last semester because my results were not good and I was struggling to cope with school work because of my personal problems. The letter indicated that I should go there [student centre] and see someone who asked me about the reason for my failure. I saw a professional person, a psychologist who gave me advice and counselled me. They find out about your problems and disappointments and they help you deal with your issues.[50]

Psychosocial support is conducted within the faculty and uses tutors to assist in identifying students in distress who are then directed to the student service centre to seek help. This comprehensive support service is not academically inclined and the uptake seems low, but it is nevertheless essential to students' success in their studies and therefore important for widening participation. One of the students who received assistance from the psychosocial service pointed out: "I don't like counselling, but, yes, it is helpful and the people there are doing a wonderful job. I am here now because of them".

5.4.4. Institutional culture and widening participation

This section on institutional culture will analyse students' lived experiences at the University of Pretoria. The main question asked is: *Do students feel 'at home' at the University of Pretoria?* It was noted that the experiences were varied. Some black students expressed cultural shock but enjoyed their independence. Networking helped students through their first year of studies. In general, more white students

[50] Focus group interview 2, 14 September 2011. [Document 1:1 (13:18) Codes Psychosocial support]

than black referred to networking as a positive experience and more female than male students. Networking can thus be used to leverage widening participation in Biological Sciences.

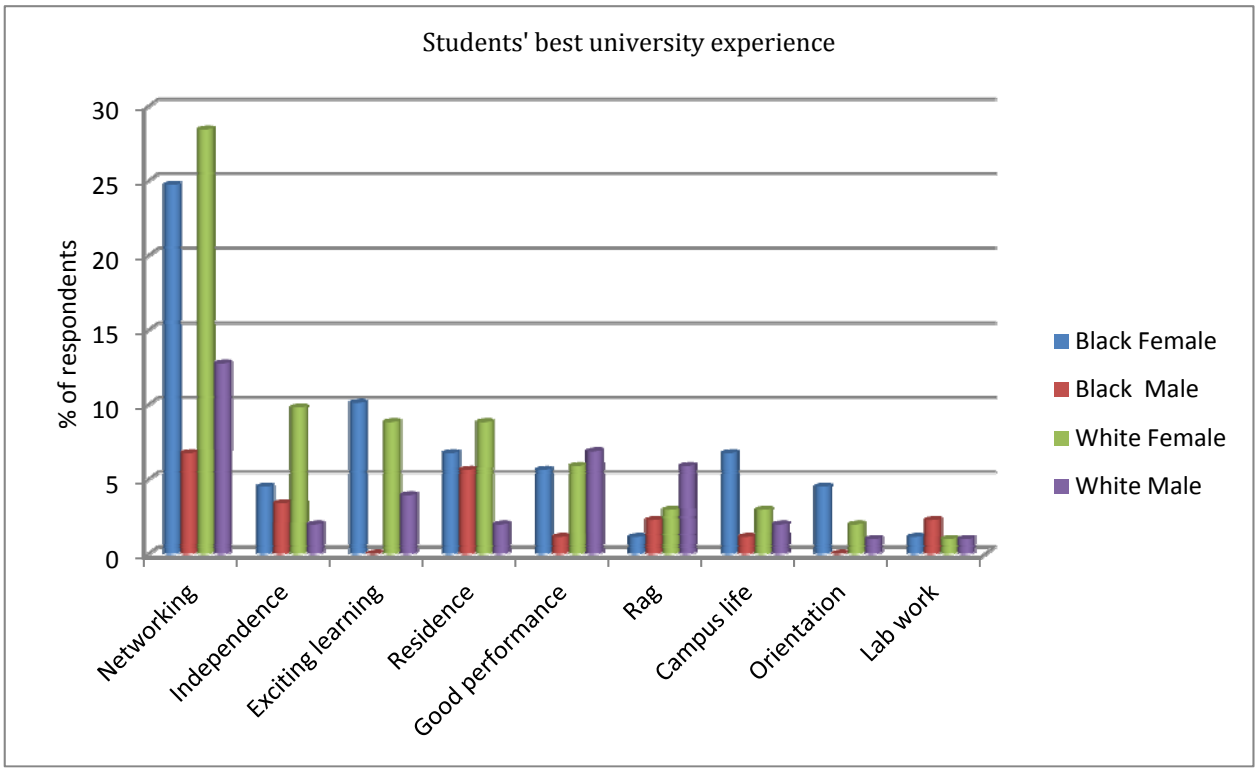
Figure 5.10 below shows that 24% of black female students indicated that their best experience was networking, while 32% of white female students had a similar experience. Networking seemed not to be as important for males as it was for females, because only 6% of the sampled black male students and 12% of the white male respondents put it as their best experience. This could mean that both black and white female students perceived forming new networks as important because these networks and new relationships could perhaps help them survive university life. Forming networks could also be understood in the sense that the students found themselves in a new and unfamiliar environment. Having abandoned their secondary school networks, it had become apparent that they needed to form new networks.

Only a very small percentage of students mentioned independence as a positive experience. It seems that more white female students (10%) than black female students (5%) enjoyed the independence that university life offered them.

When asked about their worst experience, a large number of the white students singled out sharing a room with a stranger (62% of white female and 34% white male students). At the same time, very few black students referred to this as a bad experience. This begs the question, whether most of the black students in this programme had not been accommodated in a residence, especially those who had registered late or wandered into the programme without planning it in advance, or whether they did not find sharing accommodation problematic but instead rather enjoyed the experience and the networking.

Two of the popular experiences were ‘exciting learning’ and ‘good performance’, as 10% and 5% of black female students, respectively, picked these as their best experiences, compared to 8% and 5% of white female students. It is interesting to note that 4% of black female students from the sample said they had had their best experience during the orientation week. Laboratory work (practical work), including computers, received the lowest percentage from both races and genders, as it rated less than 1%. However, one respondent noted that “the view from the building is breathtaking.”

Figure 5.10

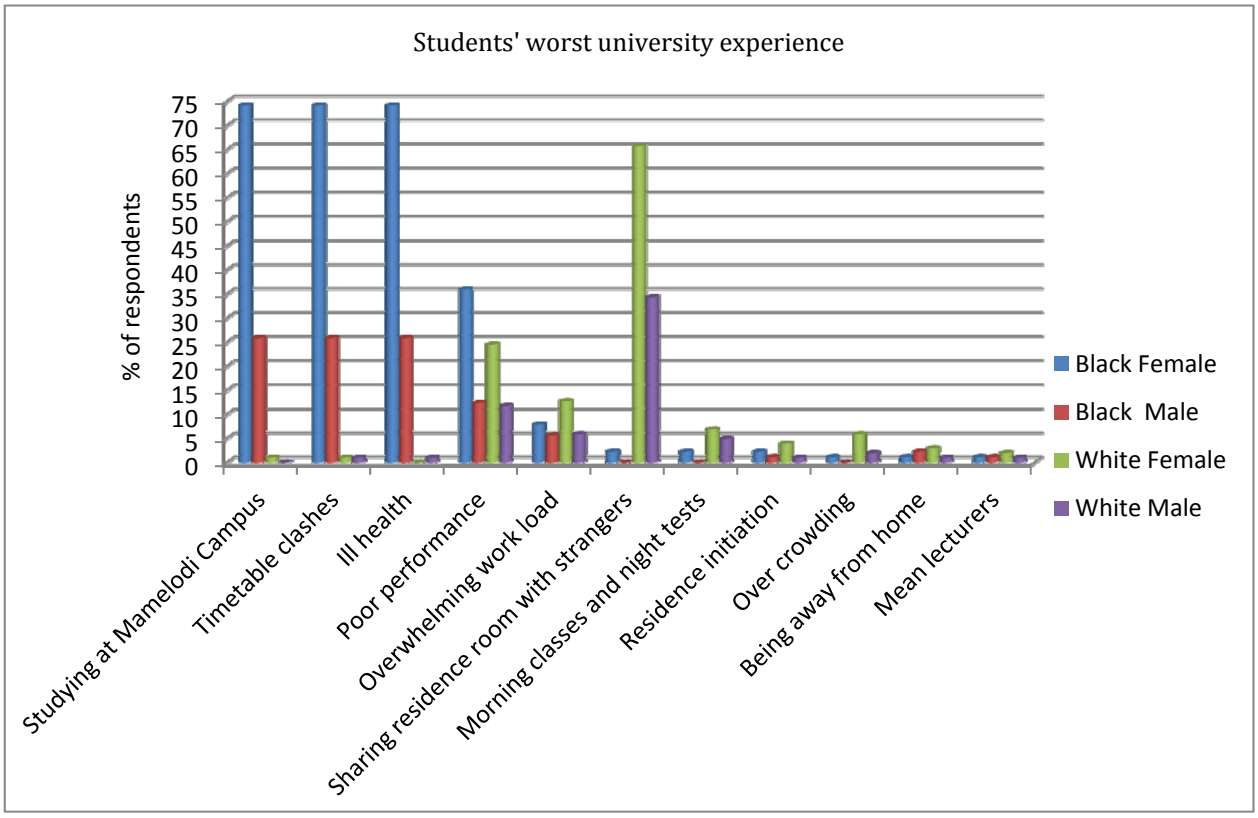


The questionnaire also sought to find out about the worst experience of the BS students in their first year at university. The percentages for worst university experiences varied, with the most highly ranked worst experience for black females being studying at UP's Mamelodi Campus, followed by timetable clashes and ill health with each amounting to 72%. In comparison, the white female students' worst experience was sharing a room in a residence. Poor performance was also a key factor, picked as their worst experience by 34% of the black female students and 22% of white female students. The percentages for worst experiences seem a little low nevertheless, assessing such experiences is important in widening participation in Biological Sciences at University of Pretoria.

Other factors that the students, both black and white and both genders, raised as their worst experiences were mean/rude lecturers, residence initiation rituals, and staying off-campus, with each category making 1% (see figure 5.11 below). Residence initiations could be detrimental to students' success. The evening classes

could have been a challenge for students who were not accommodated in a student residence, given the unreliable public transport in and around Pretoria.

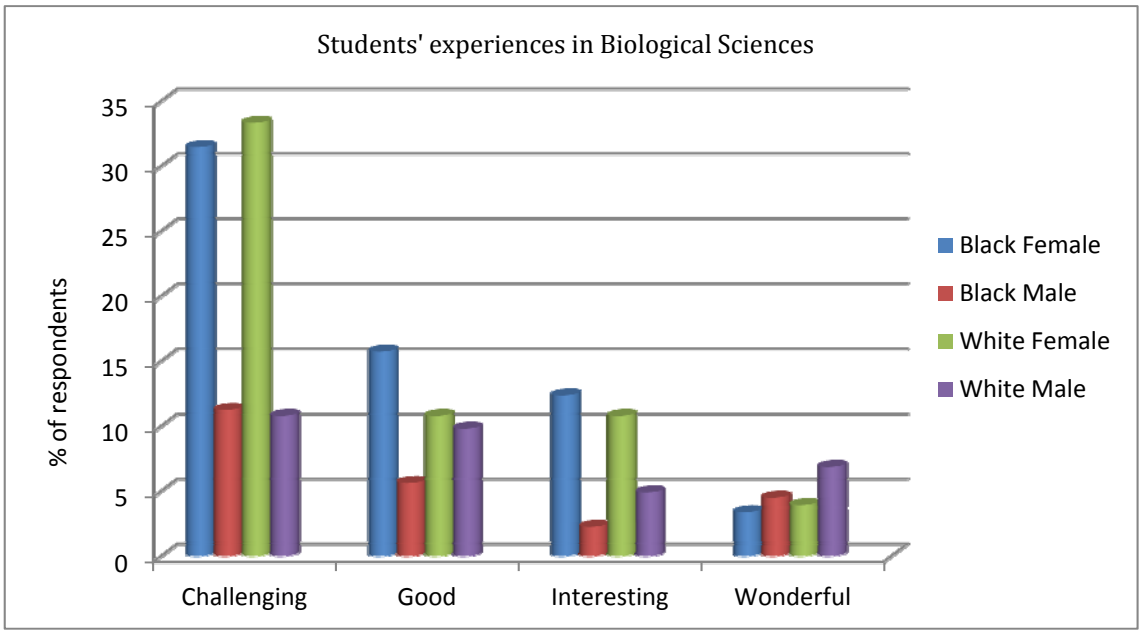
Figure 5.11



The first-year students' experiences in Biological Sciencess are myriad and varied; however, four main keys words were used by the respondents, namely 'challenging', 'good', 'interesting' and 'wonderful'. Figure 5.12 below records these experiences in terms of race and gender. 34% of white female students were of the view that the programme Biological Sciences was challenging. The same view was expressed by 32% of black female students, with 10% of both black and white male students sharing similar views. 15% of black female students described their experiences in the Biological Sciences as good, compared with 10% of white female students. Very few students said their experiences in Biological Sciences were interesting and wonderful; 12% of black females and 10% of white females said their experiences were interesting, while wonderful experiences were below 5% for all races and gender groups, except white males, whose wonderful experiences were slightly

above 6%. It is important that all stakeholders create memorable experiences for students in Biological Sciences, so that they can stay the course and realize 'access with success'.

Figure 5.12



The institutional culture plays a critical role in enhancing students' ability to negotiate access with success in Biological Sciences at the University of Pretoria. Such a culture resonates with Bourdieu's (1977b) concept of habitus – feeling at home away from home - which may contribute to the success or failure of the student. The student's ability to 'feel at home' in an institution is enhanced by artefacts, names, food and other cultural objects that relate to the student or with which he or she can identify. The absence of these fundamental elements may lead to the university environment appearing harsh and unwelcoming. In this light, the students, particularly black students, may feel alienated, and this may have a negative impact on their studies. Poor performance in turn could lead to possible academic exclusion. One of the first-year students pointed out that:

> It's a cultural shock. You come at the residences and you are one of the ten black students there. I mean, it's a big cultural shock, there's also language difference.[51]

The black first-year students had to adjust in order to 'feel at home', despite the fact that being at the institution did not feel that way. The 'white' culture made them feel alienated. It was, therefore, a question of adapting or 'fitting in' with a view to completing their studies. Failure to adapt could result in them dropping out of university. However, some of the students pointed out that things needed to change.

> Some of the residence traditions need to change to accommodate black people because we did not feel accommodated. Most of the things [activities] we did during the orientation week were English things [activities] or white things [activities], we don't sing black songs, and there are no games commonly played by blacks. We do not have such things [activities][52].

Positive experiences could help first-year students to 'feel at home' and thus fit in with the university culture and establishing cultural capital that would help them to survive in their university studies (Thaver, 2006; Bourdieu, 1997b). However, negative experiences may lead to poor performance and to the student abandoning studies and leaving the university. Assessing student experiences is therefore important, as it helps to unravel how students from under-represented groups negotiate access with success in the Biological Sciences at the University of Pretoria.

Language is a vehicle used to transmit culture and cultural practices. The language policy of the University of Pretoria insists that teaching be done in Afrikaans and English. However, these are not home languages for many students, especially for black students. In this light, the language as medium of instruction does not only became an impediment to learning and teaching but also a barrier that precluded these students from pedagogical engagement. The situation was aggravated by the lecturers' inconsistency in applying the language policy. The lecturers code-switched between Afrikaans and English; i.e. they might teach in English but gave examples in Afrikaans, or vice versa. They would "teach in English with class notes in Afrikaans

[51] Focus group interview 1, 31 August 2011. [Document 13:17 (84:89) Codes: Institutional culture]
[52] Focus group interview 2, 14 September 2011. [Document 14:20 (179:184) Codes: Institutional culture]

or teach in Afrikaans with class notes in English or teach in both English and Afrikaans at the same time" (CHE, 2010:116). The students pointed out that they were taught in English, but that the lecturers sometimes mixed the languages making it more difficult for them.

> We are taught in English, but some lecturers mix with Afrikaans and it becomes difficult. The Afrikaans group are taught in their mother tongue and get the questions in Afrikaans and if they don't understand they resort to English.[53]

Either way, black students were short-changed as some of them struggled with English. In this context, the language or medium of instruction at university level continued to serve as a barrier to epistemological access and thus limited widening participation in Biological Sciences of those from under-represented groups. The use of languages interchangeably not only affected international students but university personnel as well:

> I mean, if I am struggling about the usage Afrikaans, then what about the poor students? I think that there is an effort when it comes to some faculties where they actually try to help, for example, they lecture in some modules in English and then some modules are offered in Afrikaans, but students do suffer because of the language issue, especially the international students. When taught in English it's better, but they suffer even more when the lecture is in Afrikaans. University policy is that we are supposed to have lectures in dual medium, either in English or Afrikaans; however, not all the lecturers do that. So it's up to the lecturer to make sure that all students are accommodated. But in some modules, students can either go to the Afrikaans or English class, and students complain that students in the Afrikaans class get a better scope than those in the English class, but you will find that, I guess, in all institutions that use both English and Afrikaans.[54]

One of the key issues that emerged from the data analysis with regard to the first-year student experiences at the University of Pretoria and in Biological Sciences was

[53] Focus group interview 1, 31 August 2011. [Document 13: 29 (202:204) Codes: Student readiness]
[54] Policy-maker 4, 4 April 2011. [Document 12: 31 (353:373) Codes: Student readiness]

the issue of adapting to the 'white' culture. The students' experiences were closely linked to the institutional culture and to the values of the institution, but varied between the different groups. Both black and white females indicated that networking was their best experience. Some students perceived the university environment as harsh. White females, for instance, disliked sharing accommodation with strangers. Some of the students, however, welcomed their new independence.

5.5. Conclusion

This chapter gave detailed descriptions of the findings and their interpretations. It was found that participation could be enhanced with student recruitment conducted through the in–reach and out-reach programmes facilitated by both the CSC personnel and the first-year lecturers at UP. The University of Pretoria recruits students across the length and breadth of the country inculding in both urban and rural areas.

One of the emerging themes was student readiness. This plays a critical role in widening participation because inadequate preparation of students for university studies not only become a hindrance to WP at university level but also affects the mandate of the university. Furthermore, it has proved to be a costly exercise for the university. There is a need for the school system to better prepare the students for higher education by exposing them to a high level of cognitive activities and a better exposure to career guidance. One of the key issues that emerged was the alienation brought about by 'white' culture, compounded by the question of language.

CHAPTER 6

INTERPRETATION AND DISCUSSION

6.1. Introduction

This chapter begins with the critical analysis of the conceptual framework chosen for this study. It progresses with the provision of detailed interpretation and discussion of the research data. The interpretation and discussion of the research data also serve as an attempt to respond to the central research question of this study.

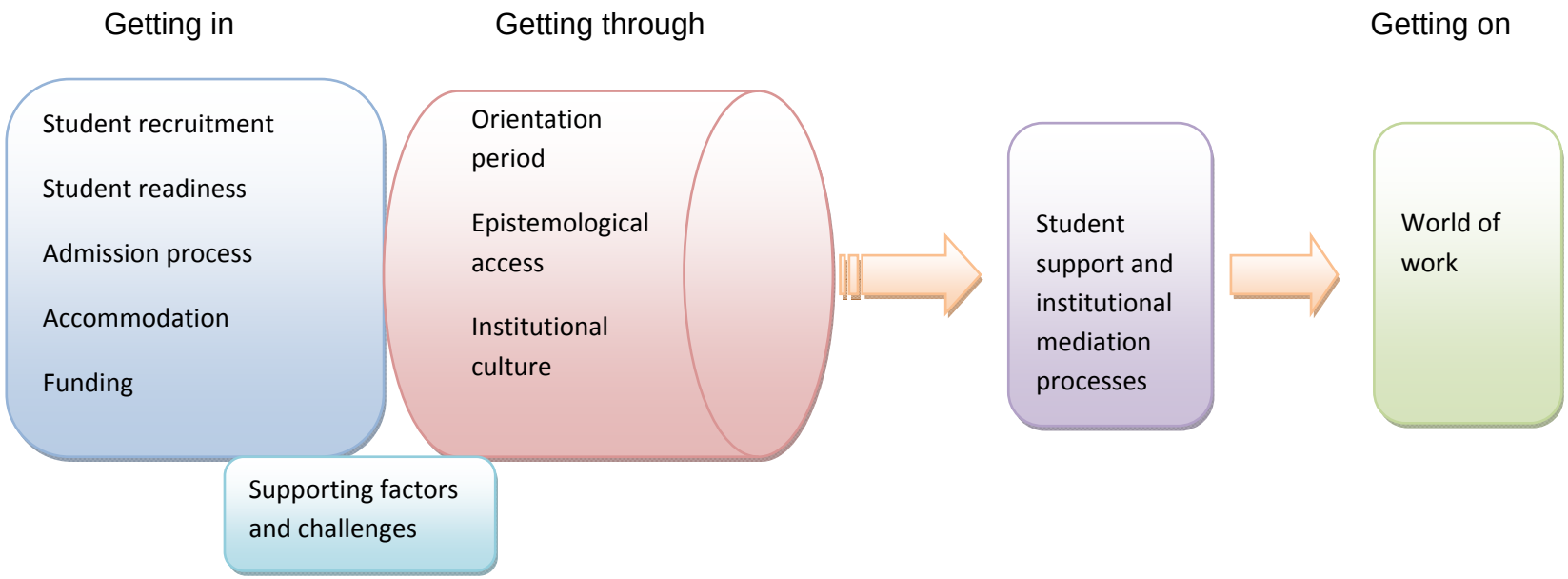
6.2. Reflection on the conceptual framework

In this study I used 'getting in' and 'getting through' as a conceptual framework (Osborne and Gallacher, 2004). The conceptual framework in this case was used mainly as an organising tool. This conceptual framework by its very nature is descriptive rather than analytical, however, by plotting the different forces along with the different categories that relates to access I was able to identify the challenges of access to Biological Sciences. Thus, even though the conceptual framework chosen was descriptive it has proven to be useful.

Figure 6.1 below delineates the process of 'getting in' and 'getting through'. The process of 'getting in' which is basically physical access, has several key factors such student recruitment, student readiness which encapsulates student preparation for higher education studies, admission process, student funding and student accommodation. 'Getting through' which includes epistemological access and cultural adjustment also highlights some critical factors such as orientation period and institutional support. Both processes in 'getting in' and 'getting through' have strong supporting factors and challenges that may enhance or impede access to Biological Sciences. However, once the institution has successfully implemented its student support or institutional mediation processes then access with success is imminent. Once access with success is attained then the students will either join the last stage which is 'getting on' that implies the successful student joins the world of work.

Figure 6.1

The process of ‘getting in’ and ‘getting through’



The academic puzzle that drove my research was: *What are the possibilities and limitations of widening access to under-represented groups in the Biological Sciences at the University of Pretoria?* In order to unravel and develop a deeper understanding of this puzzle, I used the University of Pretoria as a case study. To map out the investigation route, I used the processes of access, namely 'getting in' and 'getting through' (Osborne and Gallacher, 2004).

Armed to the apex with this conceptual framework, I then ardently embarked on an investigative journey. I purposefully chose to investigate the University of Pretoria's Bachelor of Science in Biological Sciences, which is located within the faculty of Natural and Agricultural Sciences.

6.3. Successes and challenges related to 'getting in'

'Getting in' is underpinned by various initiatives at the University of Pretoria, such as the in-and-outreach programmes, open days and exhibitions. These programmes forge strong relationships between feeder schools and the university. Furthermore, the university also recruits students from rural and township areas using both the client service centre (CSC) and some of the first-year lecturers in Biological Sciences. While the university has a strong recruitment drive and manages to reach rural and township areas, a high percentage of those enrolled in Biological Sciences are still white students from urban areas. Where students live and where they attend school has a great impact on their access to higher education studies. The data also underscore this point, as more that 80% of white students reside and have attended secondary schools in urban areas, whilst less than 30% of blacks come from an urban area. This emphasizes the urban-rural divide in Biological Sciences, and the under-representation of blacks from rural and township areas in this programme. It raises the question as to what extent under-represented students are able to gain access to these programmes.

While some progress is being made through the in-and-outreach programmes and recruitment, challenges still beset widening participation at the University of Pretoria. Firstly, the university faces a serious challenge with regards to students' accommodation. The residences are not sufficient to accommodate all the students

and this presents a challenge, especially for students from under-represented communities and those who come from rural areas. The situation is exacerbated by transport problems, since students who are not in residences have to find means of going home, as well as of attending classes and other extramural activities. The situation is especially dire when they have to attend late classes, since issues of security outside the university campus come into play.

Secondly, inadequate preparation of learners for university studies has the potential to hamper widening participation in Biological Sciences. The data point to a high level of under-preparedness for higher education studies which is a manifestation of the poor schooling system. Inadequate preparation for Biological Sciences is often demonstrated by students' inability to conduct practical sessions in the science laboratory. They are able to give answers to questions which relate to the practical session, but cannot conduct experiments to corroborate their responses.

The problem of student un-readiness is also fuelled by inadequate career guidance and counselling at school level. Bitzer (2010: 305) argues that the "futures of students have been long decided before the point of transition to higher education where universities have most influence." This resonates with the South African secondary schooling context, as learners need to select appropriate high school subjects upon completion of Grade 9. Some learners, particularly those from rural and township areas, are not given sufficient guidance regarding which subject mix and grades are needed to qualify them for Biological Sciences. Furthermore, these learners often fail to apply in time and instead 'walk-in' into the university and register for Biological Sciences simply because of its availability.

Nonetheless, there are students who give positive reasons for registering for Biological Sciences. Some register it because of a love of science, while others choose it because they want to bridge later to another programme such as medicine.

The third challenge relating to student readiness is that of insufficient information, either as a result of inadequate preliminary research by the students themselves or because they are given insufficient information about their career choices. The First Year Experience Survey report (2011:7) confirms the data and indicates that "30% of students are not registered for their first choice programme." This could lead to discontinuation of their studies and dropping out of the university.

Inadequate learner preparation for university study is also exacerbated by the high expectations created through grade inflation at Grade 12 level of the school system. On the basis of their inflated marks, the learners believe they are ready for higher education. According to Govender and Moodley (2012:5), “grade inflation is normally associated with falling standards, but can also be explained by any number of factors, such a change in curriculum and improvements in the manner of examining”. In the South African context, this phenomenon could be explained in terms of changes in curriculum. The shift from the old curriculum to the Outcome Based Curriculum (OBE), phased in from the lower grade in 1998, was later extended to the Further Education and Training Band of schooling, culminating in the first cohort of learners exiting Grade 12 in 2008 after twelve years of schooling and being awarded a National Senior Certificate (NSC).

A further finding, both gleaned from the literature and confirmed by the data, is that of the structural break. This is a result of the introduction of a new system which brings about a complete shift from the way things were before (Schöer et al., 2010). The shift from senior certificate and the introduction of NSC brought about the inflation of the Grade 12 marks, making these marks unreliable and leading to inefficient decision-making in student admissions (Marnewick, 2012). It is clear from the literature review that there is no correlation between first-year university performance in Information Technology (IT) and Grade 12 NSC marks in mathematics and English (Marnewick, 2012). However, there was a correlation between the National Benchmark Test’s (NBT) quantitative literacy (QL) scores and the first-year students’ performance in IT. Thus, for universities to select and place prospective students appropriately, additional information is required. This could be obtained through additional measuring tools such as the NBT, especially for the low performance scores (Nel and Kistner, 2009). To widen participation, the University of Pretoria uses ‘sociotechnic tools’ such as NBT. Marnewick (2012) argues that NBT has some advantages, despite the NBT results suggesting that students are not adequately prepared for university studies. It should be noted that the NSC as an exit school qualification was issued for the first time in 2008 and so has only been in place for three years; these challenges could therefore be referred to as teething problems. Furthermore, while there is high dropout rate in the first year of study, this could be attributed not only to the challenges inherent in the transition between

secondary school and higher education but also to the inadequate preparation for higher education (Marnewick, 2012; Schöer et al., 2010; Letseka and Maile, 2008).

The data suggest that NBT is viewed differently by students from poor backgrounds, as they have to pay to write the test and travel to the venues where the test is taken. This could have a negative impact on widening participation, because these learners may not have funds either to pay for the test or to travel to the venue, and thus may end up not taking the test. In this sense, the NBT could be viewed as an exclusionary tool, perpetuating access to Biological Sciences primarily for people of high socioeconomic status.

Fourthly, the policy-makers pointed out that access policy (which is also interpreted as admission process by policy-makers) at UP is designed to achieve diversity. This is done by maintaining a 40% split between blacks and whites. This split in percentages indicates the tacit procedure of allocating places according to race. This is deleterious, as it disregards the demographic of the country and further implies that enrolment places are reserved for people of certain races, despite them being in a minority. Thus, in a way, this practice perpetuates the notion of access as inherited merit (Goastellec, 2010).

The literature review in this study revealed that the notion of access as inherited merit was prevalent during the nascent stages of higher education in UK and US, and seems to have persisted in certain countries, including in South Africa even after democracy. The dawn of democracy in South Africa opened the way for social justice, equity and the redress of the inequalities of the past (DoE, 1997, 2001a). This placed access firmly in the social justice realm, with a need to craft policies that addressed this national imperative. Policy should appeal to the moral accountability and transparency of democratic practices, including in education and in pursuit of social goals and ideals. Equality of rights is crucial to the development and implementation of any policy.

The vision of the University of Pretoria states that: “The University of Pretoria strives to be a university with an inclusive and enabling, value-driven organizational culture that provides an intellectual home for the rich diversity of South African academic talent,” and its mission points out that: “... the University of Pretoria wants to be locally relevant through its promotion of equity, access, equal opportunities, redress,

transformation and diversity."[55] While these statements articulate the intention of the university regarding equity; redress and transformation, they are not clearly reflected at operational level.

The data confirmed this assertion, as the study found that the access policy at University of Pretoria is implemented using a bottom-up approach. That is to say, it is developed and implemented at faculty level, approved at senate level, and ratified at council level. The data further show that UP does not have an access policy in the form of a strategic high-level document, but instead has a strong set of practices and procedures, refined over the years, which are implemented at faculty level. This practice exposes University of Pretoria to different interpretations of access policy at different levels within the university. For instance, middle-level managers interpret it as admission regulations and procedures to implement the criteria agreed upon, while those at top management level have a different view and perceive it in terms of admission criteria. This practice can run counter to the positive intentions of access, namely addressing the demand for higher education and wider participation, especially in science and technology.

Further, the study highlights that the University of Pretoria vacillates between its commitment to widening participation and providing support to students, whether academic, financial or psychosocial, and its role as a top academic research institution.

Funding comes in the fifth place. It plays a critical role in access to higher education in general and to widening participation in particular. Each application of a potential student needs to be accompanied by a certain amount of money, called an application fee. This can be a factor in participation in Biological Sciences because without it the application may be delayed, leading to all sorts of complications, including the student not gaining access to his or her first-choice programme.

The study revealed that student funding poses a serious threat to students from under-represented groups, particularly in BS. Both the literature and the data indicate that, while University of Pretoria's top management is satisfied with the NSFAS funding model, student funding is inadequate to cater for needy students,

[55] http://web.up.ac.za

that is to say, it covers only a certain portion, such as tuition fees, but not residence fees (DHET, 2010; Wangenge-Ouma, 2010).

6.4. Successes and challenges related to 'getting through'

Once students have finally gained admittance to the Biological Sciences, they then need to 'get through' their university studies. To mediate the chasm between school and university studies, as well as to widen participation, UP supports its students academically and financially, as well as in other ways. Student support is essential because, as Marnewick (2012) points out, the universities cannot rely on school results only, but also need to investigate the socioeconomic backgrounds of their students in order to determine the kind of support that is required.

Thus 'getting through' includes the support that the university offers students so that they can succeed in their studies.

The first key step in the support that the university offers its students is a two-week orientation period. This is used for different purposes by the university, such as administration and competency testing, as well as introductory lessons. The students, however, seem to use the orientation period to achieve different things and more personal goals, such as networking. So while this session did not enjoy a lot of popularity among the students, they used it to create the new networks that are so crucial for survival in university studies. It seems that students who were in residences were able to benefit more from the two weeks, as compared to those who had to commute between the university and their homes and thus could not attend some of the activities.

The second critical support that the university offers its students is academic support, anchored in strong mentoring and tutoring programmes. These play a critical role in widening participation in Biological Sciences, as they assist students to 'achieve with success' in their studies. The mentorship and tutoring programmes also narrow the chasm between school and first-year university experience. Despite some negative comments about the poor facilitation skills of some of the tutors, the students were mostly satisfied with this service. However, this did not prevent many of them from failing their first semester exams.

Poor academic performance is fuelled by the overwhelming workload that the students in Biological Sciences have to deal with. It can also be attributed to the epistemological access, that is, in terms of how curriculum is mediated in the Biological Sciences lecture rooms. This suggests that, in order for the university to achieve widening participation and help students to succeed in their studies, which in turn would increase throughput rates, the students in Biological Sciences need to manage their time more efficiently. Further, the university need to deal with the question of how curriculum is mediated.

The third support mechanism offered by the university is the communication tool called 'click–up'. This aims at ease of communication between lecturers and students. However, its good intentions may be limited in the case of students from rural and township areas who do not stay in campus residences, do not have access to computers or the internet at home, and can only access these while at university.

In the fourth place, the university offers foundation programmes as a way of widening participation, since these programmes allow students to choose the slow progress route, completing a three-year programme in four years. This is achieved by spreading the study courses over a longer period, thus reducing the work load and pressure on the student and increasing his or her chance of completing degree studies, albeit over a prolonged period. The data showed that the majority of students in the Biological Sciences are whites from urban areas. Black students from townships or rural areas are likely to be admitted through alternative admission routes using admission tests, and are placed in foundation courses because their school marks may not be good enough to allow them to be admitted directly into degree studies. DoE (2008:64) cautions that despite the good intentions of the foundation courses they are perceived as 'dumping ground' since they cater mainly for black students. The foundation year seems to fail in shaking off its founding philosophy which links it with the apartheid education. Foundation year was proposed in late the 1930s by Malherbe's (1977) and his proposal then was that foundation year is necessary for black students in order to supplement the poor education they received. This still holds true almost two decades after democracy as majority of blacks are located in rural areas and are from low socioeconomic status thus receive poor schooling.

In the fifth place is parental support, which is critical in education in general and in widening participation in particular. Those parents who take a keen interest in their children's education will not only provide a conducive milieu but will also endeavour to give them the necessary material support, such as computers and the internet, therefore, providing cultural capital to these students. The educational level of these parents can enhance this support, as those who have some form of higher education can be used as a reference point by their children. This is especially important for first-generation university entrants. The lack of such support can reduce the students' chances of success. Thus the data show that parents have a valuable role to play in the studies of their children. One of the policy- makers pointed out that "any kind of support that parents offer to their children is reflected in their performance at university, therefore parental support is very critical." One of the first-year students echoed this, saying that "my parents are doing so much to help me settle in the university, they check from time to time as to how I am doing and this kind of support is important, especially when things are tough."

The university offers another important kind of support to students, one which encapsulates the psychological and social services. These services play a vital role in students' success, despite not being part of the academic structure. Psychosocial support is especially critical, as the students cannot focus on their studies if they have personal issues which bother them. However, as one of the policy- makers pointed out, the "university is not a welfare society; therefore the university cannot afford to address the social ills of the society." The psychosocial services offered by the university, though not popular among the students, nevertheless have the potential to assist them in handling personal issues, thus freeing them to focus better on their studies.

The literature review and data point out that institutional culture plays a significant role in students' negotiation of access with success. This phenomenon has been experienced before as a survey conducted in 1936 - 1938 in whites only and male dominated universities in South Africa also pointed out the dissatisfaction about institutional culture and the negative impact it has on the academic performance of the first year students of that period (Malherbe, 1977). The data indicate that there are still pertinent issues relating to institutional culture that need to be adequately addressed in order to widen participation of students from under-represented groups

in Biological Sciences. The cultural shock experienced by students, particularly in residences, may have a negative impact on widening participation. Nonetheless, the data indicate that, in order to succeed with their studies, the students need to 'fit-in' or adapt to the harsh institutional culture, i.e. students require cultural adjustments. One way to become part of this culture is to participate in extramural and cultural activities. However, many students do not participate in these activities mainly owing to lack of time and work overload.

This poses a serious challenge to those students who do not take part in these activities because in order for a university to develop critical thinkers and lifelong learners, it is imperative to develop and facilitate effective learning experiences outside the normal lecture room. These extracurricular activities help in enhancing the transmission of subliminal messages about institutional culture (Mandew, 2003).

Language is one of the key tenets of culture. The language issue compounds the often daunting challenges which underpin access and widening participation in Biological Sciences. The majority of black South Africans take English as a second or third language. However, Afrikaans and English are the languages of learning and teaching at the University of Pretoria. The mastery of either Afrikaans or English by students is therefore imperative for success in higher education studies at this university. The lack of command of these languages is a barrier to access with success (Bradbury and Miller, 2011; CHE, 2010; Cross and Carpentier, 2009; DoE, 2008b). The language issue at University of Pretoria is further compounded by the lecturers who not only code switch between English and Afrikaans during their lectures but also teach in either Afrikaans and give examples in English or vice versa (Jansen et al., 2010).

The challenge regarding the medium of instruction is not new at the University of Pretoria. Malherbe (1977) and Mandew (2003) pointed this issue out when it was discovered in the late 1930s. However, during those years the Afrikaans speaking students who attended universities using English as medium of communication and instruction were not pleased with that medium of instruction. Malherbe (1977) also pointed out the inconsistency of the usage of the dual-medium of instruction. To this end, the same challenges are faced by blacks at the University of Pretoria and this demonstrates the slow transformation process within the university. Furthermore, the

work of Malherbe (1977) has led to policy intervention by the apartheid government that advocated for exclusiveness in terms of language. This kind of solution is not appropriate as it is against the democratic principles which advocates for inclusiveness. Therefore, policy interventions by policy-makers at university and elsewhere should be based on the democratic principles of inclusiveness.

The other factor that could be attributed to the slow transformation of the institution is the fact that out of six policy-makers interviewed the stark reality was that majority (5) were white and only one black albeit that gender in this case was biased towards females. This is not startling as Nkomo (2012:34) points out that "although increasing equity for students is evident, the demographic picture of full-time instruction and research is the opposite of student enrolment; ... The total black representation stood at 39% in 2007, as opposed to 59% for whites. At this level, the growth rate of black staff is insubstantial..." This explains the fewer numbers of blacks in the middle management level at University of Pretoria. This situation is also aptly delineated by Jansen (2009:2) "... as one of the only a handful of senior black administrators at what was then South Africa's largest residential university".

Jansen et al. (2010:110) note "the persistent negative expectations of the students' chances of success on the part of university lecturers" as one of the key factors that may lead to students being unsuccessful in their studies. The data show that the first-year lecturers in Biological Sciences expect their students not to succeed in some parts of the curriculum, such as being unable to conduct science experiments during practical sessions.

6.5. Conclusion

In conclusion, this study confirms some of the findings of the research conducted by Jansen et al. (2010) for the Council on Higher Education (CHE) report. In the first place, there is the challenge regarding the primacy of the language of learning and teaching at higher education institution level. The complexity of the dual medium of instruction and its impact on how students negotiate access with success is highlighted. What is reflected in the language policy and what is practiced in the lecture rooms are poles apart. This is more apparent for students from under-

represented groups, including those from township or rural areas. In this sense, language as a medium of instruction has a profound impact on widening participation.

In the second place, there is the influence of residence culture and its impact on students' social integration and on their success or failure in their studies. The cultural shock experienced by black students in residences demonstrates the influence of culture. In order to succeed, they have to adapt to this unfamiliar culture.

In the third place is the chasm between school and university. The huge challenges in the secondary school system exacerbate this problem. The inadequate preparation of students for university studies is highlighted.

In this study, I argue that the main challenge to widening participation in Biological Sciences is to secure a pool of secondary school learners from under-represented groups, including those from townships and rural areas, who are adequately prepared for the rigours of higher education studies. To this end, it is imperative that higher education institutions put in place additional measures to select and place such students appropriately, since the current school system produces learners who are under-prepared for higher education (Boughey, 2010). It should be noted that the question of under-prepared first year students is not a new phenomenon to South African higher education as it has been indicated elsewhere in this study. The work of Malherbe (1977) also points to similar deficiencies albeit that the context, period, gender and race of the first year students studied are different.

I therefore conclude that the school system supplies insufficient numbers of students from under-represented groups and township and rural areas who have the potential to pursue Biological Sciences, since those from the pool of available students are not exposed to high-level cognitive activities which could better prepare them for higher education. The study revealed the entrenched social inequalities that are exemplified by the urban-rural divide.

I further argue that, while significant strides have been made regarding physical and epistemological access in this university, there is still a low participation rate for black students especially from township and rural areas. Thus physical access is still difficult to attain, as demonstrated in the findings on 'getting in'. Furthermore, lack of

accommodation in residences not only impedes access to Biological Sciences but also denies students access to important facilities, such as computers and internet, through which they could use important communication tools such as ‘click–up’. Participation in extramural and extracurricular activities such as tutoring is also curtailed, especially if these take place in the evening, or if there are evening lectures which need to be attended. If students have to commute between university and their homes after attending evening lectures, issues of security also become a serious concern. Physical access and epistemological access are therefore in themselves not enough to widen participation. It is necessary to ensure that basic needs, such as a place to sleep, are met, combined with a subsistence allowance. The National Student Financial Aid Scheme (NSFAS) funding is not sufficient to cover all the costs incurred at the university, since it covers mainly tuition fees, with only limited cover for residences and transportation.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1. Introduction

This chapter gives the conclusion and recommendations that emerged from this study.

The study highlighted the challenges for students of 'getting in' to Biological Sciences and the challenges experienced by the institution, which could also be viewed as barriers to widening participation. One of these challenges is how policy is understood, interpreted and implemented. In the first place, Badat (2008) points out that most public higher education institutions in South Africa do not have an access policy. However, such institutions do have processes and procedures which they have refined over the years. In this sense, policy is understood to form an integral part of practice. The policy-makers interpret access policy as constituting their daily practice with regard to admission and placement of students in the various programmes. However, the absence of access policy leads to various interpretations of the access process which may in turn lead to inconsistency in the application of such processes. Rizvi and Lingard (2010:6) argue that "sometimes non-decision making is an expression of policy as are the actual decisions made. Significant manifestations of policy and power are often evident when things stay the same or when issues are not discussed or are deliberately suppressed. In this way, policy can be expressed in silences, either deliberate or unplanned."

The second challenge highlighted by this study is that of insufficient residences. The shortage of residences poses a serious threat to access and denies many students the opportunity to participate in various activities, including both extramural and extracurricular activities. This phenomenon is also pointed out by DHET (2011) that there are simply too many students who require housing than universities are able to accommodate. Thus demand for student housing surpass the supply.

Thirdly, the university struggles to maintain its priority as a research institution and to balance this with the huge responsibility or support that it carries towards widening participation. This vacillation between the two imperatives shifts the focus of the university.

Fourthly, the challenges related to 'getting in' Biological Sciences from the students' perspective were also highlighted. The inadequate preparation by the school system of students for university studies is manifested in the form of incorrect subject mix poor performance in the practical sessions, and general poor academic performance. Lack of funding contributes to late submission of applications, as well as to students 'walking-in' to self-apply when the academic year is about to start.

The findings on 'getting through' highlight the positive contributions, which act as enablers towards widening participation. The university offers various support programmes, such as academic support, anchored in strong tutoring and mentorship programmes. In addition, it provides financial assistance in the form of bursaries. This assistance is essential, since the National Student Financial Aid Scheme (NSFAS) does not offer enough funding to cover both tuition and residence fees. Psychosocial support, although unpopular, plays a critical role, as it addresses the personal problems of students, freeing them to focus on their studies. However, 'getting through' benefit mostly those students in residences since they have better opportunities to be supported through academic and psychosocial services offered by the university.

7.2. Recommendations

The aim of this study was to identify the perceived constraints of widening participation in Biological Sciences as well as to highlight the barriers that bedevil widening participation.

Here are a few issues for consideration:

i) It is vital to facilitate career guidance and counselling at school level, particularly at disadvantaged schools.

ii) The first-year students need to be accommodated in residences, as this will help them adjust to university life and its demands. It will also combat the challenges of residing out of campus, including problems of transport.

iii) It is vital to bridge the chasm that seems to exist between secondary schooling and first-year university studies. The data suggest that widening

participation could be achieved through better cooperation between schools and the university.

iv) Discretionary quotas, expressed in the form of 40% black and white students, may undermine transformation and the university's quest to achieve a diverse student population. Thus for example the number of white female students in the Biological Sciences remains high, despite whites being in a minority when the country's demographics are taken into account.

v) Financial assistance is the key for most black students to accessing university studies, particularly the Biological Sciences. The available funding should therefore be promoted, particularly the financial assistance which is made available so that application fees can be waived.

vi) The vision and mission of the university demonstrate its commitment to widening participation; however, access policy needs to be put in place and to be understood and implemented consistently with this vision throughout the university.

7.3. Concluding comment

This study has contributed to increasing the corpus of knowledge on widening participation in the Biological Sciences. It has illuminated the challenges which have arisen from the secondary school system and which have a negative impact on widening participation, with special reference to Biological Sciences. It demonstrates that, despite the efforts to widen participation, more still needs to be done to reach out to students from under-represented groups. This could play a significant role in the quest to increase the number of students who obtain science and technology degrees, such as a BSc in Biological Sciences. The study has further pointed out that more attention to basics needs such residences and funding need to be ramped up in order to assist deserving but needy students from under-represented groups who wish to pursue careers in the Biological Sciences.

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Appendix 1

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

OFFICE OF THE DEAN

Faculty of Natural and Agricultural Sciences

25th April 2010
Mr. Abbey M. Mathekga
Head: Higher Education Enrolment Programme
Higher Education South Africa
P.O. Box 3854
PRETORIA
0001

Dear Mr. Mathekga,

PHD STUDY ON BIOLOGICAL SCIENCES:

Thank you for your request to conduct research and collect data in the Faculty of Agricultural and Agricultural Sciences. As you have explained your research topic: "Towards widening access in Biological Sciences: A case study of the University of Pretoria" will involved the development of a model to widen access in science related programmes (with special reference to Biological Sciences) to persons from underrepresented groups. I see no reason in principle why you should not have access to the Departments in the Faculty to collect your data. This letter is thus a statement of this. The faculty will however have to see the final project proposal to gage how much time and involvement will be needed on the part of the departments. The faculty is fully supportive of such research but cannot unnecessarily burden departments and especially HODs with additional tasks requiring large amounts of time.

Yours sincerely,

Prof Brenda Wingfield
DEPUTY DEAN
RESEARCH AND POSTGRADUATE STUDIES

Appendix 2

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

P.O. Box 58653

Karen Park, 0118

Date: .....

Dear .....,

Request to participate in an interview

I am a doctoral candidate at the University of Pretoria in the Department of Education Management and Policy Studies under the supervision of Dr Chaya Herman and Prof Mokubung Nkomo. My research project is about widening access in Biological Sciences at the University of Pretoria. The purpose of my research is to understand the possibilities and limitations of widening access in science programmes. Whilst the success of this study will contribute towards the completion of my doctoral degree, it will contribute in increasing enrolment numbers in the science fields at undergraduate level in institutions of higher learning.

It will be appreciated if I could enlist your support for this research and if you would be willing to grant me an interview. Your participation is voluntary and with your permission the interview will be audio taped in order to get the most accurate and complete record.

In order to maintain anonymity and confidentiality, your name will not be mentioned in the research report. The recorded data will be analysed by myself and may also be viewed by my supervisors. Transcripts will be made available should you wish to receive them so that you could check if what you said has been accurately captured. You may request that the audio tape be switched off at any time and you may also refuse to answer any question during the interview.

With your permission, I would like to follow up this letter with a phone call to make appointment to meet with you at your convenient time. For any clarity in this regard, you may contact me at 012 481 2916 or abbey200@gmail.com or my supervisor at 012 420 5665 or chaya.herman@up.ac.za

Yours sincerely,

Abbey Mathekga

Appendix 3

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

P.O. Box 58653

Karen Park, 0118

Date: .....

Dear Participant,

Consent letter for participation in an interview

I would like to request your participation in my research project of widening access to underrepresented groups in Biological Sciences. This study is being conducted for a PhD degree at the University of Pretoria in the Department of Education Management and Policy Studies.

The purpose of my research is to understand the possibilities and limitations of widening access in science programmes. Whilst the success of this study will contribute towards the completion of my doctoral degree, it will contribute in increasing enrolment numbers in the science fields at undergraduate level in institutions of higher learning.

I would like you to participate in an interview that will last for about 45 – 60 minutes. The purpose of the interview is to gather opinions to help me understand how access policy is developed and implemented at the University of Pretoria.

With your permission an audiotape will be used to record the interview in order to get the most accurate and complete record. You have a right to withdraw from participating in the interview at any time and there will be no penalty. The recorded data will be analysed by myself and may be viewed by my supervisors (Dr Chaya Herman & Prof Mokubung Nkomo). The data will be kept safely and securely for prescribed length of time for reanalysis and thereafter it will be destroyed. Your name will not be mentioned in any interview or report; however, you may be identified by code or pseudonym.

Thanking you in anticipation.

Yours sincerely,

Abbey Mathekga

I voluntarily give permission to be included and participate in this research study.

I agree to be interviewed by the researcher.

I would like to receive the interview's transcript: yes/no

Name :_____

Signature : _____

Date : _____

Appendix 4

Interview schedule - policy- makers

The purpose of this interview is to solicit your views about access policy at your institution.

1) What does access to higher education mean to you?
2) Does your institution have access policy? If no, why not?
    a. If yes, how is access policy developed in your institution?
    b. What is your role in the development of access policy in your institution?
    c. Can you explain how access policy is implemented in your institution?
3) What does underrepresented group means to you? (What is your understanding of the concept underrepresentation?)
4) How does your institution promote the course (recruit for the course) from the underrepresented groups?
5) How does your institution's access policy make provision for students from underrepresented groups?
    a. Finance
    b. Academic
    c. Cultural /Social
6) How do you go about selecting students? (What is your selection process?)
7) What are the challenges that students have with regards to access into your institution?
8) What does your institution have in place to assist students to adjust to university life?
    a. Financial challenges
    b. Academic life
    c. Cultural/Social

Interview schedule - 1st year lecturers in BSc in Biological Sciences

The purpose of this interview is to solicit your views regarding access policy at your institution as well as your opinion on the curriculum that is offered in your programme.

1) Tell me about your experiences of teaching 1st year Biological Sciences students? How long have you been teaching 1st year students in BSc in Biological Sciences at UP?
2) What is the student profile of your class?
3) Do you have any group of students that you enjoy teaching the most? Why?

4) What kind of challenges are you faced with in teaching of the 1st years in BSc in Biological Sciences?
5) What are the challenges facing students from underrepresented groups in this programme?
6) Do you have any group of students that you enjoy teaching the most? Why?
7) What is your role in curriculum design of BSc in Biological Sciences?
8) How does the curriculum address the deficiency of under prepared learners?
9) What is the success rate of students from underrepresented groups in your specific module/course?
10) Do you have any interaction or contact with the students outside the lecture? Give examples? (Promoting the course).

Interview schedule - students

The purpose of this interview is to solicit your views regarding access policy at your institution.

1) How did you know about University of Pretoria?
2) How did you know about BSc in Biological Sciences?
3) Why did you choose to register for BSc Biological Sciences?
4) Was it difficult to *get in* into UP?
5) What was the process like?
6) To what extent do you feel '*at home'* or welcomed in UP? Why or why not? Give me examples (by the lecturer, administrator, management, fellow students, the residence, etc)
7) Is there anything that you don't like about UP? And why?
8) How do you manage academic demands of the university?
9) Do you receive any support? If yes, please explain?
10) Are you happy with your academic performance? If no, why not?
11) What can help you to complete your studies on time? What stands in your way?

Appendix 5

Questionnaire for 1st year students in BSc in Biological Sciences at University of Pretoria

Purpose of this questionnaire:

This questionnaire is an instrument for data collection for the research project about widening access in Biological Sciences at University of Pretoria. The **purpose** of this research is to understand the possibilities and limitations of widening access to students from underrepresented groups in science programmes.

Instructions:

1. Please complete this questionnaire, it will take approximately 20 – 30 minutes;
2. Your responses will be treated with utmost confidentiality, however, you can add your name and contact details at the end of the questionnaire if you are willing to participate in focus group interview;
3. Complete the questionnaire by ticking the appropriate response and writing responses where relevant.

A. Biographical data

1. What is your gender?

Male	
Female	

2. Which of the following best describe your racial or ethnic background?

African	
Coloured	
Indian	
White	
Other (please specify)	

3. How old are you?

17 - 19 years old	
20 - 24 years old	
25 – years and older	

4. What is your mother/guardian's highest qualification?

Did not complete schooling	
Grade 12	

Diploma	
Degree	
Post graduate qualification	
Doctoral degree	
Other (please specify)	

5. What is your father/guardian's highest qualification?

Did not complete schooling	
Grade 12	
Diploma	
Degree	
Post graduate qualification	
Doctoral degree	
Other (please specify)	

6. Which of the following best describe the area where you live?

Urban	
Township	
Rural	

7. Did you attend secondary school in your area?

Yes	
No	

8. If **no**, which of the following best describe the area where you attended secondary school?

Urban	
Township	
Rural	

B. Educational data

9. How did you know about University of Pretoria?

My teacher /school	
A friend	
A relative/family member	
Newspaper	
Internet	
Other: (please specify)	

10. Are you participating in any university activities other than your studies?

Yes	
No	

If **yes**, please mention the activity/ies that you participate in:

_____
_____
_____

_____

If **no**, please explain why you are not participating in any of such activities.

_____
_____
_____
_____
_____

_____

11. What is the best experience of your first year at university?

_____
_____
_____
_____
_____

12. What is the worst experience of your first year at university?

_____
_____
_____
_____
_____

13. Why did you choose BSc in Biological Sciences?

_____
_____
_____

_____
_____

14. How would you describe your experiences in BSc in Biological Sciences so far?

_____
_____
_____
_____

_____
_____

15. What kind of support do you get from the university? (e.g. finance, academic, cultural/social).

_____
_____
_____
_____

_____
_____

16. To what extent do you feel that you were prepared for university studies?

_____
_____
_____
_____
_____

17. What are your future plans?

_____
_____
_____
_____
_____

18. Would you like to participate in focus groups interview? If **yes**, please write your name and contact details in the space provided.

Name : _____

Email address : _____

Mobile number : _____

Thank you for your time and assistance.