IMPLEMENTATION OF THE MARKS ADMINISRATION SYSTEM (MAS) AT A WESTERN CAPE UNIVERSITY

By

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DECLARATION

I, Phuthuma Macakati, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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ABSTRACT

This study investigated the implementation of the Marks Administration System, (MAS), within the context of technology and innovation in South African universities following the growth in student numbers. Using a purely descriptive approach, it focused on the implementation of the technology of mark administration (MAS) at the University of the Western Cape, Cape Town. Primary sources, which include original documents and first-hand information served as the method of data collection to explore some of the challenges associated with the process of technology implementation during and post-implementation phases. The study found that, a decade after implementation of MAS at the university, there still exist challenges such resistance and lack of compliance, which are often compounded by technical problems. The former was attributable to the lack of user involvement and wide consultations about the process during the introduction and implementation phases.

***Key words**: MAS, Implementation, factors, SASI, Administration, higher education, SEMS*

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ACRONYMS

CPUT	-	Cape Peninsula University of Technology
DHE	-	Department of Higher Education
E learning	-	learning conducted via electronic media, typically on the Internet.
Ed	-	Education
GDE	-	Gauteng Department of Education
ICS	-	Information Communication System
IOP	-	Institutional Operational Plan
IT	-	Information Technology
JITTA	-	Journal of Information Technology Theory and Application
MAS	-	Marks Administration System
NGO	-	Non- Governmental Organisation
SASI	-	Student Administration Systems Integration
SEMS	-	Student Enrolment Management System
UWC	-	University of the Western Cape

CHAPTER 1

1.1 INTRODUCTION

In the recent past, the universities in the main and South Africa in particular had undergone a visible transformation and change. These changes have affected many aspects of the operations, notable, the areas of teaching and the administration. These changes are notable in large part in the higher education sector in South Africa the focal point of the study. The main force that drove this change was the wider transformation in the administration of the country following the dislodge of a White minority government by a Black majority led government. The change was to affect the higher education sector which for centuries under the former rule saw the skewed allocation of resources to Black universities as well as limited access of the university sector, especially the previously classified as White universities. This country-wide transformation was implemented by an inclusive democratic led government of 1994.

The second change that have been witnessed in the university sector is that of process engineering through innovative technology implementation in areas of administration, learning and teaching. The university of the Western Cape, the study site and the focus my study. The political changes meant to redress the inequities of the past saw the widened access in the admission of Blacks (Indians, Coloureds and Africans) in universities previously designated and classifies as being only for Whites in large part, although other previously classified Black universities also saw a surge. The widened access meant that the university sector would be stretched beyond the capacity in terms of resources to accommodate the big enrolment figures. This then meant that the university sector had to devise innovative ways and strategies to address such a challenge. This expansion in numbers saw many universities turning into technology implementation as a form of management of the situation to effectively and efficiently run the administration of the universities. Obviously, many universities would have to strengthen their capacity while many struggled to deal with large enrolment figures, UWC had to develop and strengthen its own systems. In response to the challenge of access and for the effective management of the enrolments many universities including the University of the Western Cape introduced various technology software. The Marks Administration System was a special project among many introduced by the University of the Western Cape. Its aim was to manage and administer marks across the university and in the departments in particular. The

system was introduced in 2006 and fully adopted in 2007 which saw its institunalisation across all units.

The political redress of the university sector was also regulated and affirmed through the process of university mergers aimed at ensuring an equal allocation of resources. (NHDE:2001). The transformation of the university sector was also an ideology which saw that the transforming university sector requires the effective management of the academic work through effective administrative systems, a world phenomenon. This management is to take into consideration the role of governments into consideration as the major stakeholders. This phenomenon has been termed "new managerialism". (Oloyede:2002). The Marks Administration System is a system that administers the records of the student's progress throughout the life of a student in the university.

The demand for access and the growth in student numbers exacerbated by a need to increase the student throughput rate led in universities seeking other means to deal with the challenge. Technology took centre stage as the innovative strategy to managing the situation. This meant that many areas of operation had to be transformed by means of new technology implementation. This would not just deal with the enhancement of the processes but to directly affect the access to information by those students who are disadvantaged in terms of their background and resources. ICS is amongst prominent technologies in the university sector and other widely available technologies in different areas of the administration, research and teaching with the administration being the focal point of the study. The Marks Administration System's implementation was aimed at the effective and efficient administration as well as the management of the student records throughout the life cycle of the student during the enrolment period and beyond. Also to track the progress while also aimed at playing the role of an 'early warning system' and tracking, this becomes evident when queries arose regarding students which at times may lead to litigation but the system would be able to provide well informed responses to aid the management. The Marks Administration System is widely available in most South African universities and in various versions. The Marks Administration System is designed around modules taking into consideration the safety of student records such as programs, enrolment, fees and other important data. Various systems apart from the MAS were built and they work together in an interconnected manner tracking and keeping the student information safely.

These systems are considered user friendly thus allowing process of customisation to take place. However, some universities, especially those with lack of resources may find these systems difficult to implement and use other means resulting in undesirable outcomes that may exacerbate the situation.

1.2 RESEARCH PROBLEM

The implementation of the current system was a means to respond to the high number of enrolment and lack of access which is widely known and a bone of contention especially in South Africa. The problem of access which is a burning issue in the university sector in South Africa which has played itself out in recent years 2015,2016 and 2017 in the form of demonstrations by the students and other interested parties to highlight the problem and calling their cause # Fees Must Fall. This was witnessed almost all over the country in some cases led to the closure of the universities for a period of time.

It is within this context that the university of Western Cape and other others redesigned their systems to widen access while attempting to run the efficient systems to administer the student's information. The Marks Administration System design took the centre stage and is the focal point of the study. The main aim was to establish the problems experienced during and after the process of implementation of the system of marks administration in the main and other related systems implemented.

1.3 BACKGROUND TO THE RESEARCH PROBLEM

The stages of implementation of any project undertaken by various organisations be it in various fields of studies is widely regarded as critical, especially because any project only succeeds if all processes and steps are properly followed or otherwise is doomed to fail. Other factor considered in the implementation process as determinants for success consist of the strength of the resources, internal and externa factors, users, staff involvement, management, infrastructure, available technology, training needs and the level of resistance to the implementation. All these consist of the internal factors while the political climate and the support of government are external factors outside the organisation.

The site of the study and a case study to establish the challenges associated with technology which in itself implemented its new technologies for the strengthening of the administration including MAS. Obviously, the university of the Western Cape had its own experiences in this regard. The implementation of the Marks Administration System at UWC took place in 2006 with a full and a university wide institutionalisation in 2007. The implementation of such a system and others was considered a milestone and a significant achievement especially because it took shape within the context of efficient administration of student affairs. The system has been in existence for over ten years and is used widely across the university. However, the audit report of 2012-2013 on the system noted and criticised what was often compromised roles. While the resistance does not signify the failure in the system as such, the technical and the training units often cautioned against this exercise suggesting it would defeat the system was built and compromise the systems by way of discredit.

The units called upon the staff to embrace the system or otherwise to desist from the unlawful acts against the system. This problem would help to establish if how widespread was the problem of resistance and its impact on the system. This investigation would allow the study to provide recommendations and suggest the necessary interventions to avert a recurrence and to strengthen the system by means of improvements.

1.4 RESEARCH QUESTION

The challenge of access in South African Universities and in the Western Cape university coupled with an increased number of enrolments following a relative access in the affairs of the country almost in all spheres of life due to the demise of apartheid separate development excluding majority of Black population by the White minority rule. The government of National Unity of 1994 with its inclusive agenda affected the operations of universities as well since they were not prepared for the changes. To meet the challenge most universities resorted to the systems implementation as an innovative way to cope.

1.5 AIM AND OBJECTIVES

1.5.1 Main Aim

To what extent do the factors identified affected the implementation of MAS.

1.5.2 Objectives

- The study aimed to establish the problems encountered during and post implementation of the Marks Administration System at the University of the Western Cape.
- To establish whether the systems design was user-friendly.

1.6 SUMMARY

The study undertaken served as a baseline to the future studies regarding the implementations. Given the upsurge in the implementation of technology projects at universities following the increase in enrolment numbers to gain access. The increase was as a result of the transformation that the country had undergone following the demise of apartheid which saw an opening up of access by the previously disadvantaged into the traditional universities previously classified as being for Whites. The main aim of the study was to establish the challenges that the implementation of technological project in the university sector present.

1.7 CHAPTER OUTLINE

Chapter 1. This chapter provided an introduction and contextual background to the study which mainly adopted a descriptive approach while it attempts to investigate the factors that affect the technology implementation process. It uses the University of the Western Cape as a case study area while focusing on the broader university sector in South Africa while drawing experiences from the other parts of the continent and the world.

Chapter 2. This chapter discusses and reviews the available literature on the subject matter. It also reflects on various theories while providing a narrative viewpoint deriving from the experiences of those who participated in the implementation.

Chapter 3. Research Design the presentation of the research design and methodology used in the study. The study mainly adopts a descriptive approach in understanding the challenges associated with the implementation of technology in the university sector while dealing with technology innovation in general.

Chapter 4. The study site which is the University of the Western Cape and delves into the historical experiences of the University, inform its current form and existence. It highlights the origins and how the University came to be, the struggles for its existence and the survival.

Chapter 5. Analysis-Findings and Interpretation, recommendations and conclusion: This presents a broad summary of the finding drawn from the interviews from Chapter 3 while it provides an analysis of the findings. Given that the study is the first of its kind which seek to look into MAS implementation, it also provides recommendations informed by the gaps that were found. It also opens up the space, as a baseline study for further research in the area to expand the discourse of MAS implementation.

CHAPTER 2

LITERATURE REVIEW: TECHNOLOGY IMPLEMENTATION IN THE UNIVERSITY SECTOR

2.1 INTRODUCTION

The previous chapter provided a background and established a framework that set out the objectives of the research. Key to the research is the review of literature on the subject matter and mainly to the research question; "To what extent the factors identified affected the implementation of Mark Administration System". In answering the key question, an analysis of the system's performance through the indicators such as efficiency, reliability, credibility and usage will be explored. The literature on technology implementation is voluminous. This study, which is descriptive in approach confines itself to the technology of marks administration within the higher education sector. The literature that is reviewed is thus those pertinent to the technology of marks administration and also relevant literature on technology implementation generally. As much as the study focuses mainly on MAS implementation at the University of the Western Cape, documents on MAS at the university will be reviewed and discussed. However, there is almost no study that has been conducted on the system itself and this, limits the amount of empirical literature reviewed.

The past fifteen years have seen a global transformation in the higher education towards what researchers have described as "new managerialism" (0loyede, 2012). This saw a shift from a largely process driven sector into technology innovation. The "Information Communication Technology" and the E-Learning were among the first projects to transform the sector, and to this day, these technologies are almost in all institutions. As such, much of the literature on technology in the higher education sector is largely attributable to this software. Various administration functional areas were not to be outdone, and a major overhaul in the processes saw a transforming administration. Much of the literature has focused on the challenges in the implementation process, both in the developed and the developing world.

The thesis focuses on implementation of technology projects, mainly in South Africa, drawing experiences from other similar study areas within Africa and the Western countries. The study explores factors for consideration in the implementation of technology projects in higher education as a means to address institutional efficiency. Given an increasing demand on institutions to account and the need for the accommodation of the challenges of access through

technology innovations. It is also believed that the investment in technology by higher education institutions serves as an early warning mechanism in the effective management of student affairs. They serve as storage to important information concerning the life cycle of student in the institution, in a credible and efficient manner and thus protecting institutions against any possible litigation. While the study explores the implementation and the associated factors, it also touches on contextual issues in understanding the challenges, especially the South African context. Some are historic, such as the "access" while on the other hand universities through these technologies seek to strengthen their position on the "Internationalisation" front ensuring that the world population connects. For the universities, the connection is critical for collaborative efforts. It then becomes critical to set the tone of the research by defining the key concepts:

Various scholars writing on "implementation" consider it as "when a decision is taken and innovation is used", (Weigner, et al 2009). The Marks Administration System can be defined as an integrated and a standardised system built to manage and administer marks across the university and mainly in the department, this was the aim of building such a system (IOP; 2004: p 123). Some of the prominent systems widely used and have been implemented largely in higher education sector are the "Information Communication Systems "(ICT) and E-Learning systems. Both feature prominently in South African and some African universities, and in other parts of the world. And as such, their prevalence will often serve as a reference point in understanding the implementation in universities. ICT is said to be a diverse set of technological tools and resources used to communicate and create, disseminate, store and manage information (Blurton,1999:4).

2.2 HISTORIC IMPERATIVES AND INTERNALISATION IN SOUTH AFRICAN HIGHER EDUCATION

The higher education find itself with a challenge to confront issues of access on one hand and to position South African higher education as international entities worthy of recognition on the global stage on the other but critically, as leading in African continent in many respects on one hand. The historic context of South Africa necessitated transformation in all its facets. This is the area that has been widely debated on. Caroline Suransky and J.C.van de Merwe in their article on "Transcending apartheid in higher education: Transforming and institutional culture", argued, pointed to the deep inequalities which still persists even in the higher education (DoE, 2001: 87) in its bid to restructure the resource skewed higher education in South Africa through

the mechanisms of mergers which resulted in an expanding university sector numerically. This created a dilemma for some on how to respond to the expansion while maintaining the standing of the institution internationally. Issues of "access" required key considerations then as they remain the issue to this day as evidenced through the country-wide mass student movements popularised as #FeesMustFall. "Access" is an ambiguous term speaking to various demands and expectations. Although the response will obviously vary from institution to another, the most prominent and notable response was the investment in technology. This to enable an increased access to learning, readings, interactions and other critical aspects to the life of students while at the institution. Readings could easily be accessed via the online platform made accessible through the university laboratories and of course some via their mobiles instead of buying books which some could not afford.

Meanwhile, many aspects of the administration saw a drastic transformation in its processes through re-engineering. This resulted in a massive roll out of software acquisition and project implementation by many institutions in South Africa. UWC is no exception, the legacy and MAS systems are just amongst some of the implemented systems to aid the institution in the efficient management of its administrative affairs, especially those pertaining to student's affairs. And in great part to provide the institutional support and to address the matters related to the access of information. However, generally, the implementation is always fraught with challenges associated with the process, this, seems to be a phenomenon across various fields of study.

2.3 IMPLEMENTATION

Vaughan (2001) offers an insight into the implementation process and asserts that systems implementation efforts offers extraordinary challenges to information technology professionals and the organisation impacted by the implementation. While a successful implementation can reap vast rewards in organisational strength and efficiencies, a failure can drain the organization of people, funds and vitality. The author further asserts that implementation process is said to be challenging a process. (Vaughan, 2001; Salmon, 2004; Blinco, et al., 2004; Tarus 2011; NESC, 2007).

Various arguments have been advanced regarding the implementation process from various scholars. Kandiri and Muganda (2013) cautioned against the misunderstanding of implementation as only involving two stages, that of the concept by the management to adopt

and support the innovation and the 1st stage of newly implemented system but rather must look into the process of implementation as encompassing all stages including post implementation as studied by Klein et al (2001). The research reviews look into various aspects that could be impacted upon by implementation process. A study undertaken by McDermott and Stock (1998) using data collected from a sample of 97 manufacturing plants examined how organisational culture is related to outcomes associated with technology implementation, and theirs was to make an assessment to establish the relationship through indicators such as operational benefits, organisational benefits, satisfaction and competitive success. Similar studies looking into organisational structure and technology implementation are widely available. (Bamber and Lansbury, 1998; Adler and Shenhar, 1990; Parthalarthy and Sethi, 1992, 1993; Sohal, 1996; Gupta et al 1997). Thus, the implementation process remains a challenge in various organizations including in the institutions of higher learning. In South African institutions, the presence of ICS is noted across, however the implementation varied. Challenges were largely reported in former Black institutions, these were blamed on poor planning, absence of policy and skills to utilise these technologies (Chisenga, 2006). UWC, in its (2006) report bemoaned the little progress made in the monitoring of usage of ICT, which at the time was standing at just 10% considering the huge investment of funds on the system. South Africa is known to be leading the continent in terms of general infrastructure and the same argument seems to follow in the higher learning technologically. While a fragmented former black institution still battles the inherited system (DoE: 2001: 87). The University of the Western Cape, as a black institution could not escape the challenges. However, with enormous efforts to re-invent and emerge from the past disadvantage. The administrative re-engineering was part of such a re-design to ensure the institutional efficiency (management) responds expeditiously to the needs of the institution and its stakeholders, mainly the students. An internal assessment of the system from the successive reports pointed to a poor state and underutilisation. These have led to massive acquisition of software and the implementation of projects such as the "legacy system and Mark Administration System" MAS. UWC detected a problem in the implementation of the previous system which justified the new one. As such a newly designed and developed "Marks Administration System" and financial aid systems were built using a common technical solution. These systems are often riddled with problems at the initial implementation stages, some of which were reportedly (MAS), were of technical in nature and as such users often became very impatient with the system. This led to some devising other means against the new system. These alternative means were largely filled with inconsistencies. The widely noted implementation challenge by some, including the

developers' office, successive reports and the resistance to use the system which still persists years later since the implementation. Staff often passed on their pass words to non-designated role players. This practice was discouraged and has been noted as having the potential to discredit the credibility and the integrity of the system. It is therefore critical for this study to look into the manifestations of resistance and the theoretical evaluation of the concept will help and shed some light as to what could have been a miss- step during the process of the implementation.

A study conducted in Kenyan public universities highlighted some of the challenges associated with implementation. (Gichoya, Muumbo, Tarus, 2015), noted in the study, that there was the lack of interest and training in the use of ICT and E-Learning. However, the key challenges were noted as general lack of resources and infrastructure . This seems to be a problem in the developing world. A study conducted in South Western Nigeria, looking into the factors affecting technology (ICTs) use in libraries revealed a varied number of issues with striking similarities with other parts of Africa (Okiy, 2005). Chisenga (2004), surveyed 10 Anglophone African countries in the use and implementation of ICTs in public libraries. The lack of the skilled personnel and funding. The finding found to be interesting was that the libraries in South Africa only complained about the lack of security to protect the computers from being stolen, while Nigeria highlighted the erratic power supply as the major problem.

Ironically, and perhaps a contradiction to the widely held view that Africa and its wide gap from the developed world is that, this gap would be evident in the challenges associated with implementation. This stems from the long-noted disparities that exist, which are often attributed to poor development, poor infrastructure and lack of funds and skills. Darrel (1985) led a study in three community colleges in Arizona, titled "Factors Affecting the implementation of new educational technology in higher education". The aim of the study was to take precautionary measures. The study targeted 7 common factors which emerged as:

1. Whether the funds were available outside the normal operating budget to finance the implementation of innovation.
2. Cutting off boundary contraction
3. Users involved in the innovation had input into the implementation process
4. Ensures that clear channels of communication existed among those involved in the implementation process.
5. To limit the hierarchy involved in the approval process.

6. The support by the administration to implement the innovation, and
7. Measures were taken to reduce resistance to the innovation.

Among the challenges sighted in the study as factors for consideration in the implementation process to which the theory would focus upon is the area of "resistance". This area has been noted as requiring special attention as it has the potential to delegitimise the system. More so because MAS was implemented almost ten years ago but the problems still persist. Could it be because it was not sufficiently addressed prior the implementation or is just human behavior? Various theorists shed some light in the critical steps to implementation below:

2.4 SYSTEM IMPLEMENTATION SUCCESS FACTORS

A host of factors for consideration in the implementation process such as, organisational culture, has been considered to be impacted upon by the process. Change and resistance management, which is a critical component in the process for acceptance or non-acceptance of the perceived change, is another factor. Other factors to consider are: Training needs, which is also crucial to drive the perceived implementation by the users; End-user-participation, a critical aspect requiring the input of those to be impacted from all stages and Organisational structure and management support, which both determine the success through the allocation of the required resources and its allocation. In addition is Departmental support and inter-departmental support to ensure the smooth implementation is key to the implementation process. Techno-political is said to be another consideration and attitudes, which is positive and can benefit the implementation process while the negative attitudes can affect the process accordingly. These are the key considerations that technology implementation researchers always place emphasis upon. However, Vaughan (2001) has detailed those key concepts she considered crucial and relevant to the university sector.

A. The interaction of technology and organisation

Vaughan posits that "technology affects "the ways in which organisational members must interact with one another to accomplish routine tasks", and thus advocates that systems design must be cognisant of the cultural implications of the system's effects. She further states that institutional and cultural separation between users and designers of the system can easily result in a large gap between those who design the technology and those who actually use the it. To address this cross cultural gap "enterprises should look for functional representatives with a

broader understanding of the overall business beyond transactional level, and technical representatives with an understanding of potential business uses of technology". She also cautions that the technologists should also be aware that imposing a technological solution may exacerbate rather than resolve a problem. Also organisation should appreciate that the processes that have worked in the past may not be adequate. It is also encouraged that at all levels of the organisation, nurturing a cross cultural understanding of information technology and business practices will better position both the IT unit and the organisation for the successful implementation of technology based initiative.

B. User involvement and participation

The researchers in the field also note that "No single quality of management practice is more highly correlated with success than employee participation". Baronas and Louis examine the effect of change, focusing in anticipated and unanticipated differences in features. "More important than actual changes implementers might make are their skills at communicating them to users and linking them into user's experiences. Implementing activities that assist in making sense of and coping with changes, contrasts and surprises should contribute to system's success".

The two scholars also state that the system implementation often impose a threat of reduced control over a user's work. It is then suggested that when employees are given the opportunity to enhance perceived control during a system implementation they will adapt to the resultant changes and more readily accept the system.

Markus offers some light into resistance and why it occurs, Markus employs three theories to look into the concept. The may take place and initiated either by a group or individual in an attempt to address issues of similar interest, this is the face stage of resistance.

Eliminating this resistance may require a change in personnel involved with the system implementation educating the individual, coercing the resistor with edicts or policies, persuading the resistor, and, or by increasing user participation in order to earn their commitment to the project. Education and participation are far more preferable than coercion. Another theory seems to suggest that resistance may be a response to factors inherent in the system being implemented. People resist technically inadequate systems of poor ergonomic design and "user-unfriendly" systems. If the resistance is system-related, correcting the

problems associated with the system should reduce or eliminate the resistance. To proactively address resistance, use skilled designers, pay attention to ergonomic features, modify the system to better conform to organisational procedures and involve users during the design phase. The first theory focusses on internal factors while the second theory addresses the external factors. Both can be held simultaneously. An individual may have a tendency to resist a system but with all other factors being equal, this individual would be less likely to resist a well-designed system.

Markus's third theory addresses the combination of system and person: resistance can be of the interaction between characteristics of the people being asked to adopt the system and characteristics of the system itself. Within the bounds of this theory, the source of resistance lies with the interaction of the organisation and system. This accounts for the acceptance of a system in one organisational setting while the same system might be rejected in a different organisational setting.

2.5 BENEFITS OF TECHNOLOGY IMPLEMENTATION

A study conducted in the United States a decade ago looking into the benefits of technology argued whether what kind of computer and technogy implementation was necessary for the educators. It also looked at whether such an investment was worth a while. (Keseowski;1999).

A. Application of technology to basic skills

It has been argued that under the application of technology to basic skills that students tend to adopt pretty easily with computer assisted instructions. (Kulik; 1994). The researcher further states that using educational technology can be highly effective according to a large body of data and a long history of use (Kulik, 1994). Students usually learn more rapidly in courses that use computer assisted instruction. This has been shown to be the case across all subject areas.

B. Application of technology to advanced skills.

The above technology application noted the widely available forms of technologies for various activities that aid student learning. One of the benefits to be yielded from using complex multi - media products is that it encourages students to adapt easily, acquiring a wide range of skills while boasting their confidence.

Bralo and Kachala (1996), also noted that these technologies makes students t develop self-awareness and positive attitudes towards learning.

They became more independent learners and self-starters and worked well collaboratively. There were also the added benefits of them knowing their areas of expertise and shared expertise instantaneously and the use of technology routinely and appropriately. There was evident increase in writing skills, better understanding and broader view of the subjects, and, the benefit of the ability to teach others and greater problem solving and critical thinking skills.

2.6 USE OF TECHNOLOGY BY ACADEMICS AND ADMINISTRATORS

The use of these tools or technologies by staff (academics and administrators) plays a wide range of important roles and enhances efficiency and effectiveness. They also can be used for distance learning.

As with most projects and technology implementation, the similarities can be drawn from all the studies as in MAS, despite some areas requiring improvement, the participants did note the value of having such systems in terms of stability, efficiency, credibility and user-friendliness in features which help a great deal in the administrative efficiency. Another study looking into the benefits of implementing mobile construction technology E-SUB, cited a number of benefits that seem to cut across most industries. These included: 1, the avoidance of costly errors; 2, increasing revenues to improve customer satisfaction; 3, decreasing liability issues to avoid litigation; 4, staying up to date; 5, having flexible documentation; 6, receiving customer payments faster. These six benefits are described briefly below.

2.6.1 Avoidance of costly errors

Another argument in using these technologies which has been advanced is that it eliminates unnecessary and otherwise costly errors emanating from the use of manual and paper process and thus saving the company costs.

2.6.2 Increasing revenues to improve customer satisfaction

Another argument is that the implementation of these technologies save money, provide faster responses and service while keeping customers satisfied.

2.6.3 Decreasing liability issues and avoidance of litigation

It allows for more accurate documentation and increases less chance for legal disputes and thus avoiding risks of lawsuits. The fast and speedy responses enabled by digital signatures and stamps.

2.6.4 Staying up to date

This technology is hosted using cloud networks which means companies stay up to day with regular updates to decreasing liability issues to avoid litigation and makes daily operations efficient and seamless. The information is also well secured and the chances of exposure to insecurities are less.

2.6.5 More flexible documentation

These technologies are also argued to be flexible unlike paper forms; and thus allowing for customisation and modification.

2.6.6 Receipt of faster customer payments

Cloud enabled mobile technology ensures you get paid as fast as possible. Manual paperwork and invoices can often get lost or misplaced leading to a higher chance of errors. While it increases worker accountability and better communication.

The same benefits have been seen through in the Universities whereby the mobile technologies have taken centre stage in the life of students. Marks, information pertinent to subject content is received fast while on the move, similarly the information is photo-copies via the mobile devices for reading purposes as opposed to buying books that some can hardly afford and thus increases access to reading materials.

Technologies such as Ikamva, e-learning /ICS dominated the university sector. These were followed much later by technologies aimed at managing and tracking the progress of students of such as SASI, SEMS and the Marks Administration System (MAS) which is the subject of the enquiry of this study. The study in it'd attempt to look into the technology and its challenges in the university sector also revealed the shortcomings, a deep divide and the struggles of various communities. See below various studies commissioned looking into access to technology by various households and university. This would explain why those from the poor

communities would be left out. The above situation placed enormous pressure on the institution to start aligning themselves with the cause of those they teach and who come from these communities through various community engagement program and innovations. MAS and other related systems were implemented to make the life of a student much easier while at university, through the tracking and integration of the information in a safe and secure manner which would enable a speedy and an informed response when matter concerning marks require such. This was part of the university's IOP strategic objectives to transform processes. These objectives were: 1, to reduce the attrition rate, monitor student flow and improve the time to degree; 2, to improve throughput, graduation rates and service delivery for all categories of students; 3, to providing a safe, supportive and dynamic learning environment that respects and values student diversity and equity; 4, to strive towards increased employability, graduate placement and student diversity and equity and, 5, to develop leadership, capacity building and improved quality of student life support by a holistic care, nurturance and advocacy in matters affecting students well-being.

2.7 MARKS ADMINISTRATION SYSTEM (MAS)

The scope of the marks administration system is the capture, retention and publishing of marks obtained by students for exercises that form part of continuous assessment throughout semester or year as well as the mark obtained for their final evaluation exercise or examination. Its success is to be determined by a set of criteria, which are the consistent application of a single set of assessment rules, a sound basis for a broader system for tracking student's performance, the possibility to retain assessment marks in a secure manner, an assured integrity of assessment marks as far as possible and not include measures that could compromise this. And much more important, a successful acceptance and utilization by the university community. These criteria served as a pointer to the progress made at the time of implementation on MAS and other systems gives the indication of the progress and allows for the assessment of MAS, although the study did not necessarily deal with that aspect of the system.

MAS, as a system used for the administration and the management of marks followed the necessary steps in the implementation process. It also appears, as indicated in the timeline, that the project was released according to schedule. Despite this, the Post-implementation phase, as indicated in the earlier chapter, compliance remained a problem. This was highlighted in the auditor's report as earlier mentioned. This is due some resistance shown by some staff and their lack to fully embrace the system. It is not clear as to why the wholesale buy-in by some users

remained a problem. It is to be emphasized that the problem is not widespread but does carry a big potential to discredit the system by short-changing the roles delegated to various role players.

2.8 RESISTANCE AND THEORETICAL FRAMEWORK

Many years ago some theorist discovered the origins of resistance which in their investigation stem from the introduction of secrets from the conscience which resulted in continuous resistance. It was also discovered that that the resistance was also associated with personality traits autonomy and dominance. This was disclosed by Izard in 1960.

While Ross posited that the acceptance of change is one of the key fundamentals of the organisational change. Arguments around the resistance varied, some researchers argued it's the attitudes and feelings towards the change while others felt it was simply behavioural.

2.8.1 Everyday resistance

Everyday resistance was characterised in two forms, the public and disguised resistance. (Scott:1985). These forms of resistance, he argued resulted in various types of resistance which consist of open revolts, petitions, demonstrations against status and material domination, ideological domination, other forms of low profile, undisclosed and many more including foot dragging.

2.8.2 Characteristics of Resistance

Some of the characteristics of resistance consist of pervasive use of disguised. This involves withholding the identity of the resister and it does not provide a clear message and the resister is disguised. (Scott;1989: p 54-55).

Although the system has been in place since 2005, at this point one would have thought the acceptance of the system and its use would not be the problem. While the system is noted as stable and technically sound, the area of resistance remains a huge gap, even though, it is not widespread; perhaps, it is the area that can be attributable to the manner in which the implementation was managed and whether this area was adequately addressed with the would be "users of the system". This serves as the overarching framework for the historical approach to this study.

2.9 SUMMARY

Chapter two provided an extensive and a detailed account of the tools and the scholarly work by various theorists in understanding the concept of technology innovation, implementation challenges and the state of technology in general in the university sector. It also looked into the state of technology deployment at the University of the Western Cape which served as the case study. From the discussion of the introduction and implementation of technology at the University of the Western Cape, one was able to provide an insight, to a certain extent, on how the university sector in general, is investing in technology, the constraints and the challenges.

CHAPTER 3

THE RESEARCH DESIGN AND STUDY SITE

3.1 INTRODUCTION

3.1.1 Research Design

The previous chapter provided a discussion of the pertinent literature on technological implementation in organisations and an extensive discussion of the MAS technology at the University of the Western Cape. In this chapter, the focus is on the research design and the research site, the University of the Western Cape.

Research design is" a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings". Burns and Grove (20003;195). Other researchers states that a research design is a plan that describes how, when and where data are to be collected and analysed. Paraboo (1997;142). And also seen as the overall plan for answering the research question or testing the research hypothesis. Polit et, al (2001;167).The approach to the study is descriptive. (Leedy; 1997, Salkind;2000). Descriptive research concerns itself with existing and past phenomena. This method derives from the non-experimental research which looks into relationships between variables. Salkind (2000;11). The researcher may proceed in steps related to other forms of research. Salkind (2000;188).

A research that looks into problems and wish to investigate is known as historical research (2000:188). Historical researchers define a topic or a problem that they wish to investigate, in this instance, the ethical foundations of service quality in tourism and hospitality management: a theoretical perspective.

- The researcher sets out to utilise a variety of sources to gather data. Salkind (2000: 188) emphasises that while these sources may differ markedly from those in other research methodologies, the analysis of written documents is usually the domain of the historical researcher.
- of primary and secondary data is accomplished through the application of two separate criteria: authenticity (external criticism) and accuracy (internal criticism).
- The value of the data must be evaluated using the primary and secondary sources. The evaluations seek to establish the authenticity and accuracy. Salkind (2000;191).

Researchers often are critical of academics who shows bias for a given research methodology. Leedy (1980:3-9)

He suggested that it "is difficult to defend the position of those who claim that unless research fits an arbitrary prejudice for a given methodology, it fails to be research. All highways are of equal excellence; each, however, traverses a different terrain, but they all converge on the same destination. In other words, when research is viewed as an offensive against ignorance of the truth, then the four principal research methodologies are merely separate avenues leading in the direction of enlightenment. No one methodology is superior to any other, and they all converge at one coveted point: the point from which we are able to discern that of which we were hitherto unaware . The research follows a descriptive approach which uses both the primary and secondary sources of information. The information sources comprised of the reports, manuals, presentations, case studies books and articles that exist in the library and online. Some scholars believe that a case study allows for different kinds of data to be collected for a better understanding of the phenomenon (Creswell: 2013; 97). The study took place in one of the universities in the Western Cape Province, the University of the Western Cape. The site served as an important indicator, although not necessarily reflective of the situation in all Universities, the challenges are similar to those of other universities battling with underdevelopment and lack of funds.

3.2 RESEARCH SITE: THE UNIVERSITY OF THE WESTERN CAPE

3.2.1 Overview

The implementation of the Marks Administration System that took place in 2006, coupled with its rich history of political struggle made the university of the Western Cape suitable site and a good case study. This, to look into the implementation challenges often found in universities generally with a special focus in South Africa while citing other universities both in Africa and abroad.

Another attraction to the researcher is that the site houses all the required data relevant to the research. This means there is enormous amount of cost savings and resources in that regard.

The university of the Western Cape is a medium size, contact English –medium institution, situated in Bellville in the Western Cape Province 9.0 km from the city of Cape Town in South Africa. It was founded in 1959 pre-'94 national unity government to cater for a group classified

as coloured. It has three campuses: The main campus in Bellville, the dentistry faculty at Mitchells Plain and Tygerberg. The institution also has teaching faculties in Groote Schuur hospital, the Red Cross Children's hospital and the Lentegeur hospital. It has seven faculties, Economic and Management Sciences, Community and Health Sciences, Arts, Natural Sciences, Law, Education and Dentistry. The University of the Western Cape has a long record history of creative struggle against oppression, discrimination and disadvantage. It has played a pivotal role in South Africa's historic change, playing a distinctive academic role in helping to build an equitable and inclusive nation oriented toward nation building. UWC has become synonymous with struggles related to issues of equity and quality in higher education as such attracted a significant number of students from disadvantaged backgrounds.

The University of the Western Cape was established as a result of the "Extension of University Education Act of 1959". This law was aimed at the segregation of the higher education in South Africa according to racial lines and language. Other black institutions such as the university of the North and Zululand were founded. UWC together with its counterparts in the province of the Western Cape and others in the country have since the integration of higher education post-1994 witnessed a dynamic and inclusive higher education.

3.2.2 Early History

a college under the auspices of the university of South Africa. It offered limited training of courses targeting lower and middle level positions in schools and civil services. The university started only with a group of student cohorts at 166. The University only gained the "university status" in 1970, this recognition allowed the institution to award degrees and diplomas. In the early years the composition of staff and the board was white supporting the old government with the exception of the few liberals among which was Prof. Adam Small who was subsequently dismissed following his involvement with the "Black Consciousness Movement" and many more students protesting against the conservative board and the lack of participation in the university, subsequently led to the appointment of the first coloured rector.

In 1982, the university broke ranks and rejected the apartheid ideology. These developments led to the creation of a bush radio by students aimed at spreading the anti-board and its conservative policies and subsequently apartheid prompting Rector Jakes Gerwel to declare UWC an "intellectual home of the left".

Figure 3.1: The Research Site: University of the Western Cape, Western Province 9.0 KM from the city of Cape Town.

3.2.3 The Current State of UWC

Currently, UWC's student enrollment is standing at 21783. The university has experienced a steady growth over the past ten years, traditionally attracting a large group of students from both "coloured" and "black" communities with a small but steady growth from other race groups especially whites. Naturally, given its history and political leanings, UWC has always been a home to students from disadvantaged communities to this day, this driven by the university's principled stance on matters of "access" and equitable education to afford and uplift the poor towards a meaningful participation in societal, but crucially African development. UWC, despite its past history and challenges managed to re-invent itself in key areas such as research, administration and teaching, and academic offerings, earning itself the top rankings by Webometrics (2014), as sixth best South African university, 7th best in Africa and 885 in the world.

The ratings are a culmination of efforts aimed at transforming UWC through its "internationalisation" strategy. Today, UWC is rated and regarded as amongst the world's respected institutions as a research-rich environment with highly qualified academic staff with 50% holding doctorates. It boasts institutes with strong research focus and undergrad programs with largest intake. The university is involved in international collaborative work, including in exchange programs that enrich the environment. It has strong links and relationship with international institutions with countries in Africa, Europe and North America; this also extends to the local institutions with whom UWC is able to share expertise, especially those within the Western Cape.

In order to hold on to its good reputation, UWC continues with its efforts to upgrade and improve its systems. In the past ten years, the university embarked on an aggressive re-engineering of its processes mainly the administrative processes. This, at a time when many institutions of higher learning locally and abroad have been experiencing transformation in many aspects of operations and governance. With the changing face of higher learning from a traditional laid back into fast paced environment, exchanging ideas and strengthening an interconnected academic community, coupled with the student body increasingly becoming aware of their rights and technically-savvy types who are so embedded in the connectivity space and as such they receive information fast through their mobile devices which are largely advanced with various enabling application. These place demands on institutions to manage the administrative processes in all areas of the institution to enhance efficiency and accountability, a worldwide phenomenon referred to as the "new managerialism" Oloyede (2002). This becomes critical and even more urgent for South Africa as it continues to battle with old but pertinent issues of access, as recently seen re-inventing itself through mass demonstrations popularised as #FeesMustFall of 2015/2016 and #AccessMustRise! respectively.

A direct challenge to both the government of the day and the institutions of higher learning. A greater part of the re-engineering process which UWC embarked upon was the investment in various administrative technological projects in various functional areas. Researchers focusing on technology implementation have highlighted some of the benefits to be derived from the implementation, especially in addressing the gaps arising from issues related to "access". Many believe it helps in the management of big and overcrowded classrooms also assist the disadvantaged students to access reading materials online which would have been costly and unattainable.

Table 3.1: Enrolment at UWC

TOTAL: HEAD COUNT ENROLMENTS BY RACE

	Actual enrolment																
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
African	4949	5165	5633	5420	5062	4868	5149	5464	5799	6382	7431	7776	8328	8653	8762	8775	9423
Coloured	3881	4394	5828	6852	7056	7313	7278	7147	7020	7647	8400	8777	9067	9431	9649	9472	10243
Indian	809	862	928	1245	1384	1430	1291	1236	1139	1093	1095	1073	1044	1051	1012	960	925
White	206	235	278	356	576	696	670	683	649	666	762	813	924	1021	1159	1175	1192
TOTAL	9545	10455	12665	13873	14078	14308	14385	14530	14607	15788	17688	18439	19363	20156	20582	20382	21783

TOTAL: HEAD COUNT ENROLMENTS BY GENDER

	Actual enrolment																
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Female	5444	5907	7316	7965	8302	8607	8863	8871	9041	9801	10724	11243	11757	12171	12368	12130	13030
Male	4231	4592	5413	6088	6181	5863	5977	6056	6018	6401	7334	7521	7833	8211	8214	8252	8753
TOTAL	9575	10499	12729	14043	14283	14470	14838	14927	15059	16202	18058	18764	19590	20382	20582	20382	21783

Provided by Institutional Planning office
01-09-2016

As a means to widen access to higher education for the poor communities, UWC had consistently lowered the barriers to entry without compromising quality. Its student body is largely from the surrounding communities and rural based from various communities around South Africa and some from the continent. The problems of access can be attributed to a continuum of issues including the rapid urbanisation. Daniel Runde (2015), in his article suggested that the world's urban population now stands at 3.7 billion people, and this number is expected to double in the same year. (An assertion supported by the UN, 2012 report).

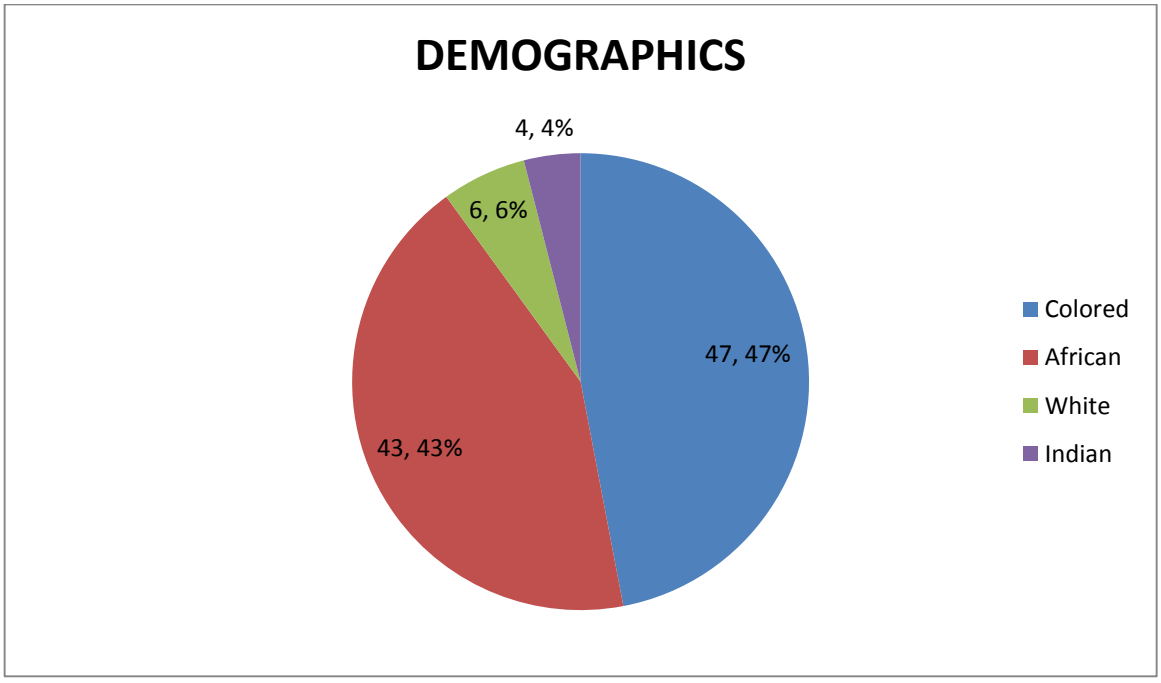

Figure 3.2: Demographics

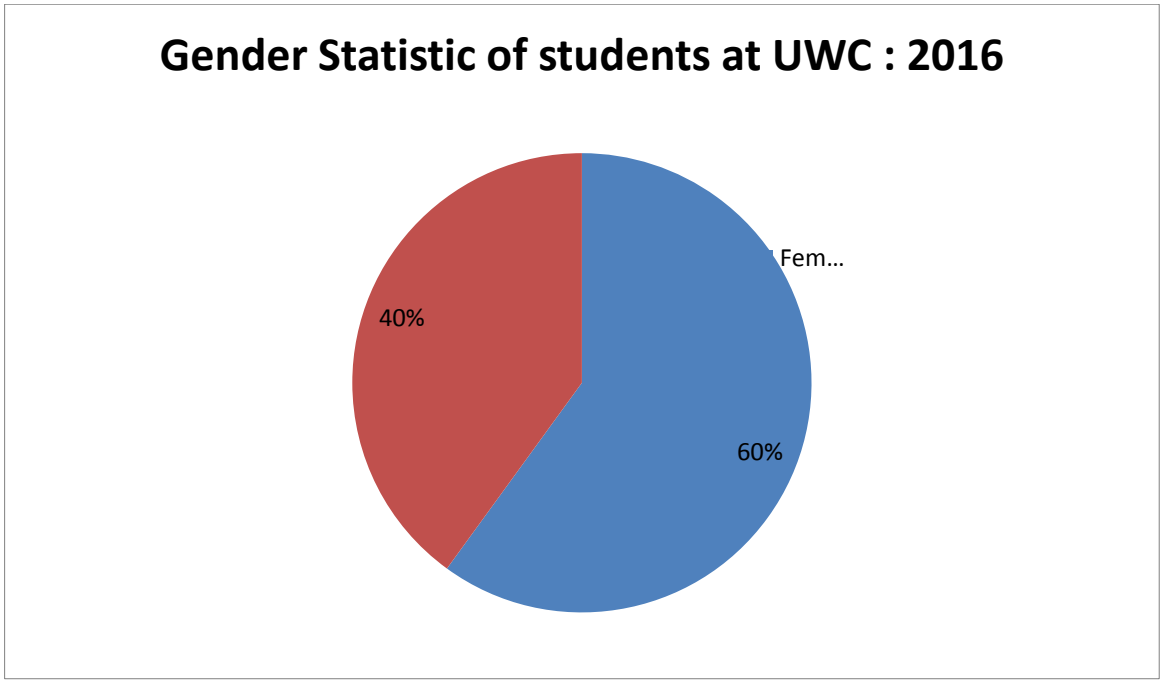

Figure 3.3: Gender Statistics

It was also stated that 2030 the urbanisation would occur in the developing world at a rate of 96% and that has profound implications for the provisions of services but critically the higher education will feel the impact. This has been experienced in South Africa where work opportunities are largely possible in big cities, this automatically attract families and their children to access these opportunities while the impact is felt by the struggling rural based South African institutions seen as unattractive, lacking in skills and downright empty.

The positive to come out of the urbanisation to UWC, although a challenge in terms of resources is that it becomes the first choice for the struggling communities given its admission policy premised on "open access" for these groups is the steady growth. This can be said for CPUT which has since relaxed its admission policies considerable.

3.2.4 UWC Research Profile

In recent years the research profile of the university of the Western Cape has been acknowledged internationally, making the institution a research-rich environment with its 50% academic staff holding doctorates. UWC has institutes, some with strong research focus. There are centres, departmental and faculty collaborative projects and sharing of expertise. UWC research has an international dimension. As such UWC had partnered and often collaborated with some international scholars in areas of mutual interest, became speakers in some

international conferences and have been published in respected international journals. UWC as it straddles a difficult part of maintaining its identity as the "intellectual home of the left" while strengthening its international dimension, like all the transforming institutions globally, importantly in South Africa, it has to strike a balance through the effective deployment and the management of its resources. This is reflected through the notion of a transforming higher education sector since the past fifteen years towards what many have termed "new managerialism" aimed at efficient management of the institutions and its processes. The deployment of technology information systems to manage and store data that is critical to the functioning of the institution and UWC becomes central.

3.2.5 UWC and Technology

In 2000, the department of information systems at UWC conducted a study looking into the state of technology and compiled a report detailing the state of technology and the information systems. This report was followed by a series of other reports. The report in its criticism cited a lot of gaps that may have served as a disadvantage to UWC to fully exploiting its strength, especially in the area of technology deployment. Some of the gaps identified related to the absence of the strategy, both institutionally and technologically. This was seen as a serious shortcoming given that the strategy document serves as a roadmap on which the comprehensive plan through which the allocations of resources should be detailed. The report made reference to the fact that organisations including UWC operate in a "knowledge" environment and that the future deployment and investment in technology infrastructure is key for that future although not necessarily determinant of that future. The state of technology was described in the report as ineffective and inefficient, poor and weak, such a state was largely blamed on the lack of funds and poor management of the already fragmented technology. At the time, some of the weaknesses were:

1. Ineffective systems, especially budgeting and financial management systems.
2. Information technology services were underfunded
3. Systems are outdated
4. Communication is poor between IT, email services and students, as such many are not aware of the developments.

It is clear that UWC has since heeded the call and revamped its systems. Today, UWC boast a comprehensive and sophisticated portfolio of technology systems which serve as an engine in

driving an improved service delivery especially in the areas of student enrolment and those pertaining to the general administration. The two reports, following the earlier report on the state of technology at UWC (Sept; 2005-July; 2013) seems to echo the same sentiments of the previous report of 2000. A result of a significantly automated administration in almost all functional areas such as (finance, human resources, general administration), but critically, the systems pertaining to the information regarding the student life circle and all the aspect related to the registration to graduation were implemented. This investment became known as the "legacy system" which integrated various critical information including tracking students, enabling the analysis of the factors against throughput, while allowing for support systems towards retention of students to postgraduate and many more strategies. The system that UWC built is interconnected and coordinates the activities together. They are but not limited to:

1. Student Enrolment Management Systems (SEMS)
2. Student Administration Systems Integration (SASI)
3. Marks Administration Systems (MAS).

It would seem as if UWC received the criticism contained in various reports in good faith, as it embarked on a wide scale aggressive improvement path. This included ensuring the proper strategy documents was made available in which the objectives of the technology deployment were put forward as:

- To manage and track the student life cycle from admission to graduation.
- Approximately, sixteen different executive offices manage the processes, as such.
- Efficiency of processes, particularly written expedient decision-making, accountability, data integrity and inadequate workflow and integration.
- Processes improved from paper based to technologically driven.
- Feedback on enquiries often led to litigation.
- Improved workflows and expedient decision making, accountability and data integrity.
- Enquiry management was not professionalised, there was (pillar-to post) response.

It becomes pivotal for any organisation implementing or strengthening its technological projects to identify gaps, this allows for a clear picture moving ahead with implementation process. MAS, the subject of my enquiry aimed to look into this important aspect whether UWC in its implementation observed the consideration that forms part of the process.

3.2.6 The Marks Administration System at UWC

MAS as part of the legacy system that came to define the management of marks at UWC, is a system that houses all the information pertaining to the marks, registration, student details, the stages of programme the student is enrolled and other pertinent data to the life of students while at the institution. The legacy system was a direct response to the challenges highlighted in various reports and to the objective outlined with a chief aim of ensuring a central point of integration that would enable a rather speedy and an informed response to the needs of the students and the university community at large and thus strengthening efficiency. While a number of processes have been improved significantly in various functional areas including human resources, finance, bursary and residence management offices. The student management systems have redefined the administration and the management of student processes such as enrolments, marks, finance, residential services, and thus tracking in detail all aspects of student related matters including the important enquiries. And thus, SEMS, SASI and MAS coordinate these processes together. MAS, however, the focus of my research, unlike other systems has become widely used, integrated and centralised across the university, given the original objective behind its implementation, to manage the efficiency of mark processes at a departmental level thereby ensuring the expedition of responses for accountability, especially at the management level. MAS is also a role based system released in various phases, built and developed, yielding itself to customisation. Although, a new software was adopted following a gap which was detected with the initial implementation surrounding MAS and the module codes

The Marks Administration System (MAS), is an integrated and an institutionalised system developed to facilitate input of marks at departmental level allowing for more expedient processing of marks and the introduction of quality assurance measures at both faculty and central administration level. This marks administration system would require academics to submit continuous and final assessment results directly onto the system, minimising the margins for error and security risk during the copying and re-entry of marks in various administrative offices. This standardised system would also allow for regular monitoring of student progress and the introduction of timeous interventions. (IOP: 2004). Essentially, MAS is a role based system consisting of eleven roles, with nine directly active and two indirectly active roles. At UWC, the roles are clearly defined as can be seen in Table 2 below.

3.2.7 The project scope of MAS

The scope of "Marks Administration System" is the capture, retention and publishing of marks obtained by students for exercises that form part of continuous assessment throughout a semester or year as well as the mark obtained for their final evaluation exercise or examination. MAS was implemented in 2005 and released in various stages in 2005-2006 and was fully adopted and used in 2007.

Table 3.2: Marks Administration System (MAS) Roles

ACTIVE ROLES	
1. Module Coordinator	The Module Coordinator role is responsible for the quality of the marks administration process for their assigned modules. The Module Coordinator role thus ensures that the integrity of the marks and the grading process, carried out by Lecturers, are implemented and sustained. The Module Coordinator consequently responsible for implementing decisions on MAS regarding assessments as agreed within the Faculty (e.g. Marks Adjustment / Internal Moderation).
2. Marks Administrator	The Marks Administrator role is responsible for the capturing of marks. Prior to submitting the marks to the Lecturer role, the Marks Administrator can make changes to the marks. To facilitate the publishing of marks, and the management of queries, the Marks Administrator has access to board lists and reports to assist in streamlining these services
3. Lecturer	Within the scope of MAS, the activities of Lecturers are teaching Students and grading assessments. Lecturers are accountable for the integrity of the marks they give to the assessments carried out by Students. Lecturers also need to vet the marks captured by Marks Administrators as well as being consulted when mark adjustments need to be carried out for continuous assessment
4. Departmental Chair	The Departmental Chair is able to view the state of assessment and grading for all departments within his/her faculty
5. Faculty officer	Faculty Officer The Faculty Officer is able to work across all modules in MAS, for his / her designated faculty. This role takes the responsibility of monitoring the progress of the marks administration process, assignment of roles and modules and the updating of marks to the student record
6. Faculty Management	The Faculty Management role can include the Faculty Managers and the Deans of faculties. The Faculty Management Roles has access to functionality that enable the user to monitor and view the state of assessments and grading on a per faculty basis

ACTIVE ROLES	
7. Student Administration	Student Administration (Faculty Liaison Officer) Each faculty is assigned a Liaison Officer from the Student Administration Department. The Liaison Officer is the only role in MAS that can execute Marks Adjustment after the Student Record has been updated. This role also receives alerts about late updates to the Student Record, and can view reports in MAS.
8. Registrar's Office	The Registrar's Office role can be assigned to the Registrar, the Deputy Registrar as well as staff employed in their offices. The Registrar's role has access to statistical reports in MAS.
9. Super User	The Super User role is assigned to a designated user elected by Business. The Super User creates roles, assigns functionality and applies an approved criterion that deviates from the Senate approved assessment rules. These deviations are normally passed by Senate Committees which will trigger the request to the Super User for the change/s (process external to MAS
INACTIVE ROLE	
10. Student	The Student role has no portal created for it. The Student role is a non-interactive and is not assigned to students. The MAS makes use of the students email addresses to service the requirement to communicate to students to inform them about their assessment.
11. Tutor	The Tutor role has no portal created for it. The role is assigned to a user only to create a link between the user as a tutor and the tutorial group s/he is responsible for.

3.2.8 MAS Work Flow

Figure 3.4 below shows the flow of MAS processes and various roles played by those involved with the system.

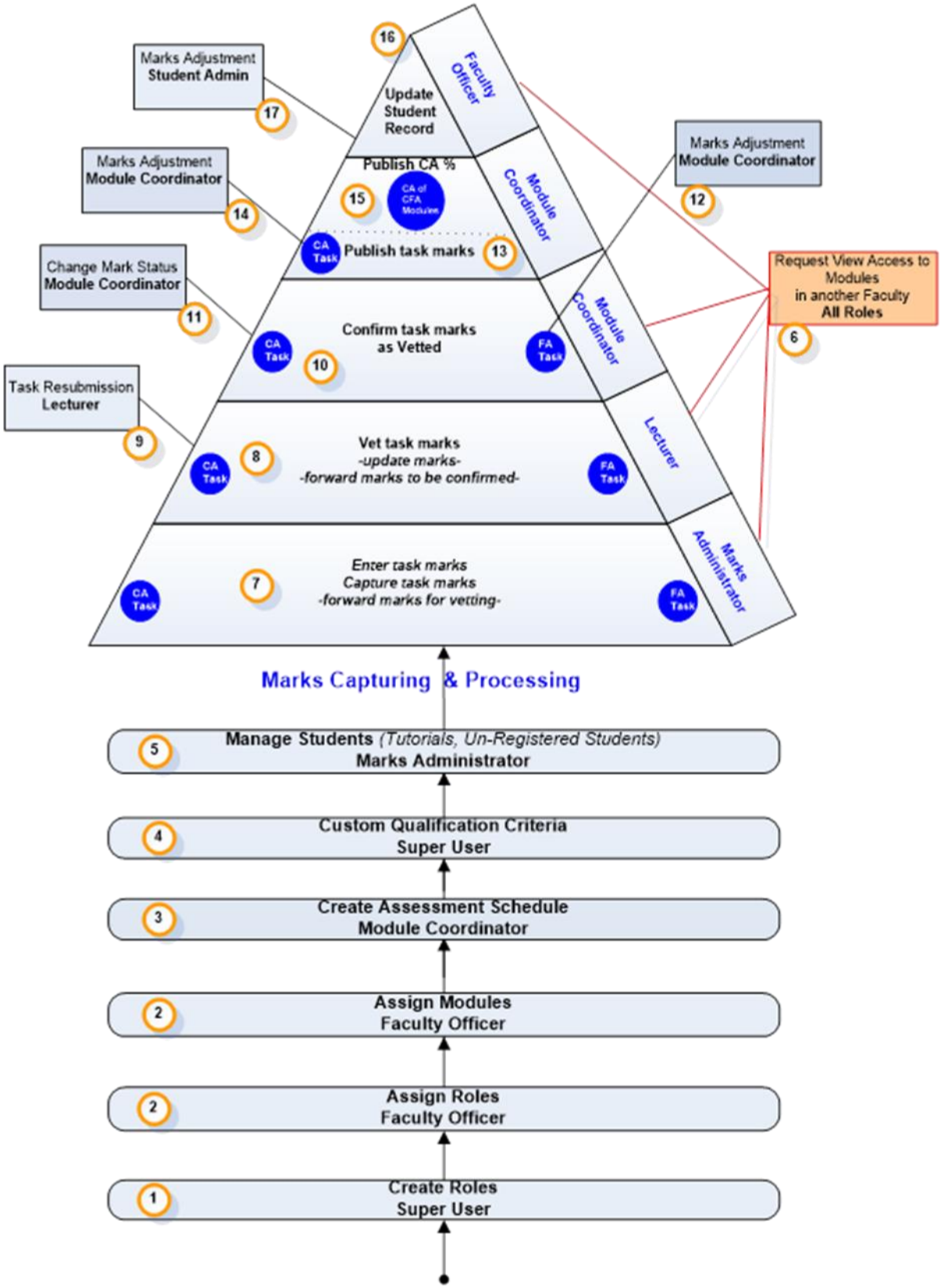

Figure 3.4: MAS Work Flow

The management identified a list of key indicators that would serve as a successful implementation of MAS. These are as follows:

The Attributes of a Successful Implementation of MAS

- Ensures the conformity of the assessments.
- To strengthen the systems for improved student record tracking.
- Ensures that marks are compliant with the regulations of MAS and are not compromised.
- Assure the integrity of assessment marks as far as possible and not include measures that could compromise this.
- The staff must embrace and use the system.
- The project released within the project timeline signifies success.

MAS' release 1 and 2 are complete. 95% of functional and business requirements were met. The system is live and is being implemented at an institutional level.

These attributes are key and very central to most implementation project process; however, this does not take away the challenges cited away. But, it appears as if though there is no concrete study that could serve as confirmation as yet, that MAS did meet the intended objectives to a greater extent. If the above statistics of 95% is what should be believed.

3.2.9 Summary

Chapter 3 presented the research design and provided a detailed account of the site, the background and the history, the challenges and the successes of the institution. It also delved into the existential circumstances of the time and the student body profile. It also gave a brief narrative of the research design and the approach which is descriptive and have used primary and secondary sources.

CHAPTER 4

FINDINGS AND ANALYSIS

4.1 INTRODUCTION

This chapter seeks to provide a descriptive analysis of the findings following the discussions from the previous chapters. The findings derived from the sources used serve to give the study the necessary grounding. These are both primary (UWC documents) and secondary sources (desktop literature search) which provide an understanding of the challenges associated with implementation and technology innovation in general and mainly in the institutions of higher education.

The study was in part prompted by a need for "access" following the increase in student enrolments, and the changing social composition of the student population since 1994(HESA; 2014). This dramatic increase meant that the institutions of higher learning had to adopt innovative ways to meet the demand and to enable student access for a meaningful impact. To restate, the study sought to investigate the challenges affecting the implementation of technology in the higher education sector. The study used a selected university in the Western Cape as a case study. The main focus is in the institutions of higher learning in South Africa but also drawing experiences in other parts of the world, within Africa and abroad. The study used "Marks Administration System", a system developed with a purpose of managing marks. The system was implemented in 2006 at UWC with a full roll-out taking place in 2007. MAS, as the system is popularly known, was implemented along other systems as part of a transformative process to ensure efficiency and a proper recording and safe keeping of student information during the period of study and beyond. (UWC IOP, 2004: 123). It is also to be stated that MAS is a relatively new system and that not much is in the literature other than other related systems like ICS and e-learning which are largely found in the university sector. These systems will serve as a reference point in understanding the challenges associated with implementation in general.

4.2 IMPLEMENTATION CHALLENGES

Various scholars have written extensively in the area that impacts the implementation of technology while highlighting the challenges that comes with it. Some of the challenges were noted largely in the university sector, the focus of the study. As stated before, MAS is a

relatively new software within the university sector which is utilised to administer marks in the academic departments. There is not much written, and there is almost non-existent research looking into this technology. However, the phenomenon surrounding the implementation is similar across sectors. The study therefore often used other technologies prevalent within the university sector to illustrate this, using E-learning and the Information Communication Systems popularly known as ICS. Researchers have researched widely on this technology; Vaughan 2000; has identified various key considerations for systems implementation considerations which are considered as key to the success of the implementation. The interaction of technology and the organisation, user-involvement and participation, resistance, commitment, planning and risk factors.

The fast changing face of the survive environment and business in general informed by technological advancement and savvy customer, there has been a demand for high quality. This is the more reason Vaughan and other scholars such as (Choi;2000, Salleh and Goh,2002 et al) advocates for training because a well trained workforce especially in the use of these new technologies is otherwise effective.

As in most universities in the developing world, the key impediments to the implementation of technology are financial constraints, technical skills, operational policies.(Taurus, Gichoya and Muumbo;2015).

4.3 THE WIDER CONTEXT OF ANALYSIS OF FINDINGS

South Africa suffers extreme digital divide notwithstanding the economic position and the respectability in the continent and stands just at 4.5% of the information have against a staggering 95% information have not population. This according to (South Africa Web Usage Behaviour 2000).

This divide is traced back in the past of separate development and skewed allocation of resources. Inevitable, the education sector is directly affected by those classified as from "disadvantage" communities. Significantly, this was reflected in the documents at UWC that were examined for this study. The lack of interest on the part of academics in the very beginning of the introduction of MAS derived, in part, from this. Evidence shows that most academics at UWC often consider their students as coming from disadvantaged background and as such would not have had computer and the associated skills in using the internet. As such, they would

not have access to any form of technology for their learning. This contributed as evidence shows to their attitude to the technology of marks administration and indeed other forms of technology in carrying out teaching in the very beginning.

4.4 THE CHALLENGES IN IMPLEMENTING MAS AT UWC

Against the wider context provided above, what were the challenges in the implementation of MAS? To bring these to relief, it becomes necessary to restate the objective of the MAS in the first place. Darries, in his 2005 (Darries, 2005), report outlines the objectives behind the implementation of various student tracking and monitoring systems at UWC. These involved the Marks Administration System known as MAS in line with university strategic plan whose aim was to: 1) Reduce the attrition rate, monitor student flow and improve the time to degree, The documents on the introduction and implementation of the MAS technology at UWC revealed all the challenges that were listed as hindering the introduction of technology generally in the education sector. These, for the purpose of reminding ourselves are: i) Inadequate ICT and e-learning infrastructure, 2) Financial constraints, 3) Lack of affordable and adequate internet bandwidth, 4) Lack of technical skills on e-learning and e-content development by the teaching staff, 5) Lack of operational policies, 6) Lack of interest and commitment among the teaching staff to use e-learning and 6) Amount of time required to develop e-learning. There was hardly any infrastructure for the MAS before it was introduced. Documents show that the management, in the form of the Registrar's office, felt a need for such a system in light of the inefficiency in administering marks, which very often get misplaced or lost in the then manual method of marks administration. At the inception of MAS, hardly was there any preparation for it. There was no academic staff with the competent skill for MAS and very few administrative staff were given the tutorials on the system. These findings are briefly summarized below.

4.4.1 Financial constraints

Documents show that financial constraint was one of the major challenges that hindered the implementation of MAS technology at UWC. The earliest stages of implementation are seen as the stages where the funds are mostly required for the purposes not limited to the training of the staff, infrastructural support, and maintenance of and development of the system and other related activities.

4.4.2 Inadequate infrastructure

However , like the most universities in the country, ESIB(2003), recommended that institutions using e-learning are urged to support the staff and students with technologicalinfrastructure.

Perhaps, one can draw parallels from the Kenyan challenges with that of UWC and South African universities' infrastructural problems in relation to MAS where student's role is inactive but was created. This may be attributable to the infrastructural capacity.

4.4.3 Lack of affordable and adequate internet

Another challenge identified had to do with the high costs associated with acquiring an affordable network, this despite the efforts and interventions by the government through the subsidy of the university.

4.4.4 Lack of operational e-learning policies

There was an observation made regarding the lack of operational policies for e-learning, another hindrance to the implementation process. This challenge is widespread and can be found in various African Universities including those in South Africa.

4.4.5 Lack of technical skills

Lack of the required skills by the staff was seen as one of the key challenges to the implementation of technology in public universities.

4.4.6 Lack of systematic approach to the implementation of MAS

What can be inferred from the documents is a complete lack of systematic approach to the implementation of the MAS technology. authors acknowledged that although the challenge existed, it was not widespread in other higher institutions in the developing world. As a technology, generally, of teaching and learning, there was no evidence of what could be considered as essentials in any introduction and implementation of technology in organisations; this is that technology as a complex process need full conceptualization and must be clearly defined from the beginning. This was hardly the case at UWC in the initial stages of implementation.

4.4.7 Administrative support

This aspect is seen as being critical to any successful integration of technology into teaching and learning process. The commitment and the support by the top management and other leaders is key. Was the case at UWC at the initial stages? The management gave the go-ahead but, as the documents reveal, academics, both seniors and juniors, were exceedingly lukewarm. Similar attitude was shown by administrators, which is in itself, a great challenge to the success of the system given that administrators can provide the conditions that are required, such as policy incentives and resources. Dreyer et al (1997) pointed out that it is crucial for administrators to be competent themselves for the successful integration. Another critical issue pointed out in the literature regarding technology implementation in organisations is ownership of the technology. What was revealed in the documents was by the authors was a lack of ownership. It needs to be stated how critical ownership is in the implementation of such technology; all stakeholders must contribute and own the policy and the plan. Institution-wide consultations, necessary in the identification of challenges, was minimal. This meant that the process did not sufficiently inculcate the kind of thinking in employees that would have seen the project implementation as a tool as opposed to competitors.

4.5. Summary

This chapter presented and discussed the findings based on the documents made available. It also looked at various experiences presented by various studies in the field of technology implementation. The discussion was both theoretically driven and empirically informed. Clearly, there were similarities drawn from the findings based on various studies and those gathered from documents on the MAS project at the University of the Western Cape.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

The previous chapter presented the findings and the analysis deriving from various scholars in the field and the area of study. The approach which was adopted consisted of both primary and secondary sources to understand the challenges of implementation and innovation. This particular chapter provides a conclusion, contributions, recommendations and further research for the study. In essence, this chapter provides a short summary of the entire study and the preceding chapters. The study investigated the factors influencing the implementation process and technology innovation. The study was conducted within the wider context of "access" in the university sector. In Chapter 3, a full description of the University of the Western Cape was provided in detail. However, a brief description is necessary here. The University of the Western Cape, previously designated for "coloreds" nicknamed 'bush" given its location, in the surrounding of short trees, is a medium size English medium institution situated in Bellville in the Western Cape Province 9.0 KM from the city of Cape Town in South Africa.

Figure 5.1: The city of Cape Town, Western Province 9.0 kilometers from UWC

UWC was founded in 1959. It has three campuses, the main campus in Bellville, dentistry facility, the only one in the Western Cape Province located in Tygerberg and Mitchells Plain. UWC with its history of struggle for self-determination, like most Black institutions under the Nationalist Party rule, suffered massively financially and as such its development was hampered. The dawn of inclusive government affirmed the long struggle, allowing UWC to craft a new path for itself inclusive of all races, striving for excellence, quality and growth as enshrined in its mission statement. As the institution improved its financial position, and so the other areas of operation but the past 10 years saw a significant investment in technology, strengthening the current one and the acquisition of the new projects to improve the efficiency of the administration in various functional areas. With this process transformation UWC not only improved its administration of data, mainly the student records and marks management but provided the institution with an international outlook that allows for interconnectivity with international institutions.

The 1994 milestone which achieved political freedom led to what can be called an inclusive governance system in the country and the overhaul of many discriminatory and exclusion practice's in the country. The University sector became the epicentre and the focus of a major transformation. This led to the overflow of enrolment numbers; obviously, the bulk of these enrolments came from disadvantaged communities with little resources to access university education. Access to information within the university became a challenge for many in several ways: availability of personal computers, internet use and high cost of reading materials are examples. However, transformation in universities, through the introduction of various technology innovations for both academic/teaching and learning, as well as the administration, brought much needed relief for many struggling students.

Technologies such as Ikamva, e-learning /ICS dominated the university sector. These were followed much later by technologies aimed at managing and tracking the progress of students of such as SASI, SEMS and the Marks Administration System (MAS) which is the subject of the enquiry of this study. The study examined the implementation of technology of mark administration and its challenges in the at UWC. Before the introduction of MAS and its implementation, the university felt that such technology of administering marks would ensure the consistent application of a single set of assessment rules and form the basis for a broader system for tracking student's performance. Historical documents examined show that MAS technology would retain assessment marks in a secure manner as well as assure the integrity of

assessment marks as far as possible and not include measures that could compromise this. What was not envisaged, which was significant was the initial resistance and lukewarm attitude to the technology and the slowness of its utilization by the university community.

Documents revealed that at the time of the 1st and 2nd phase of MAS release, a process which was released in various phases, there was at an institutional level. Student contact-centre went live at the end of November 2005. In general, the steps or stages were as follows: Release 1: Pre-registration, applications, student enquiry; Release 1: Portal and web services platform; Change management; Staging and production infrastructure; User test and acceptance; Training and Specification in the Release 2- Process. The above is clearer in the university document below.

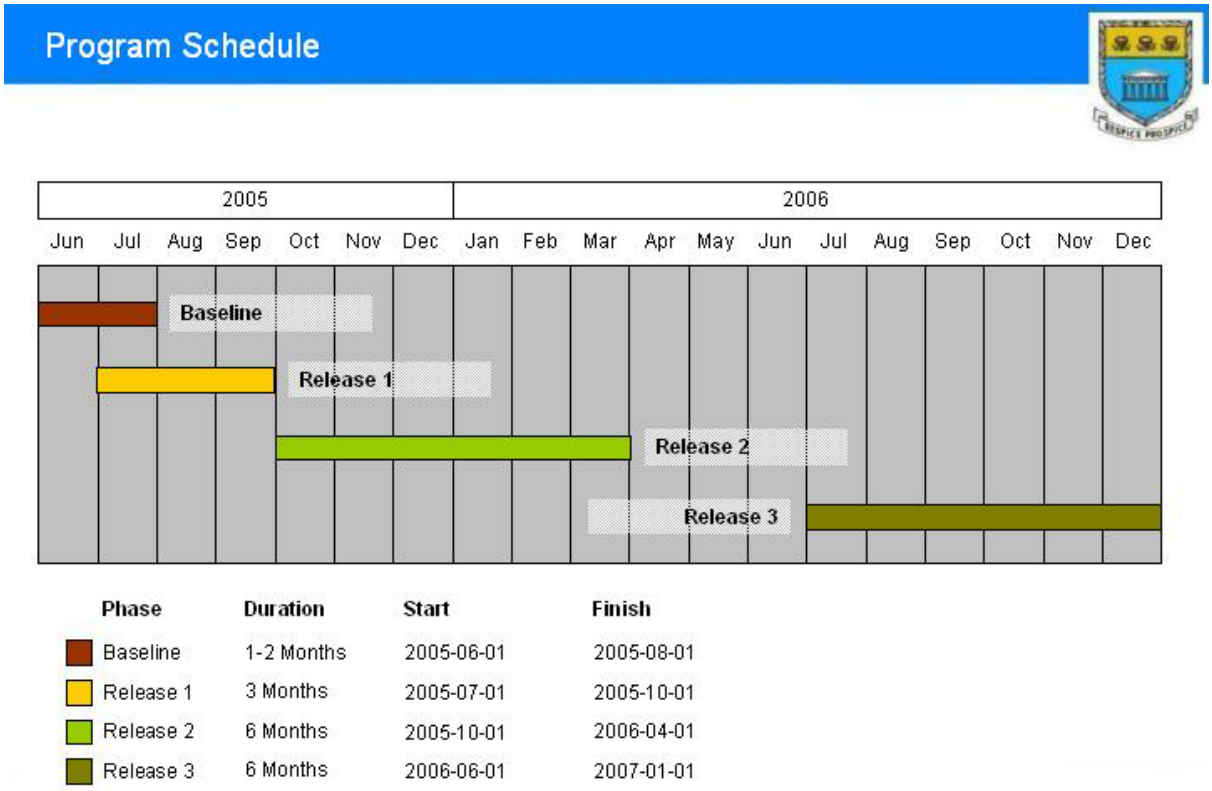

Figure 5.2: MAS Programme Release Schedule

The above serves as a pointer to the steps in the implementation on MAS and other systems as well which somehow allows for the assessment of MAS, although the study did not necessarily deal with that aspect of the system and the study enquiry.

MAS, as a system used for the administration and the management of marks followed the necessary steps in the implementation process. It also appeared as indicated in the timeline the project was released according to schedule. Despite this, which tends to suggest that MAS project was completed according to the timelines, compliance remained a problem, this was also highlighted in the auditor's report as earlier mentioned. This is due to some resistance shown by some staff and their lack to fully embrace the system. It is not clear as to why the wholesale buy-in by some academics still remain a problem from what documents show. It is to be emphasized that the problem is not widespread but does carry a big potential to discredit the system by shortchanging the roles delegated to various role players.

5.2 RECOMMENDATIONS AND FURTHER RESEARCH

To reiterate the aim of the study, which was in general, within the context of changing higher education landscape and to meet the challenges of "access", challenges in the implementation

of MAS technology at UWC was the core concern. From the findings, one can propose that, 1) all staff and academic staff in particular, needed more encouragement to acquaint themselves with technology to manage the academic administration aspect of learning and teaching. Giving the financial constraints which universities like UWC experience, it can be suggested that the government must endeavor to heavily invest, and be in the cutting edge of technology innovation as a form of community engagement to assist and to accommodate those communities affected by the divide for a meaningful contribution and be enablers to propel those affected to reach their potential and be technologically prepared before coming to university, which can, in a significant way, play a part in enthusing academics in the use of technology of teaching and learning.

The use involvement is key in any implementation given that, the users are largely impacted. If they are excluded, the damage is greater because they may not be interested in the implemented project and resist its use and flout the most important aspects of compliance, while their involvement form the outset leads to positive contributions and ownership of the system implemented. Training is also key for the effective use of technology, it is imperative that institutions encourage its staff to take regular trainings.

Before concluding, it is important to restate that the study followed a conceptual framework guided by the reviewed literature. Various theorists were used to understand the complexities associated with innovations and the implementation of technology in the university sector. The study largely used UWC as a case study in understanding the challenges associated with implementation of technology generally, focusing specifically on the technology of marks administration, MAS. It is therefore expected that UWC may not reflect experiences in other institutions in the country but it serves as important indicator and provided a significant enough understanding of the issue. It is hoped that further research looking into other aspects of MAS will be prompted by this baseline study.

5.3 FINAL CONCLUSION

The implementation of projects or any technology based innovation arguable presents a host of challenges. Some of these challenges are a result of lack of understanding of the implementation processes and poor planning, while some are as a result of poor infrastructure and resource constraints. The study undertaken looked in the area of technology of mark administration in a university, the challenges faced by the institution in implementing this technology. The study

took interest in MAS technology the University of the Western Cape which served as a case study. This interest was prompted by the general burning issue of "access". The access to information at universities became a big problem following a relatively open access due to changes in the country's governance which underwent an overhaul.

Universities, mainly those classified under the old dispensation as "Black" universities recorded a significant amount of challenges which continues to hamper their full potential. These are largely due to poor resources, planning and the inability of the bulk of students to use technology given their "challenged" backgrounds. These challenges place a lot of pressure on institutions and government to provide incentives for those affected to cater for such student's population. It appears as if the challenges of technology implementation are not only unique to South African context but in many parts of the world but Africa seems to be largely affected. Various studies pointed to this fact as the empirical literature show. Some countries have no hope because they felt governments are not providing the required support and have not taken the investment in technology as one of those key drivers to positive development and economy. However, many universities including in South Africa have taken a keen interest on technologies such as E-learning, ISC, Ikamva and many more. These serve as enablers to broaden access to information by their students in a convenient manner, often using their phone devices and computer labs. Notwithstanding these positives, scholars in the area have argued that the failure to factor in key considerations in implementation such as management support, user involvement, organizational culture, resistance and others can severely hamper the intended goals of the project and drain the organization of resources. It became crucial to consider this in the focus of the technology of MAS in this present study. The historical approach adopted to provide the narratives of the challenges was exceedingly useful in bringing out these challenges. From the findings, a general conclusion and recommendations regarding the way forward would be: 1) A technology culture has to be developed in universities. Academics need to empower themselves in order to provide leadership for their students to follow suit. If academic leaders are using technology, their students will adopt technology as well. 2) Disposal of outdated technology and all staff with internet capable computers. For lecturers to provide technological leadership, they have to be equipped with the latest technology. 3) Provision training for all staff. Universities need to develop the skills of their employees. Competent, skilled staff can provide confident technological leadership for their students. 4) Introduction and enhancement of computer literacy and web-based research across all facilities. More laboratories need to be built and equipped to provide computing to students

from all faculties and disciplines. 5) Further development and improvement of an e-learning culture where lecturers post notes and links on their personalized web sites. If course work is presented online, students will be forced to use the internet with a purpose rather than surfing aimlessly when they have free time. 6) Strengthening of a research culture where students are taught and encouraged to use the internet for research purposes. 7) Crucially, making facilities available 24 hours a day, on weekends and during autumn and winter vacations. And finally, 8) Obtain management support to reduce the digital divide. University management are dictated to by ever decreasing subsidies, increasing bad debt and decreasing student numbers. As a result, they are unwilling to invest in capital expenditure.

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APPENDIX A: PERMISSION LETTER

Faculty of Arts

DEPARTMENT OF ANTHROPOLOGY AND SOCIOLOGY

UNIVERSITY of the WESTERN CAPE

Private Bag X17, Bellville 7535, Rep of South Africa
Tel +27 21-959 2828 Fax +27 21-959 2336

14th February 2017

Ms. Putuma Macakati

Dear Ms Putuma Macakati

Request to conduct Descriptive Interview

I am pleased to inform you that your request to conduct an analysis of secondary data for your research into the Mark Administration System (MAS) system at the University of the Western Cape, has been approved. You may proceed to liaise with the responsible individuals in the relevant sections towards the completion of your study.

Best Wishes

Prof Olajide Oloyede
Professor of Sociology/Head of Department

APPENDIX B: ETHICS APPROVAL

Cape Peninsula University of Technology

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Symphony Road Bellville 7535

Office of the Chairperson Research Ethics Committee	Faculty: BUSINESS AND MANAGEMENT SCIENCES

At a meeting of the Faculty's Research Ethics Committee on **20 February 2018**, Ethics Approval was granted to **Putuma Macakati (201085267)** for research activities of **MTech: Business Administration** at the University of the Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	IMPLEMENTATION OF THE MARKS ADMINISTRATION SYSTEM (MAS) AT A WESTERN CAPE UNIVERSITY Lead Researcher/Supervisor: Prof IW Ferreira

Comments:

Decision: APPROVED

	27 March 2018
Signed: Chairperson: Research Ethics Committee	Date

Clearance Certificate No | 2018FBREC511

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Comments:

Decision: APPROVED

Signed: Chairperson: Research Ethics Committee	**27 March 2018** **Date**

Clearance Certificate No | 2018FBREC511