THE ROLE OF THE ADMINISTRATOR IN THE MANAGEMENT OF DATA QUALITY IN HIGHER EDUCATION: CASE STUDY IN A HEALTH SCIENCES FACULTY

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ABSTRACT

Contemporary universities are increasingly using information technology systems to ensure the smooth and efficient management of a range of administrative and reporting functions. This reliance on data and information systems has particularly become a feature for student enrolment management systems. Within the university sector in South Africa, verifiable data linked to student enrolments, success and throughput, along with staff and infrastructure indices have become a significant mechanism used for national planning, monitoring and funding by the government. Data integrity and the quality of data, especially associated with student enrolment management, means that the role of academic administrators is vital to data management in higher education institutions. Universities have developed increasingly robust and sophisticated information systems to capture and process the varying data required for its reporting and planning activities. However, the crucial role played by academic administrators in ensuring data integrity and quality has been an area of limited concern and research. This study attempts to address this imbalance and explore the current understanding of the role played by academic administrators in ensuring data integrity and quality associated with student enrolment management systems or student information systems. The study also seeks to offer insight into how to accentuate internalisation of the crucial role academic administrator's play in data quality and data quality management functions.

The research design of this study included an evaluation exercise of a specific programme that involved academic administrators in a faculty at a South African university. The Snyder's model was used to guide and structure the evaluation exercise. This evaluation framework ensured that principles and activities linked to action research and systems thinking were fully incorporated into all aspects of the research design. A participatory approach was adopted by the researcher and the overarching evaluation process sought to address the following research questions; What factors enable the Faculty of Community and Healthy Sciences' academic administrators to enhance data quality and data quality management? and How do the Faculty of Community and Healthy Sciences' academic administrators contribute towards data quality and data quality management?

The research is presented as a case study of the Community and Health Science Faculty at a South African university. Data collection strategies included unstructured interviews, focus groups, observations and the reliance on various documentary sources. The thematic analysis approach was used and the findings are presented through the main themes which emerged, namely student enrolment management systems processes such as applications, selection and registration, staff workload and staff training, availability of technology and data accuracy, and effective communication and management changes. The concept analysis presented in each theme shows the interdependence between recognising the vital role played by academic administrators in realising the faculty goals of data integrity and quality, and the need to assist them to internalise their contribution towards ensuring data integrity and quality.

The results of the study draw attention to and reaffirms the vital and significant role played by academic administrators who work with student enrolment data and the accompanying information systems used by the university. Also highlighted are some of the key competencies required to ensure that these administrators are able to work in ways that maximize data quality goals and render data quality management systems efficient. Additionally, the study raises interesting insights into the central role that academic programme evaluation, specifically the use of the Snyder's model, can serve in building human resource capacity and enhancing efficiencies in how student enrolment systems can be better managed and improved within a specific faculty at a South African university.

LIST OF ACRONYMS

4IR	Fourth Industrial Revolution
AA	Academic Administrator
ANC	African National Congress
CESM	Classification of Educational Subject Matter
CHE	Council on Higher Education
CLD	Causal Loop Diagram
DHET	Department of Higher Education and Training
DQ	Data Quality
DQM	Data Quality Management
EMS	Economic and Management Sciences
FCHS	Faculty of Community and Health Science
FCS	Feedback Control System
HDI	Historically Disadvantaged Institution
HE	Higher Education
HEI	Higher Education Institution
HEMIS	Higher Educational Management Information System
HEQC	Higher Education Qualification Council
HEQSF	Higher Education Qualification Sub-framework
HESA	Higher Education of South Africa

ICS	Information Communication System
ICT	Information Communication Technology
ID	Interrelationship Digraph
IMF	International Monetary Fund
IOP	Institutional Operating Plan
IS	Information Systems
IT	Information Technology
MAS	Marks Administration System
MIS	Management Information System
NCHE	National Commission on Higher Education
NQF	National Qualifications Framework
NSC	National Senior Certificate
PQM	Programme Qualification Mix
QA	Quality Assurance
QC	Quality Council
QPU	Quality Promotion Unit
SAQA	South African Qualification Authority
SASI	Student Administration System Integrated
SASQAF	South African Statistical Quality Assessment Framework
SAUVCA	South African Universities Vice Chancellors Association

SEMS	Student Enrolment Management System
SIS	Student Information Systems
SQL	Structured Query Language
TA	Thematic Analysis
TWDI	The Warehousing Data Institute
UWC	University of the Western Cape
VALPAC	Validation Package
WB	World Bank
WTO	World Trade Organization

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I have applied the Harvard conventional citation and referencing method during the compilation of this thesis.

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02/02/2021

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If a Student: Degree: MASTERS Supervisor: Corinne Shaw

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Research Project Title: IMPROVE ADMINISTRATIVE PROCESSES AT A TERCHIARY INSTITUTION

Overview of ethics issues in your research project:

Question 1: Is there a possibility that your research could cause harm to a third party (i.e. a person not involved in your project)?	YES	~~NO~~
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- the stated objective will be achieved, and the findings will have a high degree of validity;
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	Full name and signature	Date
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Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.		

DEDICATION

Sadly, in today's world we have too much visibility via social media, be that Facebook, Twitter or Instagram and very little functionality in addressing our societal problems. To become a more functional citizen of the world one must never stop learning as life never stops teaching us. I therefore dedicate this thesis to my three children, hoping to inspire them to embrace the concept of lifelong learning.

ACKNOWLEDGEMENTS

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

OVERVIEW OF THE STUDY

1.1 Introduction

The world is experiencing a rapid paradigm shift from a highly industrial society to a fast-paced technological society, responsible for an increased use of data and information systems (IS) (Abualoush, Obeidat, Tarhini, & Al-Badi, 2018). These data-driven information systems have become central to almost every business within modern society, including the domain of higher education institutions (Toro & Joshi, 2012). Student Enrolment Management Systems (SEMS) or student information systems (SIS) represent a key area where this growth and expansion of technology within higher education is evident (Jaleel, 2014).

South Africa has twenty six universities that largely operate autonomously. The state steers the Higher Education system by setting targets and goals through the Department of Higher Education and Training (DHET) (CHE, 2016). The DHET has oversight of all Higher Education Institutions (HEI) in South Africa who have to account for fiscal expenditure at a ministerial level (CHE, 2016). The ministerial office requires data from all its HEI's for better planning and monitoring purposes. This allows the DHET to monitor the Higher Education system as well as the performances of individual institutions with respect to their specified targets and goals (CHE, 2016). In order to fulfil these mandated monitoring and reporting functions, the DHET requires various data on all aspects of institutional activities. Should this data received from institutions lack integrity, it may result in poor, incoherent data analysis, which in turn might negatively contribute to poor planning and decision making. The consequences of poor data quality and integrity (for individual institutions) are equally high, and could lead to negatively impact on an institution's ability to make informed decisions (Van Schalkwyk, Willmers & Czerniewicz, 2014).

In an attempt to effectively deliver on this request from the DHET, the centrality of information communication technology (ICT) has become increasingly important for universities. Various integrated applications are now used in their daily operations and is particularly essential in processing large volumes of student data (Soares, 2013). Annually, the data universities collect

from students, staff and infrastructure is transferred to the Higher Education Management Information System (HEMIS) (Van Schalkwyk, Willmers & Czerniewicz, 2014). The HEMIS data analysis forms the basis for annual state funding allocations to HEIs and has the potential to influence policy level decision-making (CHE, 2016). As noted previously, the lack of data integrity could result in poor analysis, bad planning and uninformed decision making (Elias, 2014; CHE, 2016).

Academic administrators at universities in South Africa currently make a significant contribution to ICT processes that involve the collection, preparation and submission of data sources to the DHET (Soares, 2013). Consensus in the Higher Education (HE) sector suggests the notion of the knowledge society gaining ground. This would see administrative staff as key knowledge workers who are required to have the necessary knowledge, skills and abilities to appropriately use ICT services (Czerniewicz, Ravjee & Mlitwa, 2006; Ryttberg & Geschwind, 2017). Such thinking underlines the important role of academic administrators in their key function of collecting and processing the kind of student data essential for the efficient management of individual institutions, and the Higher Education sector by the DHET. The increased importance of academic administrators as the major users of student enrolment information management systems, and the main contributors towards the collecting, preparing and submission of data sources is therefore acknowledged (Soares, 2013; Ryttberg & Geschwind, 2017).

In the private sector the role of administrators in enabling the roll-out of ICT and their accompanying IT skill set has been viewed as giving businesses a competitive advantage (Jaleel, 2014).This potential is however, not solely dependent on IS, but how the system has been harnessed by its users, specifically administrators. A similar logic applies within the higher education context, with the role of academic administrators regarded as significant within the data supply chain. O' Brien and Marakas (2011) argue that with respect to student enrolment management systems and HEMIS, the place of the academic administrator is paramount.

The DHET reports that during 2017, more than half of all permanent staff at South African HEI's consisted of administrative staff (58741) in comparison to academic staff (55053) (CHE, 2018) and (DHET, 2018). This growth pattern, however, is not unique to South Africa. For instance, in the United Kingdom (UK) the academic administrative staff are in the majority at seventy one

percent of UK HEI (Jump, 2015), with similar trends in Australia's Higher Education (Regan & Graham, 2018). By contrast, Fowler (2015) argues that statistics are easy to manipulate and often does not truly tell the story, but rather that it negatively reflects how universities are overrun by administrative staff, instead of noting that this growth largely deals with accountability, auditing and reporting due to the increased use of ICT.

Data quality and data quality management have particular administrative demands and Ryttberg and Geschwind (2017) note the importance of both, clarifying what roles academic administrators play and helping these staff to fully understand or actualise the centrality of their function. This is particularly important as various academic administrators' roles such as data capturing, data quality and data analysis have not been carefully mapped. This kind of role clarification becomes more obvious when compared with more traditional administrative roles such as salary or human resource administrators and secretaries. However these roles are frequently seen as peripheral, "accidental or serendipitous" functions (Regan & Graham, 2018:3). There is therefore a clear need within the new environment of data quality and data quality management for some recalibration and refinement of academic administrators' roles.

Accounts of the political and academic changes within the post-democracy South African Higher Education environment illustrates the changing roles of academics and researchers (Ntshoe, Higgs, Higgs & Wolhuter, 2008; CHE, 2016). By contrast, there is a shortage of research that detail or account for the new and evolving roles played by academic administrators (Smout & Stephenson, 2002; Cloete, Bailey, Pillay, Bunting & Maassen 2011). Increasingly, administrative staff have had to undertake or become involved with student enrolment information technology and in so doing, they significantly influence their contribution to data quality and data quality management (Cloete et al. 2011). Ryttberg and Geschwind (2017) however, note the lack of scholarly attention paid to this category of staff. This research study is positioned to address some of these imbalances in research and empirical attention given to the role and function of administrative staff, especially with respect to their contribution towards associated data quality and data quality management within student enrolment management system processes.

1.2 Background to the research problem

The University of the Western Cape (UWC) was established in 1959 and in keeping with the Apartheid regime at the time, sought to reinforce the racially segregated policies of the state in the creation of universities to cater specifically for different racial groupings (Bunting, 2006). It was therefore designated to cater for people classified as 'coloured'. The notion of UWC as a 'coloured' institution was rejected by subsequent student protests in the 1970s and 1980s. These political uprisings led to the adoption of a new mission statement by the university, namely to *"Open the Doors of Learning"* to all students (IOP, 2004:16). These politically driven activities motivated the events that led the university to finally obtaining autonomy from the Apartheid state, through the Western Cape Act of 1983 (IOP, 2004:15). The acquisition of this independence resulted in the shift from conceptualizing UWC's purpose as a 'coloured' institution and serving the narrow needs of the Apartheid regime, to that of non-racialism and a commitment to the development of the marginalized communities of South Africa. It was through this belief in a new non-racial society that UWC enacted its contribution to the formation of South Africa's new democratic government (Soudien, 2012).

During the restructuring of the (HE) sector in South Africa during the early period of the new democratic government, UWC's particular political position meant it was able to resist some of the earlier merger and reconfiguration proposals put forward by the former government. Subsequently, it became the only historically disadvantaged institution (HDI) to escape the merger and restructuring processes (Bunting, 2006). As part of the restructuring and consolidation of niche disciplinary and professional areas, UWC was able to secure the niche areas of natural medicine, dentistry and nursing as part of its offerings (IOP, 2004:16).

UWC's capacity to maintain its autonomy within the face of the merger and restructuring process as well as securing these specific niche study areas are often regarded as determining factors influencing the increase and maintenance of its student numbers. As an institution it has shown consistent growth in student enrolment numbers (see Figure 1) (CHE, 2016). This is in stark contrast to the massive drop in HDI student enrolment figures in the early 2000s.

The increasing student numbers at universities across the globe since the 1970s is collectively described as 'massification' (Mouton, Louw & Strydom, 2013). The impact of massification for

UWC means that it was able to increase student numbers while also solidifying and legitimatizing its rightful position as a university of quality within the SA Higher Education landscape.

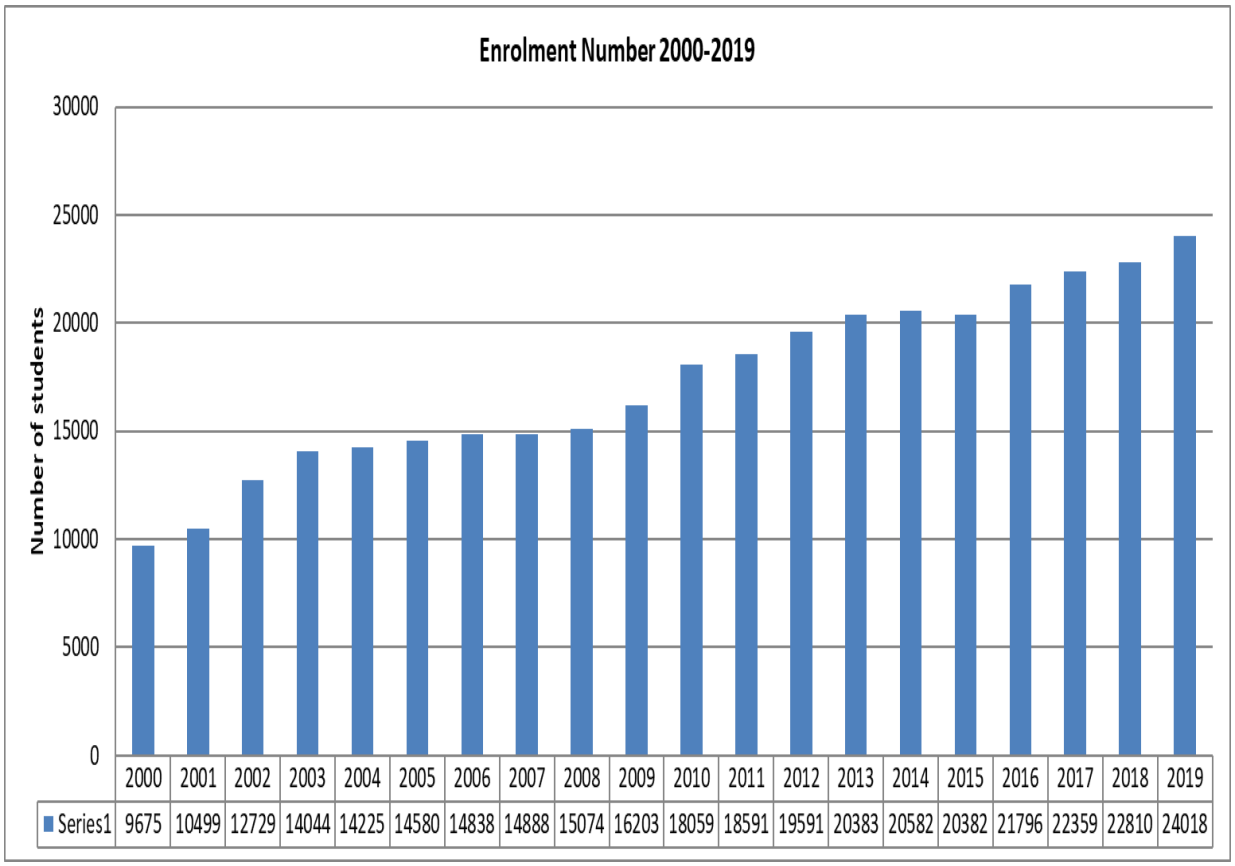
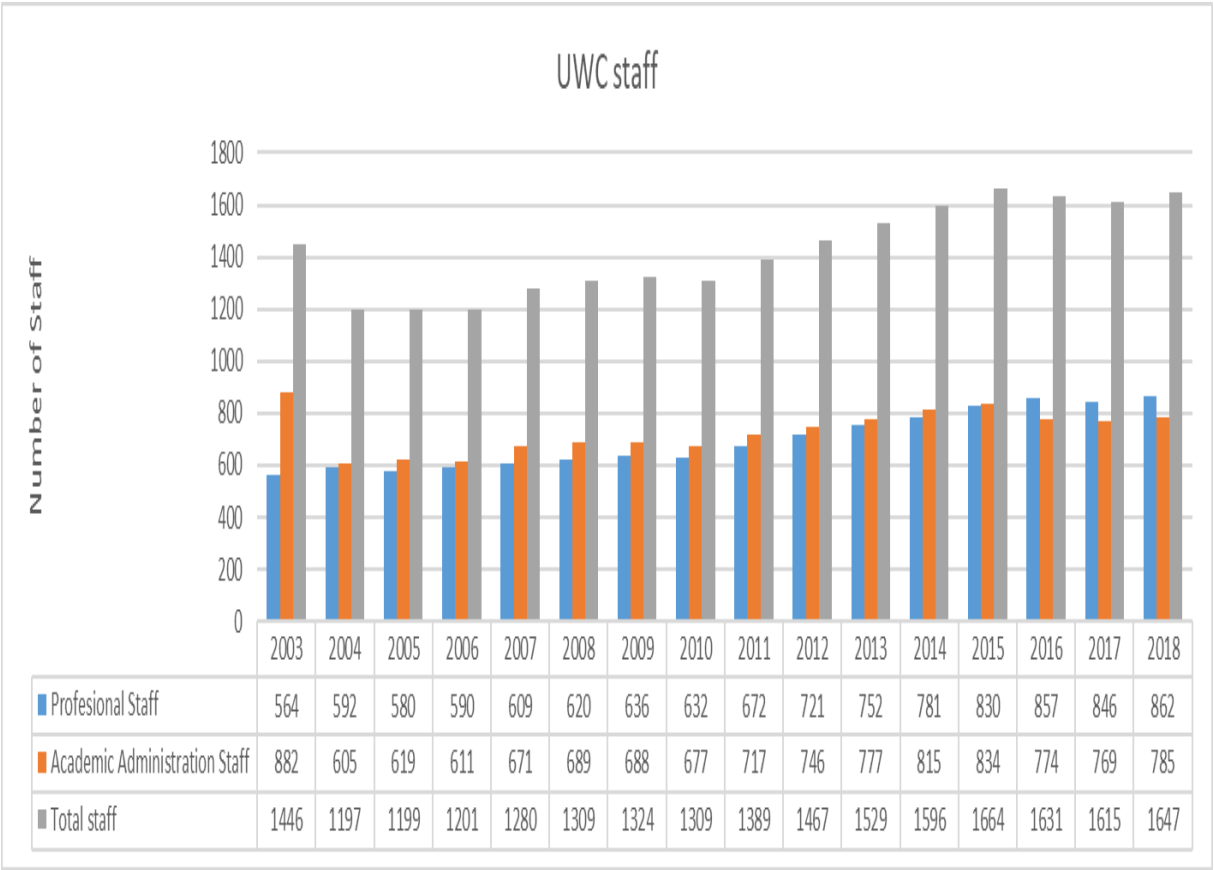


Figure 1: UWC enrolment numbers 2000-2019

The institution has however been presented with unique challenges, especially when considering the specific administration and infrastructural legacies the institution has had to contend with. Increased demands placed on student accommodation, teaching and learning, space, academic support and infrastructure resources, staffing needs and administrative services all came under pressure as its enrolment numbers increased. Increased student enrolment has not, however, been matched with the same incremental increases in academic administrators as shown in Figure 2. Academic administrators' numbers remain steady in the period between 2003-2015 and there is a decrease in numbers for this staff complement. These figures suggest particular challenges for academic administrators in an environment that places more demands on the tools they work with, and how they work.



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Profesional Staff	564	592	580	590	609	620	636	632	672	721	752	781	830	857	846	862
Academic Administration Staff	882	605	619	611	671	689	688	677	717	746	777	815	834	774	769	785
Total staff	1446	1197	1199	1201	1280	1309	1324	1309	1389	1467	1529	1596	1664	1631	1615	1647

Figure 2: Total number of UWC staff 2003-2018

Increased student enrolments also necessitated a review of the student administration system which became a key driver for the implementation of a more effective and efficient Student Enrolment Management System (SEMS) that could also meet the DHET demands for improved data quality and data integrity. The Institutional Operating Plan (IOP) of 2004 highlights the significance of this move:

> *The quality of student's administrative services was not desirable because it had difficulty with data integrity. A lack of coordination and coordination of its work processes and the lack of staff professionalism* (IOP, 2004:122).

A key focus area for the 2010-2014 IOP was the need to improve UWC administrative services in relation to the management of the SIS.

1.3 The need for data quality, academic administrators and information systems

Castells (2001) argues that both globalization and massification contributed to the creation of a knowledge economy that requires a different type of workforce, namely knowledge workers. Harrigan and Dalmia (1991) see knowledge workers as key employees able to produce imperceptible contributions and who possess critical information needed to affect a company's global marketing and logistics direction. Furthermore, they argue that with this information, managers are able to peruse preventative strategies and without it, organizations would continue to operate with outdated "products, policies and practices that are inadequate to meet the needs of a changing marketplace" (Harrigan & Dalmia, 1991:5). Chatterji and Kiran (2017) maintain that the emergence of a knowledge economy is swiftly becoming concurrent with global competitiveness, coupled with the shift of economy's emphasis on capital, to the knowledge-based workers as a source of natural wealth (Aburge, 2018). Contrary to that of the manufacturing worker, knowledge workers are supported by a different type of infrastructure, namely knowledge, skills and the ability linked to information technology able to generate large amounts of information or data (Koksal, Batmaz & Testik, 2011; Soares, 2013).

Krishnaveni and Meenakumari (2010) note that within higher education administration the ability to harness information technologies in the service of better planning, standard setting, effecting change and monitoring results is a core function within universities. Currently, data is processed by academic administrators, stored in the HEMIS, and used as the basis for all state funding allocations, as well as formulating annual government policy, planning and decision making (van Schalkwyk, Williams & Czerniewicz, 2014). Smout and Stephenson (2002) posit that the notion of data quality or quality assurance (QA) within South African Higher Education is a relatively new concept, while Cloete et al. (2011) note how the function of reporting on data quality and student information systems is also novel in the sector. There is therefore some urgency to ensure that academic administrators have suitable levels of knowledge to work in effective ways with new ICTs that now characterize most activities in the university, and become acutely aware of the significance of data quality and assurance in the work and processes they do.

1.4 Problem statement

Academic administrators are the primary users of SEMS or SIS. They are responsible for processing large volumes of student and staff data; which faculty management relies on for its monitoring and reporting functions to the university as well as internal planning and decision-making. Given the central role assigned to data quality and integrity, and the vital role academic administrators play in this function, the limited understanding and awareness of the interface between academic administrators, data quality and data quality management processes presents various blind-spots and efficiency challenges. Empirical investigation into the role and functions played by academic administrators within a specific faculty will ensure a closer understanding of their contributions towards data quality and the refinement of data quality managers strategies used in the faculty.

1.5 Motivation for this study

In my role as Faculty Manager, I have the responsibility to oversee and manage academic administrators as they utilise the current student enrolment IT system at the university. My professional insights suggest that academic administrators contribute to a suite of continually evolving new administrative tasks and duties. Guided by the position of Selwyn, Henderson and Chao (2018) educational research can enhance the understanding of how digital data is used and interpreted within the university. I set out to explore ways in which academic administrators in my faculty could become more aware of their role and function in data quality management, and sought to explore how to improve such systems with respect to student enrolment.

1.6 Significance of the study

Limited empirical research exists using evaluation assessments for academic administrators' performance (Heck, Johnsrud & Rosser, 2000) and about administrative processes within universities (Aburge, 2018). This research attempts to use a specific evaluation assessment framework, namely the Snyder's model (Dick, 1997), to investigate and account for the role played by academic administrators in data quality and integrity, in a single faculty at a South African university. The study seeks to offer two contributions: Firstly, to offer practical insights into how academic administrators understand their function and how they might be supported

to better recognise their roles with a view of improving data quality management. Secondly, the utility of the evaluation framework within the context of an empirical study will be explored.

1.7 Study goals

This research seeks to use the Snyder's model to undertake an evaluation process, with the goal of expanding the understanding of the role played by academic administrators in student enrolment systems and ways of leveraging their expertise to raise the efficiencies associated with data quality and data quality management systems.

1.8 Research questions

This research seeks to address the following research questions:

1. What factors enable the Faculty of Community and Healthy Sciences' academic administrators to enhance data quality and data quality management?
2. How do the Faculty of Community and Healthy Sciences' academic administrators contribute towards data quality and data quality management?

1.9 Programme evaluation

Gargani, Miller and Spiegelman (2016) posit that programme evaluations can serve many functions. These include contributing towards programme improvement, and the accountability of all stakeholders and enhanced decision-making. Programme evaluations can also promote social welfare by acknowledging worth and significance of all stakeholders involved in the evaluation process. Furthermore, as Shadish, Cook and Leviton (1991:20) mention "evaluation is an idealized problem-solving process that we use to learn about our world" that enable informed decisions or taking informed actions.

Evaluations of programmes originate from the business field, where efficient utilization of resources is at the core of organizations (Tasca, Ensslin, Ensslin, & Alves, 2010). Most programmes in the academic sphere exist to affect change for funders, organizers, HEI's and others who participate in these programmes (Frye & Hemmer, 2012). There are various expected outcomes of these programmes; however, the development of skills and knowledge is

paramount for the participating individuals (Allan, 1996). Evaluations are essential to determine the outcomes of programmes, to provide feedback to the relevant stakeholders and improve the programmes (Rajeev, Madan, & Jayarajan, 2009). In feedback from evaluations and assessments, both intentional and unintentional outcomes should be considered to provide insights that support continuous improvement of the programmes (Frye & Hemmer, 2012). Brooks (2003) advocates strongly for programme assessments and states that their outcomes could aid the quality improvement of services and products.

1.10 Methodological framework

1.10.1 Snyder's evaluation model

The Snyder's model was developed by Wes Snyder and adopted by Bob Dick (1997), which also demonstrated strong action research practices. Bob Dick (1997–2005) developed an extensive consultancy and research profile demonstrating a series of programme evaluation applications via online presentations and publications. In addition, the Snyder evaluation model uses embedded systems thinking and grounded theory principles (Allen, 1997). It assumes that the organization, unit, project or programme being evaluated can be viewed as a system (Checkland, 1999).

Systems models treat a program as something that transforms inputs into outputs (Allen, 1997). The main elements of the model can be exhibited as resources, activities, immediate effects, targets and ideals (Dick, 2001). To illustrate, the model consists of three phases:

> Process evaluation, which seeks to understand the links between these elements; outcome evaluation, which uses this understanding to identify performance indicators; and short-cycle evaluation, which uses these indicators to set up feedback as a way to monitor ongoing performance (Allen, 1997: 636).

The three stages of the evaluation make use of the systems model which matches how the project might operate. As Allen (1997) comments the evaluation stages also highlights how resources are used by activities and these in turn generate both intended and unintended immediate effects in the pursuit of ideals and objectives.

The researcher of this dissertation proposed that the Snyder evaluation model supports this study, with the primary focus on process evaluation. Dick (2001) describes the process evaluation method as a formative process with an embedded-systems thinking approach, having a participatory application. Additionally, it assists in developing an understanding of the programme, together with an improved ability to measure what the participants do (WHO, 2000). A key benefit for applying a systems-thinking approach is that it offers a means of using information to develop understanding. Additionally, emphasis is placed on relationships and contexts rather than discrete elements or properties such as roles and values (Allen 1997). These characteristics of a systems-thinking approach are ideally suited to multi-stakeholder situations like that of the Faculty where the research is located. Following Checkland's (1993) viewpoint such an approach is able to assist academic administrators to see how different activities and relations of different parties fit together to produce data, with the ultimate purpose of transforming this data into reliable information.

The advantage of this model is that it is participatory, contributes to change and empowers the participants engaging in the evaluation process (Dick, 2001). Accordingly, this makes systems-thinking significantly helpful regardless of the goal of the intervention. Although, Kastens and Manduca (2017) cautions that this goal can be reached, provided that the vision articulated is strong enough to attract, motivate and guide the participants to take action. Dick (2001) suggests that when the process evaluation comes to its conclusion, stakeholders should have developed an understanding of the links between adjoining elements and in this regard, allowing participants to validate the process. The usefulness of the process can then be confirmed as participants show an improved understanding of how things/elements fit together and how as a group they were able to agree on the same set of ideals.

The focus area of this research study is primarily the faculty academic administrators, including other support areas that play a key role in the generation of data through working with the SEMS. This model lends itself to involving academic administrators as co-evaluators during the application of the process evaluation. The research group was chosen for their expertise and skills, rendering them a purposeful group for the task (Maxwell, 2012). They also constituted the focus group that engaged in the process of applying the systems component of this research. This complements the participatory nature of the evaluation and systems-base used to address

the faculty's concerns and guide this purposeful group to work more cooperatively in order to achieve a common set of resource goals (Allen 1997). Dick (1997) maintains that such an application builds an understanding around how the group achieves objectives for themselves.

Through the application of this evaluation process, the researcher's goal is to assist academic administrators to develop an understanding of the most important programme resources, activities, immediate effects, targets and the links between them, subsequently highlighting its importance to data quality. Equally important, the researcher also contributes to the development of present and future bodies of knowledge in the areas such as data quality and data quality management by involving academic administrators in the evaluation process.

1.10.2 Philosophical methodology

The researcher in this study employed an evaluation with a constructivist paradigm - making use of grounded theory and systems-thinking principles, due to the uniqueness of this programme and the limited research on this topic (Morse, 2007). The Snyder's evaluation framework complements a constructivist worldview approach and encourages a participatory application, as well as the use of grounded theory and systems-thinking principles. These principles are able to assist with the emergence of new understandings or knowledge. Equally important, is that these principles assist in demonstrating the connectedness of the multi-perspectives of staff members and their work activities. Resultantly, this contributes to a shared understanding of what is required by staff members to continuously improve data quality. This evaluation approach also pairs well with the nature of this study, in so far as there being limited research on this topic.

Evaluation studies apply common social sciences research methods using both qualitative and quantitative data because they do not have specific dedicated methods (Kelly, 2012). The aims of qualitative approaches are similar in nature to that of quantitative approaches, in that they seek to find identical results through different methods (Vaismoradi, Turunen, & Bondas, 2013). Qualitative methods are varied and include approaches such as descriptive, narrative, grounded theory, phenomenology and ethnography (Sandelowski, 2000). Charmaz (1995:28) describes grounded theory as "an inductive, comparative and interactive approach that offers several open-ended strategies for conducting emergent inquiry". Additionally, the grounded theory

approach is based on the production of theory from data (Khan, 2014). It constructs theory from the data collection process rather than employing a set theory at the commencement of the research study (Bruscaglioni, 2016). It can be argued that because of these characteristics, grounded theory defines traditional positivist research because theory is seen as grounded in the data (Strauss, & Corbin, 1990). Theory development thus results from the codification and classification of the data (Charmaz, 2007).

Bogdan and Biklen (1998:6) state that "Qualitative researchers are concerned with process, rather than simply outcomes or products". Accordingly, qualitative research aims to acquire information of occurrences as described, experienced and perceived by the participants that enable the scholar to understand, analyse, and draw rational explanations on the issue (Gorman, Clayton, Shep, & Clayton, 2005). Therefore, essential to qualitative data is to gather participants' varied opinions in more detail, which is a key attribute of qualitative research (Maxwell, 2012).

On the other hand, quantitative research is based on examining numeric data in order to address the research questions (Maxwell, 2012). However, it was not essential to assess the components of this study using quantitative measures (Walliman, 2011). The programme requires a skilful and knowledgeable workforce, and therefore has a small population size. As a manager and researcher, qualitative bias is present and acknowledged, but measures such as asking open ended-questions were adopted to gain deep insights from the participants' perspectives (Maxwell, 2012).

A total population sampling approach, which is a purposive sampling, was adopted in this current study, implying that only a certain group of individuals affected by the phenomena were approached to participate in the research (Etikan, Musa, & Alkassim, 2016). Furthermore, the population size and total number of subjects who participated in the programme was limited and identifiable. Moreover, the population size of this current study comprised of twenty six (26) participants from faculty and support services; nine (9) participated in unstructured interviews, eight (8) through observation and nine (9) as part of the focus group. This current study also adopted a mixed data collection approach for this evaluation. Data collection for this current study was conducted through qualitative data collection methods; unstructured interviews,

observations, focus groups and examinations of documentation; all self-administered (Harrell & Bradley, 2009).

1.11 Structure of the chapters

Chapter 1: Overview of the study

This chapter introduces the main topic area for the study and outlines the importance of data quality and data quality management systems in the higher education setting. A brief review of the study goals and methodology are also presented.

Chapter 2: Literature review

This chapter provides an overview of the core theoretical concepts that support and guide the empirical activity of this study. The discussion includes the expansion of IT within the university sector and the importance of data and data quality. The significance of academic administration as primary users of student enrolment ICTs and its role in data quality and data quality management processes are explained. Additionally, a discussion of the evaluation process used in the study is provided.

Chapter 3: Research methodology

A comprehensive explication of the research methodology is provided in this chapter. A detailed comparative description of key evaluation frameworks is presented and a clear argument is made for the utilization of the Snyder's model. The research setting and overview of the research activities, which include the data collection, sampling strategy and data analysis approach used, are then presented. Finally, ethical considerations are described.

Chapter 4: Findings

The findings of the study are presented through the four thematic themes and eight sub-themes.

Chapter 5: Application and interpretations of the findings

This chapter presents the analytical discussion of the findings and illustrates the related and interrelated connections between the input, process and output of the various elements of the four themes and sub-themes.

Chapter 6: Discussion

Insights related to the implications of the findings are presented in this chapter.

Chapter 7: Conclusion

In this closing chapter a brief review of the study goals are outlined along key recommendations and limitations of this study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This research seeks to develop an understanding around what is required on the part of academic administrators, in the expertise of data quality and data quality management. In this chapter the researcher of this dissertation will review the available empirical and conceptual literature sources and critically reflect on the merits of this study. Through discussions of the literature, the researcher aims to validate the importance of conducting this research. Additionally, differentiated views of other researchers on higher education academic administrators, data quality and data quality management are highlighted to provide insights on focus areas that could inform future researchers about this topic.

2.2 Administrators roles in higher education

2.2.1 The emergence of academic administrators

Day (1946:340-343) believes that it is important to see clearly what administration has to contribute, even though it is implied that "administration may be only a means to an end, but it is none the less of supreme importance". Jacob, Xiong and Ye (2015) reaffirms a similar belief that in today's higher education ecosystem, irrespective of the institution being private or public, top level administrative support has become essential for an institution's long-term sustainability.

Administration staff in Higher Education were previously seen as a peripheral function that was usually perceived as a body of loosely associated workers that was defined simply as "non-academic" staff (Bossu, Brown & Warren, 2018:2). These references or nomenclatures are sources of frustration because such terms as "non-academic", "support staff", "allied" and "assistants" can sometimes be perceived as degrading, particularly when they are less valued than their academic colleagues (Szekeres, 2011:684). Hayward (1992) outlines that these academic administrators were largely seen to be contributing towards committee serving

functions with university ceremonial activities. For example, this workforce was previously compartmentalized as peripheral functions, occupying roles such as human resource administration and secretaries (Ryttberg & Geschwald, 2017). Similarly, Whitchurch (2004) acknowledges that during the early seventies, such roles and functions were generally that of advisors on regulatory aspects of policy, but also maintaining administrative standards with functional operational areas such as academic administration, finance, personnel and estates (building infrastructure); as indicated in Figure 3.

As Ryttberg and Geschwing (2017) note such staff members were largely responsible for facilitated decision-making processes as they provided vital and productive information during faculty committee meetings. Whitchurch (2004:288) further explains that these roles were stable and distinguishable from each other, by specialization and/or by academic location, "such as generalist administrators (based as registry and secretariat staff) and specialist professionals (such as finance and personnel staff)". However, these functional operational areas are insufficient in outlining precisely the actual work done by these staff

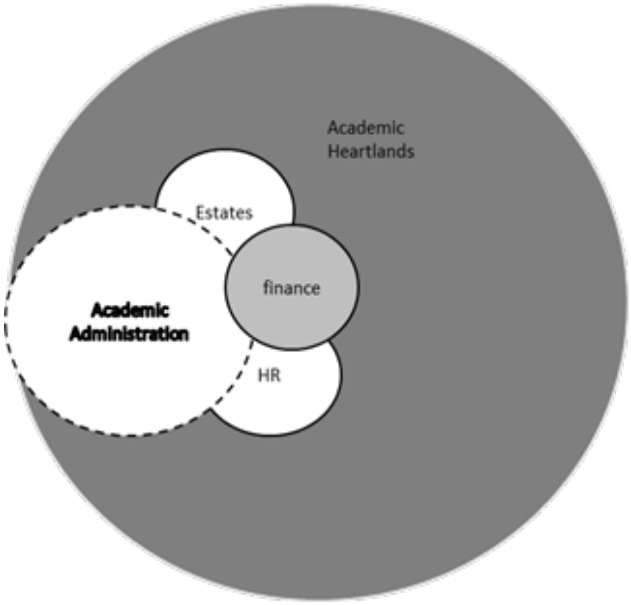


Figure 3: Academic administration during the seventies (Whitchurch, 2004:288)

and/or by academic location, such as generalist administrators (based as registry members, but nevertheless has progressively provided alternative reclassification of this category of staff; from

support staff to academic administrators, and more recently professional support staff (Ryttberg & Geschwind, 2017). Bossu, Brown and Warren (2018) suggest that the changes and challenges experienced by the HE environment through competitive funding modules, performance agendas, globalization, internationalization, massification and technology, has influenced the development of professional support staff.

2.2.2 The emergence of professional administration

In an attempt to better understand this category of professional support staff, Whitchurch (2008:378) conceptualizes the categorization as "the emergence of the third space," essentially referring to the merging of relationships between academics and professional domains, to create what is commonly known as "blended" professionals (Whitchurch, 2009:407). Likewise, Veles, Carter and Boon (2019:75) refer to such a collaboration of staff as "third space professionals" because they appear to be continually negotiating borders, often transcending professional, geographical and functional boundaries, with alternate spheres of activities. Day (1946) holds the view that the success of academic administrators is dependent upon this collaboration with their non-administrative associates.

Ryttberg and Geschwind (2017) withhold the view that these professional support staff does not identify as belonging to neither the administrative or academic fields and only further distorts the already confounded boundaries both organizationally and institutionally. This also highlights that organizational structures at universities in the past operated largely from a closed system. As Figure 3 illustrates, this did not allow for the transcendence or negotiating of borders as those seen in the academic heartland. Naturally, the alternate model to this is said to be operating from an open system which supports units operating in a third space (Whitchurch, 2008). This is demonstrated metaphorically, "like an amoeba", with functional elements that may split, merge and modify operationally as represented in Figure 4 (Whitchurch, 2006:171). This then also underpins the need for specialist academic administration, student enrolment, strategic planning, enterprise business development, QA, external relations, as well as marketing and management roles (Baltaru, 2019). All of these processes are needed and imperative in running a much larger institution with a more complex set of requirements to control university processes adequately (Baltaru, 2019). The importance of this structure is that it adheres to the

rules of open systems, in that decisions regarding resources cannot be isolated from one functional area to another, but instead highlights how professional support staff is not a homogeneous group (Baltaru, 2019). This indicates that this dynamic workforce reinforces the academic heartland in a way where finance, estates and human resources are highly impactful on the other parts of the system and now has to be managed as a single unit (Whitchurch, 2006). Thus, the attempt to satisfy this emerging need presents itself through the increased acknowledgement of "hybrid workers or multi-professionals" in face of an expanding demand for formal processes of accountability and support (Whitchurch, 2006:171).

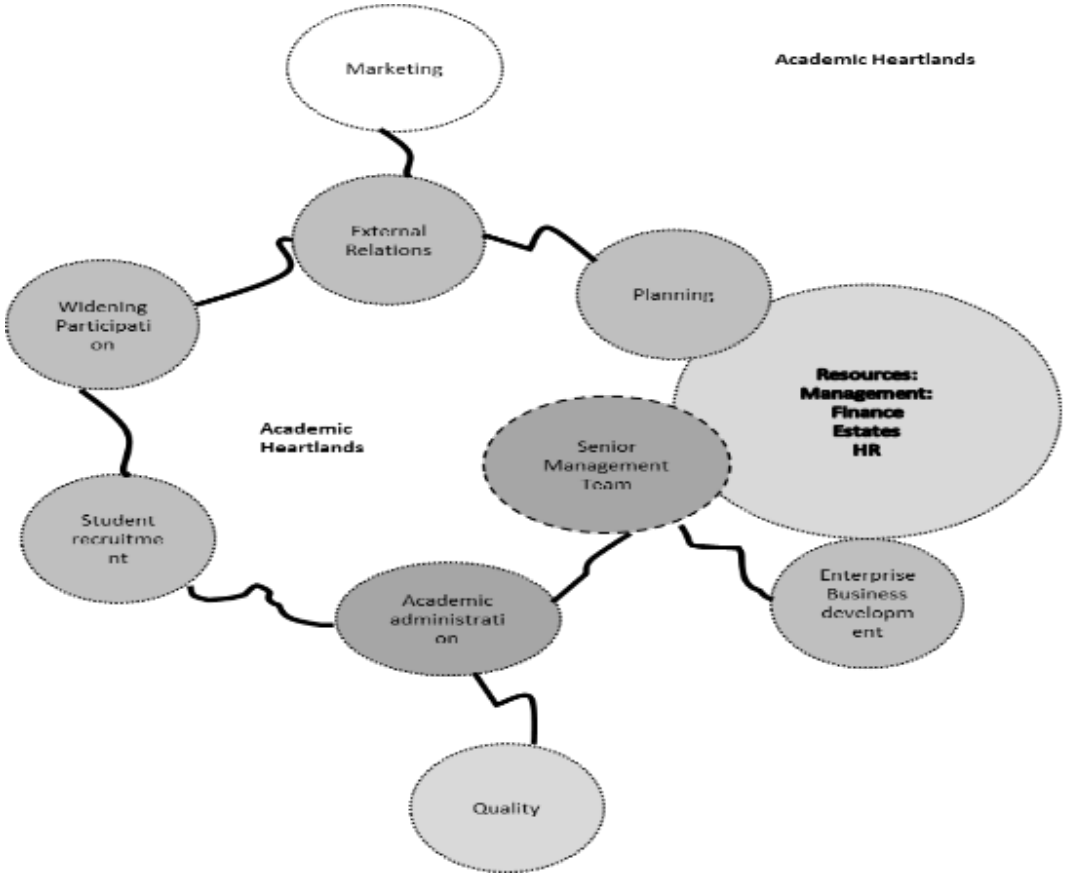


Figure 4: Academic administration in an open system (Whitchurch, 2006:171)

This demand is arguably more pressing for academics than for administrators, as Rhodes and Sporn (2002) suggest that these spaces are more often occupied by senior professors who take on hybrid roles, as that of administrators. However, very few authors have highlighted the defining views on professionalization or attributed this to the production and certification of

knowledge and expertise of academic administrators (Gornitzka & Larsen, 2004). Correspondingly, Ryttberg and Geschwald (2017:335) reveals that there is a "lack of scholarly attention to the group"; with other researchers like Bossu, Brown and Warren (2018) agreeing that there is limited literature and research on this category of staff. Furthermore, recent complementing studies by Ryttberg and Geschwald (2017) were able to present learnings on professional support staff within specific fields at a HEI, attuning their focus on specific operational areas and activities such as business liaison, internationalisation and strategic research support.

Bossu, Brown and Warren (2018) manage to highlight another pertinent issue facing administrative staff in HEI structures. They have found that in contrast to the clearly established roles and promotion for academic staff at different stages in these careers, progression and promotion for academic administration staff are generally ambivalent and limited; even though they have become a significantly enlarged work force, presently making up almost half of the staff at many HEI's (Rhodes & Sporn, 2002).

These alterations have subsequently brought about the transformation of the academic administrative management in the international HE sector where currently these roles and functions are practically unrecognizably to those present in the sector three decades ago (Bassnett, 2004). Yet, Clark (1998:5) strongly positions that in the "Academic Heartlands", the viral functional role of academic administrative management has been made clear. Consequently, these shifts have allowed for the creation of new specializations within university administration including such sophisticated roles and functions such as marketing, student enrolment services, ICT and the importance of data integrity (Toro & Joshi, 2012; Jaleel, 2014).

The formulation of student enrolment management systems (SEMS) as a new specialization blended with communication and student information systems (SIS) has changed the very nature of higher education (Krishnaveni & Meenakumari, 2010). The introduction of SIS allowed for the transfer, storage, retrieval and processing of information by an increased number of university stakeholders, be it staff or students (Jaleel, 2014). The introduction of SIS can thus be seen as the catalyst for changes in the type of work force needed within the university, specifically staff who needed specific IT knowledge and skill (Ryttberg & Geschwald, 2017). Despite such significant

changes within the SA university sector, academic administrators and IT still lack professional bodies to promote or advocate for this vital role and function within the sector.

2.3 Creating knowledge workers in HE

Dougherty, Dececchi, Clear, Richards, Cooper and Wilusz (2002) recognize the necessity for higher numbers of a knowledge workforce at HEI's with skills in IT, and proposes that the result promises an increase in productivity that would not be realized otherwise, due to limited abilities of HE structures. Chatterji and Kiran (2017) assents that the emergence of a knowledge economy is becoming swiftly concurrent with global competitiveness, coupled with the shift of economies' emphasis on capital to a knowledge-base as a source of natural wealth (Aburge, 2018).

2.3.1 A paradigm change

A paradigm change from a past dominated by 'tangible' paper-based activities to a future of more 'intangible' virtual technologies with data-driven operations, has prompted the demand for workers with particular technical skills (Czerniewicz, Ravjee & Mlitwa, 2007). As noted above, this paradigm change initiated the move towards a new kind of workforce for whom ICT is considered a basic requirement (Czerniewicz, Ravjee & Mlitwa, 2007). Unlike that of the manufacturing worker, a knowledge workforce is supported by a different type of infrastructure that takes the form of people with knowledge, skills and the ability to deliver information technology (IT) (Koksal, Batmaz & Testik, 2011). Another expectation of this workforce is having the ability to operate with generating large volumes of information or data, whilst simultaneously attempting to solve quality related problems (Soares, 2013). Krishnaveni and Meenakumari (2010) highlight that the strong reliance on ICT in administration in universities has seen the uptake of technology to guide the core functions of the university such as planning, standard setting, change management and results monitoring. Additionally, the authors point to how ICT has been able to open up information exchanges while also promoting access to higher education; aided primarily by been able to link various systems such as student admission, examination results, transcripts and student finance through ICT systems (Krishnaveni & Meenakumari, 2010). Zainally (2008:36) makes a similar argument, suggesting that, "information and communication technology provides several facilities and possibilities for educational

administrators to do their tasks". Therefore, adequacy in ICTs thus becomes a pivotal aspect to the role of the academic administrators.

Student administration involves a broad and dynamic set of activities that has a foot in every process or phase in the university. For example, as Krishnaveni and Meenakumari (2010:283) describes, the process of student administration commences "from the initial admission process, during learning activities, then lastly in processing of results and performance analysis". With the incorporation of ICT into student administration, the overall functionality of these processes are enhanced with the additional consequence of even making university admission more accessible (Obeng, 2004). Krishnaveni and Meenakumari (2010) and Jaleel (2014) provide some useful examples of the way in which ICT systems can supplement the admission processes. In particular, there research highlights how ICT have allowed for the automation of the admission process through e-media (electronic media), processing of admission based enquiries from students, using e-media for applications and registrations, course allotment and the provision of electronic timetables and attendance monitoring.

ICT have generally become a mainstay of staff administration process. "Staff administration processes involves the recruitment and work allotment of staff, which would include other functions such as attendance, leave management and performance appraisal". This information has to be communicated at various levels of the institutions, i.e. departmental and faculty levels Krishnaveni and Meenakumari (2010:284). Obeng (2004) describes how such ICT systems that has to deal with staff administration can be credited with the processing of large records in quick and efficient ways and the increased confidence associated with the data usage. It is however equally important to establish a good communication system when aiming for the overall effectiveness of administration. Toro and Joshi (2012) further assert that ICT enables a good communication system in higher education, allowing for internal and external information acquisition and dissemination, for example, the distribution of e-circulars to students, academics and administrative staff. Considering ICT as an essential asset to the optimal function of HEI is thus well established (Jaleel, 2014). With respect to the focus on this research study, it plays a vital role in ensuring functionality of administrative staff, their daily practices and the execution of the roles.

The present understanding implies that these applications are becoming indispensable aspects for effective education provision, especially within universities (Johl, von Solms & Flowerday, 2013). Nabavi and Jamali (2015) acknowledge that not enough attention is given to the functionalities of academic administration, despite being faced with a growing dependency on IT and an increasing demand for data production, processing and storage. Above all, this illuminates the need for academic administrators to possess the necessary skills and knowledge to appropriately address the current rise of administrative challenges facing HEIs in Sub-Saharan Africa. Equivalently, it urges higher education to strive to perform better, to expand the knowledge economy by producing more professionals and to improve the quality of data at HEIs (Odhiambo, 2014).

HEIs are constantly under increasing volumes of pressure emanating from massification, the rapid rate in technological advancement and the demand for more accountability (Mouton, Louw & Strydom, 2013). Subsequently, the demand for student IS effectively increases, to ensure that administrators act swiftly in capturing all student data accurately and efficiently (CHE, 2014). Furthermore, this resulted in a need for IS capable of processing large amounts of student data accurately, retrieving information swiftly and being able to convert student data into meaningful information. In addition, this induced the requirement for a new professional space for management and academic administrators to inhabit, in which data knowledge and data work can be easily processed and accessed (Selwyn, Henderson & Chao, 2018).

2.4 Understanding IS as DQ and a DQM tool

Jayaratna (1994) proposes that the term IS technology refers to the use of computers with the purpose of processing, storage, transmission and presentation of data/information; with a clear objective of satisfying the user's needs. Chang and Behl (2012) affirms this position noting how it offers a technical means for information collection, processing and information carriers which are all cardinal tools to ensuring data quality and data quality management.

Ryker and Nath (1998:1) describes IS as comprised of five components; "namely hardware, software, data, procedures and people". While these five components are present in every information system, it is the people aspect that is of more import for this discussion. The people component in IS references to those "who operate and service the computers, parties who

maintain the data, who support the networks and naturally, those who use the system" (Ryker & Nath, 1998:2). Within the context of universities, Sagitova (2012) describes IS as organizational and technical systems. Here information technologies are used to collect, process, acquire, store, search and disseminate information. A university's IS system is thus intended to support information resources and information flow, while simultaneously providing opportunities for users to work in data computing environments and allow teachers, researchers or administrators to perform the various functions of their jobs (Bi, 2011).

Improved information access for planning and managing the institution is regarded as one of the main advantages of IS systems in universities. Additional these systems can be harnessed to improve services offered to academics, students and administrators, while also reducing business risk, increase incomes through the reduction of expenditure due to improved efficiencies (Zornada & Velkavrh, 2005). Sagitova (2012:56) further asserts;

> "these systems serve to control the entire educational process; including the activities of the dean's offices and departments, compilation of timetables, introduction of changes to the list of staff and students of the university".

In uncertain and turbulent times Naranjo-Gil (2009) argues that organizations strive to improve their competitiveness, principally through enhanced productivity, innovation, quality and flexibility of their services. When under such pressures, an organization's information processing capabilities can be challenged by diverse and extraneous demands (Trivellas & Santouridis, 2013). In order to address these kinds of challenges, some commentators have suggested that organisations should develop and apply Management Information Systems (MIS) which can be more sophisticated and comprehensive in their reach (Choe, 1996; Ghorab, 1997). MIS often use computer technologies to undertake analysis, planning and control (Trivellas & Santouridis, 2013). MIS is regarded as the primary IS use within higher education, with the express purpose of meeting the varied information meets of all stakeholders in the organisation (Asemi, Safari & Zavareh, 2011). Academic administrators are the key users and drivers of processes in the value chain of data production at tertiary institutions working with IS.

2.5 Knowledge economy: data, information, knowledge and action

There is no, one, distinctive definition for the term 'information' (Madden, 2000). It is considered under various constructs which include its existence through the compilation of data, configuration to form knowledge, communication processes, and as a resource (Madden, 2000). However, the most common definition is that it is a construct of processed data (Ackoff, 1999); (Ball, Weaver & Kiel, 2004).

In Figure 5, Taylor (1982) demonstrates the concept of value-added processes in IS and illustrates how it is possible to transform data into information, resulting in useful knowledge. More particularly, data can be described as characters that make up an object or occurrence (Ackoff, 1999). These characters could be unorganized facts, numerals, as well as signals of objects and events which they supposedly portray (Morabito, 2013). Data usually seems meaningless in raw format; however, when applied in context they gain meaning (Cooper, 2016).

The difference between information and data is not entirely physical, but rather functional (Ackoff, 1999). Morabito (2013) states that data and information are part of a spectrum originating from singular facts, figures or signals relating to human actions, activities and objects; which through purposeful organization become significant and meaningful concepts.

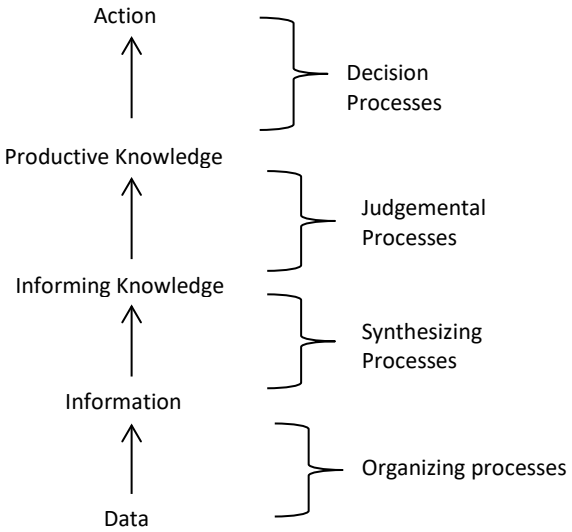


Figure 5: Taylors value chain spectrum (Taylors, 1982:342)

Furthermore, information comprises of facts, relevance and interpretation of data from a particular setting or background (Morabito, 2013). Information at knowledge level is considered instructive, which enables the answering of related inquiries (Ackoff, 1999). Consequently, knowledge is a product of information and logic, which includes beliefs and experiences (Morabito, 2013). Knowledge can therefore be contextual as it could be qualified by aspects that include beliefs and experiences, which are relative to individuals and organizations (Bernstein, 2009). Knowledge is usually compartmentalized into either tacit or explicit knowledge (Cooper, 2016). Tacit knowledge tends to be acquired through experience, intangible and not easily communicated or documented, while explicit knowledge can be documented and easily shared (Morabito, 2013). Information can be a strategic resource that could be used to generate knowledge, as well as to inform decision making (Morabito, 2013). Therefore, it needs to be appropriately managed to assure the wellbeing of people and organizations with vested interests (Adeoti-Adekeye, 1997).

Information management is the systematic process of collecting, storing, organizing, manipulating, using and disposing of information; with the underlying motive to derive value from it in order to enable organizational effectiveness (Choo, Furness, Paquette, Van den Berg, Detlor, Bergeron, & Heaton, 2006; Cackett, Bond & Gouk, 2013). Makani (2015) argues that in this manner knowledge could be viewed hierarchically, portraying knowledge as a higher form of information or data, instead of a circular view of data that portrays information and knowledge as an interwoven and interrelated set of aspects. Viewing knowledge as a higher order of information can contribute to understanding data management and knowledge discovery and show how data application tools appropriate to universities have to enable staff reflection in and on action. Taylor's (1982) model of value chain spectrum also demonstrates that through knowledge we are able to make better decisions and choices, but through actions we will be able to at least address some, if not all of our immediate problems.

HEIs rely substantially on effective management of data to generate diverse data sets that assist with managerial decision-making at both operational and strategical levels (Haug, Zachariassen, & Van Liempd, 2011; Makani, 2015). Eckerson (2002:3) agrees with this position when stating

…"data and information are now as vital to an organization's wellbeing and future success as oxygen is to a human, and without a fresh supply of clean unpolluted data, companies will struggle to survive".

Researchers like Johl, von Solms and Flowerday (2013) support the notion that data production, processing and storage needs to become a fundamental aspect within the university environment. Although these processes are now indispensable to university functionality, just how crucial it is to its operations are not yet fully realized.

A similar information data process is applied within the HE ecosystem, through which data is generated (captured) by academic administrators at the entry level (start of the student's life cycle), but also at the level of returning students. This data is used to monitor the performance of universities, which is requested by the DHET that in turn, adds it to the Higher Education Management Information Systems (HEMIS) (CHE, 2016).

2.6 Impact of poor data and information quality in HE

Hosie (1995) contends that in order to effectively build institutions able to achieve quality outcomes, management teams need current human resources information. A function Lee and Strong (2003) argue can be made possible through technology and quality information, which it provided. The term "knowledge worker" is often used to refer to those who are the primary consumers and users of information. English (2001) similarly defines knowledge workers as personnel who utilize information to perform their work activities. It is for this reason that a deficit of quality information could negatively impact the work activities of these knowledge workers, consequently affecting HEI's negatively.

For knowledge workers to be effective in their respective fields of expertise, they are dependent on data generators (Eckerson, 2002; English, 2001). Additionally, data has to meet certain accessibility, contextual and representational qualities in order to be used in helpful ways (Lee & Strong, 2003; Kovac & Cathcart, 1999). Poor quality across the data production process negatively impact the performance of knowledge workers and thus could have negative implications for the organization on a whole (Helfert, 2002). This was a point raised by the Higher Education of South Africa (HESA) infrastructure study of 2012 that showed how the lack of quality

data compromised the extent and comprehensiveness of reporting at the time. Even though HEI's are required to submit data on their infrastructure to the DHET as part of their HEMIS returns, the quality was not uniform, provoking major concerns (Badat, 2012). Commenting on the data integrity of the HEMIS system researchers Van Schalkwyk, Willmers and Czerniewicz (2014) raise the following descriptions of the system:

- The HEMIS data does not provide detailed information on registered part time students and this might be attributed to government's primary concern with fulltime equivalent students for subsidy purposes.
- There are internal capacity problems at DHET level resulting in it being unable to organize and share data in a manner that will ensure research with the potential to impact positively on the system at large.
- University planners are able to access to their own captured data and report writing tools, but comparative data is not always available.
- Without prior knowledge of how the data is coded and structured by the DHET, it remains challenging to interpret such data.

Problems with data quality are not frequently publicised primarily because the nature of these problems are either unknown or ignored (Redman, 2005; Khalil & Harcar, 1999). There is a tendency for organisations to measure data quality by focussing on the data accuracy intrinsic dimension, often at the expense of other parameters (Redman, 2005). Thus when accurate data fails to match other dimensions of quality such as contextual, representational and accessibility, it is deemed of no value (Wang & Strong, 1996).

Wand and Wang (1996:87) explain that for us to "design for better quality, it is necessary to first understand what quality means and how it is measured". Merisotis (2002) maintains this sentiment by suggesting that before developing any performance evaluative system for university, it is essential to first determine the contents and meaning of quality in higher education so that it becomes clear why it is important and to who it is significant to.

2.7 Understanding data quality

Data is created and used in all daily operations, elevating data into becoming critical inputs to almost all decisions made by HEI's; for procuring funding from government and for internal planning purposes (Cai & Zhu, 2015). Notwithstanding the necessity for quality data, the public HE sector in South Africa still exhibits a low level of maturity and understanding of IT; including data quality and data management processes (Johl, von Solms & Flowerday, 2013). It is subsequently revealed that in many cases senior management is not aware of the problems of poor quality data or its cost implications, often leading to misunderstandings and increased operational costs, in the form of time and other resources expended in detecting and correcting errors (Haug, Zachariassen & Van Liempd, 2011). These situations are compounded when staff have difficulty in making sense of data quality from two different paradigms, namely tangible and intangible paradigms. However, Wang, Storey and Firth (1995) suggest that we should consider using an analogy that displays the issues in quality existing between the two paradigms. For example, in Table 1 that outlined the differences between physical and data products using the work of (Wang, Storey and Firth, 1995), "product manufacturing" system acts on raw material inputs and material processing, produces output material, or "physical product(s)". In a similar way an IS can be regarded as a data manufacturing system acting on raw data input. For example, a single number, a record, a file, a spreadsheet, or a report and uses data processing (information systems) to produce output data in the form of data products for example, sorted files, a corrected mailing list or statistical graphs for monitoring and planning (Wang, Storey & Firth, 1995:623).

Table 1: An analogy between physical products and data products (Wang, Storey and Firth, 1995:624)

	Product Manufacturing	Data Manufacturing
Input	Raw Material	Raw Data
Process	Material Processing (Assembly line)	Data Processing (Information systems)
Output	Physical Product	Data Products (Information products)

The term data manufacturing can be used to encourage present and future researchers and practitioners, to embrace this analogy when in the facilitation of knowledge transferral from one field of product quality to another; namely, data quality. It is therefore understood that by using the term "data product", it is merely to emphasize the fact that data output has value, in the same way we value physical output, and that this can then be transferred to customers as a product (Wang, Storey & Firth, 1995).

The problem with data however, is that it degenerates quickly over time. Some estimates suggest that two percent of records in a customer file becomes obsolete in the course of just one month, for an array of reasons including customer mortality, customers getting married or simply moving on (Eckerson, 2002). On the other hand, HEI records of data do not necessarily follow this trend as most academic records of students remain unchanged even after graduation, unlike personal information. In addition, an error in a data entry or a systems migration could cause serious errors to existing data forms. Concurrently, fragmentation of universities into different departments and units can result in distinct interpretations of data elements to meet their specific business needs, consequently, generating differentiated views and perspectives on the importance of these data elements (Mlangeni, & Ruhode, 2017; Wahyudi, Kuk & Janssen, 2018). This, more importantly, is one of the most significant and indirect contributors to complications in data quality.

According to The Data Warehousing Institute (TDWI), most organizations do not fund programmes designed to build quality into data and nearly half of all companies have no plan for managing data quality. This is an attitude seemingly reinforced within the South African higher education system, stressing the importance for why a greater emphasis on the education and development of academic administrators and managers in IS is urgently needed (CHE, 2016).

2.7.1 Defining data quality

Research on data quality started during the 1990s. At this time, industrialization dominated the globe and this resulted in diverse definitions for data quality that were largely driven by an overarching conceptualization of data quality, defined through a lens of manufacturing and production (Cai & Zhu, 2015). Similarly, Wang and Strong (1996:6) understand data quality from

the perspective of the consumer, ensuing the definition that data quality is “data that is fit for use by data consumers”. In the manufacturing and production area, quality definitions of Juran (fitness for use); and Deming *(*quality of any service or product can only be defined by the customer), both have similarities regarding data quality (Crosby, Deming & Juran, 1992: 4-23). These complementary definitions are formulated on the view that the quality of data depends on the design and production processes involved in generating that data (Wand & Wang, 1996). Nevertheless, although there are similarities in some aspects of product quality; dimensions of data quality are much broader and intricate than these provided definitions. Evolving to the present, data quality is viewed instead as a multidimensional concept (Wang & Strong, 1996).

“Fitness for use” is a prominent definitional view of data quality as advocated by the operational standards and guidelines of the South African Statistical Quality Assessment Framework (SASQAF). “Fitness for use” is used to assess the quality of data and statistics produced at the DHET. Statistical information is thus understood as the degree to which a set of inherent characteristics in the statistical data fulfils particular user requirements (Statistics South Africa, 2010). Statistical information is therefore measured in terms of the “prerequisites” or the eight dimensions of quality, namely “relevance, accuracy, timeliness, accessibility, interpretability, comparability and coherence, methodological soundness and integrity” (Statistics South Africa, 2010:2).

2.7.2 Data quality management

Wang, Hulstijn and Tan (2016:76) describes data quality management as the “establishment and deployment of roles, responsibilities, policies, procedures and systems; for the acquisition, maintenance, dissemination, and disposition of data”. It is neither regarded as a business or technology process, but a combination of the two. It suggests the difficulties associated with the implementation of data quality management (Wang, 1998). Owing to this, Helfert, Zellner and Sousa (2002) reported that many businesses failed to clearly delineate the roles for data quality management. Responding to this particular shortcoming, Vosburg and Kumar (2001) asserts that organizational-wide initiatives are needed to promote an understanding of what data quality management entails and its applicable methods and techniques. Clarification of these definitive

roles becomes essential to establishing data quality management that is effective and productive.

The implementation of data quality management requires the use of a specific framework. Such a framework would assist in how data quality management is conceptualised and also allows for the design of effective and necessary activities (Otto, 2007; Olson, 2003). The Total Data Quality Management (TDQM) framework developed by Wang (1998) is an example of a product-oriented approach to data quality management that also aimed to improve business performance. Wang's (1998:59) framework viewed "information as a product and associated data to that of raw materials in a manufacturing process".

Strong (1997) suggests that viewing information as a product also allows for defining its quality attributes. Table 1 illustrates that in information manufacturing, raw data is processed by an IS to produce information products. Notwithstanding, the commonly known expression of 'garbage in, garbage out' may easily apply to this process as well. This naturally implies that poor raw data (input) will result in poor information product (output). It is thus critical to ensure data quality, and the input of quality data, in order to obtain quality information products (Lillrank, 2003).

Furthermore, information products are typically manufactured, distributed and consumed by intended users (Davenport & Brooks, 2004). Accordingly, information products generally meet the requirements of its intended user/s. However, information products should still be delivered with a certain level of quality, even though it meets the essential requirements of its consumers (English, 2001).

Kovac, Lee and Pipino (1997) identified roles in the data delivery process as data generators, distributors and consumers. Figure 6 shows that data is manufactured by originators and distributed through various mediums to consumers. This process comprises of the generation and organization of data into meaningful information for consumers. Data quality requirements, as defined by consumers, should therefore be met by originators and distributors (Wang & Strong, 1996).

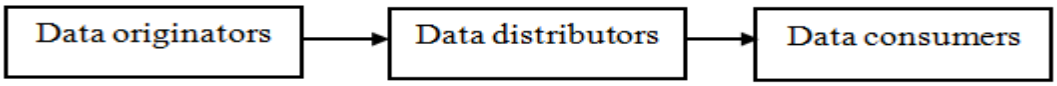


Figure 6: Roles in information delivery (Kovac et al, 1997:64)

In the context of South African HE, Figure 6 can be understood in light of the supply of data to the HEMIS. These are presented in a wide range of data sets that are submitted by all HEI's on an annual basis and consists of data on students, staff and on building space or infrastructure (CHE, 2016). Additionally, these data sets consist of the Classification of Educational Subject Matter (CESM) categories, course registration, credit values, qualifications, course files and staff files (Calderon & Webber, 2015). The data from the HEMIS is primarily used as the basis for all state funding allocations as well as a platform to formulate government policy, and the annual planning and decision making (van Schalkwyk, Willmers & Czerniewicz, 2014).

Most of the HEMIS data is obtained from universities' Student Enrolment Management Systems (SEMS). Defined as an organizational concept, enrolment management consists of a systematic set of activities designed to enable HEI's to exert more influence on their enrolments (Hossler, 2015). This definition was strategically redefined as a comprehensive process. It was meant to assist institutions to achieve and maintain optimum recruitment, retention, and graduation rates of students (Dolence, 1998).

These definitions contribute to a much broader view of enrolment management to include the incorporation of the understanding "institutional budgets, communications, marketing, admission processes, recruitment, retention, institutional fit, external demographics, institutional profile", communication, institutional research, assessment and data collection, adding drastically to the complexity of administration processes (Hossler & Kalsbeek, 2013:6). These complex administrative processes often reveal conflicting situations during the implementation of quality assurance (QA) measures, especially when having to collect accurate and reliable data (Kahveci, Uygun, Yurtserver & Ilyas, 2012).

2.7.3 Data quality dimensions

Quality can be highly subjective and complex, thus making it difficult to provide measurements for data quality dimensions (Knight & Burn, 2005; Khan, Strong & Wang, 2002). In an IS, the state of the real world is often represented by symbols; be that textually, numerically or graphically and can be used only when there "is an agreement or set of rules governing their interpretation by people which they refer to as a system of connotation" (Shanks & Darke, 1998:295). Semiotics becomes a useful theoretical concept that aids in understanding how signs and symbols are created, processed and used (Shanks & Darke, 1998; Tejay, Dhillon & Chin, 2004; Daraio, Lenzerini, Leporelli, Naggar, Bonaccorsi & Bartolucci, 2016).

Moreover, there are four semiotic levels: empirical, syntactic, semantic and pragmatic (Tejay, Dhillon & Chin, 2004). Firstly, the empirical levels are concerned with the study of the physical properties of signs and its use for the communication of symbols. Secondly, the syntactic levels concern the structure of symbols and focus on form rather than content. The semantic levels on the other hand refer to the meaning of symbols, while pragmatic levels involve the usage of symbols and are dependent on the particular task of the person using the data.

Wang and Strong (1996:6) mutually defines the dimensions of data quality as "a set of quality attributes that represent a single aspect or construct of data quality". They withhold the belief that these dimensions are "intrinsically good, contextually appropriate for the task, clearly represented and accessible to the consumer" (Wang & Strong, 1996:22). Table 2 below demonstrates these positive characteristics of data quality dimensions asserted by Wang and Strong.

However, it could be argued that intrinsic data quality only displays a singular quality that the data possesses. For example, accuracy is one quality dimension intrinsic to data, and is a distinct quality of the data. Similarly, contextual data quality considers solely the context in which data is used, like the dimension of completeness that is strictly related to the context of the task at hand.

Table 2: Wang and Strong conceptual framework of data quality (Wang & Strong, 1996:22)

Categories	Dimensions	Understanding
INTRINSIC DQ	Believability Accuracy Objectivity Reputation	This denotes that data has quality in its own right which consists of accuracy, objectivity, believability and reputation
CONTEXTUAL DQ	Value –added Relevance Timeliness Completeness Appropriate amount of data	Highlights the requirements of considering data quality within the context of the task at hand and focus on the value-added, relevance, timelines, completeness and appropriate amount of data
REPRESENTATIONAL DQ	Interpretability Ease of understanding Representational consistency Concise representation	Emphasizes the important roles and encompass interpretability, ease of understanding, representational consistency and concise representation
ACCESSIBILITY DQ	Accessibility Access to security	Stresses the importance of the roles of systems and consists of accessibility and access security

Another example in light of representational data quality captures aspects exclusively related to the format and meaning of data, as in the case of currency figures like Dollars and Yen (Wang & Strong, 1996). The work of Knight and Burn (2005) furthermore provides a collective set of the most common data quality dimensions or attributes as represented in Table 3 below:

Table 3: Knight and Burn's list of common dimensions of data quality: (Knight and Burn, 2005:162)

Dimension	#of times	Definition
Accuracy	8	The extent to which data is correct, reliable and certified as being free of error
Consistency	7	The extent to which information is presented in the same format and compatible with previous data
Security	7	The extent to which accessibility to information is appropriately restricted in order to maintain its security
Timeliness	7	The extent to which the information is sufficiently up to date for the task at hand
Completeness	5	The extent to which information is present and is of sufficient breadth and depth for the task at hand
Concise	5	The extent to which information is compactly represented without being overwhelming or hollow
Reliability	5	The extent to which information is valid/applicable and reliable. The extent to which information is correct and reliable
Understandability	5	The extent to which data are clear, without ambiguity and easily comprehended
Accessibility	4	The extent to which information is easily available and quickly retrievable
Availability	4	The extent to which information is physically accessible or attainable
Objectivity	4	The extent to which information is unbiased, unprejudiced and impartial
Relevancy	4	The extent to which information is applicable and helpful for the task at hand
Usability	4	The extent to which information is clear and easily found and fitting to tasks
Amount of data	3	The extent to which the quantity or volume of available data is appropriate
Believability	3	The extent to which information is regarded as true and credible
Navigation	3	The extent to which data is easily found and guided
Reputation	3	The extent to which information is highly regarded in terms of its source or content
Useful	3	The extent to which information is applicable and helpful for the task at hand
Efficiency	3	The extent to which data is able to quickly meet the information needs for the specific task
Value-added	3	The extent to which information is beneficial and provides advantages from its use

When comparing the collection of data quality dimensions of Knight and Burn (2005) to that used by SASQAF, it is found that the only corresponding dimensions between the two are accuracy, timeliness, accessibility and relevance. Conversely, the dimensions of interpretability, comparability and coherence, methodological soundness and integrity are not reflected by the SASQAF. Nonetheless, the dimensions used by SASQAF still fulfil the necessities of data quality appropriately by ensuring that the data is intrinsically dependable (on account of the 'accuracy' dimension), contextually appropriate for the task (on account of the dimension's 'timeliness' and 'relevance') and by making it accessible (the dimension's 'accessibility'). Wang and Strong (1996) assent to denoting the quality of the data gathered by SASQAF. Accordingly, Marcella and Knox (2004) corroborates this belief that underpinning IS are the dimensions of accessibility, relevance of data, reliability and consistency; which are crucial to its use and effectiveness in a university setting. In view of this, it could thus be inferred that the focus on university data should be gazed at through the lens of these quality dimensions, such as reliability and consistency.

2.7.4 Measuring data quality

The measurement of data quality at HEI's is not just an academic discussion about how to best understand and measure programme quality; but is at the same time an organizational problem. The problems involves how to organize information and IS optimally, in response to both internal and external demands concerning performance of programmes and services (Welsh & Dey, 2002). Nevertheless, most companies develop quality measures on an adhoc basis to solve specific problems that do not necessarily deal with data quality, often because they lack usable metrics (Pipino, Lee & Wand, 2002). However, if data quality can be considered a multidimensional concept, then naturally, companies must employ a multidimensional approach to deal with the subjective measurement perceptions of individuals involved with data; as well as the objective measurements based on datasets. For example, on the one hand, subjective data quality assessments reflect the needs and experiences of stakeholders (collectors, custodians and consumers of data products (Pipino, Lee & Wang, 2002:211). Within many healthcare, finance and consumer product companies, these take the form of questionnaires oftentimes measuring the perceptions of stakeholders on these data quality dimensions. Objective assessment on the other hand, can be either categorized as task independent or task dependant. Furthermore, task independent metrics reflect states of the data without the

contextual knowledge of the application and can be applied to any data set, regardless of the task at hand. Whereas, task dependant metrics are developed in specific contexts of application such as organizations with business rules and government regulations, routinely provided by the database administrator (Strong, Lee & Wang, 1997). However, when performing objective assessments, companies follow a set of principles in order to develop metrics specific to their needs. Usable data quality metrics is preferred with underlying principles of subjective and objective data quality (Stausberg, Nasseh & Nonnemacher, 2015). These usable data quality metrics have three functional forms, namely:

1) Simple ratio, that measures the ratio of desired outcomes to total outcomes (Pipino, Lee & Wang, 2002:213);
2) Minimum or maximum, as an operation applied to dimensions that require the aggregation of multiple data quality indicators that are also referred to as variables (Pipino, Lee & Wang, 2002:213);
3) Weighted average, in which application is applied for multivariate cases, like when a company has a good understanding of the importance of each variable to the overall evaluation of a dimension, then a weighted average of variables is appropriate (Pipino, Lee & Wang, 2002:215).

Evaluations are important forms of assessing or measuring the relevance and impact of programmes, thereby determining whether they should be abandoned, improved or continued (Saks & Burke, 2012). Equally important is that evaluation is a process of determining the worth of an entity, based on the available data (Frye & Hemmer, 2012). This resultantly enables institutions to provide a systematic method to study a programme, practice, intervention, or initiative to understand how well it achieves its goals (Patton, 1987).

Evaluations should be a main feature within any academic environment, considering their constant need to evolve in order to meet the continuously changing social, economic and educational environments (Frye & Hemmer, 2012). Therefore, the primary aim of a university performance evaluation system is to provide institutional improvement through quality assurance in every process and action (Anninos, 2008). When effectively carried out, evaluation produces a comprehensive perspective that informs the judgments and decisions to be made

about and within a programme (Bennear & Coglianese, 2005). Moreover, they further contribute to insights that are pertinent to decision-making, feedback and marketing of an institution (Saks & Burke, 2012).

It is then conclusive that evaluations in HE are key in providing information about programmes, which could be used to comprehend their impact and value to the interested stakeholders like that of institutions, funders, governments, participants, employers and the people at large (Schomburg, 2003).

2.8 Programme evaluation

Educational institutions engage in evaluations for various reasons both internally and externally (Frye & Hemmer, 2012). They are usually conducted to determine the impact of policies, to address resource allocations, for accountability purposes, to gauge service delivery, as well as to assist in decision-making regarding programmes and interventions (Tilley, 2006). Evaluations falls into one of two broad categories, namely formative and summative (Ewell, 2008).

Formative assessments for one, are considered ongoing evaluations that tend to influence ensuing actions during the progression of programmes (Nusche, 2008). At individual level they inform on the progress, development, knowledge and capabilities of persons; while at programme level, the feedback continuously aids the improvement of the programmes (Nusche, 2008). Furthermore, the formative evaluation categories consist of *input evaluation*, which assess the resources needed to implement the programme activities or meet the programme goal. Process evaluation assesses the programme's activities and whether it is implemented according to plan. Output evaluations assess the immediate results based on the activities carried out (Gorgens & Kusek, 2010).

Lastly, summative assessments have the tendency to focus on performance evaluation for records or decision-making and are predominantly used for purposes related to accountability (Nusche, 2008). They are additionally used to determine the value or effectiveness of programmes (Eseryel, 2002). Moreover, summative assessments could also be conducted at various levels of the programme and comprise of multiple categories (Nusche, 2008). These categories consist of outcome evaluation that assess the benefits of the activities; and also

impact evaluation focussed on assessing the effects the programme has on the beneficiaries (Gorgens & Kusek, 2010). These categories use various approaches to qualitative methods, such as descriptive, narrative, grounded theory, phenomenology and ethnography (Sandelowski, 2000). Essentially, these categories are guided by two dominant, traditional, philosophical paradigms referred to as positivism and interpretivism (Adom, Yeboah & Ankrah, 2016). However, despite the distinguishing features between the two assessments, the aims of these qualitative approaches are similar in nature; in that they seek to find identical results through employing different methods (Vaismoradi, Turunen, & Bondas, 2013).

Owning to the research situation i.e. the uniqueness of the programme and the limited research on the topic, the researcher, in this current study, embraces a constructivist viewpoint as it complements the use of grounded theory and systems thinking principles. Adom, Yeboah and Ankrah (2016) suggest that the philosophical viewpoint of constructivism had in time emerged from an interpretivist view. Moreover, a constructivist paradigm takes a relativist stance similar to interpretivism; enveloping the belief that there is no single, tangible reality that can be reduced and approximated; but that there are multiple, constructed realities instead (Pickard & Dixon, 2004). Accordingly, constructivist researchers believe that there is no single reality, but that the researchers elicit the participants' views of reality (Bogdan & Biklen, 1998; Morse, 2007). Epistemologically, constructivism sees subjectivity as the only option in the research process and suggests that the only way the unknown can become known is through our own belief systems (Pickard & Dixon, 2004). Notwithstanding this view however, Guba (1992:26) proposes that subjectivity is not only forced upon us by human condition, but is a means of unlocking the constructions held by individuals.

Qualitative researchers are concerned with process, instead of focussing on the products (Bogdan & Biklen, 1998). Qualitative research aims to acquire information of occurrences as described, experienced and perceived by the participants, with the underlying motive of enabling the scholar to understand, analyse and draw rational explanations on the specific issue/s (Gorman, Clayton, Shep & Clayton, 2005). For this reason, it is essential to gather the participants' different opinions in excessive detail, which is a cornerstone of qualitative research (Hoepfl, 1997). In contrast, quantitative research is based on examining numeric data in order to

address the research questions (Muijs, 2004). However, this method was not essential to assess the components of the current study (Walliman, 2011).

Furthermore, the evaluation studies apply common social sciences research methods using both qualitative and quantitative methods because they do not have specific dedicated methods (Kelly, 2012). Data collection for this current study was conducted through qualitative data collection methods, as the likes of unstructured open-ended interviews, observations, focus groups and examinations of documentation were all self-administered (Harrell & Bradley 2009).

Lastly, the programme implemented in the study requires a skilful and knowledgeable workforce, consequently producing a small population size. As a Manager and researcher, I acknowledge and account for qualitative bias, although attempted to offset any present bias through measures like asking open-ended questions during interviews as a way to acquire deeper insight from participants' perspectives (Hoepfl, 1997).

2.9 Conclusion

This literature review discusses the emergence of academic administrators as knowledge workers operating within a HE environment, utilizing technology in the form of a SIS. Additionally, it covers how the drivers (academic administrators) need to become cognisant of intangible products such as data and data quality, including ways in which to manage and improve it. It further suggests that the applicability of knowledge can be studied through the application of a participatory evaluation research study, which shows the local contextual relevance of the knowledge or an evaluation study. This then becomes a guide to the next chapter for choosing an appropriate research design and method for applying an evaluation framework.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the researcher engages with the processes and measures employed in the study that aims at producing results and insights to the research. The researcher first provides a brief background to academic administrators, data quality and data quality management, including a discussion on the research design and setting. Additionally, the applied model is unpacked, as well as the advantages and disadvantages; together with comparisons of other available approaches and methods. Moreover, the approaches and methods used in this current study are presented, as well as the reasons for their use above other available approaches and methods. This chapter also provides a description of the data analysis framework and justification of its suitability for this study. Accordingly, this framework further reflects on the processing of data collection from techniques, including semi-structured interviews, observations, focus groups and documents, through the application of a thematic analysis (TA) particularly as a qualitative analysis tool.

Lastly, the researcher discusses the population and sample used in the study, as well as the validity and trustworthiness of the study, and then finally concludes this chapter with the ethical considerations pertaining to this research (Lincoln & Guba, 1985; Collier-Reed *et al*., 2009).

3.2 Background to the evaluation study

Globalization and massification has had a direct influence on the development and expansion of technology in the form of SEMS/SIS at UWC (Ryttberg & Geschwind, 2017). This has effectively become the primary vehicle for HEMIS data collection and storage, resulting in academic administrative staff having to increasingly take on various important roles (Ryttberg & Geschwind, 2017). This naturally makes academic administrators an essential part of the human capital involved in this domain. This workforce has become the major users of SEMS/SIS at HEI's – responsible for the collecting, preparing and submission of data sources, directly or indirectly to the DHET (Soares, 2013).

The Department of Higher Education and Training (DHET) reports that during 2017, more than half of all the permanent staff at their HEI's consisted of academic administrators (58741), as compared to the academic staff (55053) (CHE, 2018:52; DHET, 2018). However, researchers have highlighted that even though an increase in student and staff numbers is apparent, these HE systems in Southern Africa often encounter limited capacity in the capturing and reporting of statistical information (Calderon, 2018:11). Fan (2015:1) proposes that such situations can likely be attributed to real life data often being "dirty", inconsistent, inaccurate, incomplete and duplicated; with more than twenty five percent of the data used by the world's top companies being generally flawed. Admittedly, problems in data quality cost businesses in the United States (US) an estimated loss of 600 billion dollars in revenue (Marsh, 2005:105). Accordingly, this signifies the necessity for high quality data as a prerequisite for business analysis and further demonstrates the importance of guaranteeing the accuracy and value of that data (Cai & Zhu, 2015:1).

3.3 Research design

Maxwell (2013) leads us to understand that a research design is comparable to a plan that connects specific methods and techniques, research goals, questions, as well as participants, with the purpose of collecting information. This view primarily aims to use this connection in order to reach a conclusion about the particular research problem.

This current study was an evaluation exercise of a programme (academic administrators) involving complex elements that could not be addressed easily nor adequately through a single dimensional approach. The deciding factor for the use of evaluations in place of basic research is that the aims and objectives of the latter are usually predefined, and relative to the entity of evaluation (Kelly, 2012). Hence, the selection of design in this current study was influenced by the general complexity of the evaluation situation. This had effectively engendered the use of the Snyder's model, given that it is grounded in action research and contains principles embedded in systems thinking (Dick, 2001).

In addition, the study facilitates the thematic analysis of a focus group by constructing multiple themes i.e. *enrolment management*; *professionalization of academic administrators; student*

administration data management and effectiveness of communication and management. The research seeks to establish links between resources, activities, immediate effects, targets and ideals in particular. It allows the participants (focus group) to understand the links between resource use, programme activities, the intended and unintended immediate effects of those activities, the predetermined targets that are pursued and the contribution of the themes to some overall and long-term vision (Dick, 1996). The sole purpose is to understand the participants' contributions to data quality and data quality management.

The study uses a derivative of the interpretivist approach, particularly a constructivist approach, to promote the understanding of academic administrators' contributions to data quality and data quality management (Blaxter, Hughes & Tight, 2006). Thorne (2016:29) defines the interpretive approach as, "*an approach to knowledge generation that straddles between objective neutrality and abject theorizing*". The interpretivist approach aims to find new interpretations or underlying meanings, while adhering to the ontological assumptions of multiple realities, which are time and context dependent (Thorne, 2016:297). The interpretivist/constructivist approach thereby supports research in a natural setting, rather than in a laboratory (Maxwell, 2013). On this account, it complements this research by capturing the unique nature of each of the participants in their work environment, specifically, the faculty. In addition to this knowledge, the study is supplemented by data generated from unstructured interviews, observations and documents in the form of reports and emails, contributing to the relevant experiences of the research participants. (Maxwell, 2013; Gill, Stewart, Treasure & Chadwick, 2008)

3.4 Evaluation theory and frameworks

There are various frameworks for evaluation and assessments providing methods that assist in ascertaining the value of programmes (Dahiya & Jha, 2011). However, older models tend to adopt a linear focus to the evaluation of programmes that are mainly outcome oriented, limited to specific evaluation objectives and are continuously functional solely for that purpose (Frye & Hemmer, 2012). By contrast, newer evaluation models are usually more dynamic in approach to counter the multifaceted nature of programmes, as well as the contributing factors that impact on those programmes (Frye & Hemmer, 2012). It is thus advisable that the selection of a model should be determined according to what information is required from the programme under

assessment, so that gathered data would be collected and processed accurately (Wankhede & Gujarathi, 2012).

Similarly, evaluation framework models are categorized according to their approach to assessment, and models used in HE are commonly goal-based, objective-based, systems-based, and also goal-free approaches (Eseryel, 2002; Anh, 2018). More specifically, goal-based evaluations investigate mainly whether the programmes under assessment meet their objectives or goals (Wankhede & Gujarathi, 2012). On the other hand, objective-based evaluations assess the degree to which an instructional programme's goals or objectives were achieved (Anh, 2018). Furthermore, the systems-based approach to evaluations has a more holistic approach, and is dependent on the contexts and circumstances under which the assessments are conducted (Dahiya & Jha, 2011). Lastly, goal-free evaluation is an assessment in which the official programme goals and objectives are withheld or screened from the evaluator (Youker & Ingraham, 2013).

Some of the prominent evaluation models are the four-levelled Kirkpatrick goal-based model; the Stufflebeam Content, Input, Process and product (CIPP) systems-based model and to a lesser extent; the Snyder's Systems Thinking Model as well as Scriven's goal-free model. A brief overview of these models is illustrated in Table 4.

3.4.1 Kirkpatrick model

The Kirkpatrick model provides a simple, easily identifiable and systematic process for the evaluation of learning outcomes in workplaces (Yardley & Dornan, 2012). The model comprises of four components of analysis, specifically; reaction, learning, behaviour and results (Praslova, 2010). The first two levels of the model assess the education or training related factors, while the third and fourth levels subsequently assess the outcomes of education or training. Noteworthy is the straightforward nature of this framework, with Moldovan (2016) supporting that the Kirkpatrick model offers a simplistic and flexible approach to the assessment of training outcomes.

Table 4: Evaluation framework models

Kirkpatrick (1959) **Goal-based Model** (Bramley & Kitson, 1994:10)	**Stufflebeam(1989)** **CIPP Model** (Nicholson, 1989:313-314)	**Scriven's (1972)** **Goal-free Model** (Youker & Ingraham, 2014:51-56)	**Snyder's (1997)** **Systems Thinking Model** (Allen, 1997:629-643)
1. Reaction: to gather data on the participants' reactions at the end of a training programme	1. Context: obtaining information about the situation, to decide on the educational needs, and to establish the programme objectives	1. Identify relevant effects to examine without redefining goals and objectives	1. Systems models treat a program as something which transforms inputs into outputs. The model consists of three phases
2. Learning: to assess whether the learning objectives of the programme were met	2. Input: identifying educational strategies most likely to achieve the desired result	2 Identify what occurred without the prompting of goals and objectives	2. Process evaluation, which seeks to understand the links between these elements
3. Behaviour: to assess whether job performance changes as a result of the training	3. Process: assessing the implementation of the educational programme	3. Determine if what occurred can logically be attributed to the program or intervention	3. Outcome evaluation, which uses this understanding to identify performance indicators
4. Results: to assess costs vs. benefits of training programmes; namely, organizational impact, in terms of reduced costs, improved quality of work, increased quantity of work, etc.	4. Product: gathering information regarding the results of the educational intervention, to interpret its worth and merit	4. Determine the degree to which the effects are positive, negative or neutral	4. Short-cycle evaluation, which uses these indicators to set up feedback to monitor ongoing performance

This sentiment is maintained by Praslova (2010), who states that the Kirkpatrick model provides an understandable systematic approach through templates and categories, which provide context for assessments. Another viewpoint suggests that the Kirkpatrick model is a goal-based approach to evaluation, as proposed by Rajeev, Madan and Jayarajan (2009). On these grounds, Frey and Hemmer (2012), as well as Rajeev et al. (2009) supported the model's use in an academic setting and demonstrated its compatibility in the evaluation of educational programmes.

Nonetheless, regardless of its practicality in academic evaluation, Kirkpatrick's model has its shortcomings and critics. For one, the model is routinely critiqued for being an outcomes catalogue because its components lack experimental foundation and constructing concepts

(Tamkin, Yarnall, & Kerrin, 2002). Another pertinent criticism is that there are limited relationships between the levels, especially with regards to reaction and performance (Rajeev et al., 2009). In addition to its shortcomings, the model is also not conceptually hierarchical, despite its visual presentation structure; but is instead setup to deliver the necessary outcomes of the programme (Yardley & Dornan, 2012).

3.4.2 Context, input, process, product model

The Context, Input, Process, Product (CIPP) model was initially designed to support the improvement of training programmes, rather than the proof of programme outcomes (Frye & Hemmer, 2012). This was formulated on the basis that evaluations were essential for improving the performance and functionality of programmes (Topno, 2012). Accordingly, the CIPP model was a proactive evaluation method that could provide continuous information to improve decision-making throughout the programme cycle (Stufflebeam, 1971). Additionally, it is considered a systems-based approach of evaluation which is intrinsically valuable to the design of this study (Dahiya & Jha, 2011). The model furthermore comprises of four assessment components, namely context, input, process and product evaluation (Wankhede & Gujarathi, 2012). These evaluation components are distinct and can be used either independently or jointly, for a complete assessment based on the required feedback (Johnson & Dick, 2012).

The model's first three components are characterized as formative and focuses on improvement; while the last component is described as summative and focuses on results (Frye & Hemmer, 2012). More specifically, the first component, *context evaluation*, explores the strengths and weaknesses of the entire training system, directed at assisting device improvement strategies for all levels of the system (Stufflebeam, 1971). Secondly, the *input evaluation* determines strategies that could be selected to achieve the set objectives regarding the strengths and weaknesses of the training system (Stufflebeam, 1971). This is essentially achieved by recognizing or identifying the skills, resources and strategies on hand (Wankhede & Gujarathi, 2012). The *process evaluation stage* on the other hand assesses the strengths and weaknesses of the selected strategies, to ascertain their suitability for the programme under evaluation (Stufflebeam, 1971). Given the nature of this component, it is an ongoing monitoring process that assesses potential success, or failure of the implemented strategies (Topno, 2012). Finally,

the *product evaluation* is directed at determining whether the intended results were in fact achieved and depending on the outcomes, deciding the way forward; whether to continue, amend, or abandon the changed element (Stufflebeam, 1971). While in the process of its evaluation, it further assesses both intentional and accidental outcomes of the applied solutions which assist in gaining a broader understanding of the training system (Topno, 2012).

The considerable strength of this model lies in its comprehensive approach to evaluations and because the components have non-linear relationships, it makes it an especially dynamic evaluation model (Frye & Hemmer, 2012). Moreover, the evaluation components are complementary, which enables the assessment of beneficial, but easily omitted aspects of programmes (Frye & Hemmer, 2012). However, the main criticism of the model is that it is abstract and difficult to apply practically (Passmore & Velez, 2012). Another critique is that it lacks detailed guidelines on its application process and evaluation tools, while also failing to clarify the positions and responsibilities of people involved in the evaluation exercise (Dahiya & Jha, 2011).

3.4.3 Goal free model

Goal-free evaluation (GFE) is any evaluation in which the evaluator conducts the evaluation without having particular knowledge of, or reference to, stated or predetermined goals and objectives (Baker & Alkin, 1973). In the programme evaluation, the GFE examines the programme's actual outcomes rather than its intended outcomes in contrast to evaluation frameworks such as the CIPP model (Youker, Ford & Bayer, 2017). The evaluator also operates without knowledge of any claims programme developers make for their programme, for example no statement of purposes, goals, or objectives are admissible data (Youker & Ingraham, 2014). This evaluation alternatively embraces a formative evaluation approach ensuring that the evaluator is able to be a part of the development (Baker & Alkin, 1973). More particularly, the evaluator collects his or her own data and renders an assessment of the actual effects of the project (Baker & Alkin, 1973). Youker (2011:65) recommends that the following principles form the foundation of the GFE:

- Identify relevant effects to examine without referencing goals and objectives.

- Identify what occurred without the promoting of goals and objectives.
- Determine if what occurred can be logically attributed to the programme or intervention.
- Determine the degree to which the effects are positive, negative, or neutral.

Baker and Alkin (1973) moreover, suggest that formative evaluation does not necessarily attend to the outputs of a given project solely, but instead is interested in how well the programme works and what is probably needed for it to effectively work. Thus, it emphasizes the connection between having a concern with the evaluations of the development process, and how the development staff is proceeding with its business.

One of the prime benefits of the GFE is that it allows evaluators to be attentive to a wider range of program outcomes, rather than just honing in on specific results, aims or goals of the programme (Anh, 2018: 144). Furthermore, other advantages include using GFE to supplement goal-based evaluation, that the evaluation avoids the difficulty of establishing true goals that is consequent when working with multiple stakeholders. Also that GFE can be adapted or adjusted to suit sporadic changes in consumer needs, programme resources and programme goals (Youker & Ingraham, 2014) and (Anh, 2018).

On the contrary, the disadvantage of goal-free evaluation is that although evaluators have a thorough understanding of GFE in theory, they however, have little knowledge of it in practice (Youker & Ingraham, 2014). Consequently, without knowledge of GFE's use, evaluators have less trust in implementing it or knowing whether it can be used, which could lead to an increased use of goal-based evaluation instead (Youker & Ingraham, 2014).

3.4.4 Snyder's model

This research fundamentally seeks to develop an understanding around what academic/professional administrators require to make a meaningful contribution towards data quality and data quality management. Despite having unique advantages in evaluating programmes, none of the three prior models are appropriately aligned to the requirements of this research. For instance, the Kirkpatrick model focuses on learning outcomes, CIPP concentrates on improving the performance of a programme, and GFE effectively negates any

notion of prior goals or aims. Systems thinking on the other hand, provide a framework where information can be arranged and can develop understandings (Dick, 2001). In place of emphasizing discrete elements and properties characteristic of the other models, systems thinking emphasize relationships and context existing within the programme (Dick, 2001). These properties, encompassed by systems-thinking, with Allen suggesting that it is ideally suited to "multi-stakeholder situations, as in the case with this research where the aim is to help participants see how different activities and relations of cooperation between different parties fit together within a wider social programme" (Allen, 1997: 635).

The key elements of this model can be exhibited as follows: resources, activities, immediate effects, targets and ideals (Dick, 2001). The model further consists of three phases: *Process evaluation*, which seeks to understand the links between these elements; *Outcome evaluation*, which uses this understanding to identify performance indicators; and *Short-cycle evaluation*, which uses these indicators to set up feedback to monitor ongoing performance (Allen, 1997:635-636). In light of Snyder's model, Dick (2001) describes it as consisting of three flexible components: process evaluation, outcome evaluation and short cycle evaluation (See Figure 7).

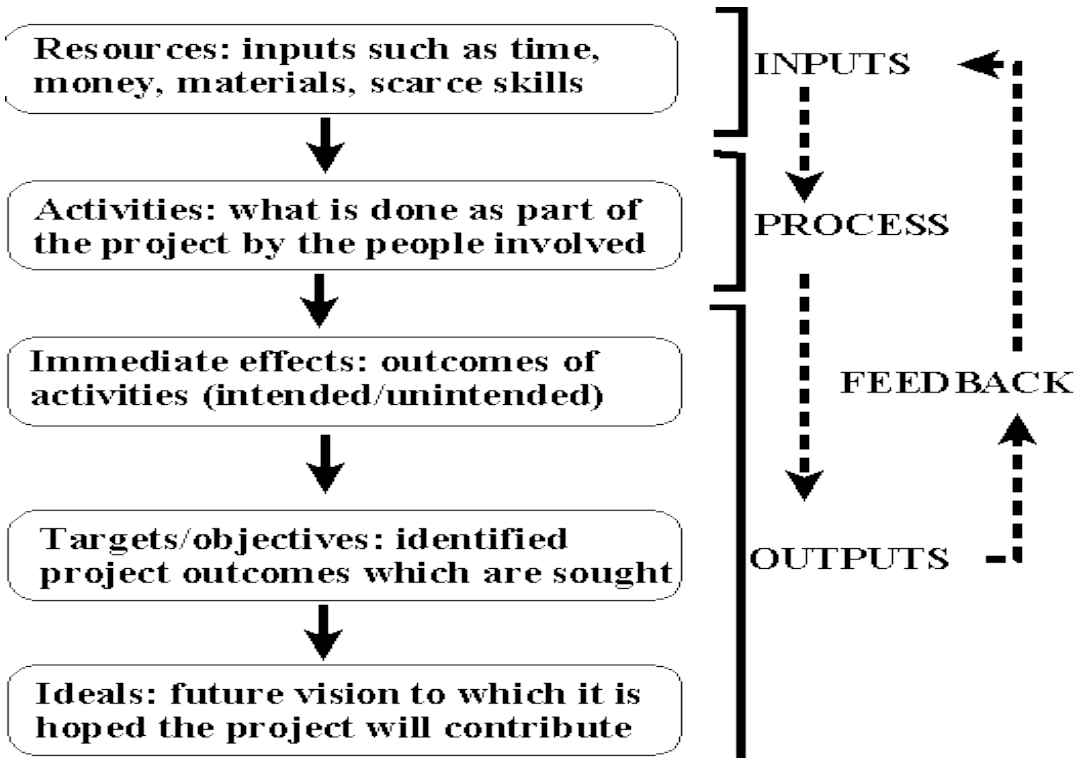


Figure 7: The Snyder's evaluation model (Dick, 2001: 6)

This asserts that each process provides a different form of evaluation, and each builds on the understanding and insights accumulated during earlier stages. Furthermore, each of the three evaluation stages draws upon a systems model indicative of how the project operates. It does this by highlighting resources being consumed by activities, that produces immediate effects both intended and unintended in the pursuit of ideals and objectives, which ultimately contribute to a vision of a better world (Allen, 1997).

The activities involved in each of these processes has been summarized below in the following manner (Dick, 1997:1-6)

- The process evaluation enables the evaluator and the stakeholders to develop a better understanding of how the programme functions. In particular, it allows the stakeholders to understand the links between resource use, programme activities, the intended and unintended immediate effects of those activities, the predetermined objectives that are pursued and the contribution of the programme to some overall and long-term vision (Dick, 1997).
- The outcome evaluation enables participants to apply the understanding which they develop in the process evaluation, to assess which of their goals are being achieved and how well this is being done. It also allows the development of performance indicators which can be used to set up ongoing feedback and monitoring (Dick, 1997).
- The short cycle evaluation in turn, uses the understanding and the performance indicators attained in the two earlier phases to set up the feedback loops, which can then be used to empower a programme to become self-improving (Dick ,1997).

Gorgens, Zall and Kusek (2010) assert that a systems approach to evaluation can be conceptualized by means of participation, observation, interview and document analysis. This model is also known to assist management and the academic administrators with their understanding of the daily activities concerning data quality and data quality management. The reasons for using this formative process evaluation are due largely to:

- It's participatory nature to involve stakeholders such as the academic administrators, IT personnel, management and other support staff.

- Promoting stakeholders to develop a better understanding on how the elements operate and how these elements link to each other during their daily activities to improve data quality.

In consideration of this current research, the researcher used the Snyder's Model to evaluate the academic administrative staff member at faculty, applying only one of the three evaluation processes, specifically, the process evaluation (Allen, 1997). The reason being is that the process evaluation presents a procedure whereby researchers can explain the outcomes resulting from complex interventions that often have nonlinear implementation processes (Limbani, Goudge, Joshi, Maar, Miranda, Oldenburg, Parker, Pesantes, Riddell, Salam, & Trieu, 2019). Evaluations of this nature takes a holistic approach, beginning from the initial recognition that people have different values and perceptions of reality and accordingly, distinctive views about the interrelations in a system (Checkland, 1993). Thereupon, it subsequently outlines that these evaluations depend on the contexts and circumstances under which the assessments are conducted (Dahiya & Jha, 2011). This consequently underlines the uniqueness of the situation, but more importantly stresses the need for an appropriate evaluation strategy so that the manager can assemble in-depth information in order to better understand for example, a policy, program or project (Zall Kusek & Rist, 2004).

A systems-thinking approach provides groundwork for how information can be arranged in a way that aids in developing an understanding, by emphasizing relationships and context of a programme; instead of emphasizing discrete elements and properties, such as roles and values (Allen, 1997). This understanding is premised on how stakeholders comprehend the links between adjoining elements, subsequently enabling participants to understand how they achieve their objectives in order to become more effective (Dick, 2001). In this way, the generation of knowledge is not seen as a role of experts alone, but as a collective process including various stakeholders (Checkland, 1993).

The advantage of this model is its participatory nature, which promotes the empowering of participants through a process of developing an understanding of their situation (Dick, 2001). Although the framework consists of three phases, evaluators have a choice on deciding which of the three phases to apply (Allen, 1997). In the case of this research, the decision entailed focusing

only on the process evaluation phase. This phase takes on a formative approach for evaluating the development of an understanding on the topic to which the pre-existing knowledge surrounding this topic was admittedly limited to non-existent, prior to this research (Dick, 2001). However, the participatory nature of the study was complementary in respect to the deficiency of pre-existing knowledge on the topic and ensured that the evaluator was able to be a part of the development (Baker & Alkin, 1973). As previously mentioned, formative evaluation does not necessarily attend only to the outputs of a given project but may also be concerned with the evaluation of the development process and remove how the development of staff is proceeding with its business (Baker & Alkin, 1973). Formative evaluation, moreover, can identify problems in communication, like pinpointing where there are apparent overlapping chains of authority that might be confusing staff, for instance (Baker & Alkin, 1973). Another important feature of the systems-thinking model is that it can also be used by an independent evaluator, specifically, consultants as independent contractors or for companies. On the contrary however, the disadvantages of this model are that it is not widely used and can be problematic when all three phases are attempted at once, especially by novice or inexperienced evaluators (Allen, 1997).

3.4.4.1 Systems thinking approach

Systems-thinking is suggested by Loorbach (2010) as an approach that captures complexities by focusing on the system's interconnectedness and interdependence, while composing it to be used as a language that describes the complex interactions and patterns between its components. Systems-thinking forms part of general systems theory, originally proposed by biologist Ludwig Von Bertalanffy (1969), and is based on the assumption that there are universal principles of organization which hold true for all systems (Checkland, 1999). Those principles postulate that within systems theory, the whole is more than the sum of its parts. The whole determines the nature of the parts, that the parts are related and interrelated and that the parts cannot be understood in isolation of the whole (Banathy, 2000). Banathy (2000:43) further highlights characteristics that most systems comprise of:

- Systems are goal-oriented;
- Systems have inputs from their environment;
- Systems have outputs to achieve their goals;

- And systems have feedback from the environment about the output.

Within systems thinking it is important to note the observed relationship, as it highlights how important the specific viewpoint is in interpreting organizational behaviour. Behavioural aspects underline the significant contribution of individuals to the performance of businesses (Polese, 2010). In short, the concept of a system is not connected with the notion of objectivity, but instead refers to a specific point of view that can vary from actor to actor; being strictly dependent on the contextualized system's perception of time and space.

Systems can also be composed of subsystems, as well as units or parts making up the whole. Once organized, a system is not simply a collection of parts, but a functional entity with properties that cannot exist independently (Banathy, 2000). In this way, systems thinking offers a comprehensive insight into the role IS play in the sequence of data, to information and then knowledge. On these grounds, it could additionally assist in understanding the impact of data quality and data quality management in practice, by looking at relationships between input, process and output (Mizikaci, 2006). This level of comprehension sees information systems as a collection of subsystems embedded within a larger framework of a real-world *Feedback Control System* (FCS), alternative to it merely being seen as a product (Orr, 1998). It is commonly understood that in an IS, data quality does not exist in a vacuum; as the principle role of IS is to present views of the real world, so that the people in the organizations can create products or make decisions based on these views (Orr, 1998). Notwithstanding, should these views be incoherent with the real world for any extended period of time, the system is then considered to be poor or insufficient. The reasons for this approach are two-fold because:

1. Most, if not all the IS that are developed, operate in a larger goal-seeking organizational environment.
2. Those systems that failed to take into account the larger Feedback Control System (FCS) context, were difficult to operate, and their outputs were difficult to reconcile with the real world.

Even though Wand and Wang (1996), Pipino, Lee and Wang (2002), as well as Knight and Burn (2005) support the idea that data quality can be defined as a multidimensional concept. Orr

(1998) on the other hand defines data quality as the measure of agreement between the data views presented by an IS in the real world. For example, a data quality of 100% in a given system would indicate that data views are in perfect agreement with the real world, whereas a data quality of 0% would indicate no agreement. Although it is not necessary to ensure for data quality to be perfect, we should however ensure that the quality of data in our IS is to be accurate enough, timely enough and consistent enough for the organization to survive and make reasonable and informed decisions. Orr (1998) claims though, that the real problem or difficulty with data quality is change, as demonstrated in Figure 8. He further argues that data within our database is static, but in the real world, it keeps on changing.

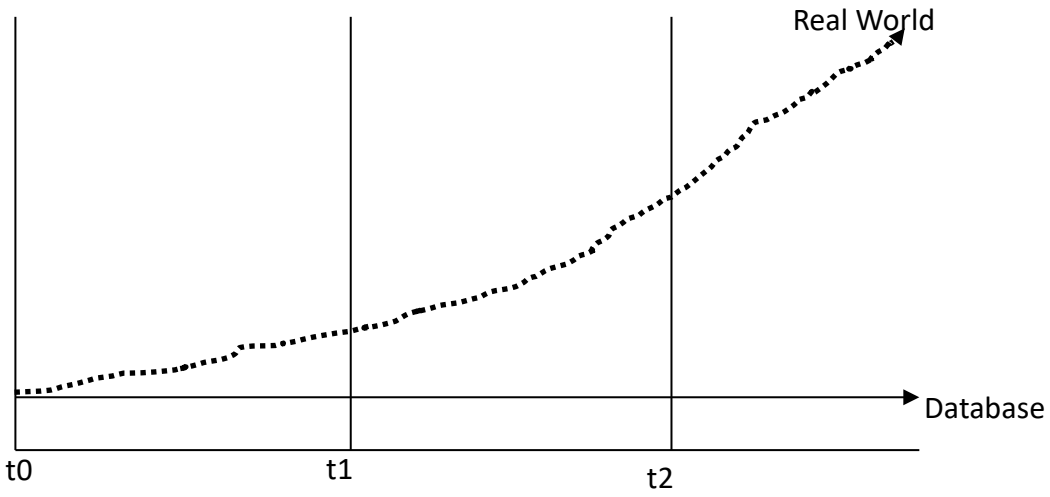


Figure 8: Data and the real-world

Should our system have a base that is 100% in agreement with the real world at time t0, by time t1 it will be slightly off and at time t2 it will be even further off. The FCS theory states that if you want a system to track the real world, then you must have some mechanism to the data in the system, which can respond to changes in the real world, which Orr (1998) calls feedback. Where does this feedback come from though? The concept of feedback comes from systems theory and if used in an IS, it will come from the users of the system (Kauffman, 1980). However, for this to take place, two things have to happen for data on any database to track the real world:

1. Someone or something has to compare the data views from the system with data from the real world.

2. Any deviations from the real world have to be corrected and re-entered.

Allen (1997) points out that many of the participatory processes that are in use in the development field are inherently evaluative. This is particularly true for all those processes that have built on principles of action research and learning, with its iterative cycle of planning, reflection and action. However, if we are serious about guiding different interest groups to work more cooperatively towards a common set of environmental goals, then we also need processes that are explicitly systems-based (Allen, 1997).

3.5 Research settings

There are seven faculties at UWC, of which the Faculty of Community and Health Sciences (FCHS) will form the focus area for this research topic specifically. The FCHS is headed by a Dean and is supported by a faculty executive consisting of a faculty manager, as well as three deputy deans. The faculty comprises of three (3) schools (Natural Medicine, Public Health and Nursing), six (6) departments (Psychology, Social Work, Dietetics and Nutrition, Physiotherapy, Occupational Therapy and Sports Recreation and Exercise Science, two (2) research units and one (1) Inter Professions Education Unit. The faculty has a student population of three thousand, two hundred and sixty nine (3269) and a staff component of two hundred and thirty one (231), of which one hundred and thirty (130) are academics and one hundred and one (101) being academic administrative staff/support staff/professional staff.

3.6 Research approach

In this current study, the researcher adopted a participatory approach for the process evaluation study. As highlighted before, a participatory method seeks to involve all stakeholders in the process evaluation, which encourages critical reflection by all stakeholders on the process (Dick, 2001). This additionally allows for the evaluator and stakeholders to mutually develop an improved understanding of their work and work environment. This was essential to the current study, as the researcher is also the faculty manager, who needed to account for any unwelcomed biases (Maxwell, 2013).

A situation of this kind therefore presents the need to embrace an approach that has the potential to access all respondents in a relatively equal, fair and non-obligatory manner (Neuman, 2007). The initiative for mitigating research biases is usually inspired when one becomes consciously aware of the researcher's position, privilege and power. Above all, the researcher (manager) needs to consider how biases can manifest when managing staff or getting staff and participants to perform duties. For this reason, it is also crucial that the researcher is an active participant in the process evaluation, and is thoroughly engaged within the research (Maykut & Moreshouse, 1994).

Adopting this approach contributed to conscious and transparent decision-making when dealing with staff. For instance, each participant needed to first give their consent, through a designed permission letter for staff to engage willfully in the study (See Annexure 4). Participants were also given the power to disengage at any point within the research, thus reinforcing and contributing to a trustworthy and confidential research approach (Maxwell, 2012).

This uniform treatment of participants facilitated the lucrative movement of the researcher in the research environment that resultantly aided the data collection process (Kelley et al., 2003). This action also enabled the researcher to adopt an observational approach to the study, insofar as the evaluator (Walliman, 2011). In result, it produced more practical or realistic observations, with minimal investigator's influence exerting on the findings (Kelley et al., 2003). In turn, these observations were valuable for the researcher to gather realistic outcomes that were essential for effective decision-making. Nevertheless, it was not an approach without its challenges. One pressing matter to the study was that HE environments had set periods for when most of the operational activities were to be observed. Missing this period of observation (as in the case of enrolment) results in a delay in timelines, which effectively delay the outcomes of the research. Using this understanding of the approach, the researcher could collect relatively large quantities of data, within a short period of time and at a low cost, in comparison to many other approaches (Kelley et al., 2003).

3.7 Process evaluation

The process evaluation is adopted from *Snyder's evaluation model*, for the reason of it being participative in nature with embedded systems-thinking principles. These principles assist

participants to materialize the interconnectedness between input, process and output phases, expressed through its elements; resources, activities, immediate effects, objectives and vision. This process directly involves the participants in the evaluative process and encourages critical reflection during implementation, enabling its ability as a formative evaluation process (Dick, 2001). The fundamental purpose of the formative evaluation is to aid academic administrator's understanding of how they contribute to data quality and data quality management (Dick, 2001).

Evaluations are usually conducted quantitatively because of the focus placed on outcomes in assessments (Kelly, 2012). However, quantitative approaches often have practical limitations, which are mostly due to the fact that not all social behaviours can be easily quantified; hence why the need for applying a qualitative approach to evaluation is appropriate (Kelly, 2012). Tilley (2006) maintains that quantitative methods tend to investigate what is or is not successful, whereas qualitative methods attempt to understand what is and how (something) is relevant, as well as to whom or what context this relevancy applies. Furthermore, Kelly (2012) ascertains that qualitative approaches in evaluations stimulate the consideration of the social drivers behind the outcomes of evaluations. These qualitative researchers for instance, conceptualize the world as a connection of people, situations, events and processes that are all entwined in the form of words (Maxwell, 2013). This largely facilitates the use of transcriptional interviews, observational checklists with descriptions of activities and conversations, and equally facilitates the use of documents that can describe people's actions (Creswell, 2009:3).

3.8 Qualitative approach

Qualitative research attempts to acquire information of occurrences, as described experiences and perceptions of the participants; all in which provide the basis for scholars to analyse, understand and draw rational explanations on issues (O'Leary, 2004; Rule & John, 2011). The approach draws on the experiences and interpretations of the participants regarding the phenomena in question, while taking into consideration that different explanations could derive from a singular occurrence; relative to background or context (Neuman, 2007).

A particular strength of the qualitative approach is that it assists the researcher in providing detailed descriptions of the findings that creates an opportunity to examine the functionality of the research relating to what does or does not work, thus leading to an improved understanding

of the causal mechanisms involved in the process (Kelly, 2012). An additional strength of the qualitative research approach lies in its usefulness for understanding contexts within a real life or natural setting (Kaplan & Maxwell, 2005).

This approach is highly compatible for this research as its inherent, participatory nature reinforces extant faculty work practices; its natural tendency to liaise with students, academics, as well as other support staff like quality assurance, student administration, ICS and managers (Maxwell, 2013). Thus, taking this approach was essential, as the participants with pertinent experiences emanated from key operational areas within the faculty. Their experiences were therefore crucial in understanding the degree of impact they had on data quality and data quality management, with limited generalizations regarding the participant's backgrounds. Because the programme under evaluation (academic administrators) is unique and had not been previously evaluated, it was paramount to engage a more generalized approach that could assist in developing a holistic understanding of the programme's outcomes (Dick, 2001).

3.9 Quantitative approach

In contrast to qualitative research, quantitative research is based on examining numeric data in order to address the research questions (Creswell, 2009). There are two distinct types of quantitative designs, namely, *experimental* and *quasi-experimental* designs (Muijs, 2004). The experimental design is considered scientific in approach and is generally conducted in controlled environments, such as laboratories (Muijs, 2004). On the other hand, quasi-experimental or "non-experimental" designs are not necessarily considered scientific, but closely simulate scientific procedures, and are mainly used in the social sciences (Muijs, 2004). Muijs (2004) further states that quasi-experiments are mainly associated with survey-based research. Quantitative surveys are designed to convey numeric data, statistical analysis and accuracy of information within set variables (Creswell, 2009). Given its disposition, such an approach is not highly regarded for the nature of the research at hand, as the current study is more focussed on human experiences, word descriptions and is process-oriented, rather than outcomes-orientated (Maxwell, 2013).

Accordingly, this research supports a qualitative approach as it is imperative that the implemented approach accommodates qualitative facets of data, insofar as to tackle the

complexity of the human factor during evaluations (Maxwell, 2013). This descriptive nature of qualitative research enables readers to understand the meaning attached to the experiences, to recognize the distinct nature of the problem and uncover the impact of the problem (Meyer, 2001).

3.10 Sampling

The population regarded in this research refers to all possible candidates or people, who possessed the required traits of academic administrators for the research investigation (De Vos, Delport, Fouché & Strydom, 2011). More specifically, the population was made up of all applicable personnel around the faculty office, including selected academics, ICS personnel, administrators from the Registrar's office, faculty managers and quality assurance (QA) personnel. The size of the population utilized in this study consisted of twenty six (26) participants in total, which comprised a broad spread of staff from across faculty and other parts of the University of the Western Cape (UWC) campus. The selection of this population was characterized by their administrative role in the faculty and was also based off their interaction and involvement with SEMS and IS services. This categorization of staff offers these administrative services to a student population of more than twenty-two thousand (22000), together with a population of nearly two thousand (2000) academics. Their engagement largely takes place during the student lifecycle, with a focus on enrolment processes such as applications, selections, registrations, promotions and graduation.

The researcher opted for this population type and size because it represented an extensive collection of HE knowledge; an in-depth knowledge and experience of the UWC institution, a broad administrative skill-set, an engaging experience with the SEMS and also a comprehensive acumen of governance and management. However, because the population size was rather limited, the researcher appointed a *total population sampling* (TPS), as the input from all participants was deemed essential to the study (Etikan, Musa, & Alkassim, 2016). TPS is a form of purposive sampling, where the entire population of the study is considered for research (Etikan, Musa, & Alkassim, 2016). *Purposive sampling,* accordingly, is a non-probability sampling technique that relies on the researcher's judgement when considering participants, events, or objects, based on their association to the research undertaking (Maxwell, 2012:82; Sharma,

2017). Purposive sampling is commonly associated with qualitative studies, which is appropriate for this current research because it deliberately selects a group of knowledgeable experts to represent the population located at UWC (Barratt, Ferris, & Lenton, 2015).

In gaining access to the CHS faculty, as well as gaining the trust of participants, emails were sent to the dean of the faculty, to the dean of research at UWC and also to the Registrar at UWC, requesting permission to undertake the research together with an approved proposal from the University of Cape Town (UCT) (See EBE Faculty: Assessment of ethics in research projects). All the senior respondents were approached to participate in unstructured interviews, as they were the most knowledgeable and experienced group of the population. Each participant was either personally contacted, via email or telephonically, for permission to take part in the interview. Once the interviewee accepted the electronic proposal, the necessary arrangements were made that best suited the participant. A letter was also provided to the participants that explicitly outlined the conditions and provisions of the research (see Annexure 4).

3.10.1 Interview sample

The interview population consists of nine (9) participants, especially chosen for their extensive institutional knowledge, staff and resource management experience and experience engaging in, and prowess of the student enrolment management system (SEMS) or Student information system (SIS) at UWC (Maxwell, 2012). These are staff members mostly in middle to senior management positions at UWC who are chiefly responsible for the faculty's operations, budgets and staff members. They collectively form part of the governance structure at UWC, be that faculty, senate or council. This population group has a broad understanding of how the HE ecosystem operates and functions, which further includes an extensive wisdom of the faculty and university's institutional history, together with a knowledge of its bouquet of programmes. This then places them in a knowledgeable position of the problem areas existing in the fabrics of the institution, be that in finance, human resources and technology, or in the form of SEMS/SIS.

Table 5: Interview participants

Interviewees	Years of service	Positions
Interview no 1	35 years	Quality Assurance Manager
Interview no 2	35 years	Deputy Dean
Interview no 3	20 years	Faculty Manager (EMS)
Interview no 4	8 years	Faculty Manager (Arts)
Interview no 5	7 years	Faculty Manager (Dentistry)
Interview no 6	7 years	IT Project Manager
Interview no 7	20 years	Manager (Academic Administration Training and Development)
Interview no 8	10 years	Manager (ICS Application and Support)
Interview no 9	7 years	Faculty Manager (Science)

3.10.2 Observation group

Eight (8) academic administrators were observed; four (4) from the faculty office and four (4) from different departments within the faculty. This group of subjects were chosen because of their understanding of the SEMS system, as well as their knowledge of the faculty's activities and their involvement in the university's daily operations (Maxwell, 2012).

3.10.3 Focus group sample

This population consists of six (6) faculty officers and three (3) academic administrators from the FCHS. These staff members were selected for the focus group because they actively engage in the daily administrative operations; attending to the requirements and demands of the students and academics, through the utilization of the student IS (Maxwell, 2012). These staff members principally are responsible for the capturing of student information during registration, amendment periods, student mark adjustments, the external and internal transfer of students, and they also deal with applications for special exams and general student queries. In addition to these responsibilities, they also take on the role of faculty committee officers that are responsible for minute taking, report writing, the delivery of minutes, agendas and documents, whilst also acting as the custodians in meeting governance processes and academic rules. In

essence, this branch of staff is duty-bound in ensuring that the system, whether technological or operational, are quality assured, thus making them the eyes and ears of the Faculty (Maxwell, 2012).

3.11 Researcher's biases

Apart from the inclusion of the interested parties as mentioned above, an added interest was on certain participants with an operational competence in their respective administrative fields such as ICT and QA. The emphasis on this particular group was in fact imperative in ensuring that they contribute towards the intellectual goals at the end of this dissertation.

This section covers the considerations and awareness of my personal biases. In light of these considerations, it became apparent that the study required strict control when participating and engaging throughout the data collection processes. Henceforth, my position as faculty manager could not be ignored while in the process of this research, as being in a position of privilege or power could generate the notion of having certain biases, some of which could have adverse impacts on the research and its findings. However, these notions were rationalized, and under no condition was this position ever used as a leverage of power to exert influence over any person, process or outcome of this study. My position, nevertheless, could have unintentionally contributed to some issues relating to selecting staff members to take part in the interviews, focus groups and observation process. I, however, would like to believe that my position of authority did not coerce any of the participants to take part in the study; but that their willing participation was attracted by the respectful values, qualities and attributes that I have displayed and upheld in my past and present relationships with each of these staff members. Admittedly, these historic relationships that had established and developed over time had an instrumental influence on the participation these members in this research project. In effect, this allowed for the execution of the research applications without prejudicing the participants involved in this dissertation.

3.12 Data collection methods

Data collection methods are determined by the purpose of the study, the key research questions, research ethics and research constraints (Meyer, 2001; Maxwell, 2012). There are various

acceptable means of data collection that provide reliable data, including methods like interviews, observation and the examination of documents (Creswell et al., 2014). The research in question utilized a combination of qualitative data-collection methods, namely interviews, observations, documents and focus groups; with a predominant emphasis on the first two methods of collection (Harrell & Bradley, 2009). The choice of qualitative data-collection procedures was principally guided by the research questions and the choice of the qualitative design for the study (Meyer, 2001; Maxwell, 2012).

3.12.1 Interviews

Harrell and Bradley (2009) argue that in seeking a complete response to the research questions, interviews and focus groups are the most likely to provide the depth of information that is useful for the research of qualitative design. In addition, certain methods may also be used in sequence with other qualitative methods of data collection. For instance, qualitative analysis generated by a sequence of interviews, observations and focus groups might add to the interpretation of results, advancing the triangulation of methods to provide a stronger validation of constructs and hypotheses (Harrell & Bradley, 2009; Meyer, 2001). According to Gill, Stewart, Treasure and Chadwick (2008:291) there are three fundamental types of research interviews, namely: *structured*, *unstructured* and *semi-structured*, as indicated in Table 6 below. In relation to this research, the deficit of literature on the topic necessitated an unstructured approach, with no predetermined questions. It also contributed to the utility of a participatory approach, which allowed for further questioning in acquiring extensive knowledge on the topic during the data-collection process (Harrell & Bradley, 2009; Maxwell, 2001). Gill, et al (2008:292), support the notion that qualitative methods as the likes of unstructured interviews, “provide a deeper understanding of a social phenomenon than would be obtained from using purely quantitative methods”, like questionnaires.

Table 6: Types of research interviews

Types of research interviews	Advantages	Disadvantages
Structured: Usually verbally administered with a predetermined list of questions	Quick and easy to administer	Limited participation responses Do not allow for in- depth questioning Little or no variation and with no scope for follow-up questions to responses that warrant further elaboration
Unstructured No predetermined list of questions.	Can be performed with little or no organization Starts with a simple question	Very time consuming Can be difficult to manage
Semi-structured Consists of several key questions	Allows for elaboration of information that is important	Limited participation responses

The unstructured interview as the data-collection method chosen for this research allowed for open-ended questions in a conversationally relaxed approach, highlighting only key points and containing no predetermined list of questions. For this reason, the method was easy to administer, thus making exploration of the research topic uncomplicated and amicable. Even though the roles of academic administrative staff were formerly realized, the open-ended nature of the questions allowed for further exploration of the activities of these staff that were not necessarily pronounced or explicitly highlighted through their job descriptions. This in turn promoted an improved understanding about the roles of academic administrators and contributed to providing role clarity of this workforce. Additionally, these deeper enquiries were also used to acquire levels of understanding on the topic of how they (the academic administrators) contribute towards data quality and data quality management.

With the permission of the interviewees, each interview was audio taped using a digital recorder (Creswell & Plano Clark, 2011). The permission was sought from each participant through a formal email; explaining the research topic and why they were specifically chosen to participate in the study. The participant was also informed that all the necessary approvals were granted for

the research interviews to proceed. On agreeing, the participant was sent possible dates for an appointment and highlighted the required duration of the interview. It was important to relay this information because of the limited time these individuals had, due to their degree of responsibility within the university. I, as the researcher, therefore, consider myself fortunate; acknowledging that my position and rank within the organization had indeed bestowed this advantage of having access to these personnel. Especially in knowing that normally, access for outsiders does present a challenge or problem in getting people to participate.

As mentioned before, information was collected with a digital recorder, which allowed the researcher to be more attentive to the interview and be more engaging with the interviewee; presenting a friendly and relaxed demeanour in the interview process that had an indirectly positive impact on the interviewee. To supplement the audio recording, the researcher also had a notebook that was primarily used to highlight key points or issues, such as power dynamics and unequal privileges amongst academics and academic administrators. Interviewing was the preferable method over scribing because it gave the researcher the freedom to concentrate on the questions and flow of the interview, paying close attention as to capture the exact messaging and responses of the participants (Maxwell, 2012). Notwithstanding, this data collection method was time consuming and therefore, prior provision from each participant for the interview was very important; as reflected in the interviewee's profiles (See Table 7).

Table 7: Interviewees profile

Interviewees	Years of service	Positions	Duration of interview
Participant no 1	35 years	Quality Assurance Manager	1 hour 5 minutes
Participant no 2	35 years	Deputy Dean	1 hour 9 minutes
Participant no 3	20 years	Faculty Manager (EMS)	56 minutes
Participant no 4	8 years	Faculty Manager (Arts)	30 minutes
Participant no 5	7 years	Faculty Manager (Dentistry)	56 minutes
Participant no 6	7 years	IT Project Manager	33 minutes
Participant no 7	20 years	Manager (Academic Administration Training and Development)	42 minutes
Participant no 8	10 years	Manager (ICS Application and Support)	37 minutes
Participant no 9	7 years	Faculty Manager (Science)	1 hour

Each interview recording was transcribed, and each transcription document was checked for correctness, to facilitate the information for the analysis process (Gibbs, 2007). The transcription was then sent to the interviewee to verify and acknowledge its contents. Effectively, this also aided in addressing possible biases that might have existed.

3.12.2 Observation

Observation is a crucial element in analysing participant responses during the interview process and is pertinent to the qualitative design that this research supports. Kothari (2004) posits that observation can be viewed as structured or unstructured. The distinction between the two is rooted in the type of research being conducted. For example, structured observation is considered appropriate for descriptive studies, whereas an unstructured observation tend to consider exploratory studies. In a similar fashion, Kothari (2004) furthermore explains that observation can also be categorized as participant and non-participant, but in this instance the distinction is founded upon whether or not the observer shares similar life experiences

(context/environment) with the group being observed (Kothari, 2004). If the observer forms part of or becomes a member of the group under observation and incidentally experiences what members of the group experience, then the observation is considered as participant observation (Kothari, 2004). Conversely, if the observer's experiences are detached from that of the observed, then it is regarded as non-participant observation (Kothari, 2004). Although distinct both approaches have their benefits. According to Kothari (2004:97), the advantages of the participant-type observation are:

1) The researcher is permitted to record the natural behaviour of the group.
2) The researcher can gather information that would not be easily obtainable if observed in a disinterested fashion.
3) The researcher can verify the truth of statements made by informants in the context of a questionnaire or a schedule.

On the dark side, the disadvantage of this type of observation is that the observer may lose objectivity to the extent of participating emotionally during the observation process, which could result in observation-control issues and in turn, have a negative impact on the data-collection process (Kothari, 2004).

A participant observation process was conducted personally, in a dual capacity (researcher and faculty manager) as sometimes researcher and other times Manager, given the challenges presented on the day. Admittedly, this did become a little confusing at times when operational interventions were required. In other words, as a researcher my default state was always that of the faculty manager and my immediate operational responsibilities takes priority at the FCHS. Prior permission was obtained, and my position was explained to all academic administrators at a faculty staff meeting (Rule & John, 2011). On the upside, the advantage of this situation was that my presence was not considered as you would an outsider, thus interacting with my own staff was a privilege as everyone gladly cooperated.

Eight (8) academic administrators were observed in total, four (4) from the faculty office and four (4) from various departments around the faculty. It is important to reiterate that the reason this group of subjects were chosen was because of their expert understanding of the SEMS system,

as well as their vast knowledge of the faculty and university's activities and daily operations. One implication of the group's differing roles and responsibilities, however is that it was not always possible to observe them simultaneously because they had different tasks and were situated within different departments during the data-collection/observation period. It is for this reason that participatory observation was introduced with lists that were drafted for specific aspects of the student enrolment process (Kothari, 2004:97). During the student enrolment process, student applications, selections and registrations were observed and recorded; as on the observation checklist (see Annexure 1, 2 & 3). These observation checklists had sets of activities that needed to be executed by each of the participants. The composition of these activities were structured in a questionnaire format; by which the completion of the observation entailed asking all the questions on the (observation) checklist. At the end of the observation checklist the researcher compiles a summary indicating any noticeable gaps in the execution of duties, incorrect entry of data on the system, but also short comings on behalf of the department, faculty or management's support of completing operational tasks.

The observation checklists also assisted with highlighting the linkage of activities when using the SEMS. Moreover, the observation of administrators during the application, selection and registration processes assisted in developing an understanding of their respective activities during the process of SEMS. More importantly, the underlying analysis of these observations helps to illuminate their level of contribution to data quality and data quality management; which is the fundamental intent of this research. Thus, the completion of this checklist enabled us to see which steps were used or applied by the administrators/participants during the student selection process. Effectively, this also indicated the degree and level of mastery the administrators had of their respective activities/roles, or which ones needed to be reviewed.

3.12.3 Focus group

Focus groups were used for generating information on collective views, as this was also useful in generating a rich understanding of participants' experiences, beliefs and attitudes (Harrell & Bradley, 2009). Nine (9) academic administrators, (six faculty officers and three administrators) granted their permission to participate in the focus group. This group of individuals were

especially sought after because these staff members actively engage with the day-to-day requirements and demands of the SEMS.

The knowledge and skillset that the study is formulated to test is derived from their competency and experience in the capturing of student information. For example, these staff members are principally responsible for capturing student information during periods of registration, amendment periods and student mark adjustments, external and internal transfer of students; while also being involved with applications for special exams and general student queries. Furthermore, some of these staff was also faculty committee officers that were responsible for minute taking and the delivery of minutes, agenda and documents. In short, Maxwell (2012) refers to these staff as the custodians of university governance processes and academic rules, and therefore their experiences and knowledge was considered highly valuable to the research.

However, the same challenge faced in the interview process presented itself here, that being difficulty in getting them all together at the same time and place because of their respective roles and duties at UWC, making the focus group process difficult to navigate. To mitigate such a situation, the *faculty administration strategic planning* sessions provided the opportunity to address the issue. This initiated the conversation that allowed the group to collectively reflect on some of the issues and findings highlighted during the interview and observation applications. This group additionally assisted with the process of categorization during the analysis of codes (Braun & Clarke, 2006). The categorization process was explained to the group, with an emphasis on conceptually labelling, while keeping in mind particular events/actions/interactions; effectually aiding the formation of categories by highlighting their comparisons of similarities or differences (Clarke & Braun, 2013).

3.12.4 Documents (reports and emails)

Two annual faculty *enrolment reflection reports* (2014/2015 & 2015/2016) were used to extract information from parts of the enrolment process, looking at both successful and unsuccessful academic administrative practices. These are critical-feedback reports from the different schools, departments or units of faculty regarding the application, selection and registration processes as experienced by each functional unit. During the same period, several emails related to the enrolment processes, including the promotion and graduation, were issued by me as the

faculty manager with permission of the dean, requesting that all this data be gathered. This constituted over a hundred and fifty emails, dealing with registration problems, dissatisfied staff members and irate or agitated parents/caregivers/independents. These documents were also coded in the same manner as the interviews (Maxwell, 2012).

The documents were helpful in a number of ways. Firstly, it was used as inputs for the interview guide, which was beneficial and saved me a lot of time during interviews as having a base or reference base of actual events that can be related to by the interviewee. Secondly, they were also useful for tracing the history of the organization and statements made by key people in the organization. Then lastly, the documents were helpful in counteracting biases expressed/present during the interviews (Meyer, 2001).

3.13 Data analysis

Data analysis is defined as the process of evaluating data using analytical and logical reasoning to examine each component of the data provided (Braun & Clark, 2006; Maxwell & Miller, 2008). Analysis of data in any research study seeks to answer the research question which was set out at the beginning of the study (Rule & John, 2011). This attitude about data analysis is reflected by this research, to which Braun and Clark (2006:79) describe as Thematic Analysis (TA).

3.13.1 Thematic Analysis (TA)

TA is classified under the qualitative descriptive design, essentially described as a set of techniques used to analyse textual data through the explanation of themes. It can be seen as a form of pattern recognition of the data, where emerging themes become the categories for analysis (Fereday & Muir-Cochrane, 2006). The key characteristics of this method are the systematic processes of coding and examining the meaning of social reality through the creation of themes (Vaismoradi, Jones, Turunen & Snelgrove, 2016; Maguire & Delahunt, 2017). Moreover, the advantage of this method is its accessibility and flexibility; making it an increasingly popular method used in qualitative data (Clarke & Braun, 2013). It additionally offers a way for researchers into qualitative research by getting them to understand the mechanics of coding and systematically analysing qualitative data. Such an application complements the researcher's constructivist style of being engaging and participatory, thus allowing for a method

that is designed to encourage the researcher to continually interact with the data, while remaining constantly involved with the emerging analysis (Morse, 2007).

Atlas T.i. ™ is one of the foremost analysis software tools used for the processing and assessing of data collected qualitatively (Rosenfeld, Gatten, & Scales, 2013). Notwithstanding the benefit of using analysing software as such, Hwang (2008) proposes that software does not conduct the work, but rather assists in collating data, without interfering with the intellectual contribution. It is however suggested that for novice researchers the manual processing of data would be advisable to gain sufficient experience. Furthermore, the six steps recommended by Braun and Clarke (2006) were followed closely by the researcher in the following manner as indicated in Table 8 below.

Table 8: Braun & Clark's six – phase framework for doing thematic analysis

Phases	**Description of the process**
1. Familiarize yourself with your data	Data that was collected through interviews, observation and documents; these were personally gathered by the researcher, via an audio recorder and was later transcribed; adding to the familiarization of the data. However, the transcribing of the interview was outsourced although the researcher examined the recordings and checked for inconsistencies.
2. Generate initial codes	During the reading of the data sources, any pieces of the reading resembling the research question or goal was underlined and numbered accordingly; additionally, seeing inferences if it could be made. This was done to maintain consistent categories of the dataset in order to avoid distortions during analysis. In doing so, the researcher ensures that the responses to relative questions and goals were consistent across all data sources. The highlighted data was collated into group responses, under five hundred and fifty (550) relevant codes.
3. Search for themes	Here codes are rearranged into relating themes to gather constructive meaning; some codes will be important and useful, while others might be rejected. The codes were grouped together according to the relevant categories. The data was then regrouped within the codes and categories which contributed to relevant themes. The manual application process of coding, together with analytical reflection and interpretation resulted in the formation of

	twenty-two categories (22) that contributed to the formulation of four themes (4).
4. Reviewing themes	At this stage, the subjects are reviewed for meaning and coherence. Therefore, at the end of the step, there should be a clear narrative about the data. This process involves the participant's contribution to substantial amounts of reflection around the comparisons of the codes and categories and how they relate. Those that were unrelated to each other were changed to resemble the specific theme of the grouped concepts. The themes were then regrouped, according to the number of responses elicited.
5. Defining and naming themes	The themes were analysed and discussed to establish how they fit into the overall research as a formative story and relabelled for the final report. As the outcome of themes and categories formed part of the Snyder's evaluation process, the strength of these themes were tested to establish the links between the inputs, processes and outputs.
6. Producing the report	The report should be compiled in such a manner that it does not merely narrate the obvious, but provides insight, meaning, examples and evidence to support the themes. Taking all of these into account, the final report was compiled. Information from the Snyder's evaluation was incorporated, highlighting the additional insight from the application of a systems-thinking evaluation model.

However, there was a slight deviation from Braun and Clarke, in that the coding was completed by the researcher, and the categorization and themes were group activities, which included the focus group. The reason for making it a group activity was to extend the involvement of participants; effectually enhancing and enriching their understanding of how they (administrators) contribute to data quality and data quality management. These activities consequently allowed the participants to connect the various concepts to one another, which contributed to their understanding of the various research themes.

TA is considered a flexible and basic analytic approach to qualitative studies. Nevertheless, it still provides a systematic and rigorous approach to research capable of producing superior, thorough and intricate explanations of data (Braun & Clarke, 2006). The key characteristics of this method are the systematic processes of coding, but also examining the meaning of social reality through the creation of themes (Vaismoradi, Jones, Turunen & Snelgrove, 2016). Strauss

and Corbin (1990) refer to the process of examining data in the form of words, phrases, sentences as a “basic analytical process”. Given its simplicity, Maxwell (2012) withholds the view that it makes TA one of the most widely used forms of qualitative data analysis. During this research, the TA application also consisted of participatory aspects involving a focus group, which consisted of academic administrators whom collaboratively contributed to the categorization and naming of the themes (Dick, 2001).

3.13.1.1 Coding

The coding process applied during this research was a manual application that required the transcribed interviews, observation records, reports and documents to be read several times before attempting to code them. Any piece of the readings that was found to resemble the research question or goals was underlined and appropriately numbered, as illustrated in Figure 9. Similarly, at times segments of the scribed interviews were underlined that had no resemblance to the research questions or goals, yet still ignited an interest. This then contributed to the underlining and numbering as indicated in examples of the interview notes and reports (See Figure 9).

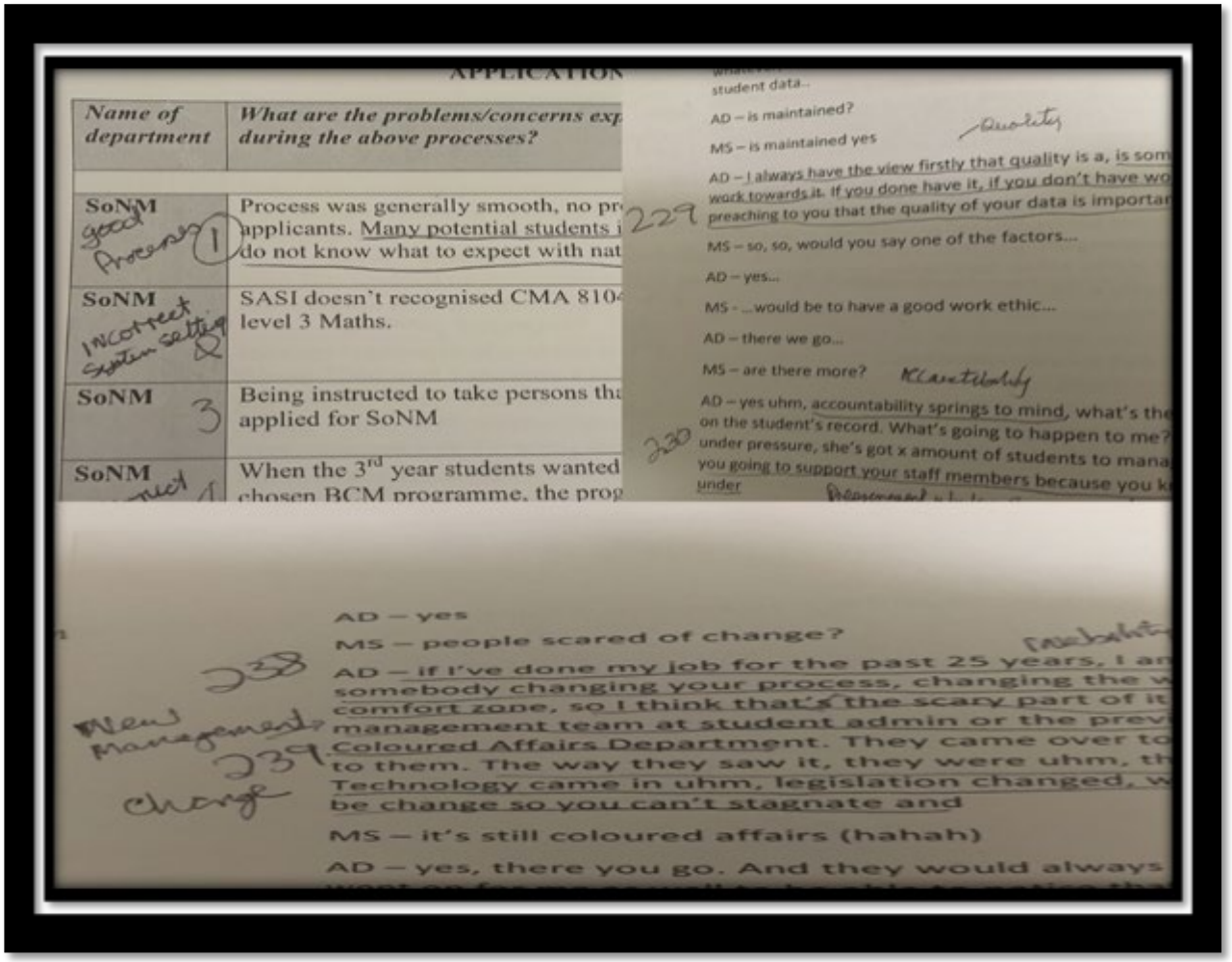


Figure 9: Coding of Interviews and enrolment reflection document

These literature segments from the interviews and reports were then coded with what was thought to be an appropriate concept or meaning. It was then further organized by numbering and labelling them using an excel spread sheet, as indicated in Figure 10 below, resulting in five hundred and fifty (550) different codes (Straus & Corbin, 1990; Maxwell, 2012).

3.13.1.2 Categorization

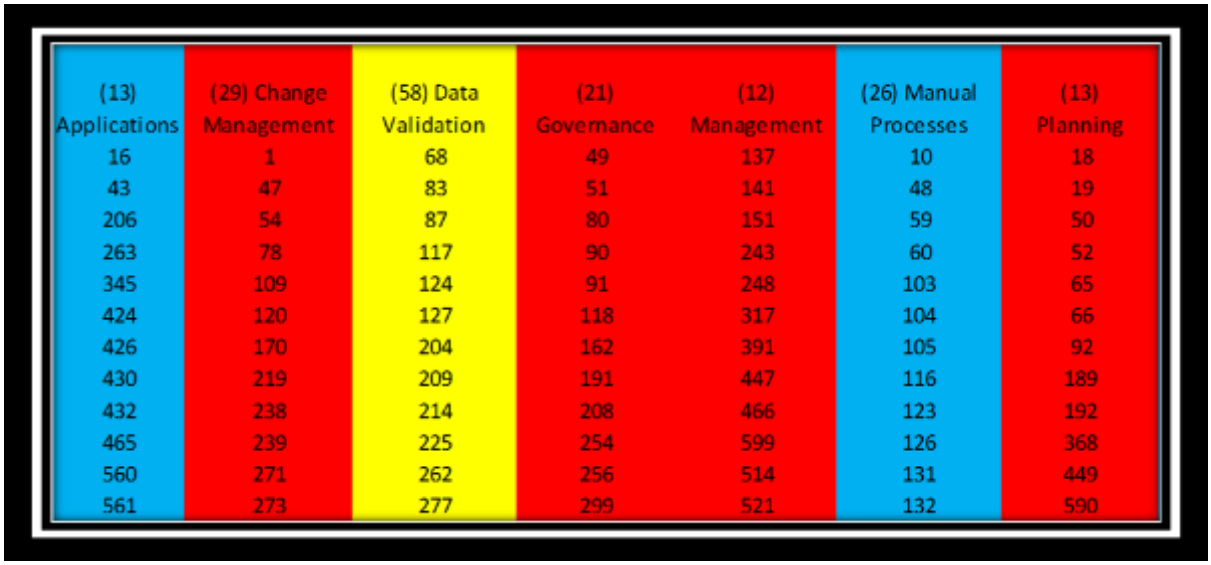
Microsoft Excel was used to assist in capturing the data during the process of coding and categorization. This was done by issuing a coding number next to underlined data that resembled the research question or goal (See Figure 9). The spreadsheet highlighted a code number, the

data source, extract of the data underlined, the code and a category (a concept describing data and code) that was translated onto the spreadsheet, as indicated in Figure 10.

code	data source	data	code	catogary
1	CHS Enrolement reflection 2015/2016	Many potential students interested but do not know what to expect with natural medicine	not knowing what to expect	Change Management
2	CHS Enrolement reflection 2015/2016	SASI doesn't recognised CMA 8104 students, level 3 Maths.	incorrect selection creiteria	Selections
3	CHS Enrolement reflection 2015/2016	Being instructed to take persons that have never applied for SoNM	process intervetion	Operational Flaws
4	CHS Enrolement reflection 2015/2016	When the 3rd year students wanted to apply for a chosen BCM programme, the programmes were not a selection option.	unavailable programme	Student Information Systems
5	CHS Enrolement reflection 2015/2016	Selections went well with assistance from staff	helpful staff	Staff Development
6	CHS Enrolement reflection 2015/2016	Applicants never received the selections letters sent from SASI	no system notification	Data Integrity

Figure 10: Organizing codes by numbering and labelling

This manual application of coding, together with analytical reflection and interpretation, resulted in the formulation of twenty-two categories, as illustrated in Figure 11. For example, the category referred to as applications appeared thirteen times, although numbered differently at times during the processing of the interviews, reports and documents, and is indicated as "13" on the spreadsheet. The other categorizations consisted of *change management* (29), *data validation* (58), *governance* (21), *management* (12), *manual process* (26), *planning* (13), *role clarity* (17*), operational flaws* (20), *staff training* (60), *staff development* 49), *liability* (23) *data security* (4), *student matters* (12), *student information systems* (52), *promotions* (22), *quality assurance* (36), *registration* (27), *selections* (21), *communication* (29), *data integrity* (86) and *finance* (11); as indicated in Figure 14 below. Moreover, the excel spread sheet allowed for filtering out of similar categories, through which it was then colour coded, as demonstrated in Figure 11.



(13) Applications	(29) Change Management	(58) Data Validation	(21) Governance	(12) Management	(26) Manual Processes	(13) Planning
16	1	68	49	137	10	18
43	47	83	51	141	48	19
206	54	87	80	151	59	50
263	78	117	90	243	60	52
345	109	124	91	248	103	65
424	120	127	118	317	104	66
426	170	204	162	391	105	92
430	219	209	191	447	116	189
432	238	214	208	466	123	192
465	239	225	254	599	126	368
560	271	262	256	514	131	449
561	273	277	299	521	132	590

Figure 11: Categorization of codes

3.13.1.3 Themes

The theme naming process was a group activity that included the focus group, consisting of nine academic administrators (six faculty officers and three administrators). Prior to starting this process, the categories that were developed by the researcher - a total of one hundred and fifty codes - were transferred onto yellow post-its and stuck onto A3 sheets in our boardroom. This visual display of post-its assisted in the process of developing the themes.

As mentioned previously, this process prior to categorization was explained to the focus group during the faculty enrolment reflection reports. This highlighted the requirement for participants to conceptually label responses attained during the student enrollment process that assisted in making group comparisons of similarities or differences during the formation and formulation of the themes. Despite this being a lengthy process, it ensured however that the data was not placed in an incorrect analytic category accordingly making the application of a systematic comparison to locate incorrect placings (Corbin & Strauss, 1990).

Strauss and Corbin (1990) claims that a theme is the result of coding, analytic reflection, contemplation, as well as interpretive categorization. Therefore, generating themes involves a higher-order of data analysis, which should not be confused with the lower-order coding

processes (Strauss & Corbin, 1990). Illustrations in Figures 9, 10 and 11 outline the processes of coding and categorization and effectively are what has brought us to this point of the research study. The process of the emergence of themes started with several iterations highlighted in discussions with the focus group; by reflecting on the processes of coding and categorization during the arrangement of the post-its, and through discussing how it contributed to the five hundred and fifty (550) different codes and twenty-two (22) categories. It was with such understanding that the focus group was able to contribute towards the formulation of four (4) themes, as indicated in Figure 12.

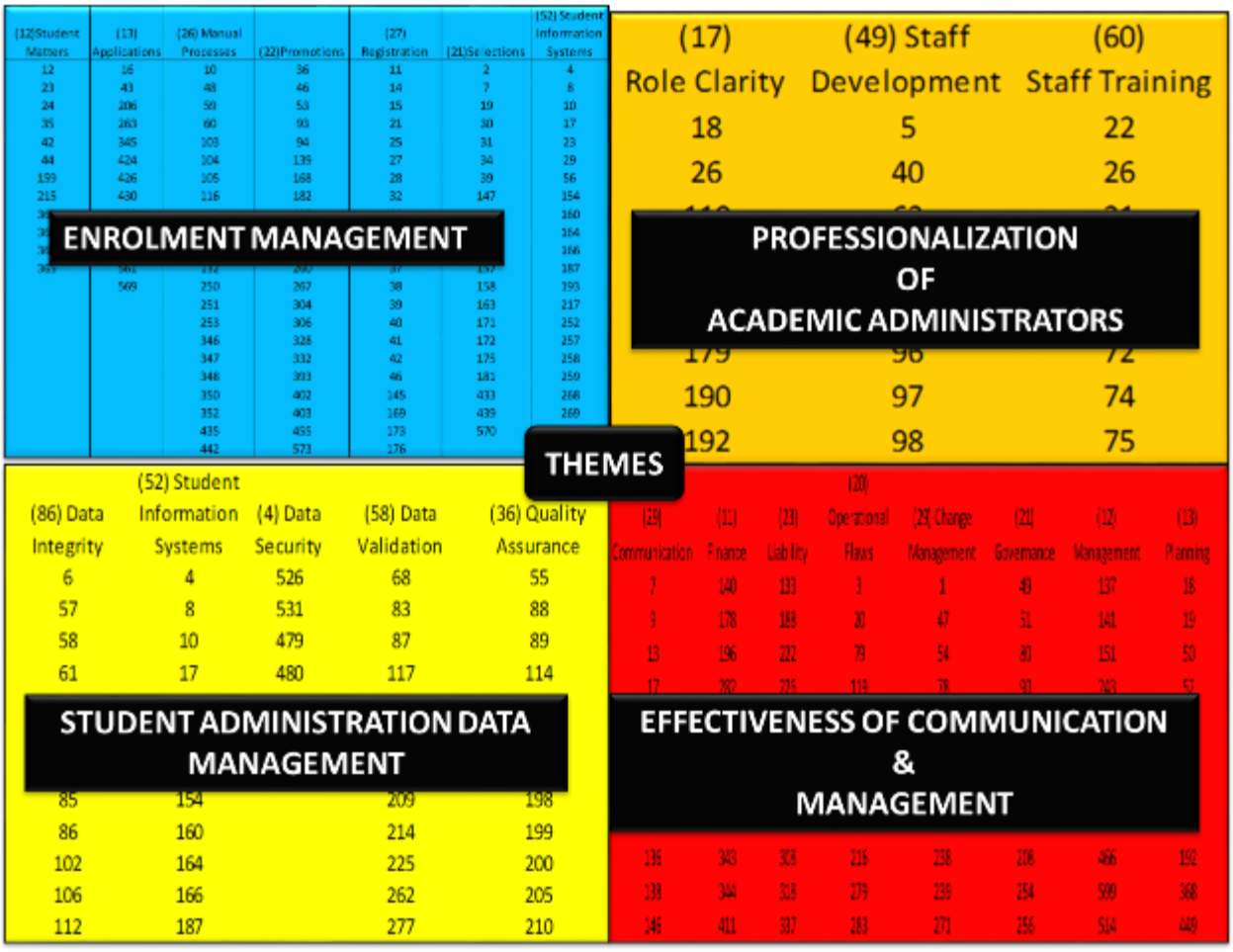


Figure 12: Study themes

The four themes and sub-themes of interest that emerged out of the application of the thematic analysis are:

- ***Enrolment management***: applications, selections, registration, student matters, manual processes, promotions and student information systems.
- ***Professionalization of academic administrators***: role clarity, staff development and staff training.
- ***Student administration data management***: data integrity, student IS, data security, data validation and quality assurance QA.
- ***Effectiveness of communication and management***: communication, finance, liability, operational flaws, change management, governance, management and planning.

3.14 Validity and trustworthiness

Validity and *trustworthiness* are factors used to determine whether measures to conduct research are appropriate for certain constructs (Newman, 2007). These factors are usually associated with quantitative research and functions to determine what tools ought to be used to achieve the intended objectives; which is an attempt to improve rigor in research (Creswell, 2009). Reliability in quantitative studies signifies the potential replicability of the results if the same measures were applied; while in qualitative research, it is an attempt to determine whether the data collected about an occurrence or an individual is an accurate representation of the phenomenon (Neuman, 2007). However, replicability is usually unattainable in qualitative research because various important factors, including the reality that the participants' views and the contexts are prone to change (Neuman, 2007). Therefore, evaluators of qualitative research require a balance, impartiality and comprehensiveness in a study to substantiate its quality (D'Cruz & Jones, 2004). Regardless, it is a challenge to justify qualitative findings as the same data is subject to different interpretations, suggesting the need to prove the trustworthiness of the study (Mandal, 2018).

Qualitative research signifies that experiences have value to those who are involved in the occurrence, but the researcher can only ask that participants represent the facts correctly and truthfully (D'Cruz & Jones, 2013). As such, qualitative research in the social sciences investigates events that are difficult to mathematically quantify, like that of beliefs and experiences which are largely abstract and intangible, but nonetheless constructs that can be observed (Creswell, 2013). The quantification of social constructs is made possible through different inferences dependent on the type of measurement in action (Welman, Kruger & Mitchell, 2003). These

various measurements ultimately require measurement tools through which the value can be captured (Boliarinwa, 2015). One of the most common tasks often encountered in social science is determining the validity and reliability of the measurement tools (Boliarinwa, 2015). This is mainly because researchers always wish to know whether the measurement tool employed actually measures the intended research concept or construct (Boliarinwa, 2015). For the record of this research, the data collection tools used as the primary sources for data collection is the observational checklists and interviews (Creswell, 2013).

3.14.1 Validity

It is suggested by Boliarinwa (2015) that validity expresses the degree to which a measurement measures what it intends to measure. There are several varieties of validity, which includes *face* validity, *construct* validity, *content* validity and *criterion* validity (Boliarinwa, 2015:195). In addition to these types, there is also what is termed as *member validation*, as well as *natural history* and *ecological* validity (Neuman, 2007). These validity tests are categorized into two broad components of internal and external validity. *Internal validity* refers to how accurate the measurement utilized by the research actually was in quantifying what it was designed to measure. On the other end, *external validity* refers to how accurately the measures obtained from the study sample describes the reference population from which the study is drawn (Boliarinwa, 2015:195).

In relation to the pertinent study, the researcher did not use a questionnaire as a tool to collect data, but used unstructured interviews and observational checklists as the primary sources of data collection. The researcher additionally opted for face validity and member validation. More specifically, face validity is a form of content validation where an expert's opinion is requested to review the researcher's tools for study compatibility (Boliarinwa, 2015). Campanelli (2008) proposes that even a single expert is considered a positive contribution towards validity; although more than one expert is recommended. In this study, the researcher started with a co-supervisor (as an expert) which approved the observational checklist used during data collection.

Member's validation in sequence is an attempt to affirm that the data collected correctly describes their accounts, through the participants review (Neuman, 2007). It is also considered to be the debriefing of participants in an attempt to ascertain their understanding of the

interview after completion (Campanelli, 2008). In this current study, the researcher chose to confirm responses after the completion of the recorded interviews by presenting each participant with a complete transcription of the interview. They were then able to reaffirm their responses through an open discussion, and conclude whether there were no inconsistencies or major changes that needed to be made in the transcripts (Mandal, 2018).

3.14.2 Trustworthiness

Collectively, Collier-Reed, Ingerman and Berglund (2009) support the idea that adding trustworthiness to the research process could be a substantial alternative for measuring the value of research as well its effects. They further suggest that by applying trustworthiness, it would add considerable rigour to the research process. Moreover, they highlight four qualitative criteria for trustworthiness applied in this study: credibility, transferability, confirmability and dependability (Lincoln & Guba, 1985; Collier-Reed *et al*., 2009).

3.14.2.1 Credibility

Data source triangulation can be used to reveal atypical data and identify similar patterns in data, thus increasing the credibility of the data (Collier-Reed *et al*., 2009). Furthermore, different types of data may provide different kinds of insights on the research questions. The combination of these insights yields a stronger knowledge base for drawing conclusions (Shenton, 2004). In this study the data was obtained from academic administrators, faculty managers, academics, ICS managers and QA managers through unstructured interviews, observations, documents and focus groups. Due to the input of the experienced and specialized individuals that were included in the data collection, the four themes that emerged from this research process can be considered accurate and credible. These participants, as well as their activities during processeses such as applications, selections and registrations were oberseved; which were subsequently reinforced and highlighted during the obseravation process.

The assesment of various documents such as enrolment reports and emails also helped the researcher with undestanding many of the issues expressed during the interviews, and simultaneously aimed to debunk any biases that might have been formulated. In addition, the credibility of the research was further encouraged through the researcher's integrity as the

faculty manager of the FCHS for the last ten years, and by giving an anecdotal account of the interactions of the category of personnel chosen for this research (Collier-Reed *et al*., 2009). Accordingly, the loyalty and reliability of these staff members, as well as their paramount contribution towards the generation of data through the application of their extensive knowledge and skills in the HE environment, has greatly added value and credibility to this research (Shenton, 2004).

3.14.2.2 Transferability

Crawford, Leybourne and Arnott (2000:6) describe transferability "as being parallel to generalisability, with relevance to the degree to which noticeable conditions overlap or transferred to other populations or settings". However, Lincoln and Guba (1985:316) state that, "it is, in summary, not the naturalist's task to provide an index of transferability, it is his or her responsibility to provide the data base that makes transferability judgements possible on the part of potential appliers". In other words, this suggests that the researcher cannot prove that the findings of the research study are applicable, but instead provides evidence that it could indeed be applicable. Transferability can also be described as being parallel to external validity or generalizability, to the extent of it also being relative and entirely dependent on the degree to which noticeable conditions overlap or match (Crawford, Leybourne & Arnott, 2000). Therefore, as the researcher, one can only suggest that the measure of rigour has been enacted through making this research project a vehicle for change, by contributing to the theme of professionalization of academic administrators at HEIs.

3.14.2.3 Confirmability

Confirmability is described as being parallel to objectivity (Crawford et al., 2000). The researcher confirmed the content of the audio interviews by listening and re-listening to the audio recordings, as well as reading and re-reading the raw texts, before analysing the data. To further extend the notion of objectivity in the study, the researcher provided the interviewees with a transcription (written text) of the recordings, so as to validate its correctness with result ensure objectivity (Shenton, 2004). ly

Notwithstanding these efforts, the researcher also accepts the element of subjectivity that exists within a constructivist (qualitative) research. However, to prevent any preconceived biases the researcher highlights his position as faculty manager during the process of the research and explicates that it could be construed as a position of power and privilege. In subject, this underlines the issues of power leveraging that could be exerted to gain influence on personal or research processes. In sequence, the researcher explains that although unintentionally, his position did have an influence or effect (whether positively or adversely) on the process of finding research participants (staff members) for the interviews, focus groups and observation processes.

3.14.2.4 Dependability

Dependability is parallel to reliability and likewise, concerned with the stability of the data over time, but is also concerned with providing evidence that similar findings would be obtained if the research was to be repeated (Crawford et al., 2000). However, exact replication of the findings would only be possible if the same participants and methods were to be used in similar contexts (Crawford et al., 2000).

The participants in the current study were purposively selected because of the level of skills and knowledge they possess. Unstructured interviews, observations, documents and focus groups were chosen to strengthen the qualitative aspect of this study. The researcher also scrutinized the recorded interviews and transcripts thoroughly, which was additionally validated by the interviewees to ensure its correctness and consistency of its applications. A focus group was also used during the analysis of results, to ensure the coherency of the data. Principally, the validity of these methods has contributed to the dependability of these data collection techniques, together with the interpretation of the results. Under these or similar conditions, it makes it possible for this research to be repeated; otherwise this study is not replicable and cannot be applicable to any other population, setting or wider population (Shenton, 2004).

3.15 Ethical considerations

Ethics are principles and regulations designed to provide a generally acceptable and desirable approach of conducting research and behavior towards subjects (Creswell & Poth, 2016). Blaxter,

Hughes and Tight (2006:158) state that informed consent plays a crucial function in conducting research in an ethical manner. Informed consent relies on informing participants of the aims and intentions of the study and reassurances regarding how the data collected will be reported and disseminated once the research is concluded. Of key importance in these discussion are issues of anonymity and confidentiality. Researchers will also face certain choices or decisions that determine the integrity of the research process. The researcher was guided by the suggested ethical principles proposed by Booth, Colomb and Williams (2003:286) which includes ensuring that sources used are not misrepresented, that results are not invented, the provision of accurate representation of the data – including views or opinions that might contradict those of the researcher and the honest and accurate inclusion of data collected as part of the research process.

To ensure the ethical standards of this research study, ethics clearance was obtained from the UCT's EBE Faculty: Assessment of Ethics in Research Projects. Moreover, this was paired with the approval from the dean of the FCHS, the dean of research and the registrar at UWC. Furthermore, voluntary participation in the study was established for academic administrators from faculty office, student administrative services and the office of the deputy registrar. Written, informed consent was obtained from all participants with a letter clearly indicating the conditions and provisions of the research study (See Appendix 4). In addition, the researcher sought permission from participants to audiotape the data-generating activities. Each individual was either personally contacted via email or telephonically, for permission to conduct or take part in the interview. This was followed up with a formal email request. Once the interviewee electronically accepted, the necessary arrangements were made that best suited the participant.

3.15.1 Anonymity and confidentiality

Participants were given the assurance that their identity would not be revealed in the research report and the ethical principle of anonymity assured. A key component of ensuring participant anonymity and assurances of confidentiality was the importance assigned to building trust between the researcher and participants (Meyer, 2001). The researcher was known to participants and had an established ethical reputation amongst the participants which was cultivated over an extended period.

3.16 Conclusion

This chapter has discussed the research approaches, rationale for a qualitative approach, philosophical approaches, methodologies and rationale for research methodology. The research participants' methods for data collection and data were presented in the chapter. This section is concluded with ethical considerations, validity and trustworthiness. This has allowed for a sound foundation to present research data results.

This methodology embraces participatory applications and complements its qualitative design and constructivist philosophies. It also demonstrates its appropriateness, as it fits with the qualitative nature of this study by drawing on the experiences and interpretations of the participants. Accordingly, it also encourages participants to develop a better understanding of their work environment and to critically reflect on their immediate environment. Thus, making this methodology fit for purpose through the choices such as that of the Snyder's evaluation framework in the form of the process evaluation method. The research data will be discussed in the next chapter.

CHAPTER FOUR

FINDINGS

4.1 Introduction

In explaining the themes resulting from the thematic analysis, concept analysis was used to describe and explain the characteristics of each of the concepts supporting these themes in terms of antecedence, attributes and consequences (Tofthagen and Fagerstrøm, 2010). Tofthagen and Fagerstrøm (2010) offer the following descriptions of these concepts; *antecedence* is regarded as events or phenomena that have previously related to the concept; *attributes* are clusters of characteristics that make it possible to identify situations that can be categorized under the concept and *consequences* are the result of the use of the concept in a practical situation.

4.2 Theme: Enrolment management

Enrolment management is not a new concept but has existed for a long time within higher education as a tool to recruit new students through more manual processes (Black, 2010). However, during this research, the theme *enrolment management* encapsulates the participants' understanding and expectation of an electronic SIS that is used by them on a daily basis. These participants (academic administrators) do so with a combination of expectations to manage each of the enrolment management processes in holistic, integrated, fast, reliable and effective ways to contribute to the production of data quality. "Participant 8" understands enrolment management to be *"*a vision to integrate, to make it a fully holistic, totally integrated system to encourage the complete student lifecycle, from applications right through to alumni*".* *"*Participant 4*" saw and understood it to be that of* "key processes that contribute towards the production of student data and how to give feedback on those processes*".*

Enrolment management emerged as an important theme that has an influence on data quality and data quality management, as indicated in Table 9. Equally important is the integrated nature of this theme and therefore makes it difficult not to highlight or mention the surrogate processes embedded in this theme, such as that of the SEMS or SIS of the antecedence. This antecedence,

"volumes of student numbers", has SIS/SEMS attributes such as applications, selections and registration. In this study, these processes are observed to form part of the contributing factors "volumes of student numbers" for *enrolment management* at the faculty, which is embedded within the SEMS.

Table 9: Antecedence, attributes and consequences of enrolment management

ENROLMENT MANAGEMENT at Faculty of Community and Health Sciences		
Antecedence	**Attributes**	**Consequences**
Volumes of student numbers	Existing SIS/SEMS administrative processes for correct capturing /acquiring of student data, the diverse nature of its professional programmes, the reputation and performance of faculty graduates and its internationally recognised qualifications.	Contributes towards diversity and equity nature of specialized health and allied programmes, creating more access opportunities for previously disadvantaged and marginalized applicants to enter such professionalized programmes, Access to demographically, biographically and academically diverse mixed data sets, increase student data errors.

4.2.1 Sub-theme: Dealing with volumes of student numbers

The attributes of *volumes of student numbers* at the Health Sciences (FCHS) are also observed to have surrogates in the form of SIS or SEMS administrative processes such as applications, selections and registrations that are routinely applied by the participants for the capturing and storage of student data. Additionally, the other attributes are grounded in assisting disadvantaged students in obtaining access to the faculty's diverse professional health and social programmes, as well as using the reputation and performance of faculty graduates, together with its internationally recognised qualifications, as a means of drawing attraction to the programmes in the faculty.

The consequences of this sub-theme are observed to be promoting towards the nature of diversity and equity in the faculty through its specialized health and allied programmes. This in turn has also created more opportunities of access for previously disadvantaged and marginalized applicants into these professionalized programmes. Additionally, the consequence

of such has also contributed to the demographics of the student population, biographics and academically diverse mixed data sets at the faculty.

Contrary to this however, this could also be contributory to unintentional increases in student data errors, as ascertained by one of the research participants who stated that,

> *"Sometimes technology is to blame, and sometimes human beings are to blame when there are inconsistencies and when their integrity is at stake" (Participant 4).*

This has led to staff often having to revert to lengthy manual activities and duplication, as highlighted in the following report: suggesting that technology fails, and staff has to resort to lengthy manual correction of registration processes (CHS Reflective report of 2015/2016). Resorting to these manual activities increased the risk of human errors, creating unnecessary assumptions about poor administrative processes, poor data quality and poor management of data at faculty level, as maintained by Participant 5:

> "*Yes exactly, if you make a mistake with; at registration for instance, students registered incorrectly and it's not picked up, it could pull through. So, it is important for staff to be aware of that. Also, for the manager to have oversight to ensure that staff are aware of that and for the manager to intervene*" (Participant 5).

It is for such reasons that the automated online registration process is favoured, in the belief that the absence of human intervention will increase the quality of data on the SIS. Furthermore, this reduced errors and eliminated long queues associated with student registration (ENCA, 2020). Even though the existent perception is that technology contributes to alleviating some of our human error or operational issues, this does not necessarily seem to be true in all cases. The CHS enrolment reflection reports of 2014/2015 and 2015/2016 for example, had highlighted how some students had difficulty with online registration, making apparent the challenges that these technologies could present (Reflective report of 2014/2015).

Moreover, other issues that these reports outlined are how online timetables would sometimes clash with formal timetables that were submitted to venue management via faculty, which "made online registration impossible" and consequently resulted in increasingly "long lines for

assisted registration" (Reflective report of 2015/2016). Additionally, it was expressed in the report that, "The online system did not work for the majority of the students" and that many students had complained to administrators (participants) that modules could not be selected on the online system and that they had general difficulty with online registration (Reflective report of 2015/2016).

Accordingly, these online challenges were not exclusive to any one department in the faculty. On the contrary, it apparently seemed to be equitably experienced across departments at the faculty. "Participant 4" from a department reflected the challenges this faculty faced with regards to online registration and mentioned that,

> "*This was not only because the department doesn't have clear, what do you call it, fields, you know when you have… streams. The department doesn't have set streams, so wide open, makes on-line registration extremely difficult for our students" (Participant 4).*

Notwithstanding these challenges, the participants understood the importance of the enrolment management attributes of volumes of student numbers at the Health Sciences (FCHS) and its consequences in creating opportunities for previously disadvantaged applicants to enter health and social science professional programmes offered at the faculty. Cognizance of this matter is expressed through a participant suggesting that, "There should be a system in place where we can identify these applicants. Then we also need clarity on how and who to select, they also affect our targets" (CHS Reflective report 2014/2015).

The participants equally understood that the reputation and performance of the faculty graduates contributed to attracting new applicants into the faculty's programmes. This had a direct impact on the increasing numbers within specialized programmes such as nursing, dietetics, physiotherapy, natural medicine and occupational therapy. Accordingly, it is perceived that the strict rules and competitive criteria of these programmes add to their reputation, which is maintained by "Participant 2" who expressed that:

> *"My first year of teaching, I... remember the course, Dietetics started in 1987 with a class of I think, 8. But by the time they got to their 4th year in 1991, there were only 2… in their final year. And… now my first year class was I think, 16 or 20"* (Participant 2).

Other participants are supportive of the opinion that the demand for the diverse professional programmes in the faculty could be a contributing factor to the increase in student numbers. This is apparent in that Bachelor of Social Work (BSW) targets were met, whereas "other departments did not meet targets for first time entering students" (CHS reflective report 2014/2015). This could also be supported by the notion that broader programme interests exist due to programme reputation and its international statutory standings. For instance, the clinical nursing programmes "require the South African Nursing Council's (SANC's) registration for foreign students" and although being a "lengthy process" attracts large numbers of students because of its international recognition (CHS reflective report 2014/2015).

This competitive nature is reiterated in that the BSc Mainstream and Chinese Medicine and Acupuncture (CMA) programme having "the same code but different entry requirements", which often resulted in applicants for CMA being "automatically declined" (CHS Reflective report of 2014/2015). Another prominent accolade of the faculty is held within the international terrain of sporting; wherein one of the physiotherapy graduates in the faculty was part of the 2019 Springbok rugby world cup team. These are however, but a few specialized areas that have contributed significantly to the faculty's prestigious reputation.

Furthermore, the participants are also aware that the surrogates of volumes of student numbers are easily recognisable through SIS/SEMS processes such as applications, selections and registration. The participants see these processes as tools that are greatly advantageous when having to manage volumes of student numbers to reach target. For example, "Participant 4" expressed that the faculty gets around 20 000 applications, in which they can only select "800 – 1000 students" (Participant 4). Therefore, these processes have a key role in managing large volumes of student numbers. However, participants also perceive notable consequences of such large numbers as contributing to errors to be corrected; expressing how there often were "far too many applications that needed to be amended" (CHS reflective report 2015/2016).

Notwithstanding, even though faculty has had an increased use in technology, human error is still perceived as a consequence of concern. "Participant 1" lays out this margin of error saying that; "... it had to do with the input conversions and the output, because the human being must still do the input. The system then configures the data and then it creates the output" (Participant

1). Moreover, such consequences are also perceived to be contributors to data errors or inaccuracies, as suggested by the participant below:

> *"an example for the enrolment applications for our undergrad applications we've from past experience we've learnt that when you extract information from the system it's not always accurate and it doesn't have the matric scores so we actually have a manual process with our selections"* (Participant 5).

Equally important, is that these volumes of student numbers and the existing SEMS administrative processes are largely responsible for generating large volumes of data, as emphasized by the participant below in saying that,

> *"Now the production of student data... starts at a particular point. Right, now we always talk about processes... and I just summarised in a way where I say ok, processes is big lot of activities that we can make sense of. So, we normally talk about an application process but there's a set of activities"* (Participant 2).

To paint a clearer picture of the immensity of these SIS/SEMS processes, the above must be taken together with sets of activities that are perceived to be at the heart of such SEMS processes; where "…each kind of broad process would have numerous sub-processes as well...with the list having almost reached about 400 processes" (Participant 7).

4.3 Theme: Professionalization of academic administrators

Professionalization of academic administrators is a relatively new concept within the South African HE ecosystem (Naidoo, 2009). However, the concept is well - established internationally, with an emphasis on skills, training, registration through a recognised professional body and the creation of a knowledgeable workforce (Sebalj, Holbrook & Bourke, 2012).

The theme of professionalization encapsulates the struggles and frustrations that academic administrators deal with in order for them to be sufficiently recognized and acknowledged for the knowledge and skills required in their roles, but also for the significant contribution they feel that they make to the academic project. More appropriately, this theme focuses largely on the

demand for the increasing use of IT in relation to increasing student numbers, along with the constant need for new skill sets in this area.

The participants in this study have identified professionalization of academic administrators as another theme that is perceived to have an influence on data quality and data management at the faculty of Community and Health Sciences (CHS). More specifically, the participants at the faculty identified the antecedence, attributes and consequences of professionalization, as summarised in Table 10.

Table 10: Antecedence, attributes and consequences of professionalization of academic administrators

PROFESSIONALIZATION OF ACADEMIC ADMINISTRATORS at the faculty of Community and Health Sciences		
Antecedence	**Attributes**	**Consequences**
Staff workload	Additional administrative tasks, new technology and increased student numbers.	Increased number of administrative errors, dissatisfied and frustrated administrative staff.
Staff training	The need for skilful and knowledgeable administrative staff, recognition and acknowledgement of the administrative roles.	Formal and informal accreditation, academic administrators are much more employable, address issues of power and privilege and less tension between academics and administrators

4.3.1 Sub-theme: Staff workload

The perceived antecedents of professionalization are highlighted as that of *staff workload* and *staff training*. One participant maintained that,

> *"Professionalization has got to do with a profession and certain skills that you must obtain, you must be able to understand what you're doing... you can professionalize issues but if your training is not geared at professionalization, there's nothing you can do"* (Participant 1).

Accordingly, the participants perceive staff workload attributes as being "additional administrative tasks", the use "new technology" and "increased student numbers". The consequences following these attributes are identified as an increased number of administrative

errors, which in tandem produce dissatisfied and frustrated administrative staff. One participant attest to the consequences of such additional tasks associated with increased student numbers and expressed that,

"Because it's one person now capturing and vetting the marks, which wasn't designed in that way..." errors will obviously arise and that "... the amount of mark adjustments in that process is basically the evidence" (Participant 7).

Participants have also often observed that with the introduction of new technology, supervisors or managers just make random allocations of workload without appropriate training. For instance, one such incident was highlighted by "Participant 3", who mentioned that,

> *"because the HOD decided that the one is going to deal with Honours and the one's going to deal with Masters and PhD's, so if you say just deal with this matter relating to Honours 'well it's not part of my job description as defined by the HOD' and that to me is the worrying thing"* (Participant 3).

Thus, it is clear that the attribute of "new technology" had clear implications regarding staff workload, which in effect produced consequences of staff dissatisfaction and frustration. Furthermore, these consequences often transpired into other areas of conflict and disagreement between different levels of workforce, like that between managerial staff and administrative staff, as seen above. Another example of how the consequences of dissatisfied and frustrated staff members translated into conflict amongst the workforce was expressed by this participant:

> *"I do not think that, given my 40 years' experience at UWC and my international experience on how it should be done, it is, no space is created for staff to develop, admin staff. It depends on the relationship and what type of relationship there's going to be between the academic side and the admin side"* (Participant 1).

4.3.2 Sub-theme: Staff training

The attributes for staff training are considered as firstly, "the need for skilful and knowledgeable administrative staff" and secondly, "recognition and acknowledgement of the administrative roles". The consequences of these attributes, on the other hand, were observed as formal and

informal accreditation, academic administrators that were more employable, addressed issues of power and privilege, as well as less tension existing between academics and administrators.

However, some participants held the view that despite staff training having many positive outcomes in the administrative environment it is still an area of concern. “Participant 9” supported this view in saying that the training had its challenges because the feedback from the staff who goes for “the systems training” often reports that what they are taught “is not reflective of reality” and also that “the skills that they trying to develop has already been developed” (Participant 9). Thus, with this type of training particularly, the feedback indicated that there is a constant loop that seems counter-productive as this participant attests that, “feedback should also inform the training and that is not happening...” (Participant 9).

Moreover, participants also highlighted that tensions existed toward the biases around training in so far that,

> *“...there are two different structures within the institution: one is the admin and support structure and the other one is the academic structure. The academic structure is more about the ‘I’ factor, where the academics are for themselves in terms of their own research, blowing their own whistle. Well, the admin that supports them... they do not support you, what you got to do. There’s nothing you will be able to reach and that is where the challenge for all universities lies, because if you look at political parties, you can call each department a political party on its own. You can call senate, the parliament or you can call the different faculty committees as working committees of parliament… You can easily compare a university with the state of political parties...”* (Participant 1).

These tensions expressed itself through academic privilege when it came to the provision of staff development, training and progression; and the lack thereof for academic administrative staff. This frustration is emphatic in what “Participant 1” expressed about this issue:

> *“Yeah… from the academic side, for arguments sake, they are giving a lot of benefits to staff to complete PhD’s, but that’s not coming from the admin side. They are not supporting the admin side to improve their qualifications”* (Participant 1).

Another effigy of this tension existing between academics and administrators was expressed by "Participant 7" who said that there has always been a "fight between academics and administrative staff" and although it is rarely spoken about, to a certain extent, this conflict has to do with training and development (Participant 7). However, the belief that staff training and development should not only be for academics, but rather common practice for all university staff, holds constant for many of the participants.

4.4 Theme: Student administration data management

This theme or concept can be best described as a phenomenon that arose due to the introduction and availability of technology at the faculty. This theme furthermore presented participants with the opportunity to understand the processes of student administration data management. This involved the acquisition, validation, storing, protecting and processing of the required student data. More importantly, it ensured the accessibility, reliability and timeliness of the data for its users (Drew, Wilks & Wilson, 2015).

The theme of *student administration data management* was recognised to be a pertinent concept to the research and regarded as being influential to the data quality and data quality management at the CHS faculty. The antecedents of this theme have been highlighted as being the "availability of technology" as well as "data accuracy". Furthermore, the antecedence along with its attributes and consequences are summarised in Table 11 below:

Table 11: Antecedence, attributes and consequences of student administration data management

STUDENT ADMINISTRATION DATA MANAGEMENT at the faculty of Community and Health Sciences		
Antecedence	Attributes	Consequences
Availability of technology	Paperless administrative processes, integrated data collection processes (applications, selections and registrations) and automated processes.	Access to real time data; increase speed of administrative processes; increase storage capacity and connectivity; better communication; less student frustrations; shorter queues; increased student data errors.
Data accuracy	Improved administrative processes, acquire data timeously, relevant and reliable data sources/ sets.	Decreased human errors, fewer student complaints, better data integrity and decreased number programme amendments.

4.4.1 Sub-theme: Availability of technology

The participants identified the increased volumes of student numbers to be a precursor of the availability of technology, which had taken the form of SIS/SEMS. “Participant 4” for example, observed that the application process that was once a manual process has now become “online” (Participant 4). Moreover, what was also interesting is that the participants observed the attributes of availability of technology at the faculty to be “paperless administrative processes”, “integrated data collection processes” such as applications, selections and registrations, and also “automated processes”. What this brings to the foreground is the move towards administrative processes which are solely undertaken and dependant on using technology.

This highlights in tandem the complexity underpinning the importance of the integrated processes such as applications, selections and registrations as being salient contributors towards data quality and data quality management. “Participant 8” reinforces the above views by suggesting that, “There’s definitely a vision to integrate, to make it a fully holistic... totally integrated system to encompass the complete student life cycle, from application right through to Alumni and beyond that…” (Participant 8). This statement exemplifies then the grossly important role of technology (IT) concerning data quality and data quality management. This is especially pertinent to data quality and data quality management within the academic environment, but most importantly in the administrative environment as the primary users of this technology.

Furthermore, it complements the observation that additional technology at the faculty has added considerably to administrative processes concerning data quality and data quality management, as captured by the participant below:

> *“The system is set up now where you have your appellations pulling through where you select your stream. Now it does that, but in the past we had quite a few certificates that had to be re-printed, because then the wrong stream would be on the certificate. It was a manual process back then I think, where they used to type it out and then you had the wrong streams on or there was no stream, and people would come back and say, ‘but you know we needed to have it re-printed’”* (Participant 5).

Nevertheless, not all participants view it this way, even though they support the notion that the presence of technology enabled administrators to process large volumes of student data. For instance, one participant conveyed that oftentimes the system would falter and administrators would have to intervene, manually correcting "certain aspects" or errors made by a system that "promises a lot but delivers inconsistent results" (Participant 9). Such perceptions are reinforced through occasional inconsistencies in technology, which is actually perceived as one of the consequences of *availability of technology*. However, these inconsistencies are most times cognized by its users, as highlighted within this report that states that, "Online Registration was not 100% user friendly especially for first years who are not aware of their modules" (CHS reflective report 2015/2016). Therefore, these discrepancies about the efficacy of IT is often accounted for, but this admittedly is contrary to what the university had in mind when introducing technology. "Participant 1" expounds on the university's initial vision of creating and implementing the SASI system "to attend to" and "automate a lot of processes" that was previously done manually (Participant 1). Thus, it becomes apparent that the original hope in these technologies was for it to eliminate all manual input as well as "human error" when it came to administrative processes. However, this has not entirely been the case yet as these systems are in itself prone to error. Such views are supported amongst participants whom are frequent users of the SEMS system, who oftentimes account that the "SASI's not always reliable..." (Participant 5).

Even though the positive consequences are understood as being access to real time data, increased speed of administrative processes, increased storage capacity and connectivity, better communication, integrated data collection processes (applications, selections and registrations), remote online administration work processes, fewer student frustrations and shorter queues, some participants are of the view that there are worrying "shortcomings of the system and often feel that the system causes more manual work than it should" (Participant 9).

Nevertheless, the participants have highlighted that the concept of "availability of technology" within the theme of enrolment management is an important and necessary means for academic administrators to make a meaningful contribution to data quality and data quality management in the academic administrative environment. Despite current SIS/SEMS like that of SASI having its shortcomings, these technologies have undoubtedly been largely advantageous to

administrative processes and is the foundation for the progression of data quality and data quality management within the academic administrative world in future.

4.4.2 Sub-theme: Data accuracy

To avoid the dangers of data accuracy within IT, Clegg (2017:28) alerts us to the acronym GIGO - "garbage in, garbage out". The premise is simple: Even within a good system, if the data input is rubbish, the output invariably will be rubbish. Thus, the system will perpetuate the error, as maintained by "Participant 8" in reiterating that,

> *"The old concept of garbage in, garbage out... applies now. Which means that if any faculty gives us information that is inaccurate, we haven't got control over that, that's the unfortunate part. So maybe that question you must pose to those guys that feed it into the system because whatever we get, we process that, and not manually. It is all automatic, all electronic, all through the system"* (Participant 8).

The participants have identified the attributes of data accuracy at the CHS faculty to be "improved administrative processes", "timeous acquisition of data" and "relevant and reliable data sources/sets". These attributes in effect, are followed by consequences such as decreased human errors, fewer student complaints, improved data integrity as well as decreased number programme amendments.

When considering the accuracy of data, the participants understood that acquiring data timeously is largely important to its efficacy, but at the same time recognized the importance of data being relevant and reliable. More importantly however, is that the manipulators of this data have a comprehensive understanding of what the data entails. For example, what data is being captured, where and what is the source of the data, what will the data be used for, etc. This sentiment is expressed by "Participant 1" who is of the view that, "you cannot just use data elements and you don't know what you have to do", while firmly asserting that it is imperative for you to "understand the data elements to create data sets" and can only then extract information from these data sets (Participant 1).

Moreover, the participants believed that it was equally important to understand the consequences of data accuracy when working with it. One such participant attests that, "information needs to be captured correctly in order for accurate information to be made available" and is therefore crucial for data handlers to be aware that when human input is involved, there will be human error, so "whoever is capturing should make sure that the information is correct and accurate" (Participant 4).

These participants furthermore acknowledged that just as it was important to understand the data it was equally important to understand the administrative processes and its relationship to data accuracy. In light of this, "Participant 1" had highlighted that when working with data sets, you will essentially make use of data elements to extract data, from whence information is created (Participant 1). Another participant shared their experience with data accuracy pertaining to administrative processes, expressing that:

> *"an example for the enrolment applications for our undergrad applications... from past experience we've learnt that when you extract information from the system it's not always accurate and it doesn't have the matric scores. So, we actually have a manual process with our selections"* (Participant 4).

The above example draws back to the issue with the efficacy of IT versus "old school" manual processes. In this case it seems as if reversion to manual processes were more conducive to data accuracy than using SIS/SEMS. However, human error is still a major adversity to data accuracy and the impact human intervention has on compromising data quality is expressed by the following participants' experience:

> *"The extent of mark adjustments and why mark adjustments are is because I think that compromises the quality of the data as well... and some of the requests are just crazy you know, there's no logic to why. You can explain a simple error but there's no logic to it. So, I think that process needs to from a marks' admin point of view, needs to be looked at..."* (Participant 3).

4.5 Theme: Effectiveness of communication and management

Kaplan and Norton (1996) suggest that if management cannot communicate effectively or encourage staff to do so; then staff might feel that they are not part of the organization's purpose or strategic vision.

Effectiveness of communication and management emerged as a theme that has an impact on data quality and data management at the FCHS. The antecedence of this theme has been identified as being that of "effective communication", "management changes" and also "governance". The antecedence, as well as attributes and consequences of effectiveness of communication and management have been summarized in Table 12 below:

Table 12: Antecedence, attributes and consequences of effectiveness of communication and management

EFFECTIVENESS OF COMMUNICATION AND MANAGEMENT at the faculty of Community and Health Sciences		
Antecedence	Attributes	Consequences
Effective communication	Clear and well established standard operational practices; integrated instructional and operational tasks.	Better performing administrative staff; staff understanding what is expected of them with regard to their daily duties; no unnecessary disciplinary action for non-compliance or performance.
Management changes	New university management styles; focus on social, political and economic imperatives; new technologies.	Organizational failure; low confidence levels; poor planning in anticipation of new developments or technology Increase levels of planning and monitoring; setting of institutional targets.
Governance	Well documented university rules, laws, practices and procedures and processes; adhering to all policies.	Failure of management to communicate such governance could result in a dysfunctional organization; contribute to self –evaluation of existing processes.

4.5.1 Sub-theme: Effective communication

The FCHS participants have established the attributes of effective communication to be "clear and well established standard operational practices" and also "integrated instructional and operational tasks". Following these attributes are consequences such as better performing

administrative staff, staff understanding what is expected of them with regards to their daily duties, but also no unnecessary disciplinary action needed for non-compliance or performance.

The participants have highlighted that effective communication in the workplace has ensured that they constantly focus on performing better in their daily tasks. This effective communication was translated into the form of applied standard checking protocols by staff and this level of operational structure was indicated by the following participant:

> *"There are always checks and balances in place to make sure information is accurate and that is why we have manual records. I suppose checks and balances should be put in place. That is currently happening, but I mean like I said; you always have to leave room for human error that happens every day... I like to cross check and I always double check on information I receive from the faculty... if for instance I get information from staff members regarding say, pass rates; I will cross check, double check against QA, check with what I have… specifically talking about data input or quality checks"* (Participant 5).

They also felt that aside from adhering to operational tasks, effective communication also took the form of sharing information and work experiences with each other as staff members, which ultimately benefitted everyone. This sentiment was echoed by "Participant 7" who believed that it is only natural to share information, especially when working at a learning institution, as it is "all about your personal growth as well" (Participant 7).

It is also observed that even though most participants comply in their operational tasks, information can easily be distorted if communication is poor. "Participant 8" for example recalls how information would only be thoroughly checked for the category of a student who has applied for residency, while with "the other 90% of students, that information would never be checked" and administrators would only become aware of incorrect information when it is communicated (Participant 8).

Participants have also understood that it is essential that data or information is interpreted "the way it is intended" (Participant 6). This participant illustrates an example of how, when it comes to applications and registrations, selection criteria needs to be "consistently aligned with the

business processes and the business processes must be kept up to date regularly" (Participant 6).

Furthermore, some participants also attest to other instances of problematic communication within their work environment. For example, one such participant clearly expressed their belief that people within the work environment should be able to communicate, however it is not always the case.

> *"What I feel is that a lot of people actually sit in their offices, they're too scared to ask, they're too scared to communicate. It might be that they feel that they will be regarded as a lesser employee, whatever the case"* (Participant 7)

Notwithstanding these occurrences of inadequate communication amongst certain staff, the impression created and belief that largely existed between participants is that having open effective communication between staff is central to efficient operations. This was particularly significant when it came to the use of IT. One participant pointed out that constant communication between administrative staff promoted teamwork that allowed for issues with technology to be "raised" and then "sorted out" (Participant 3).

4.5.2 Sub-theme: Management changes

The attributes that participants of the CHS faculty collectively distinguished and listed were the "unknown", the "rate of change", "new university management styles", the "focus on social, political and economic imperatives" and "new technologies". The consequences of these attributes were envisaged as organizational failure, low confidence levels, poor planning in anticipation of new developments or technology, an increase in the levels of planning and monitoring and lastly, the setting of institutional targets.

The faculty and the university generally had been confronted with many management changes over various periods of time. Many of the participants like "Participant 1", who has had an extensive history with the UWC, has stood witness to these changes:

> *"Since 1984, the university attempted to become financially independent and therefore we joined the SAPSE system - the South African Post-Secondary Education system. It's a manual*

from government where we have to supply information. It's about 44 pages of student data that had to be completed, those years, manually. I was responsible for completing all those data manually for students until 1999 when it started to automate" (Particpant1).

This had advertently stimulated faculty management to develop and implement a clear and fervent vision for the advancement of administration and technology, which is still deeply embedded in present day. The words of "Participant 8" are reaffirmed in light of this vision to produce a "totally integrated system" that encompasses the "complete student life-cycle" from their initial application to the university, right through to becoming an Alumni, and even beyond that (Participant 8).

The outset of these technological and administrative changes, but also the shift in management style were escalated in the year 2000, wherein the university first initiated a strategic plan for the future and highlighted the issues within its pre-existing strategic plan (Participant 1).

Furthermore, this strategic plan worked towards the integration of various systems, merging administrative processes with technology.

"We want to integrate MAS completely into SASI which means it's going to be a module within SASI, not a stand-alone system. The same with... committee management system now a subset of SASI is easy because now that committee management system and SASI will be in the same language" (participant 6).

However, "Participant 3" had expressed that the management of the faculty had to take a "firm line" for this to work and function efficiently (Participant 3). Moreover, this participant had explained that it is often found that people have not been performing their roles in a way that was expected of them, with no one illuminating these issues or delegating responsibility to these workers. For this reason, managerial positions had to take a more stringent approach and "take action against that individuals", while taking the responsibility upon themselves to "sign off on the mark adjustments and... refer mark adjustments back", for example (Participant 3).

Therefore, these particular changes to the management style was a necessary action to ensure that there was a smooth transition into the administrative and technological evolution.

Ultimately, this contributed to the efficacy of data quality and data quality management at the faculty of CHS.

4.5.3 Sub-theme: Governance

The attributes of governance were perceived as being "well documented rules, laws, practices, procedures and processes of university" but also "adhering to all policies". The participants of the CHS faculty distinguished the consequences of these attributes as the failure of management to communicate such governance, which could result in a dysfunctional organization and contribute to self–evaluation of existing processes.

The faculty and the university's application and adherence to governance were furthermore viewed through its structures and management style. This was to ensure that the laws, rules, practices, procedures and policies were communicated and applied effectively. However, there were alternative perceptions of this application, as some participants were of the view that,

> *"...the university now has become what we call a bureaucracy machine where the rules dominate everything and there's no discretion that should be allowed and that is the concern that I have... a university is regarded as a professional bureaucracy because there's a lot of professionals working here" (*Participant 1).

Whereas, other participants had a completely different outlook on this matter, with the view of there being a level of assurance that the information that these participants have signed off on, or that information that has been forwarded to the Senate Assessment Committee (SAC) for approval, has been completed by the system and is in fact correct (Participant 3). Therefore, "Participant 3" asserts that they "don't see any need for further checks" because information that has been approved and sent off to SAC ought to have been through a process of "checks and balances" at the student administration level and "not necessarily back at the faculty again", which would have ensured that the information was correctly captured (Participant 3).

This conformity to governance and adherence to policy is furthermore maintained by the following participant:

> *"Let me put it to you this way, nationally, there are certain data that you have to submit annually to the government and not only to the government, but to the South African Qualifications Authority (SAQA), where they register each person's qualifications against the National Learner Register. So, you can go to SAQA and say in 20 years' time, 'what qualifications did I complete?'... They can give you a printout of what you completed. So... there is an improvement in data validation and data reliability in the last 5 years*" (Participant 1).

What this effectually does is reinforce the importance of governance to data quality management, but equally how these rules are transferred into the institutional and national databases of the enrolment management system. This is endorsed by "Participant 2" who expressed that "HEMIS has been built on the rules and requirements of what is required by the Department of Higher Education" (Participant 2).

Moreover, "Participant 1" reaffirms that governance was further encouraged through planning and self-evaluation procedures. This was achieved through the establishment of a national commission of inquiry in higher education. This participant accounts how the national commission had asked that universities submit three rolling plans; whilst ensuring that the enrolment management was based on the three-year rolling plan as a way of managing "the overall size and shape of the university", as well as to "stimulate future enrolment growth and support the development of students using a coherent and well-planned participation strategy" (Participant 1).

Such adherence to governance is vital to faculty as they have to manage a curriculum with diverse professional health and social programmes, especially since faculty has to report to several national professional health and social regulatory boards. One example of the CHS faculty's compliance to such a professional body is given in that its clinical nursing programmes require approval from the South African Nursing Council (SANC's), which is preliminary for the registration of foreign students (CHS reflective report 2014/2015).

However, despite it often involving byzantine processes, applications of governance through administrative management practices and adherence to policy have long term benefits. The

statement made by “Participant 1” earlier in the chapter regarding SAQA containing all information/data about an individual’s qualifications, even many decades after one had achieved it, is a true testament to the long-term benefits of governance through administrative management practices and adherence to policy. This is illuminating of how these are greatly beneficial data quality and data quality management.

4.6 Conclusion

This chapter presented the four themes and eight sub-themes that emerged from the data analysis. The qualitative approach and participatory nature of the study allowed for engagement with, and confirmation of the themes and sub-themes. Participants were involved in action-reflection cycles led by the researcher in a real live setting to develop a shared understanding, leading to an improved understanding of the way of work and the academic administrator’s functionality within this research study.

These themes, sub-themes and insights with respect to the various antecedence, attributes and consequences produced are used in the next chapter where an evaluation of its value and application is described.

CHAPTER FIVE

INTERPRETATION OF FINDINGS AND PROCESS EVALUATION

5.1 Introduction

In this chapter the findings from the thematic and concept analysis are integrated with a process evaluation to answer the second research question, namely how do academic administrators contribute towards data and data quality management within the Faculty of Community and Health Sciences? The sub-themes of four themes of the former chapter were used during the implementation of the process evaluation in order to answer this research question.

During the evaluation process, the researcher was able to demonstrate how the stakeholder group applied the evaluation method. It furthermore expounded how it contributed to the emergence of the various elements such as resources, activities, effects, targets and ideals of each of the respective sub-themes. Demonstrating the integrated and interrelated nature of the elements within each of the sub-themes.

5.2 Applying process evaluation

Through the application of the process evaluation method, the researcher was able to demonstrate the systems-thinking principles of the evaluation process. This was essentially achieved by highlighting the related and interrelatedness between the various elements of each of the various sub-themes. This had also created an opportunity to examine the gaps between the faculty's various elements, such as resources and activities, refining the targets and evolving strategies for achieving programme goals or ideals (Dick, 2001).

5.2.1 Administrators stakeholder workshop

The stakeholder workshop group was instrumental in the application of the process evaluation. This group consisted of the faculty administrators, including the research focus group that contributed to the data collection process. It was important to have a combined group of

participants to allow for a shared view of the various concepts during the construction of evaluation.

By the start of the workshop, the focus group participants were already aware of the four themes and its sub-themes or surrogates, because of their prior participation in the research process. This was helpful when the themes/sub-themes were explained to the rest of the academic administrators, as the others had a comprehensive grasp on what the research was all about, having previously been invited to make a contribution towards the evaluation process. The researcher found the extended group to be accommodating for the purposes of generating ideas for the various elements of the respective concepts, themes, sub-themes and surrogate terms.

5.3 Theme: Enrolment management

5.3.1 Sub-theme: Volumes of student numbers

During the application of the theme, *enrolment management,* the researcher chose to make use of the sub-themes of, "volumes of student numbers", with an emphasis on systems processes within the SEMS. These SEMS processes comprise of application selections and registration processes, for example. These processes were appraised as the central contributor to volumes of student numbers at the faculty. It was important for the researcher to have made this choice, as the participants were very familiar with the SEMS processes, and this gave them great comfort and confidence in working with identifiable concepts and processes.

At the start of the evaluation the researcher introduced a brainstorming exercise. This exercise was explained to the stakeholder group to be a tool allowing them to list the elements of each of the SEMS processes (such as applications, selections and registration) identified during the thematic and concept analysis (Brassard & Ritter 1994; Tofthagen & FagerstrØm 2010).

To demonstrate the construction of this evaluation method, the stakeholder group started with the application process. They began by formulating and listing the ideals/vision and targets of the application process on post-its and stuck it on the wall, ranking it in order of importance. To assist the stakeholder group with the process, the researcher requested that they briefly forget about their ideals and then formulate their targets. Unfortunately, the group struggled with this

approach and instead opted to list the activities and immediate effects both intended and unintended, of the application process as they could relate to these activities far easier. Once the activities were listed, the group then found the formulation of targets to be much easier.

Effectively, it had made it far less complicated for participants to define the list of targets for their adjacent sets of activities. This concurrently made it simpler when comparing ideals and targets, highlighting its relationships by drawing a connecting line between the two adjacent elements, as illustrated in Figure 13 below.

During the construction of the *ideals and targets* relationships, it was observed that the ideal "Faculty aim to have the best technology available" possessed the strongest link, followed by the "Faculty office aims to have an effective and efficient communication system" and also *"*administrators constantly seek to have uniform approaches with perfect processes".

These ideals have complementary targets with equally strong links, such as "increase the number of *first time entering* (FTE) applicants" and "increase the rate of student applications per programme*"*.

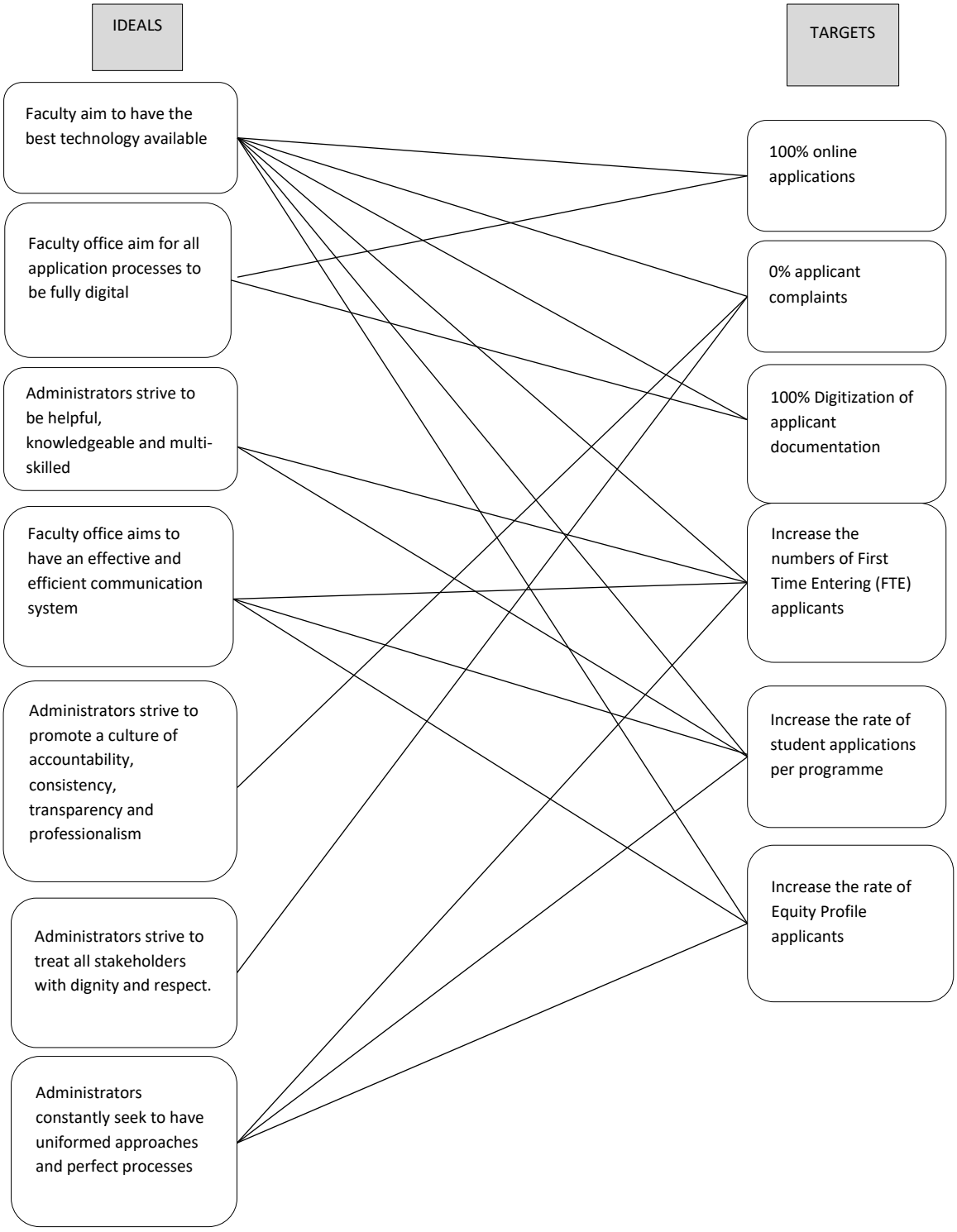


Figure 13: Comparing ideals and targets – applications

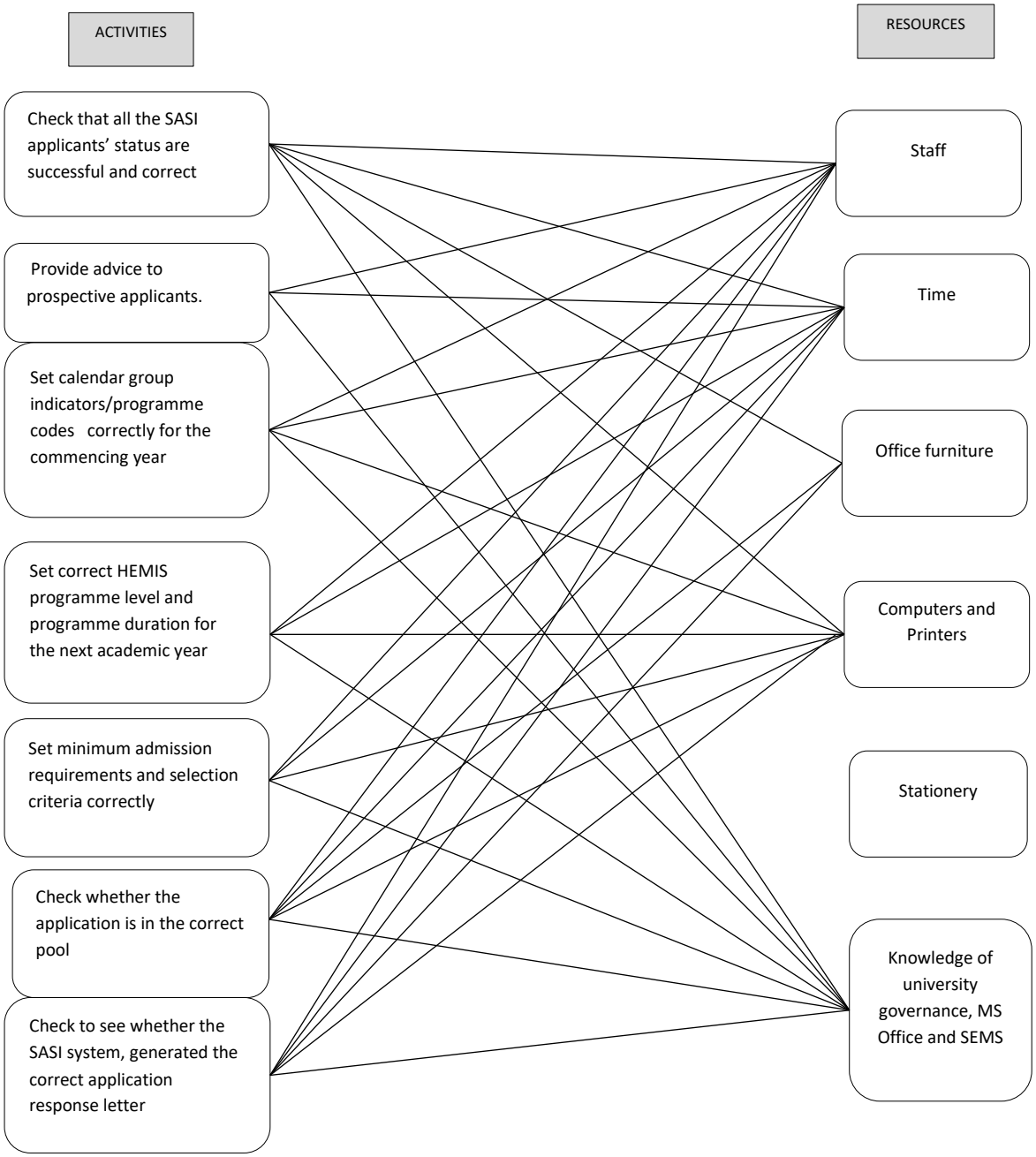


Figure 14: Comparing resources and activities - applications

These are followed by weaker links, such as "*100% online applications*" and "100% digitization of student applications". Figure 14 above demonstrates the comparisons between these applications.

The stakeholder workshop group was also able to identify "orphans" or "near orphans" during the applications comparisons of resources and activities. Dick (2001:13) describes an *orphan* as

those elements (ideas, targets, activities and resources) that have zero links, as in the case of the resource “stationery” indicated in Figure 14. Whereas, a *near orphan* are elements that have limited links with each other, as seen in the case of the “ideals” in Figure 13, where it only presented one link.

Furthermore, the first attempt listing the elements resulted in the workshop group not prioritizing the elements of the activities. In correcting this, the group then prioritized all the elements of the activities and immediate effects, ranking them from the most important to the least important. It must also be noted that during the construction of the elements, resources and activities, the workshop group simultaneously developed both intended and unintended immediate effects not just of the applications, but all surrogates and sub-themes. These immediate intended and unintended activities were then also linked to the existing targets, as indicated in Figure 15.

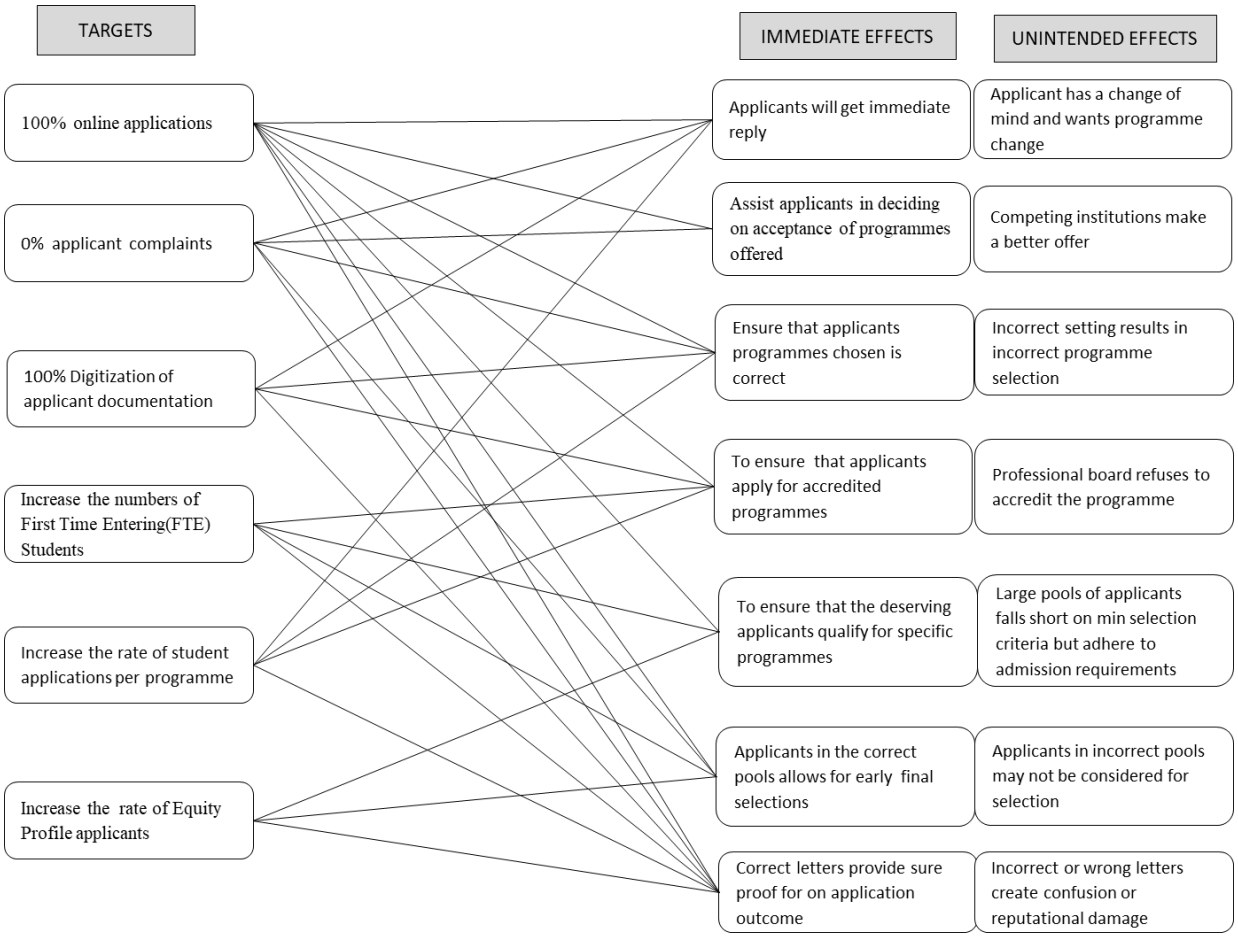


Figure 15: Comparing targets to immediate and unintended effects- application

The full effect of the enrolment management theme and the impact on its sub-theme, volumes of student numbers, is only fully realized after assembling the elements of the SEMS (application, selection and registration) and linking it into a complete process of the evaluation. This is demonstrated by its surrogate sub-themes in figure 16, 17 and 18.

5.3.1.1 Sub-theme: Applications

The SEMS application process highlights the ideal, "faculty aim to have the best technology available" as having the highest numbers of links, thus making it the strongest ideal. Moreover, this ideal emphasizes the desire or focus on future technology, its uses and enhancements. Other marginally strong ideals are, *"*faculty aims to have an effective and efficient communication system*"* as well as, *"*administrators constantly seek to have uniformed approaches and perfect processes*".* Following these are the weaker ideals such as, "administrators strive to promote a culture of accountability, consistency, transparency and professionalism" and, "*administrators* strive to treat all stakeholders with dignity and respect". These "weaker" ideals did not sufficiently address the targets that were considered to be faulty and being removed altogether.

At the other end, the targets with the most links were, *"100% online applications*" and "*0% applicant complaints*", with ensuing targets that had an equal number of links, like that of "100% digitization of applicant documentation", "increase rate of student applications per programme" and, "increase the number of first-time entering students", which was then followed by, "increase the rate of equity profile applicants".

Most of our targets in this case seem to sufficiently address the immediate effects, indicating that the targets are not faulty. The activity labelled, "provide advice to prospective applicants" along with the immediate effects of, *"*assist applicants in deciding on acceptance of programmes offered*"* did not seem to fittingly address the targets and the ideals. This was indicative that this activity was not needed. Nevertheless, most of the activities were resource expensive and contributed discernibly to the strongest of the ideals, making it worth achieving.

The move away from paper-based applications was also highlighted and therefore "stationery" in the form of paper as a resource was not really a high priority, indicated by its "orphan" status in Figure 16 as presenting zero links. This then also highlighted the future possibilities around

new academic administrative roles using new technology, reinforcing the move from tangible resources to that of intangible resources. This had effectively accentuated the academic administrators role in remotely working with student enrolment IS and therefore the need for a better understanding to their contribution to data quality and data quality management practices.

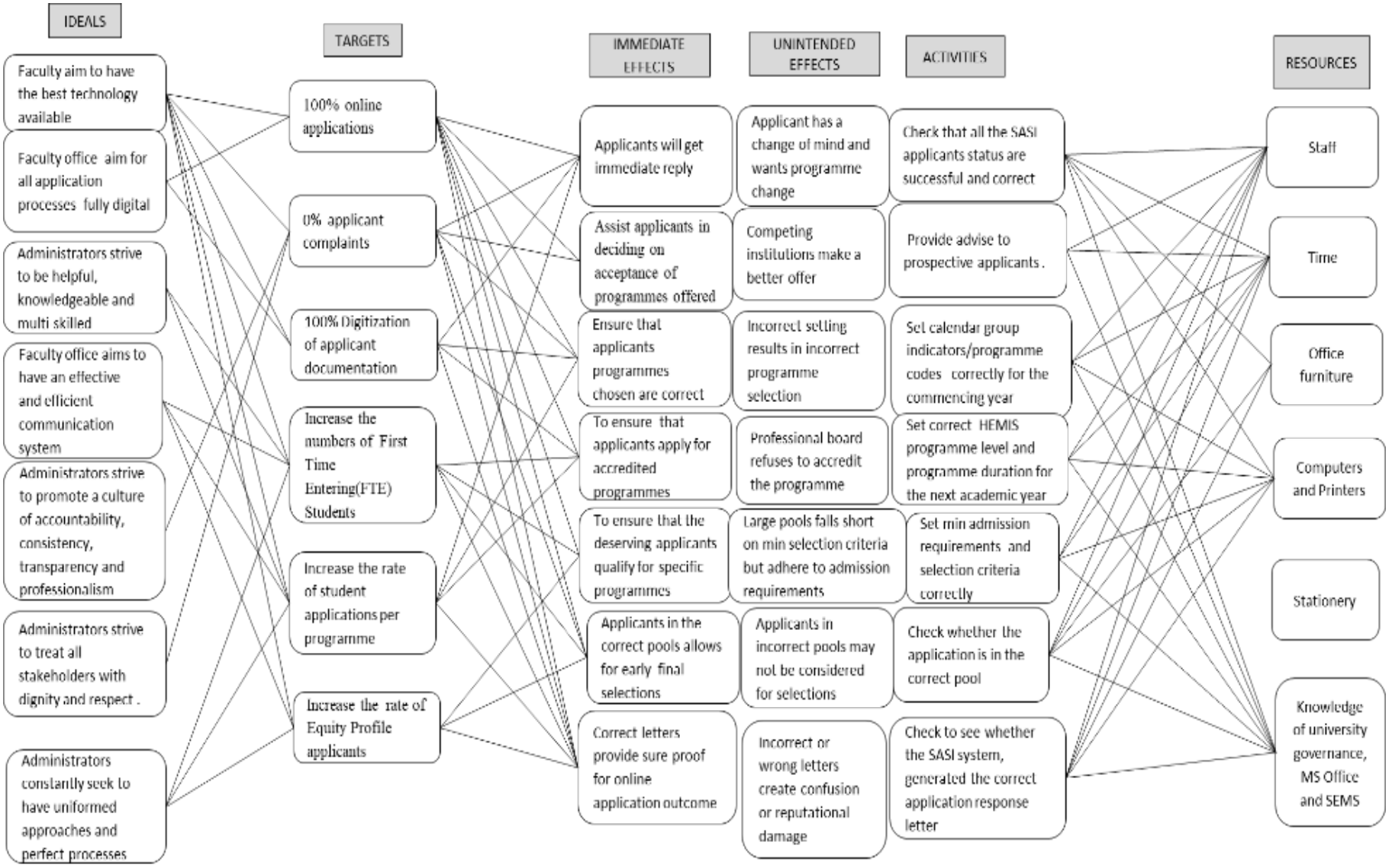


Figure 16: Overview of the applications process and its element links

5.3.1.2 Sub-theme: Selections

The SEMS selection process provided us with an overview of its links and relationships between the various elements, which can be seen in Figure 17.

The ideals labelled, “faculty aim to have the best technology available” and, “faculty office aim for all selection processes to be fully digital” have the highest number of links. This is followed by, “administrators strive to be helpful, knowledgeable” and then, “multi-skilled and faculty aims to have an effective and efficient communication system”. This had provided the researcher stakeholder group with well-founded reasons for choosing the process of selections and the existing opportunity to formulate better targets.

The targets were viewed as goals that were more tangible, with more definite achievable goals than that of the ideals. Furthermore, the targets with the highest number of links were, “0% complaints”, “100% programme selections”, “increase the rate of selection per programme”, “increase the number of first-time entering students” and, “increase the selection of equity profiled students”. They were concurrently the most resource consuming elements connected to the immediate effects as well.

Accordingly, the immediate effects arose as a result of those activities that consumed the most resources, which were the ones with the highest number of presented links. Such immediate effects were identified as, “verifying results allows for immediate selection response”, “qualifying pending pool applicants receive final selection notices earlier than provisional pool applicants”, “equity demographics contribute towards national transformation processes”, “some qualified applicants declined” and also “applicants are extremely pleased to receive early communication”.

Respectively, the activities that showed the highest number of links were “administrators verify NSC and foreign qualifications”, hereafter was, “administrators select the most qualified and diverse pool of applicants”, “administrators rank provisional pools accordingly before proceeding with automated selections” and lastly, “check to see whether the SASI system, generated the correct selection letters”. Correspondingly, these activities consumed resources with the highest number of links to “staff”, “time”, “office

furniture", "computers and printers" and "knowledge of university governance, curriculum, programmes, SEMS and MS Office".

The selection process however, seemed to mimic previous analysis. More specifically, it closely resembled that of the applications process, which had similar trends in that "stationery" as a resource presented itself as a "near orphan", resulting in having only one link. This continually reinforced our previous insights that the increased utilization of technology contributed to a shift away from tangibles, such as stationery, to that of intangible resources, such as knowledge and skills. This need for new technological knowledge and different skill sets was what indirectly contributed to the drive of understanding, but also the role academic administrators play in contributing to data quality and data quality management practices.

5.3.1.3 Sub-theme: Registration

During the overview of this sub-theme it was observed that the registration process had strong ideals. These consisted of, "faculty aims to have the best technology available", "faculty aims to have an effective and efficient communication system" and "administrators constantly seek to have uniformed approaches and perfect processes"; as illustrated in Figure 18. These ideals have equivalently strong targets as that of, "100% online application", which is then followed by less stronger targets such as, "0% registration complaints", "100% digitization of documentation", "increase the numbers of first time entering students", "increase rate of student registration per programme" and lastly the substandard target of, "increase the rate of equity profile registrations".

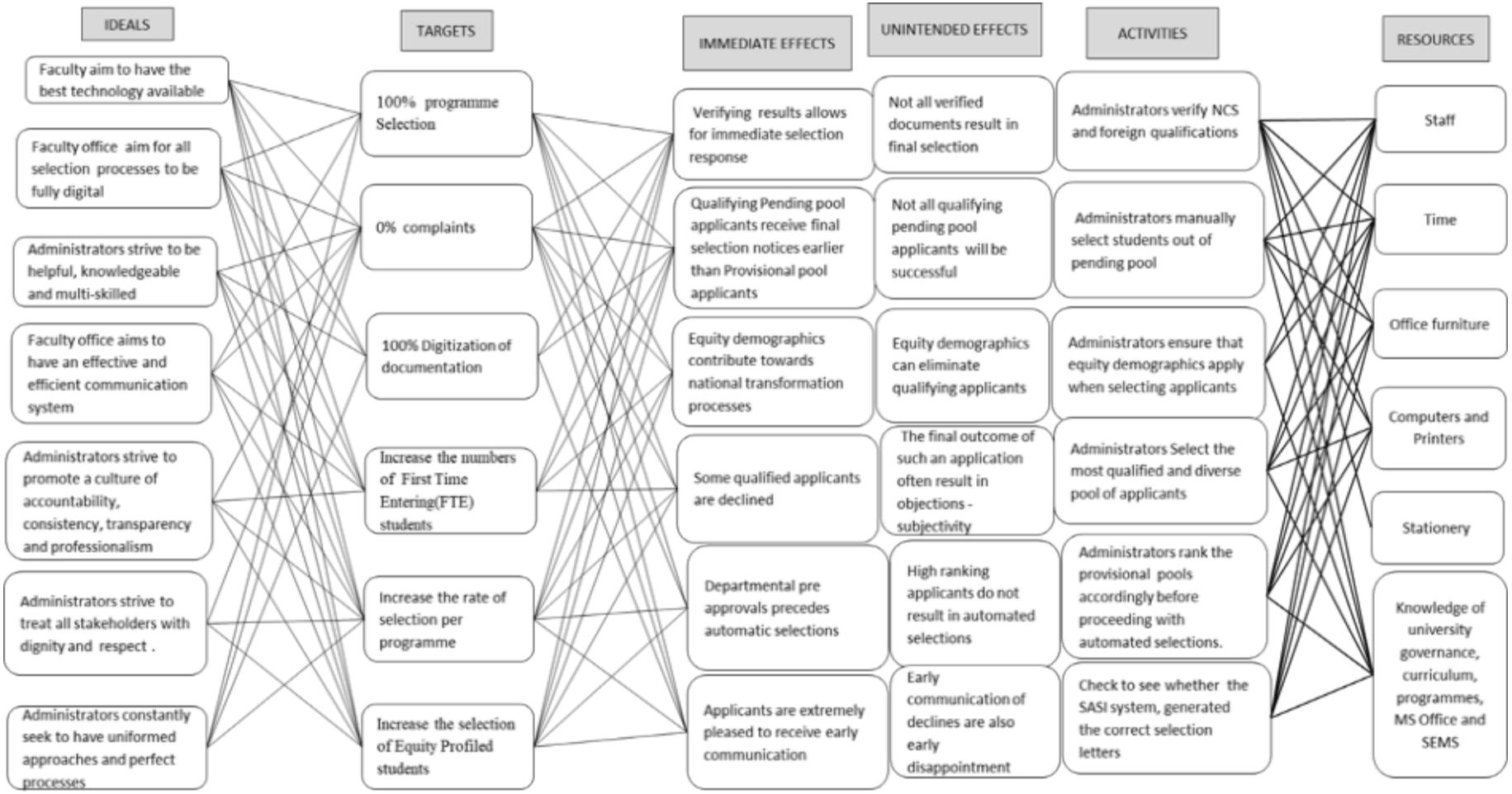


Figure 17: Overview of the selections process and its elements links

Moreover, the focus on better technology, along with strong online targets had greatly relied on, “staff, time, knowledge and skills” as primary resources. Accordingly, these were consumed by activities such as, “encouraging students to perform online registrations”, “managing timetabling and curriculum issues”, “having to ensure that students register the correct modules per programme”, “generating proof of registration on completion” and, “provide curriculum and programme advice during registration”. In essence, this demonstrated the importance of the interconnectedness of these elements.

These observations highlight similar trends presented during the analysis of the applications and selections processes, in which “stationery” as a resource was presented as a “near orphan” with only one link between the activities and resources elements. This further reinforced the insight exhibiting the direction towards being consistent within all three enrolment processes, coupled with an increased availability of technology that must be complemented with, “increased levels of student numbers”, “staff knowledge” and also, “the demand for skills training”.

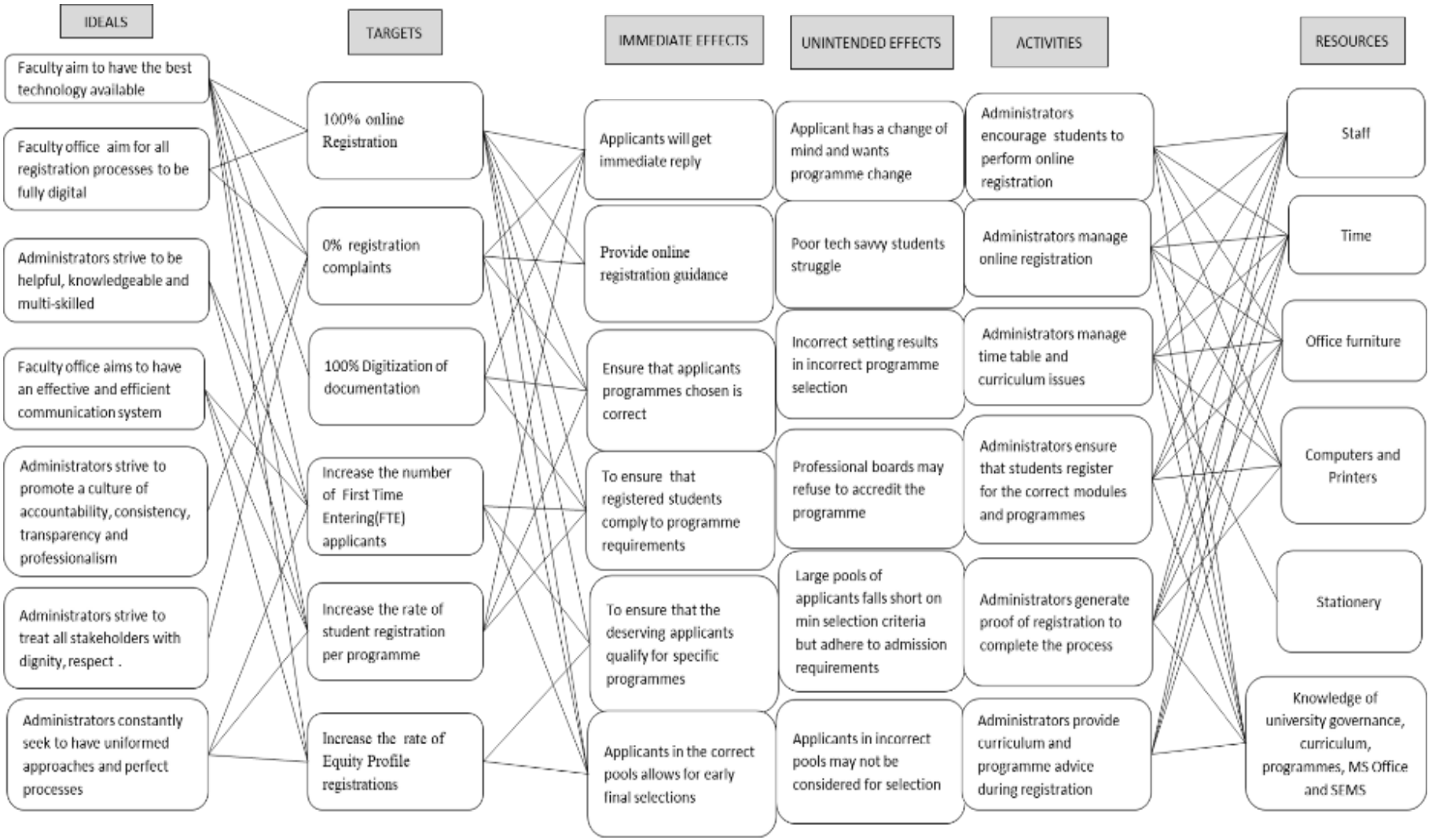


Figure 18: Overview of the registration process and its elements links

5.4 Theme: Professionalization of academic administrators

5.4.1 Sub-theme: Staff training

During the process evaluation application of the, “professionalization of academic administrators” theme, the primary focus was on the antecedence/sub-theme, *staff training and staff workload*.

The construction of this evaluation, overview of staff training exhibited the ideals with the greatest/strongest links as being that of, “gain new knowledge or information that helps admin staff to do their job well”, “faculty administrators aim to have the best technology available” and “administrators strive to be helpful, knowledgeable and multi-skilled” illustrated in Figure 19. However the ideals, “admin staff aim to adhere to regular feedback and deadlines” as well as that of, “administrators strive to treat all stakeholders with dignity and respect” were not sufficiently addressed by the targets, thus either making them incompatible or not having been considered by the group in the first place.

The targets however, seemed to have sufficiently addressed the immediate effects and the activities. Thus, making the resources with the highest number of links, “staff, time, knowledge and skills”, which were consumed the most by activities such as “*admin* staff enjoy their work”. A possible reason for this high consumption of these resources was because of the preceding activities such as, “get on the job training and formal training”, which was superseded by, “admin staff must agree with management on training frequencies”. Accordingly, the immediate effects of these activities comprised of, “generating a positive work environment”, but also, “staff are instantly updated with new technology” and “admin staff has a targeted training approach”, which respectively contributed to the high consumption of such resources. Notwithstanding, one cannot forget about the unintended effects such as, “not all the staff members shares the same sentiments”, “absenteeism creates loss of continuity”, together with, “operational needs and staff shortages prevent structured training completions” that has the ability to do harm and therefore, must be appropriately managed.

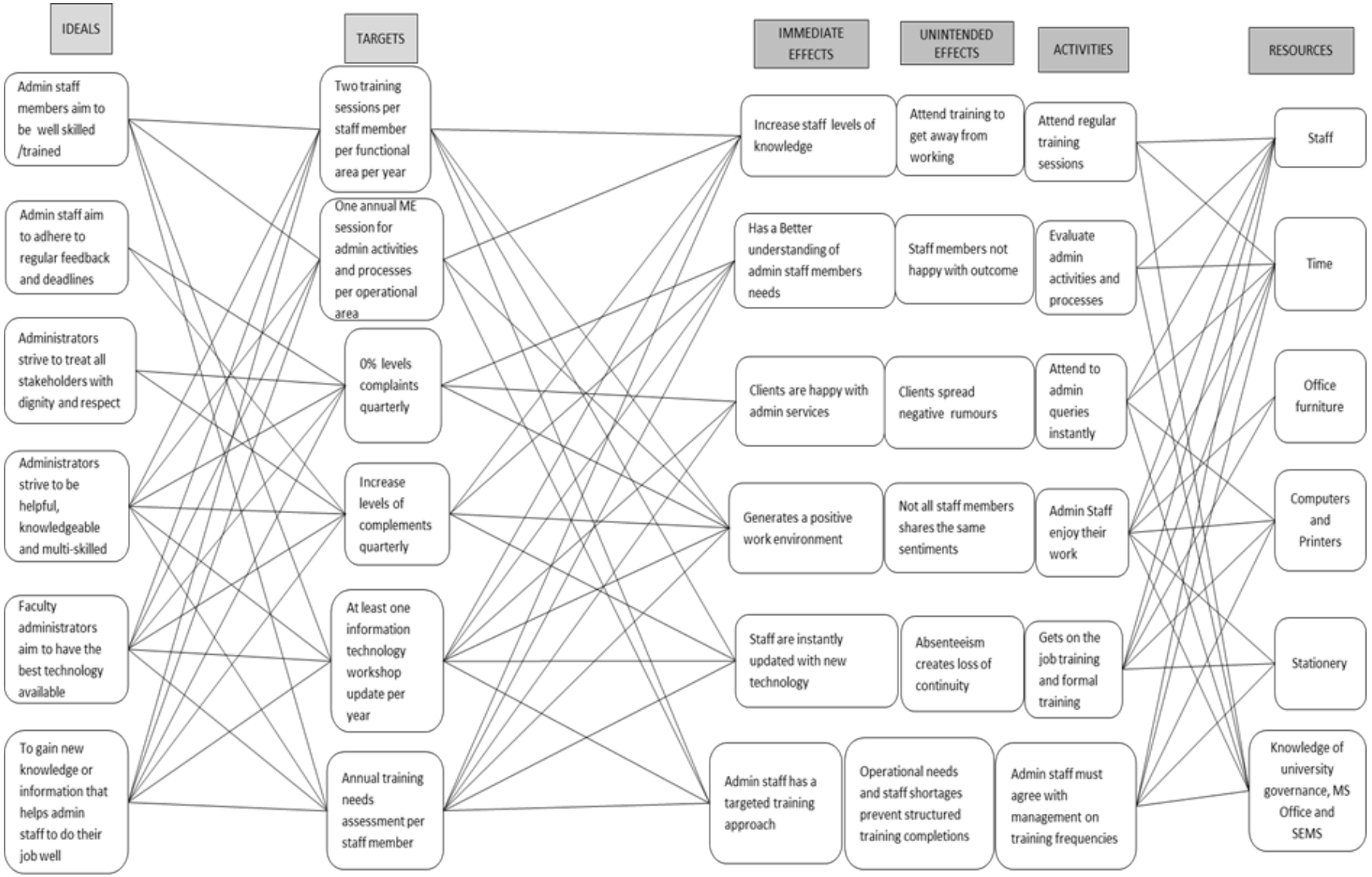


Figure 19: Overview of staff training and its elements

The sub-theme *staff training* seems to behave unlike any of the other sub-themes, in that it needs a large number of activities which also consume a vast array of resources, deviating from the eighty-twenty principle as expressed earlier. This however is also understandable, given that technology is an ever-changing constant which would require fluctuating training needs. It is for such reasons that management may want to take and invest appropriately in the present and future training needs of academic administrators with the focus on technology, data and the management thereof. Therefore, even though the immediate cost(s) might be high, the future returns might be even higher.

5.4.2 Sub-theme: Staff workload

During the construction of this sub-theme/antecedence the stake holder workshop group managed to construct an overview of its various elements, which is illustrated in Figure 20. This overview furthermore highlights that the ideals associated with *staff workload* had sufficiently addressed all the targets with an equitable strength and that there was no need to adjust or amend any of these ideals. Accordingly, these corresponding targets labelled, “annual registration of all administrators to a professional body”, “annual employee survey”, “annual role measurements for levels of efficiency and effectiveness” and “annual facilitating of management policy” had also addressed all the immediate effects sufficiently, which subsequently resulted in no need for adjustment or amendments to make for these targets. Equally significant were the activities along with their immediate effects, which had addressed all the targets and ideals satisfactorily and therefore called for no amendment or adjustment of these activities.

In addition to the above, it was found that the most resource consuming activity for *staff workload* was, “management design a people plan with clear operational goals”, which was preceded by, “management align all roles to tasks, activities and processes with clear targets”, “management outline clear processes” and lastly, “management clearly design administrator’s roles with clear deliverables”. These activities contributed significantly towards the ideals and therefore required no adjustments. By contrast, the resources which displayed as *near orphans* of the resources such as, “office furniture”, “stationery” and also “computers and printers” were less pertinent to the prescribed ideals and therefore required amendment or adjustment. This however did point out that the

reduction in these consumed resources such as stationery, computers, printers and office furniture by these activities, have in turn, resulted in possible financial savings. On top of that, it indicated that twenty percent of the resources (staff, time and knowledge) had then consumed eighty percent of the activities with immediate effect, as well as the “strong” targets with dominant ideals. Fundamentally, this had emphasized the possibility that there were additional funds that could be redirected for further staff development instead. Preferably, these excess funds could have been pumped into the “knowledge area” dealing with intangible resources like data and the management thereof.

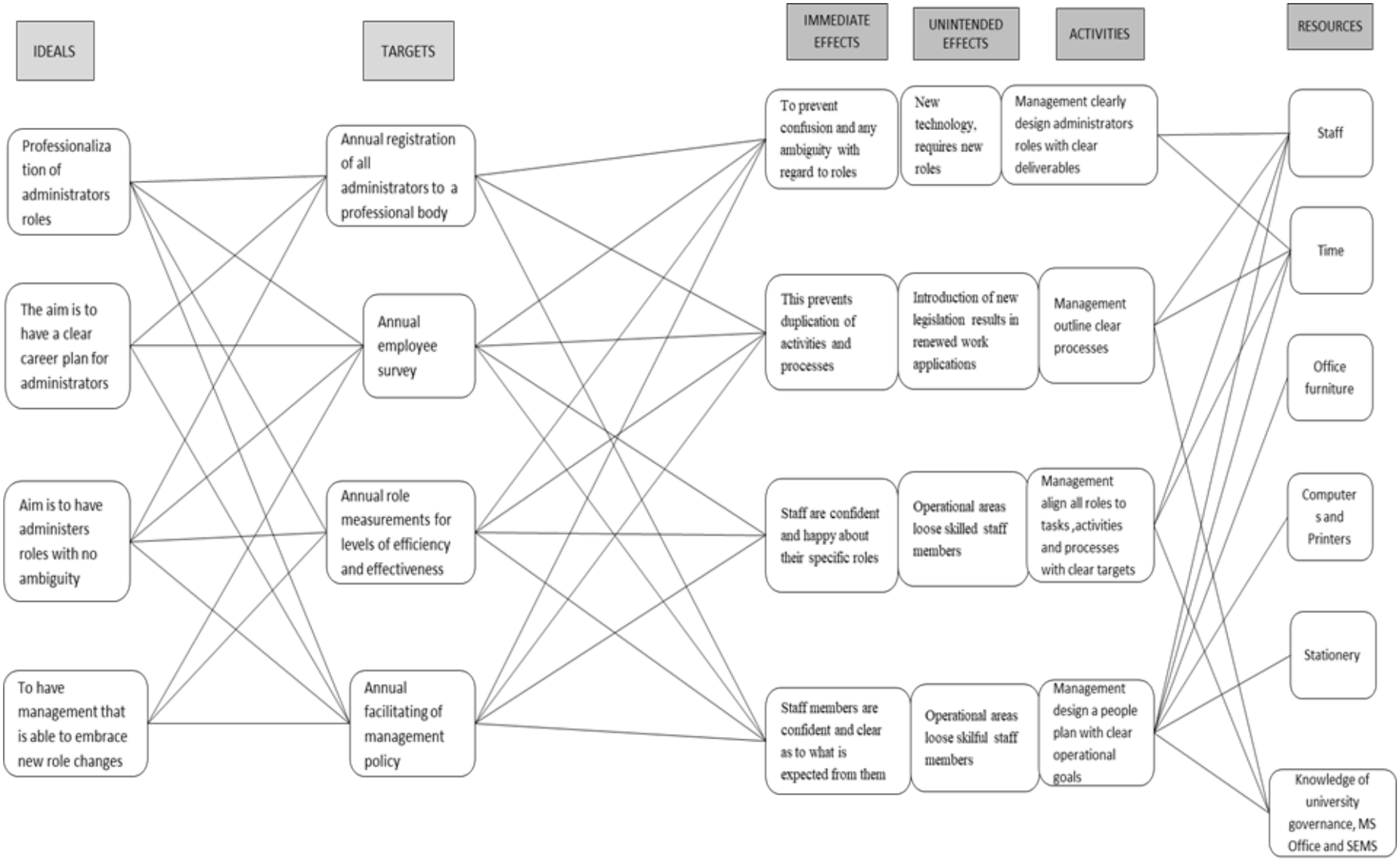


Figure 20: Overview of staff workload and its element links

5. 5 Theme: Student administration data management

5.5.1Sub-theme: Availability of technology

The theme of *availability of technology* brought to light the relationships existing between the various elements comprising the sub-themes, *availability of technology* and *data accuracy*. During its application the stakeholder workshop group managed to compose an overview of this particular sub-theme of availability of technology (indicated in Figure 21). What this overview highlighted as formerly mentioned, was the existing relationships between the various elements, which in process underscored the elements with the most significant linkages between the resources, activities, effects, targets and ideals. What the group had found was that the ideals classified, “they aim for the SIS to be a fully integrated system”, “they aim for the SIS to be user friendly” and “the aim for the SIS to be easily accessible and reliable”, had addressed all the targets both adequately and sufficiently.

The targets such as that of, “to connect all student finance, marks and biographical data”, “for all users to be able to easily navigate the SIS functionalities 24/7” and, “to easily access all student information data 24/7” had accordingly addressed the immediate effects of, “able to save time by having to check on many students’ categories”, “able to access data easily” and, “able to easily request student reports” satisfactorily. These had however, presented corresponding unintended consequences such as, “student data may not be reliable and accurate”, “admin staff not fully skilled” and “report files are not compatible to other systems”. What this indicated was that these targets were not incompatible and that they were on the contrary, able to sufficiently address the immediate effects.

When regarding the activities of this sub-theme, it was found that the activities that were seemingly resource expensive was that of, “administrators access all student data simultaneously”, “admin staff navigate easily through the SIS functionalities” and “admin staff access, load and retrieve data”. Moreover, they were also supported by those resources that were extensively consumed such as “staff, time, computers and printers”, but had also illuminated that another dominantly consumed resource to be “knowledge of university governance”.

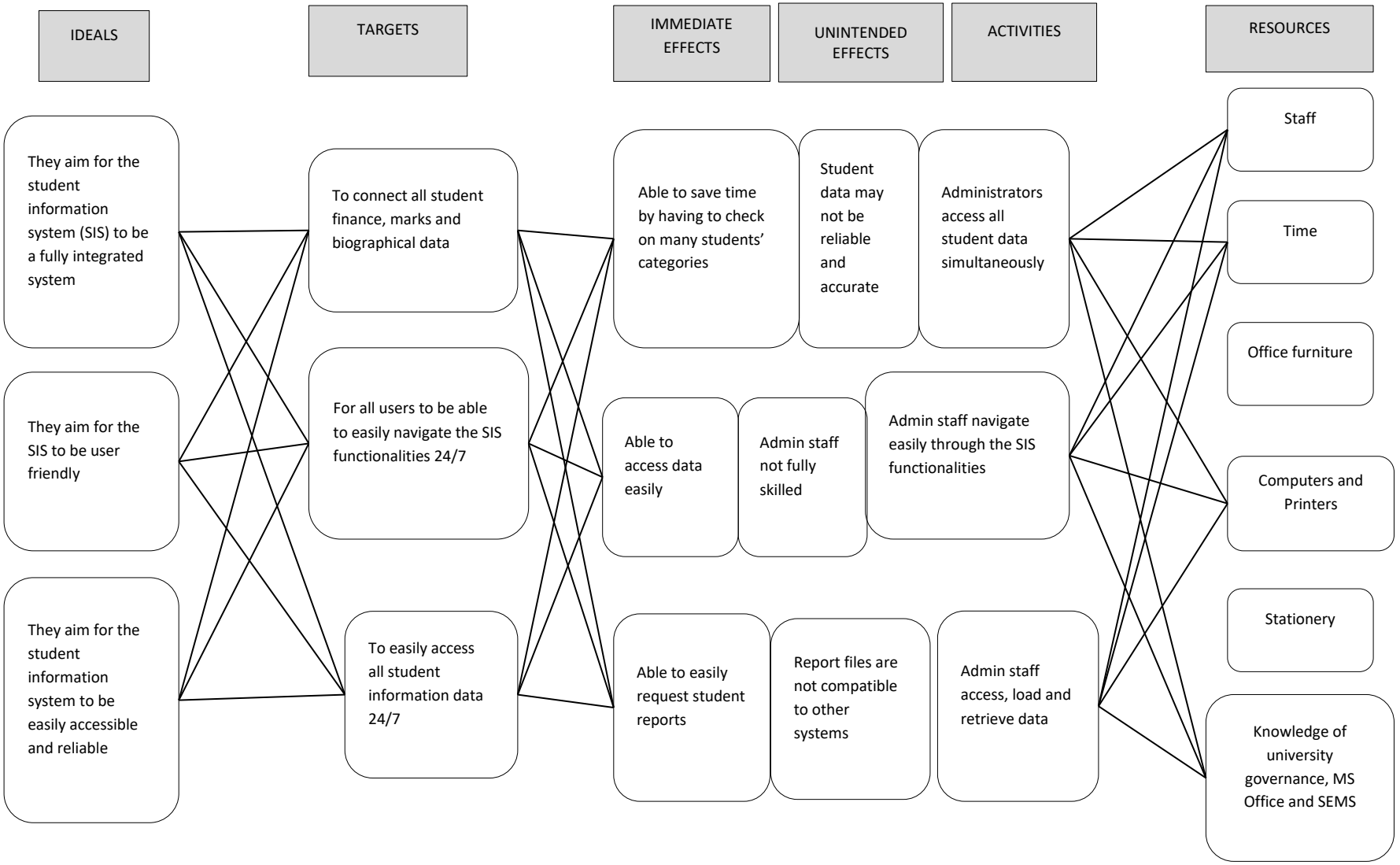


Figure 21: Overview of the availability of technology and its element links

The sub-theme/antecedence had displayed in addition several orphans such as, “office furniture” and “stationery”, which indicated that these resources were not really needed. This display had also contributed to an earlier analysis that the data quality and data quality management applications encouraged the shift away from tangibles. This was essentially due to the diminishing need for physical resources, with the simultaneous increase in the use of technology through digitization and online activity that contributed to an increasing demand for intangibles in the form of data and data quality.

5.5.2 Sub-theme: Data accuracy

The overview of the sub-theme/antecedence data accuracy as indicated in Figure 22 is concerned with getting academic administrators to concentrate on data consistency, accuracy and completeness when working with data. During the analysis it was observed that the ideals, “to assure that all data is of high quality”, “to ensure all admin staff employ QA applications” and, “to ensure that committee admin apply QA” all addressed the targets sufficiently. This subsequently suggested that there were no incompatible ideals or missing targets, which resultantly meant that no adjustments or changes were required.

Furthermore, the targets such as, “capture all data accurately with 100% relevance”, “to retrieve data accurately 24/7” and, “data retrieved from our system must be 100% valid” had addressed adequately the immediate effects of, “all data will be accurate”, “data is instantly available” and, “information used will be reliable and valid”. Moreover, this had contributed to certain unintended results such as, “online data is not always accurate”, “data is costly” and, “information used from online data is suspect”. This had effectively emphasized the need for precautionary management insights that required regular measures to ensure data quality.

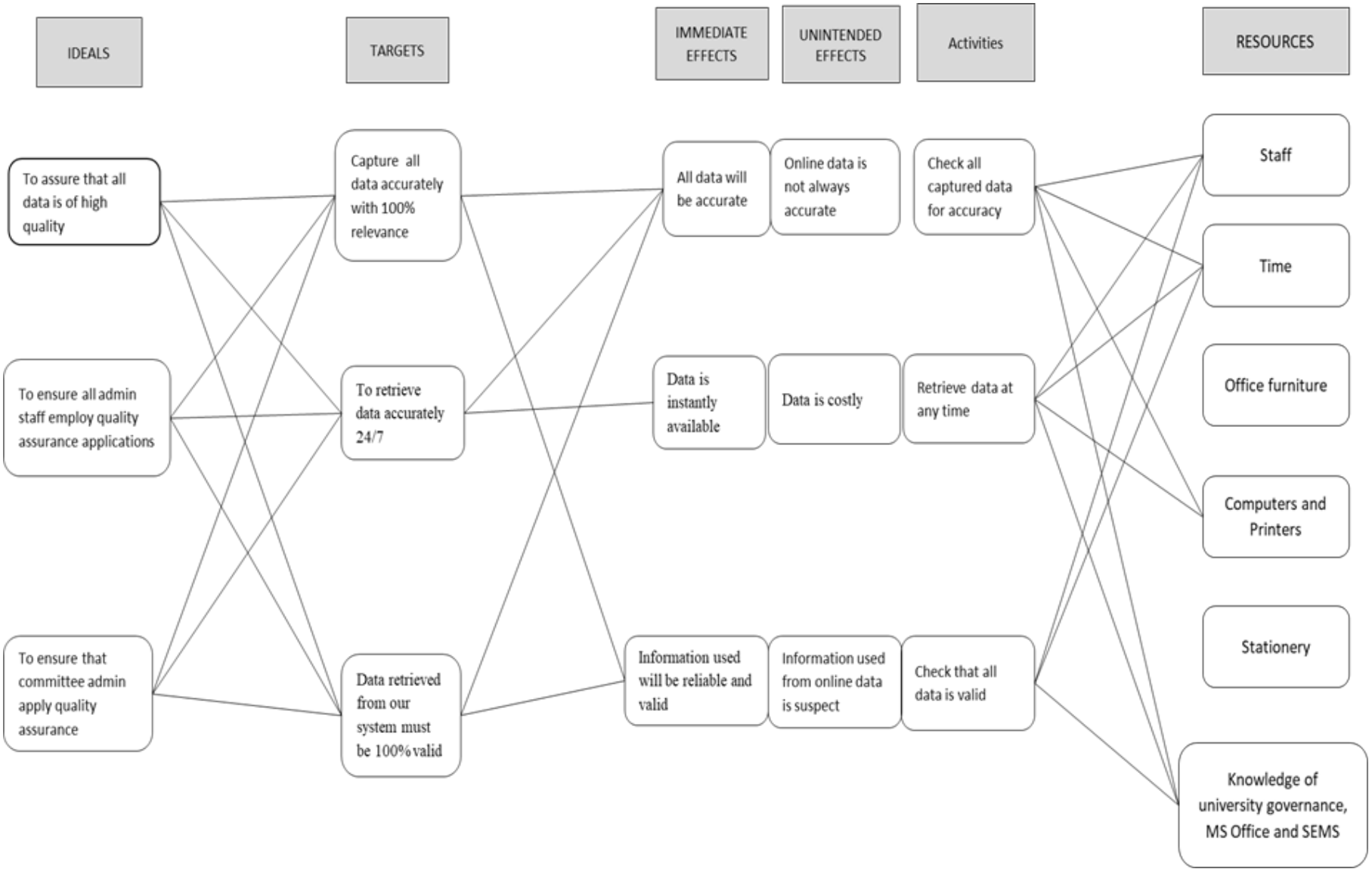


Figure 22: Overview of data accuracy and its elements links

Through the application it was found that the activities that were the most resource consuming consisted of, “check all captured data for accuracy”, “retrieve data at any time” and “check that all data is valid”. It was also observed that this sub-theme’s resource consumption was very much similar to that of enrolment management, in that they had similar orphans, like “office furniture” and “stationery”. This once again reinforced the indication that management needed to take heed of the move from tangibles to intangibles. This had duly highlighted the need for management to consider data as the new intangible resource, as to the presently diminishing physical or tangible resources.

5.6 Theme: Effectiveness of communication and management

5.6.1Sub-theme: Management changes

The overview of this sub-theme/antecedence management changes is illustrated in Figure 23 to have a focus on the ability to organize, plan and change situations in a proficient manner with the use of technology.

During this application the stakeholder workshop group observed that the most significant of the ideals were, “faculty management aims to use staff and technology efficiently and effectively”, “faculty management aims to increase the use of technology during meetings” and “faculty management aims to have all meetings without paper and documentation”. Following these were less significant ideals as the likes of, “faculty management aims to drive the professionalization of administrators” and “faculty strive to have a systems organizational structure with participation management style”.

Notwithstanding, these ideals had adjacent targets that were noticeably equal in strength, like that of, “efficient and effective use of technology by 2025”, “50% reduction in use of paper during meetings by 2025” and “faculty will show 75% increase in use of technology during meetings”. There were however also less favourable targets following these, such as, “100% of faculty admin will be professionalized by 2025” and “100% of new management appointees must have a participatory management style”, which nevertheless had still addressed the ideals satisfactorily.

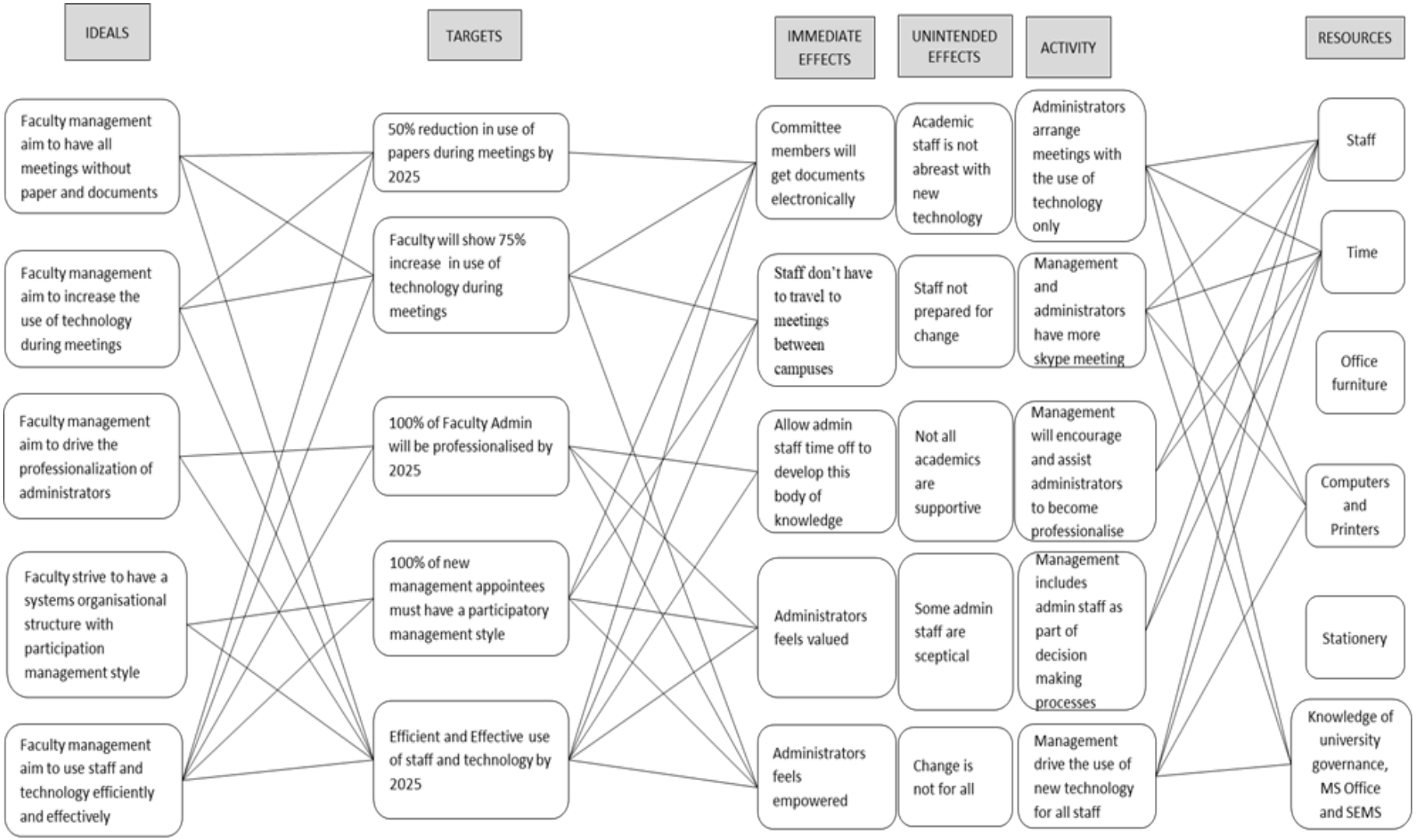


Figure 23: Overview of change management and its elements links

On top of this, the prescribed targets of, "committee members will get documents electronically", "administrators feels empowered", "staff don't have to travel to meetings between campuses", "administrators feels valued" and "allow admin staff time off to develop this body of knowledge" had seemed to adequately address the immediate effects. This however was not the case for the target "50% reduction in use of paper during meetings by 2025", which could have pointed to the target being incompatible or indicative of missing activities.

The group had also observed that the adjacent elements to the immediate effects had appropriately addressed the activities as well. This had subsequently highlighted the most resource consuming activities to be that of, "management drive the use of new technology for all staff", "management and administrators have more Skype meetings" and "administrators arrange meetings with the use of technology only". This had moreover indicated that activities such as, "management will encourage and assist administrators to become professionalized" and "management includes admin staff as part of decision making processes" to be less resource consuming, yet equally important in building staff morale and confidence. Accordingly, the most resources consumed by the activities were in fact "staff", "time", "computers and printers", as well as "knowledge of university governance" and "MS Office and SEMS". This sub-theme had additionally showcased orphans like "stationery" and "office equipment, reasserting previous insights of a shift away from tangible assets and the creation of a new asset base, namely data and the focus on its quality and the management.

5.6.2 Sub-theme: Governance

The holistic overview of this sub-theme/antecedence highlighted possible ways in which policy could be combined with staff efforts to improve decision-making efforts and effective management through using technology (as demonstrated in Figure 24).

During the application the stakeholder workshop group categorized the ideals in the order from the most significant to the least significant. Specifically, they have arranged it in the following order, "to have a well-defined system of authority and responsibilities", "to have clear policy and vision documents", "to regularly revue all committee documentation", "to have strong management in mid and senior positions", "to have well documented standing

orders for all committees" and lastly "to have more than sufficient faculty administrative support".

It was also observed that these ideals had equally strong significant adjacent targets, as the likes of, "100% clearly defined powers of authority and responsibility", "5 year vision and policy document", "100% of all committees are fully constituted", "100% faculty administrators are professionalized", "100% of all mid and senior positions are filled with qualified managers". The least significant target was that of "fully functional governance structure for faculty committees", which in fact had seemed to have sufficiently addressed the ideals as well.

On the other hand, the targets seemed to have sufficiently addressed all the immediate effects, such as, "knowledgeable about governance and management", "impact positively on faculty administrators", "senate committees function well", "committees function well", "well directed" and "operates well". At the same time, this was focussed on highlighting unintended consequences or effects that might have negatively affected an important activity, such as, "drive political agendas", "not all staff feel the same way", "admin staff becomes the drivers", "over regulated", "political and government interference" and "can become over bureaucratic".

Moreover, the most resource consuming activities in relation to these ideals were, "faculty admin observe that all committees have standing orders", "faculty develop 5 year visionary plan", "promote and professionalize faculty admin staff", "faculty admin contribute towards functionality of senate committees", "faculty admin clearly understand their responsibilities and authority" and "faculty fully employ qualified staff in management positions". These had all contributed effectively towards the ideals.

This sub-theme/antecedence had additionally highlighted a strong correlation with resources such as "staff", "time", "knowledge of university governance" as well as "MS office and SEMS". Weak correlations were those concerning tangible resources such as, "office furniture", "stationery" and "computers and printers", which once again strongly suggested a shift from tangible assets to intangible assets.

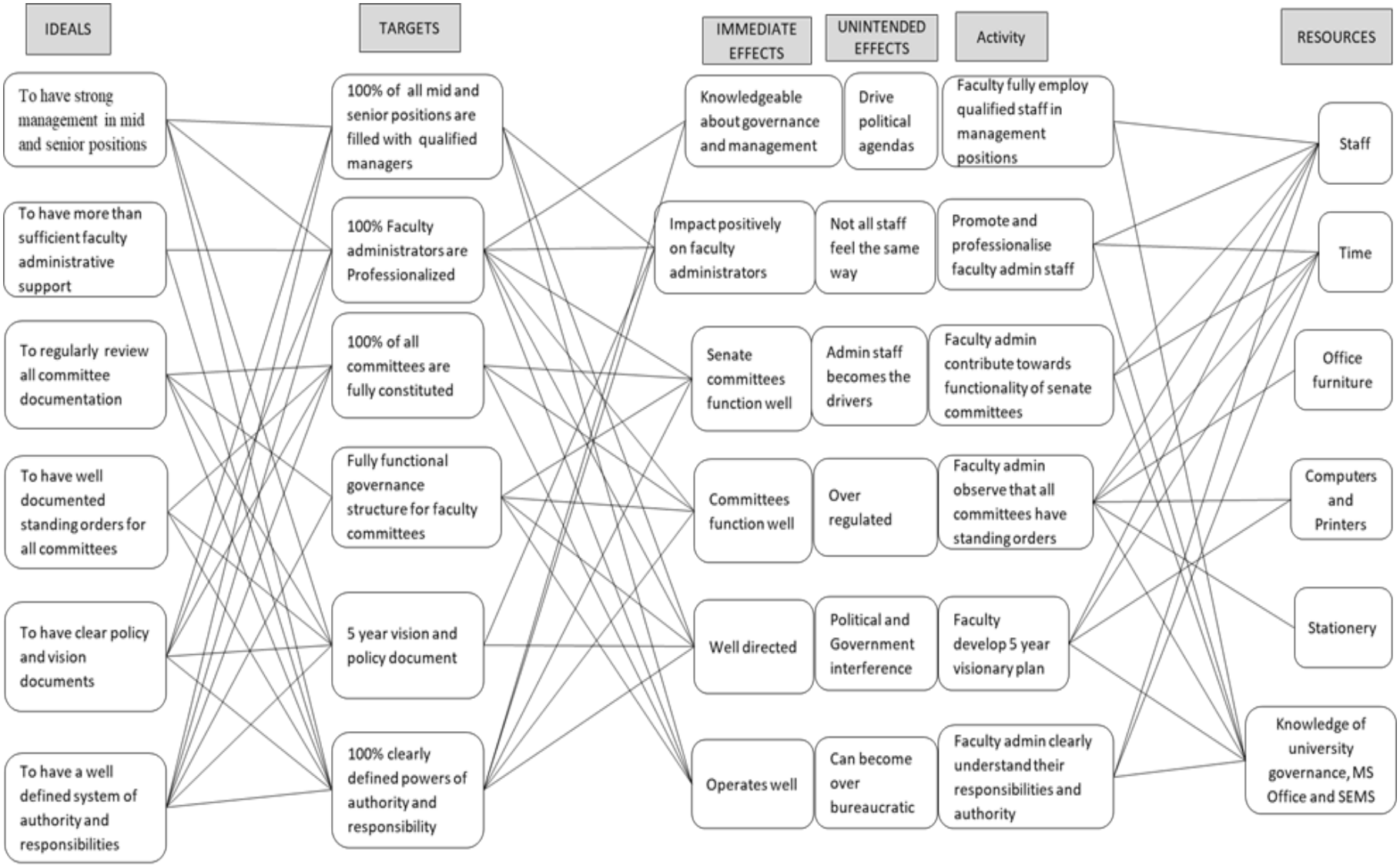


Figure 24: Overview of governance and its elements links

However, unlike the previous sub-theme/antecedence, governance was able to demonstrate the importance of it being a well-crafted support structure that ensured the success of this faculty, through well formulated sets of activities, committee structures, rules and policies that were applied and adhered to on a daily basis. Having such a variety of entities seemed to have been imperative in ensuring that faculty as well as the university remained a viable, relevant and sustainable organization. This was also indicated clearly in the participants' view of how they had visualized the future ideals. These ideals embodied an emphasis on strong management, sufficient administrative support, regular reviews, clear committee meeting standing orders, clear policies and clearly defined systems of authority and responsibilities. Having a set of such compelling entities at the same time called for active and substantial processes that could actually sustain and support a viable organization. Such governance is what is required during this present paradigm shift from tangible assets to intangible assets that would ensure that public organizations remain accountable for data as the new-found asset base and the quality and management thereof.

5.6.3 Sub-Theme – Effective communication

The overview of *effective communication* focused on the sub-theme/antecedence as a tool for sharing information when using technology to avoid uncertainty and confusion, especially when concerning the efficacy of data and information. This had further highlighted that ICT and MIS were enablers in facilitating the communication functions of academic administrators. The evaluation of this sub-theme/antecedence had in turn provided an overview on faculty's links and relationships between the various elements (as illustrated in Figure 25). In this overview the stakeholder workshop group highlighted the links of the strongest ideals to the weakest. In this particular order, these were listed as follows: "its administrators' ambition to be effective between faculty and senate committees", "faculty strive to provide effective committee feedback reports", "faculty strive to have the best technological communication support" and "faculty aims to have the best communication strategy".

Furthermore, the ideals were adjacently linked to targets which were equally significant comprising of, "faculty communicate 24/7 with all staff", "admin staff communicate

verbally, written, digitally and on social media", as well as, "100% of all committee members receive meeting docs on time" and "admin staff digitize and PDF all meeting documentation". The compatibility of these ideals pointed toward them sufficiently meeting targets and suggested that no amendments or adjustments were in order.

These targets in turn, addressed the immediate effects adequately. More specifically, these immediate effects were that, "staff feels informed" and also consisted of "instant messaging", "committee staff is competent" as well as, "instant messages". The unintended effects on the other hand were those such as, "wrong language changes the meaning", "power outages affect communication", "not all members get documents" and "lower level technology is incompatible", which were important to cognize to ensure that none of the important activities were unnecessarily undermined.

Moreover, the most resource consuming activities of this sub-theme were, "faculty communicate with all staff", "admin staff communicate using technology", "admin staff complete meeting documents on time" and "use digitalization, emails and social media for communication". These predominantly fed off the same resources as the other antecedences under the theme of, "effectiveness of communication and management", such as "staff", "time", "computers and printers", "knowledge of university governance" and "MS Office and SEMS". Accordingly, this presented the resource orphans or near orphans such as, "stationery" and "office furniture", further exemplifying the shift away from tangible sources to intangible sources. Once again, this sub-theme/antecedence further exemplified the same tendencies as expressed by that of SEMS, data accuracy, management changes and governance. To reiterate, these had all shown that orphans such as office furniture and stationery were drastically reduced, in tandem expressing the understanding that the move from tangibles to intangibles are an ever-present reality and that a refocus for future management is indefinitely required.

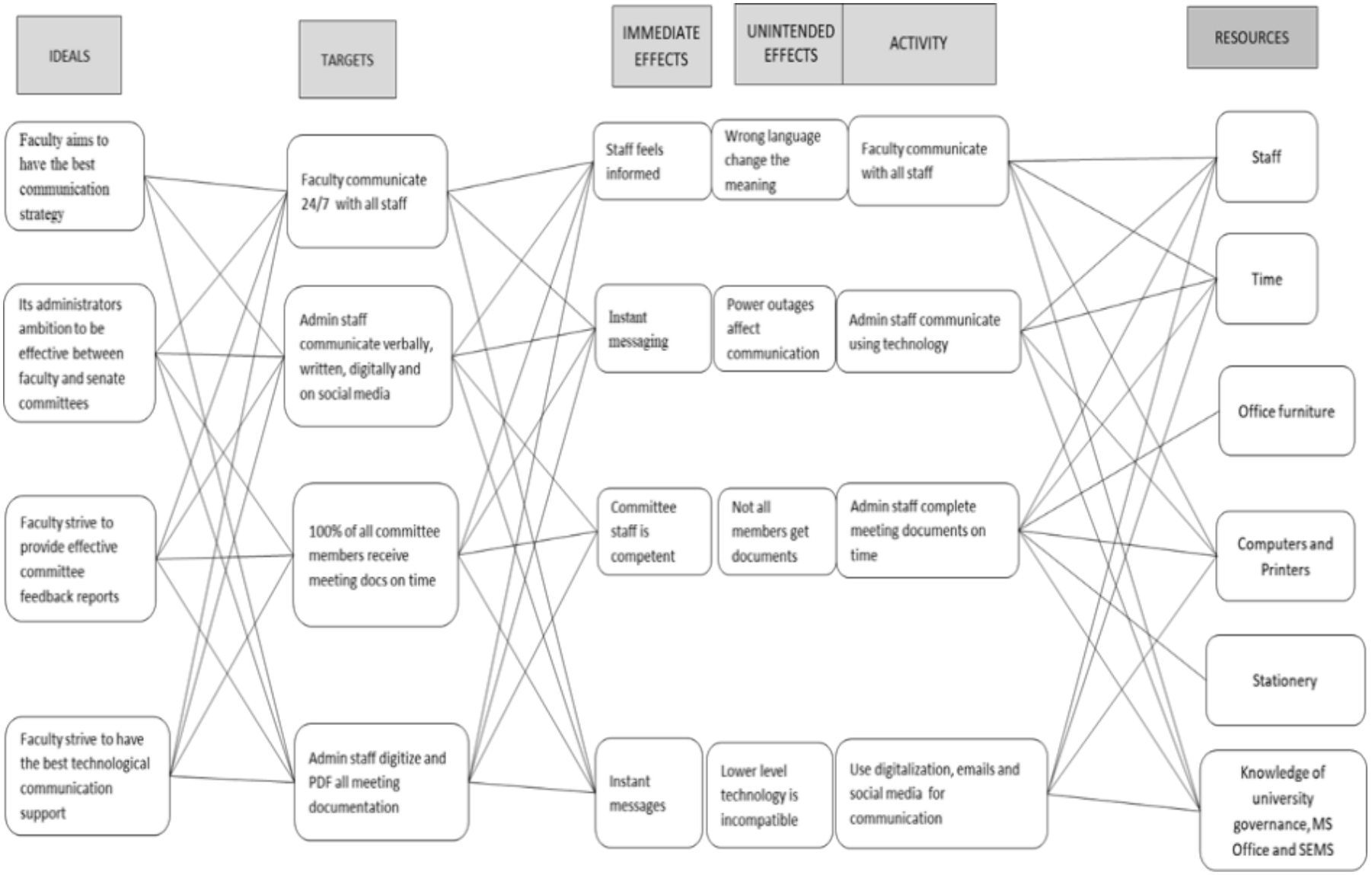


Figure 25: Overview of effective communication and its element links

5.7 Conclusion

This chapter moves us closer in answering the research question on how academic administrators contribute towards data quality and data quality management within the Faculty of Community and Health Sciences. The integrated application of this evaluation allowed for the emergent TA and concept analysis themes to be combined during the process evaluation. This had effectively created the opportunity for these research findings enveloping these four main themes and sub-themes of interest to be operationalized as tools that contribute towards understanding data quality and data quality management within an administrative environment.

The usefulness of this process evaluation application became evident during the structuring and application phases. This is not an application with the conventional view in mind that seems to be often demonstrated by evaluators when only focusing on inputs, processes and outcomes. It is rather in its own respect an approach that attends to evaluating what the inputs mean in terms of resources, and what processes mean in terms of activities. Moreover, it also analysis the effects both intended and unintended of these activities and also looks at how these targets relate to particular ideals for the future. Equally important is that this evaluation method creates opportunities for both researcher and participants within the application process, to design and experience their own insights of the integration and interrelatedness of the various elements of each of the four themes and the respective sub-themes which will be discussed in the next chapter.

CHAPTER SIX

DISCUSSION

6.1 Introduction

The current study is an evaluation of academic administrative systems at faculty, with a goal to develop an understanding around what is required or needed on the part of academic administrators to be able to contribute towards data quality and data quality management at a Health Sciences faculty.

The researcher was interested in achieving this academic goal by answering two main research questions. Firstly, what factors enable the Faculty of Community and Healthy Sciences' academic administrators to enhance data quality and data quality management? And secondly, how do the Faculty of Community and Healthy Sciences' academic administrators contribute towards data quality and data quality management?

Apart from the academic research goal, additionally this creates an opportunity for the researcher to obtain another qualification (MA) and in this case the researcher also wears the cap as manager. This duality of roles as researcher and manager has encouraged the desire to add to the pool of knowledge, specifically within the area of professionalization of administrators at tertiary institutions.

In this chapter we will be discussing and comparing the research findings with the relevant literature, by focusing on the research themes and sub-themes that were empirically produced during this study. These themes and sub-themes formed the basis on which this research builds its findings; specifically aiming to address what contributions are required by academic administrators and how these insights can be applied or implemented through utilizing an evaluation method.

6.2 Enrolment Management

6.2.1 Sub-themes: Volumes of student numbers

The enrolment management theme, together with the sub-theme, “volumes of student numbers” acts as a precursor to enrolment management, thus making it extremely relevant to our research question as being one of the main contributors to data quality and data quality management. Furthermore, volumes of student numbers strongly coincided with the perceivably worldwide phenomena of massification. Consequently, this had created a growing need for better and faster automated student administrative processes, as opposed to manual processes which are much slower and vastly outdated (Hossler & Kalsbeek, 2013). On top of that, this period was coincidentally met with a worldwide shift from using manual paper-based enrolment management systems, to using automated technological SIS instead (Hossler, 2015). Accordingly, this effectuated the introduction and application of SIS, as the likes of SEMS. Given the administrative nature of the processes involved in these systems (SIS/SEMS), it had largely become the domain of academic administrators over time, that were fundamentally responsible for managing these paperless driven processes (Baltaru & Soysal, 2018; Bassnett, 2004).

Therefore, what this illuminates is that the theme and sub-theme of “enrolment management” and “volumes of student numbers” is at the heart of the surrogate attributes, such as the existing SIS/SEMS administration processes, which are essentially used for the collecting and acquiring of student data. In addition, it can also be argued that the emergence of such technology is what has given rise to an administrative paradigm shift; in which operations and applications went from being exclusive processes, to the emanation of interconnected and integrated enrolment processes (Checkland, 2012), as depicted in Figure 26. These processes now cover the student’s entire lifecycle from initial recruitment, to applications, selections, registrations and graduations – clearly highlighting the integrated dependencies of these processes when working with student data. This then subsequently highlights the complexity underpinning the importance of the integrated surrogate sub-themes such as applications, selections and registrations as being some of the most important contributing processes towards data quality and data quality management.

In conjunction to the paradigm shift in the operational application as formerly highlighted, equally important was a simultaneous shift during the same period, acknowledged as the move away from tangible data products to that of intangible data products (Wang & Strong, 1996). This has been demonstrated in the study through the application of the process evaluation method which exhibited a clear shift away from tangible resources such as stationery and, physical resources such as office equipment. More importantly, this supports the insights that the increased utilization of technology has effectively generated the move towards intangible resources, such as knowledge and skills (Cai & Zhu, 2015). Subsequently, this accentuates the value of future possibilities around new academic administrative roles using new technology. In addition, it also highlights the necessity to refocus and redefine the roles of academic administrators when working with SIS/SEMS as well as the need for a better understanding of their contribution to data quality and data quality management practices.

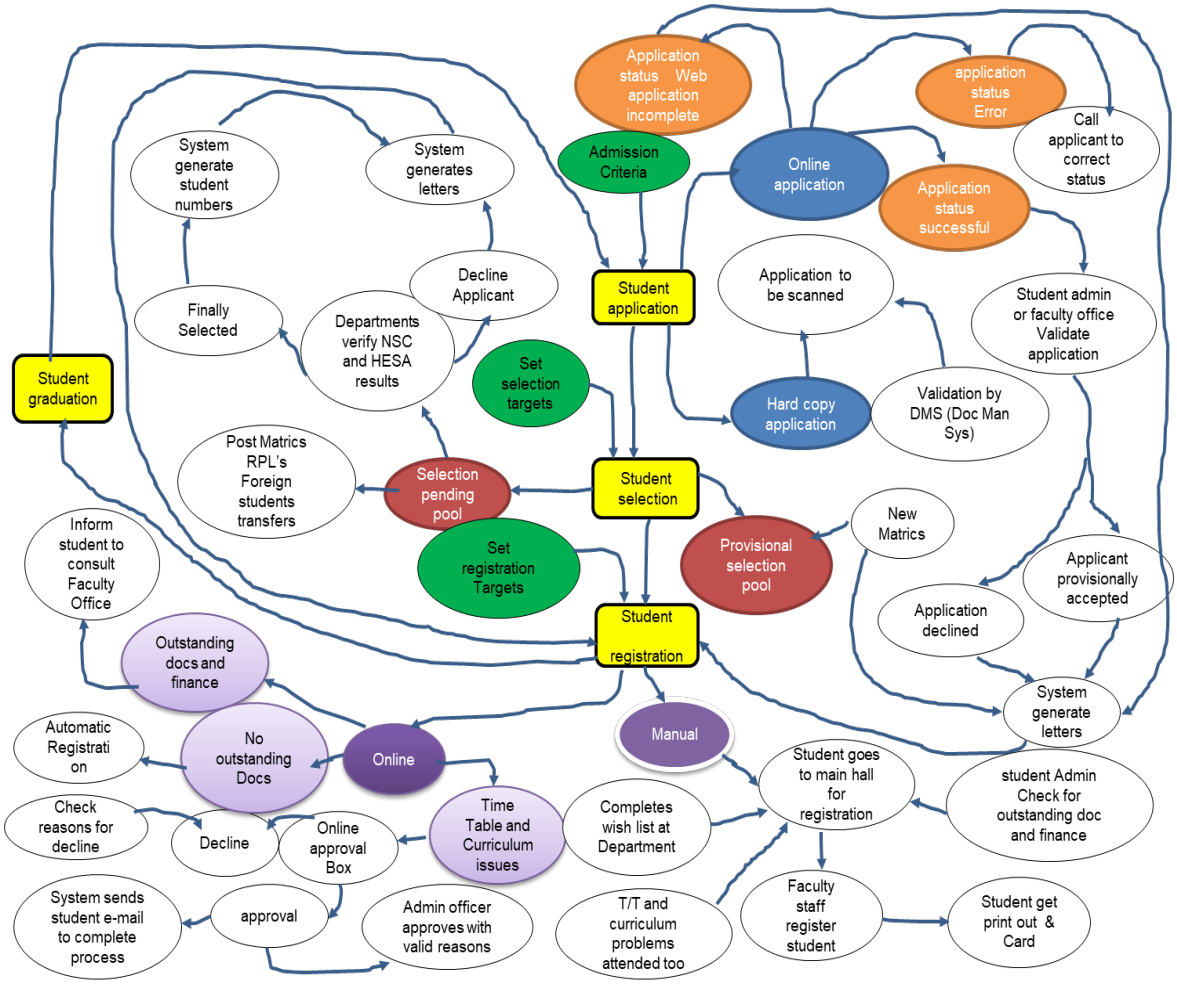


Figure 26: Overview of the SEMS processes with the Faculty

The process evaluation application is further complemented by its embedded systems-thinking principles, in reinforcing the nature of systems through the desire of having a purpose (targets) to reach the systems ideal (Hummelbrunner, 2011). This was further presented during this study using clear enrolment targets that focused on an increase in first time entries, the increase in diverse equity profiles and having a registration target of a hundred percent. This however, at the same time emphasizes a distinction, in that activities are often much more complicated, in comparison to targets or vision because to identify these activities participants need to have the necessary knowledge, skills and expertise as in the case of the administrator's stakeholder group of this study. Whereas, targets or vision are largely a concept to be attained due to the application of such activities.

In this way, the sub-theme of volumes of student numbers also highlights the importance of academic administrators needing the necessary knowledge and arsenal of skillsets required to deal with such large volumes. This had resultantly initiated the increase in the various activities of such as checking biographical and demographical data, ensuring that automated letters have the correct data or information, verifying foreign qualification data, checking system HEMIS settings and so forth. What this effectually underpinned was our understanding that the increased use of technology could thus be the result of increased levels of staff activity. In turn, this must be complemented by staff knowledge and skills, or rather stresses the need for new knowledge and skills to attend to the growing demand for data accuracy and to contribute towards reliable information.

Volumes of student numbers and its surrogate SEMS have largely contributed to developing an understanding around the important aspects needed for a skilful and knowledgeable workforce. This is especially the case in the production of student data but more importantly, towards the future practices in a technological space. Therefore, if the foreseeable future of faculties at academic institutions like UWC entails the holistic embrace of digitization of academic processes, as well as online and remote learning, then it is crucial to empower academic administrators in the fields of SIS/SEMS. It is for this reason that the study makes SIS/SEMS to be one of the central themes, together with its focus on the processes of application, selection and registration. In so doing, management

will be able to empower and capacitate academic administrators, effectually enabling them to exercise skilful data quality and data quality management practices.

6.3. Professionalization of academic administrators

6.3.1 Sub-Themes: Staff workload and staff training

The emergence of the theme *professionalization of academic administrators* and its sub-themes, *staff workload* and *staff training* are seemingly complementary and equally relevant to the previous theme, volumes of student numbers. This correlation is accentuated in that they both focalize on the (career) development of academic administrators. However interestingly, it is a relatively new concept within the South African HE environment, which had subsequently coincided with the recent establishment of the Association for Academic Administrators (AAA) in the year 2018 (Naidoo, 2015). During that period, this had accordingly led to academic administrators being registered as a non-profit company (NPC), including its registration to SAQA as a professional body. Furthermore, this theme is a novel area of research with great future relevance for further study within the South African HE setting, which is significantly pertinent to this current study. What makes this theme increasingly significant is that it is internationally recognised and well established, with a growing body of knowledge that emphasizes skills and knowledge. However, the essential focus of this theme is not necessarily concentrated on areas of SIS/SEMS, or on data quality and data quality management (Sebalj, Holbrook & Bourke, 2012).

Notwithstanding, this theme is of interest to management in that it aids management in developing an understanding of the struggles and frustrations of academic administrators related to *additional workload*. Given that the research study highlights the need for an awareness and agency for academic administrators due to additional tasks generated by the increasing use of IT (technology). This theme thus contributes to this illumination of the struggles and challenges that seems to have emerged due to the additional workload.

Moreover, it could also be argued that this may be one of the issues at the heart of the difficulties academic administrators face in their quest to becoming recognised as a crucial and significant workforce to the academic environment and beyond, which is classified as

knowledge workers through the creation of new professional spaces such as "expertise in information systems" or student information systems with the focus on data quality and data quality management (Whitchurch, 2008:381). Thus, the underlying question that is raised is whether the South African HE system is ready to embrace such a request by academic administrators to be recognised for their imperative role in academia and become equal partners within the HE ecosystem. Effectively, this provokes a range of subsequent questions and concerns for HESA. For instance, if the answer is yes to the underlying question, how will such a stance be viewed by academics amidst a technological society in need of knowledge workers? Insofar as there always being the distinct pre-existing perceptions of being of importance or relevance among academic and administrative staff within the academic environment. More specifically, academics are generally considered as knowledge workers and have always received the honours or accolades as being the forerunners of this particular working group. Therefore, how will academics respond to the idea of administrators sharing equal rights and respects within this working group? More importantly, if the academic administrators can be viewed with the same respect as knowledge workers in HE, then why does there seem to be a difficulty or resistance toward understanding their role and connection to the contribution of data quality and data quality management at institutions? The former question is further stressed in that HE environments are regarded as learning organizations, yet not many were witnessed to endorse the professionalization of academic administrators as knowledge workers. Aside from being an organization of learning, the enlightenment of the major contribution administrators has to data quality and data quality management in academia would make one assume that development of this work group ought to be the natural progression both presently and for the future.

Therefore, the inaction on the part of HE leads us to question whether the powers that be would rather prefer academic administrators to protest or resort to demonstrations in order to awaken a complete transformation of the South African HE system. On top of this, there seems to be no logical reason as to why there has been no effort on the part of these organizations to promote the professionalization of present and future academic administrators, or to wholly acknowledge or accept them as being knowledge workers, especially within a growing technological society. What this research has actually made

apparent about this matter, is the understanding that the increased use of technology and the expansion of SIS, has and continuously will have, a direct and significant impact on the lives of academic administrators. Thus, the power to control this fate should therefore rest with the academic administrators and not academics or other staff. This view is one that strongly emanates with Szekeres (2011) who proposes that historically, academics in HE have had very little regard for the growth of academic administrators. It is for such reasons that the researcher holds the view that the training and development of academic administrators should be common practice for all within the HE ecosystem. Additionally and equally important, is that preference should not be given to academics for training and neither should the training and development of administrators be determined by academics or other groups of staff.

One has to however question, why is there this discernible opposition or disunion between academic staff and the administrative workforce? A possible answer could be what Morgan (1998) metaphorically describes as the university being like the state with a parliament and its various departments and corresponding academics, representing the distinct political parties and politicians. Accordingly, this also reflects dynamics of power and privilege existing between academic and administrators/support staff at these institutions, in the same way that some political parties and politicians have more influence in the affairs of the state. More specifically, academic staff is perceived to have more privileges and influence than their administrative counterparts. Some of the research participants attested to these tensions often being expressed through unequal access to opportunities for career progression, development and training; with academic staff commonly seen to be given greater access to these opportunities, while academic administrative staff mostly lack the same degree of privilege.

Owing to the above discussion, the researcher has established the sub-theme *staff training,* as the core of professionalization. According to the research findings, application of the process evaluation has demonstrated a demand for several activities that in turn consume a vast array of resources. In contrast, this was not the case for the other sub-themes, as discussed in the earlier sub-theme. Nevertheless, these results were inevitable, given that technology is an ever-changing variable which would require constant

sustainable training needs. For this reason, structures of management at academic institutions may want to make serious considerations about investing appropriately in the present and future training needs of academic administrators. Although the immediate cost of doing so might be high, the future returns of this investment could be invaluable. Furthermore, another illuminating factor is that HE has an ever-changing environment as well as growing demands, which has effectively made the role of the academic administrators of utmost importance in meeting these needs sufficiently and to ensure global competitiveness (Jung & Shin, 2015).

Lastly, the exercise of the process evaluation had contributed towards the emergence of prominent elements within this sub-theme (activities, targets and ideals) and had also managed to determine certain orphan resources of staff training such as “office furniture”, “stationery” as well as “computers and printers”. What had then come to light was a level of efficiency of this sub-theme, in that twenty percent of the resources (staff, time and knowledge) were consumed by eighty percent of the activities, had productive immediate effects and presented strong targets consisting of three dominant ideals. This had consequently stressed the importance for management to explore the operational duties of future ways of work, especially in regard to the progression from tangible to intangible as the dominant resource of operation.

6.4. Student administration data management

6.4.1 Sub-theme: Availability of technology and data accuracy

As formally discussed, the HE environment is in a constant flux of change, and in this we have thus acquired an understanding of the academic administrators’ crucial role in ensuring the global competitiveness of institutions (Jung & Shin, 2015). The emergence of this theme, *student administration data management* was reinforced by all participant’s experiences. These experiences were guided by their congruent understanding that the present availability of technology has become a vital resource to ensure accurate data is obtained; which ultimately allows for reliable information (Gelbstein, 2013). Accordingly, the available technology recorded in this study takes the form of SIS or SEMS, which is the systems responsible for managing all the student data of the faculty, including, but not limited to, student programmes, student finance, student marks and student test data. The

function of these sorts of ITs has been more definitively defined by Gürkut and Nat (2017:390), ascertaining that most HEIs of late uses student IT to collect, organize and manage student data. They additionally highlight that such data provides important information that helps with day-to-day activities, decision-making processes and future planning. Under these conditions, the relevance of this theme and sub-themes is substantially reinforced, moreover with today's increasing pressures on organizations to supply accurate data for efficient managerial decision-making.

The theme of data accuracy draws attention to the importance of academic administrators to have a substantial understanding of data, as well as the technologies used to manipulate this data. This is formulated on the premise that the academic workforce is largely responsible for capturing data accurately and consistently to ensure its validity (Gelbstein, 2013). Drew, Wilks and Wilson (2015) for one, suggest that in today's world, daily businesses are flooded with data and to ensure data quality and data accuracy, it must start with managing one's own data. Therefore, this view is sharply reflective of the researcher's awareness about this reality. They, moreover, believed that this understanding is the first step toward handling large volumes of data both structured and unstructured, efficiently. For this reason, it is assumed that such insights will tremendously contribute and assist organizations like faculty to understand as well as harness the power of their data. This will also undoubtedly ensure that the quality and accuracy of data will improve, while accordingly ensuring the transformation of data into useful information products. Equally important is that the accuracy and reliability of data meets the expectations of the partners and beneficiaries involved in academic affairs, such as international accreditation bodies and national and local government bodies like DHET and SAQA that highly depend on accurate data in order to measure and assess the effectiveness of HEIs (Gelbstein, 2013).

Furthermore, the underlying theme of student administration and data management has branches of sub-themes, like *availability of technology* and *data accuracy*. These two sub-themes essentially accentuate the imperative role of technology in ensuring that student data is captured accurately and consistently at faculties, in an ongoing pursuit of data quality. Accordingly, data quality on the other hand is defined by measures of data consistency, accuracy, and completeness within IS (Ugboma, 2004). Thus, the research

highlights the availability of technology as a considerable precedence for data quality and data quality management at HEIs. This view was strongly influenced by the application of the process evaluation, which ultimately allowed academic administrators (participants) the opportunity to visualize the connections and interrelationships between the various elements of student administrative data management. It correspondingly relied on its component sub-themes to further inspire the realization of its contribution to data quality and data quality management. For example, during the application of the sub-theme, "availability of technology", the researcher along with the participants had observed the display of several orphans in the area of the resources, like office furniture and stationery under the overarching theme, which was duplicated in earlier findings within other sub-themes. The congruency of these findings has enlightened the understanding that continuous pursuit of data quality and data quality management is consistently resulting in an apparent shift away from tangibles, which is indicative by a decrease in resource consumption, with a simultaneous increase in intangible activity through means of digitization, data management and online activity. It was also observed that the resources of the data accuracy sub-theme presented only near orphans and orphans, unlike the sub-theme of availability of technology. Thus, this had resultantly become another area of focus for managers who have a hand in the management and distribution of resources in relation to the consumption of activities, which effectually leads to the adequacy of data quality. In essence, this theme and sub-themes were incredibly significant, relevant and useful to this research, especially in its attempts to understand and appropriately apply the views highlighted by staff (participants) and the present authorities of data quality and data quality management.

6.5. Effectiveness of communication and management

6.5.1 Sub-Theme: Effective communication, management changes and governance

Notably, we live in a world where there is no shortage of so-called "fake news", which makes it difficult to establish a true reflection of how matters actually are. It is therefore crucial for management to exercise sufficient control of the information they receive or obtain, as this often involves the detailed aspects of an organization's performance, which makes having reliable data essential to an HEIs survival. This theme can be best described

as an area concerning staff conveying information unambiguously to the correct operational sectors, to allow for management to efficiently navigate through the changing times and ensuring effective operations of the organization. The emergence of this theme is thus highly regarded as a valuable contributor towards acquiring efficient data quality and data quality management at faculty. Castells (2009:54) endorses the prominence of this theme by proposing that "communication is the sharing of meaning through the exchange of information" and therefore could view effective communication as a means of best avoiding uncertainty, but also one that promotes positive change (Burnes, 2005). Embracing this point of view is therefore assumed to be of great importance to understanding effective communication between people that has an indirect, yet significant impact on organizational success (Kitchen & Daly, 2002).

The researcher is therefore highly supportive of these views brought to light through this theme, as the manager and researcher has observed through experience that communication and management can be considered as one of the fundamental ingredients to ensuring the completion of operational tasks, as well as that targets are reached time-sparingly and adequately. However, what makes these views all the more valuable is that it is largely supported by the participants' experiences and inputs, which creates a broader level of understanding around the topic.

Furthermore, another pertinent area of focus was conceptualized by the sub-theme *management changes.* This was instrumental in uncovering the importance of planning for unknown factors that could generate from the implementation of new technology, or technological advancement. Insofar as to how this would be done precisely, this research took consideration of innovative management styles with regulatory reforms and focused on changing political and social patterns. This was all taken under by predicting or creating possible opportunities or threats that needed to be addressed by organizations to ensure its survival (Hayes, 2018). Subsequently, this research had also come to understand that any organization ignoring such probable change, do so with high risk and at its own peril (Paton & McCalman, 2008). It is therefore important that managers and planners at all levels within organizations acquire a certain level of competency in identifying the need for change, foresee possible changes, as well as have the ability to act in ways that will address and respond to such changes (Hayes, 2018). More pertinently, this then explicates the

necessity for faculty management to take the necessary precautions and have the appropriate understanding to effectively operate within a pressurized and ever-changing technological environment.

Apart from management changes however, the sub-theme of governance also seemed to provide the necessary tools, processes, activities and principles to support staff in understanding the organizational shifts from a current state to a desired futuristic state, so as to realize organizational goals and outcomes (Al-Mudimigh, Zairi & Al-Mashari, 2001:219). Capano (2012:1625) moreover, suggests that the term governance can be viewed as a reference to possible ways in which policy makers unify to solve collective problems and find ways of directing policy-making processes.

Another variance in how governance is viewed can be attributed to Fukuyama (2013:350) who defines it as the ability of governments to make and enforce rules and deliver services. Notwithstanding the view most appropriate to that withheld by this current research is maintained by Biermann, Stevens, Bernstein, Gupta and Kabiri (2014:1-4), that in their work, dealing with sustainable development goals (SDGs), argued that quality of governance plays an important role in assisting economies and societies. Governance is therefore described as being purposeful and authoritative in steering social processes. It is also ascertained that such processes are not necessarily about making correct decisions, but rather about choosing the best possible process for making those decisions, which include philosophies and ideologies of practice (Fukuyama, 2013). This type of governance is often confused with management though, in which Dayton (2001:9) proposes can often result by hampering the mission of any organization. Although, Khatri and Brown (2010) advocate that the discerning difference is that governance refers to what decisions must be made to ensure effective management and are primarily responsible for making those decisions, while management's role involves not only making, but also implementing those decisions.

Nevertheless, it is commonly found that in today's world, governance at universities has been subjected to huge pressures, which could be due to globalization, rapid changes and the exponential growth of student numbers and technology (Oni, Gonese, & Matiza, 2014:200). What this effectively means for HEIs is the constant prompting of unanswerable challenges and it is for such reasons that this research highlights the sub-theme of

governance as an essential contributor to data quality and data quality management and an area that must be continuously tended to, if to ensure the improvement of data quality and data quality management at faculty level.

Furthermore, this sub-theme has been observed to be supporting of previous trends that arose in other sub-themes like staff workload, staff training, availability of technology, data accuracy and volumes of student numbers. The common thread between these seemingly distinct sub-themes is that they all have shown to present poor links and activities associated with physical resources. This could fundamentally point out the need for change in the way management operates or will be operating at a later stage, which had congruently shown to inevitably lead to the reduced use of tangible resources and increased use in intangible resources. These management changes have also presented particular ideals to increase participation and use of technology during governance meetings, while indirectly reducing the use of paper-based resources through the increased digitization of documents as a means of minimizing errors and maximizing staff efficiencies. It was additionally observed that these sub-themes operate in an interconnected manner, which consequently exhibits a move away from tangibles and reinforcing the need to shift our focus on staff and time, in the preparation of having to perpetually share new knowledge through intangible information in the form of data. Thus, the move from tangibles, to intangibles is an emerging reality. Therefore, where managing staff and technology is concerned, managers will now be left with a new terrain requiring the virtual management of staff and operations. This then naturally raises several other pertinent questions managers would need to answer, like and how will these changes actually manifest itself? But more importantly, does management have the necessary skills and knowledge to meet these needs efficiently?

6.6. Conclusion

The chapter highlighted the importance of the four themes and sub-themes and informed an attempt to address the questions significant to this section. It further informs the evaluation process, which contributed influentially to academic administrators developing an understanding around what is required to effectively contribute towards data quality and data quality management at the faculty. Given the essential focus of this section, it was extremely useful not only to the academic administrator (participants), but also to the

researcher as the manager of the faculty, which added to the validity in its application to reach that conclusion.

CHAPTER SEVEN

CONCLUSION

7.1 Introduction

In this chapter, the researcher provides a summary of this study, offers a view on what has been the limitations of the study, as well as what could have been done differently, and offer recommendations through identifying opportunities for future research.

7.2 Summary

This current study was an evaluation on the role of academic administrators to data quality and data quality management practices in a Health Sciences faculty at UWC. The Snyder's model of evaluation was employed as a theoretical base. Furthermore, a purposive qualitative approach was utilized because the sample size was mostly limited to the Health Sciences faculty. However, support staff was additionally sourced as specialized participants who were particularly chosen for their degree of expertise, knowledge and skills in the research environment.

This research fundamentally sought to develop an understanding around what was required on the part of academic administrators, to improve their expertise in data quality and data quality management. This was initiated by two main research questions, namely: What factors enable the Faculty of Community and Healthy Sciences' academic administrators to enhance data quality and data quality management? And how do the Faculty of Community and Healthy Sciences' academic administrators contribute towards data quality and data quality management?

Based on the qualitative, thematic and concept analysis it was determined that the following four themes, along with their corresponding sub-themes, must be established as areas of importance to be highly considered by academic administrators in dealing with data quality and data quality management. The four themes and their sub-themes are:

- Enrolment management: Volumes of student numbers.
- Professionalization of academic administrators: staff workload and staff training.

- Student administration data management: availability of technology and data accuracy.
- Effectiveness of communication and management: effective communication, management changes and governance.

7.2.1 Enrolment management

7.2.1.1 Volumes of student numbers

The findings of this study revealed that most of the participants of this research endorse the theme of enrolment management and perceives it to be an effective management tool to increase student numbers. Similarly, Hossler (2015) understands it to be an approach for better management of recruitment and retention numbers at HEIs, which further bolstered its pertinence to this study's research findings. The participants had also agreed that for academic administrators to make meaningful contributions to data quality and data quality management, they must improve their understanding of how enrolment management can act as a precursor for volumes of student numbers. The participants accordingly perceived the attributes towards volumes of student numbers as being that of the administrative processes of the SEMS/SIS, which primarily focused on the application of capturing of student data correctly (Dolence, 1998). Additionally, they also perceived the attributes of "diverse nature of faculty's professional programmes", "reputation and performance of faculty graduates" and its "internationally recognised qualifications" as measures of attraction that influence the increase in student numbers. Lastly, the participants had also attested to the process evaluation method being very resourceful and imperative to the research findings, as it capacitated them to better understand and conceptualize their roles during the construction of the elements of each of the SEMS processes, consequently classifying it as the sub-themes *application*, *selection* and *registration*.

In designing the overview of the sub-theme *applications process*, the participants were provided with an opportunity at ensuring that data quality measures were entrenched in the design. In effect, this reinforced the thinking that data quality is dependent on the design and production processes (Wand & Wang, 1996). The participants followed through on the process evaluation by designing data quality measures into the application

overview, establishing activities such as “check that all SASI application statuses are successful and correct” and to ensure that all according system settings like “set calendar group indicators, set HEMIS settings and set minimum admissions criteria” were accounted for (Calderon & Webber, 2015). Additionally, targets were also designed like that of “100% online applications and increase rate of equity profile applicants” to secure place for the monitoring and management of data quality. Furthermore, the researcher and participants understood the consequences of volumes of student numbers, establishing that it “contributes towards diversity and equity nature of specialized health”, which was effectually aligned to the targets of this overview.

The participants also shared similar experiences with the designing and overview of the selections and registrations processes. Despite these targets and ideals for the applications, selection and registration being designed exactly the same; there activities however were observed to be vastly different. This consequently accentuated the integrated nature of the SEMS, but equally noted that although the systems have complex interactions, it nevertheless encompasses a single goal, which congruently pertained to data quality and data quality management (Loorbach, 2010; Banathy, 2000). Subsequently, the designed activities in the overview of selections presented fewer data quality activities, as opposed to the overview of the registration process which presented more activities for data quality. This accordingly mirrored the participants’ daily experiences that most of the managing and checking happens during the registration process and thus leaving room for further opportunity of assessments in this area.

7.2.2 Professionalization of academic administrators

7.2.2.1 Staff workload and staff training

The theme “professionalization of academic administrators” as well as its sub-themes “staff workload” and “staff training” was expressed by the participants as themes that might not seem to directly contribute to data quality and data quality management, but does nevertheless contribute substantially, whether it be indirectly. The participants moreover perceived the professionalization of academic administrators to be a management tool involving staff workload and staff training, which was understood to have impacted staff on an emotional, psychological and career aspectual level. More

definitively, the participants are of the view that professionalization of academic administrators can be taken as a precursor for staff workload and staff training. The participants had also determined the attributes of staff workload to be that of additional administrative tasks and new technology, which were both witnessed to contribute to the increase of student numbers. Furthermore, the attributes of staff training was perceived to be future characteristics of formal and informal accreditation and qualification, which would effectively make academic administrators much more employable and under these circumstances, could subvertently address pre-existing issues of power and privilege that could disarm some of the tension existing between academics and administrators.

Even though the goal of professionalization in this study has been designed by the participants during the evaluation to ensure that they played an active role in data quality and data quality management; on the surface it does not seem to have been designed successfully. The participants however argue that it is not a flaw in the design, but rather that these activities are appropriately designed for holding management accountable, as indicated by the activity of "management clearly design administrators with clear deliverables". Nevertheless, these activities have also allowed for meaningful contributions by academic administrators in better understanding of the methods, concept and techniques of and data quality management (Vosburg & Kumar, 2001).

In essence, this theme highlights that the workload is largely the responsibility of management and it becomes the operational duty of these staff members to ensure that staff training focuses on up-skilling academic administrators, as highlighted by the activities of "goes on job training and formal training" and "admin staff must agree with management on training frequencies". Accordingly, the consequences of increased staff workload may be a contributor to the rising number of administrative errors that consequently leads to poor performance and contributes to poor data quality. This makes the concept, professionalization of administrators as well as its sub-themes useful, valid and pertinent to this study.

7.2.3 Student administration data management

7.2.3.1 Availability of technology and data accuracy

The findings of this current study have also revealed that most of the participants are congruent with the theme of “student administration and data management”, perceiving it to be a management tool utilized to ensure the availability of technology and accuracy of data. The participants viewed attributes of the first sub-theme, *availability of technology* to comprise of “paperless administrative processes”, “integrated data collection processes” (applications, selections and registrations) and “automated processes”. Similarly, they perceived the attributes of *data accuracy* to be that of “improved administrative processes” as well as the “timeous acquisition of data from relevant and reliable data sources”. Moreover, participants have determined the consequences of availability of technology as access to real time data, increase speed of administrative processes, increase storage capacity and connectivity, better communication, less student frustrations and shorter queues. Conversely however, the availability of technology was also seen to have contributed to an increase in errors with student data and therefore insisted that data accuracy must focus on decreasing human errors, having fewer student complaints, procuring better data integrity and having decreased numbers of programme amendments.

Both overviews of the evaluation process of availability of technology and the data accuracy were highlighted as having much clearer or more established activities for data accuracy than that of availability of technology, which comprised of regular data checks and the ability to retrieve data and validity of data; with an underscoring motif of securing data quality. This was in turn supported by complementary targets such as “capture data accurately with 100% relevance” as well as “systems data retrieval must be 100% accurate”, reassuring the participants’ propositions that the design was indeed appropriate in the pursuit of data quality and data management. Thus, making this concept, student administrative data management as well as its sub-themes to be useful and valid to this study.

7.2.4 Effectiveness of communication and management

7.2.4.1 Effective communication, management changes and governance

The findings of this current study revealed that most of the participants supported this theme of *effectiveness of communication and management.* They had accordingly perceived it to be a management tool ensuring effective communication, management changes and governance that could effectively be used to procure efficient data quality and data quality management. For instance, the participants had maintained that for effective communication to manifest itself at faculty, it must have a complementary base such as the attributes that were highlighted in the overview of this theme. These attributes in part emphasize that academic administrators must have a well-established standard of operational practices and a fully integrated set of instructional and operational tasks of their daily operations.

Subsequently, this has accentuated the consequences to these attributes as being that of better performing administrative staff and also staff having an improved understanding of what is expected of them with regard to their daily duties, as to protect data quality. The consequences will further ensure that no unnecessary disciplinary action for non-compliance or non-performance would be required. Correspondingly, the attributes of management changes emerged as that of “new university management styles” with a focus on social, political and economic imperatives during the introduction of new technologies. However, it was found that the according consequences of these management changes could be negative if not considered appropriately, and will resultantly lead to organizational failure, low confidence levels and even poor planning. In contrast, a positive response could result in technology contributing towards increased levels of planning and monitoring as well as setting institutional targets.

Additionally, the participants were also of the view that data quality and data quality management will improve when the faculty has a strong sense of governance to guide management. The participants accordingly felt that the attributes of governance like having well documented university rules, laws, practices, procedures, processes and a strong management for example, will ensure that staff adhere to faculty and university policies more stringently. Nevertheless, participants had also highlighted the

consequences of poor governance, who in their experiences have noted that it had often resulted from the ineffectiveness of communication between staff members, but also the managerial structures of universities and faculties. Thus, it was essential that this theme be taken seriously as this was shown to have a major influence on the efficacy of data quality and data quality management at faculties.

When reflecting on these four (4) themes with their respective attributes and consequences as part of this study outcomes, we become aware of the reasons for adopting a qualitative method with its underlying systems-theory and participatory nature. This essentially was undertaken with the intention of making this a qualitative approach with a reliable application that can be reproduced by others, to empower staff and bring about fundamental change within the work environment. It has additionally contributed to attaining a better understanding of the faculty resources used to carry out certain activities with attainable targets. This in turn has allowed for an improved formulation of roles and tasks during the SEMS processes as well as being able to clearly formulate responsibilities of academic staff and those directly involved with these processes. Therefore, the managerial focus on the advent of new technology has equipped faculty academic administrators with the necessary skills needed for critical-thinking and problem solving abilities in order to meander through the sea of faculty data more efficiently, and ensure the quality of this data. Nevertheless, this research might not clearly highlight certain areas within the faculty that are poorly equipped to manage both the use and the consumption of faculty data but has however raised it as an area of concern. Essentially, this research has also allowed for the development of an awareness on the importance of academic administrators to expand their understanding on these four themes and related sub-themes to be used as key focus areas that will have a significant impact on data quality and data quality management .

This study shows pertinent results relating to the contributions required from academic administrators to be able to effectively contribute to data quality and data quality management when working with SIS or SEMS. There are however limitations to the replicability, sample size and generalizability of these results.

7.3 Limitations

This study used a sample size of twenty-six (26) administrators to examine what the contributing factors are that can be used by academic administrators to impact on data quality and at Health Sciences faculty. Although significant results were noted in the findings of this study, there were limitations to these findings.

Firstly, the sample size was small, with only faculty academic administrators and other key support staff forming part of the participant group. Accordingly, such a small sample size makes it difficult to generalize these findings to the larger academic administration population. Also, all participants in this study were from one university in the University of the Western Cape (UWC), which also limits the generalizability of these findings to the larger academic administration population.

Moreover, this study focused on an important topic within higher education, emphasizing the need for academic administrators to find solutions to improving data quality and data quality management. Nevertheless, other barriers also emerged from this study related to the situations causing anxiety for academic administrators on a daily basis. These anxieties are primarily rooted in the reality that academic administrators are not recognised appropriately for their imperative role as knowledge workers and are still largely under-appreciated. Therefore, the emergence of the theme for professionalization of academic administrators with focus areas such as staff workload and staff training were instrumental in addressing these issues. The attributes of this theme (administrative tasks, new technology, increase student numbers and the need for skilful and knowledgeable staff) could thus be useful for future research in this particular area. However notably, this study did not adequately describe all the attributes and the antecedences of professionalization of academic administrators, which could have difficulties for future researchers to replicate this research when using a larger sample. Furthermore, the small sample size and lack of diversity amongst participants limits the generalizability of these findings.

However, we must also acknowledge that the Snyder's evaluation method is not an extensively used approach, and this in part has attributed to the researcher having a limited opportunity to reflect or review on any past applications as such. Thus, making the task of applying this method somewhat challenging, contributing to the choice of only applying

the process evaluation instead of all three evaluations. In hindsight it can also be argued that the other two parts of the Snyder's methodology was not necessarily needed or required for this research specifically, leaving room for future engagement and application.

Lastly, this study also experienced limitations and benefits of engaging in a participatory research process as academic administrators were not always available. One of the most difficult tasks that existed in this process was getting the stakeholder workshop group together. The researcher soon discovered that it was not always possible to arrange meetings with this entire group due to their demanding schedules, which resulted in seeking an alternative opportunity to arranging meetings. This materialised during the faculty academic administrative staff workshop reinforcing the participatory nature by obtaining permission from the research focus group and the workshop attendees for the application of the process evaluation exercise. This process evaluation and its participatory research process has become a viable method for this research. Fundamentally, this method was used to develop an emerging understanding from the research group and the researcher, as to what the focus areas are that are effective contributors to data quality and data quality management at the Faculty of Community and Health Sciences.

7.4 Recommendations

This research contributes to knowledge regarding the importance and significance of academic administrators working with student IT. It highlights the important insights to competencies and understandings that are essential for the academic administrators and to facilitate the development of effective administrators within higher education. It additionally contributes to insights around academic programme evaluations, which are essential for the development of relevant programmes and meet the practical needs of people who are interested in them.

The researcher in this current study offers the following recommendations:

1. To start a process of professionalization for academic administrators within the South African HE ecosystem.
2. To advocate for a formalized undergraduate circulation of academic administrators as a contribution to the career-pathing for such individuals.

3. The standardization of roles, responsibilities and procedures that could become acceptable to all HEIs in South Africa, with the emphasis on effective work-based and lifelong learning.
4. To increase the opportunities for future research and collaboration in the area of academic administration or professionalization of HE administration.

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LIST OF ANNEXURES

Annexure 1: Observation Checklist (For the SASI application process activities)

We are assessing administrators to gain an understanding of their activities during the student application process and their use of the student enrolment technology, to contribution to data quality. This will enable us to see which steps are used or applied that need to be completed prior and during the student applications processes and whether it has been mastered by the administrators or which ones need to be reviewed. Several administrators perform different tasks prior and during the application process, through this it will be identified and listed to determine how it links to the student enrolment technology. This group of subjects were chosen because of their understanding of the SEMS and their knowledge of the activities during the student application process.

The observation was conduct by me, the Faculty Manager, performing the role as researcher at the Faculty of Community and Health Sciences. Prior permission was obtained, and my position was explained to all faculty academic administrators at a faculty staff meeting. The advantage of this was that my presence was not considered as an outsider thus interacting with staff was not an issue.

Staff / Activity	Kelly (Faculty Officer)	Grant (Admin Officer Faculty Help Desk)	Carmen (Administrators from the Deputy Registrar's Office)
Have the calendar groups indicators been set correctly for each of the modules on the SASI system?	*Yes, it was observed that a triangulation exercise was applied by the academic administrator between, the faculty calendar, SASI (Academic Planning) and a checklist document from the Deputy Registrar's office*	N/A	*The information to perform this task was gathered from AP on SASI and issued to the faculty in the form of a hard copy. The academic administrator at faculty liaises with departments to change or confirm the information. After department and faculty staff has checked and recorded the necessary changes it is then signed off by the faculty manager as confirmation that it has been checked and or must be changed. It then gets updated or changed on SASI by the Deputy Registrar's office.*
Was the appellation and programme code checked for correctness on the system?	*Yes, with a triangulation exercise*	N/A	*Yes, it was checked and if necessary updated in the same manner as explained above.*
Was the degree, graduate and study type of the programme checked for correctness on the system?	*Yes, with a triangulation exercise*	N/A	*Yes, it was checked and if necessary updated in the same manner as explained above.*
Have the HEMIS programme level and status indictors been set correctly on the system for each programme?	*Yes, with a triangulation exercise*	N/A	*Yes, it was checked and if necessary updated in the same manner as explained above.*
Has the programme duration been set correctly for the minimum and maximum number of years?	*Yes, with a triangulation exercise but there were a few discrepancies*	N/A	*Yes, it was checked and if necessary updated in the same manner as explained above.*
Has the minimum admission and selection criteria been entered	*Yes, with a triangulation exercise but there were a few discrepancies*	N/A	*This activity requires two screens to be checked, corrected and updated. Yes, it*

correctly for each programme on the system?			*was checked and if necessary updated in the same manner as explained above.*
Has all programme module descriptors been loaded onto the system?	*Yes*	NA	*Yes, it was checked and uploaded*
Did the system correctly process the application for the correct programme applied for?	N/A	*This was checked and confirmed when applicants called to follow up on the status of their applications*	N/A
Did the system generate the correct letter to inform the applicant about his/her application status?	N/A	*Yes, all applicants received the correct letters indicating their application status. This is confirmed when they inquired telephonically. For confirmation it is then checked against the functionality of the SASI documents*	N/A
Is the applicant in the correct pool e.g. provisional or manual/selection pending pool?	N/A	*This was not checked*	N/A
Memo	*Concerns were raised by the wording of the acknowledging letter, decline letter and provisionally selected letter created confusion and anxiety amongst administrators and applicants.*	*It was expressed that students do not read the SASI automated generated letters they receive via e-mail, resulting in unnecessary phone calls from parents and applicants enquiring about their application status.*	*Concerns were raised about the indicator settings of visible or invisible that is not set correctly, resulting in students applying for programmes that have either been discontinued or phased out and it will be considered as an incorrect application. Application report is regularly drawn from SASI to check applicant's status. It also serves as a statistical report to indicate the number of applicants per programme.*

Annexure 2: Observation Checklist (For the SASI selection process activities)

We are assessing administrators to gain an understanding of their activities during the student selection process and their use of the student enrolment technology to establish its contribution to data quality. This will enable us to see which steps are used or applied that need to be completed prior and during the student selection processes and has it been mastered by the administrators or which need to be reviewed. A number of administrators perform different tasks prior and during the selection process through this it will be identified and listed to determine how it links to the student enrolment technology. This group of subjects were chosen because of their understanding of the SEMS and their knowledge of the activities during student selection process.

The observation was conducted by me, the Faculty Manager, performing the role as researcher at the Faculty of Community and Health Sciences. Prior permission was obtained, and my position was explained to all faculty academic administrators at a faculty staff meeting. The advantage of this was that my presence was not considered as an outsider thus interacting with staff was not an issue.

Staff / Activity	Nursing (Department Admin Officer)	Cox (Faculty Officer)	Social Work (Department Admin Officer)	Physiotherapy (Department Admin Officer)	Occupational therapy (Department Admin Officer)
Selection Category (Provisionally Selections pool)					
Did any of the administrators check that the SASI system had correctly provisionally selected the student for the appropriate program?	*No checking but did indicate that applicants in this pool should not be early declined.*	*Yes*	*Yes, applicants call in and its checked on SASI to confirm the correctness of the application*	*No checking*	*No checking*
Did any of the administrators check whether the system generated the correct provisionally selection letter?	*No checking*	*Yes*	*No, only if there are queries*	*Only when applicants called to inquire about their selection status*	*No*
Has the selection targets been set correctly on the system?	*No checking*	*Yes*	*Yes*	*Yes*	*No checking*
Selection Category (Manual/Pending selection pool to be finally selected)					
Were all documents verified prior to finally selecting candidates from this selection pool?	*Yes, applicants that bring their documents were also immediately verified*	*Yes*	*Yes, this is checked by viewing the documents on the system. If no documents, applicant is called to forward docs to student admin services to be scanned in onto the system*	*Yes, when no documents then applicants were asked for them*	*Yes*
Was the available verification button on the system used prior to finally selecting the applicant from this pool?	*Yes*	*Yes*	*Yes, it is used*	*Yes*	*Yes*
Did the administrators check whether the system generated a student number when finally selecting the applicant from the	*Yes, but observed that in some cases this number is not visible in one screen (applicant Audit) but then visible in the student by programme screen*	*Yes*	*Yes, this was checked via Audit trail application*	*Yes, it was checked by viewing the students by programme screen to see the student number*	*Yes*

manual/Pending selection pool?					
Did administrator check whether the system generated student numbers on the finally selected letters?	*Yes, concerns were raised but sometimes there is a delay in generating this number*	*Yes*	*Not always but indicated that there are problems with letters*	*No*	*No*
Were any equity principles applied to the cohort of finally selected applicants?	*No, focused only on applicants points scores.*	*Yes*	*Yes, but it was observed that this is a problem area because students from advantaged schools scored better than those from disadvantaged schools*	*Yes*	*Yes*
Selection Category (Finally Selected from DHET download of NSC results Automatically)					
When ICS download of NSC results for applicants in the provisional pool was completed, was it successfully checked before finally selecting the applicant?	*Yes, ticked/indicated what they decided on.*	*Yes*	*Yes, it was checked and also equity principles applied*	*Yes*	*Yes*
Did the administrator/s check whether the system generated a student number when finally selecting the applicant from the selection pool?	*Yes*	*Yes*	*Yes, the class list was used to check this*	*No*	*Yes*
Did administrator check whether the system generated finally selected letters for this cohort?	*Yes*	*Yes*	*No, only if they phone in to query or check*	*No*	*Yes*
MEMO	*Academic administrator mentioned she struggles to export a list of provisionally or manually selected applicants into an excel spreadsheet*		*Concerns raised about NQF levels at colleges used to qualify to enter university, what level should this be?*	*Academic administrator did express concern about the time prospective were given to decide on accepting the final selection offer. It too long, should be one day.*	

Annexure 3: Observation Checklist (For the SASI registration process activities)

We are assessing administrators to gain an understanding of their activities during the student registration process and their use of the student enrolment technology to establish its contribution to data integrity. This will enable us to see which steps are used or applied that need to be completed prior and during the student registration processes and has it been mastered by the administrators or which need to be reviewed. Several administrators perform different tasks prior and during the registration process through this it will be identified and listed to determine how it links to the student enrolment technology. This group of subjects were chosen because of their understanding of the SEMS and their knowledge of the activities during student registration process.

The observation was conduct by me, the Faculty Manager, performing the role as researcher at the Faculty of Community and Health Sciences. Prior permission was obtained, and my position was explained to all faculty academic administrators at a faculty staff meeting. The advantage of this was that my presence was not considered as an outsider thus interacting with staff was not an issue.

Staff / Activity	Kim (Faculty Office)	Kelly (Faculty Office)	Keegan (Faculty Office)	Magda (Faculty Office)
Assisted Registration				
Was any checking performed to establish whether the SASI system correctly selected finally accepted students for the appropriate program?	*Yes*	*No, it is assumed that departments choose the correct students and during orientation this is confirmed*	*Yes*	
Are administrators checking whether the finally selected applicants are cleared e.g. financially (did the student pay registration fee)?	*Yes, the system block students from being registered if documents and finance are outstanding*	*Yes, system blocks students*	*Academic administrators do not check this for first time undergraduates it is done during orientation but for returning students student credit management clears the student.*	
Are administrators checking whether the finally selected applicants' documents are scanned into the system? (NSC or other results)?	*Don't check*	*Yes*	*Don't check this*	
Did administrators check whether the students completed a wishlist (curriculum advising) and was it signed by HOD of that programme?	*Yes*	*Yes*	*Yes*	
Were any autofill functionalities being used during the registration process?	*Yes*	*Yes*	*Yes*	
Did any of the administrators manually select modules for set programmes during the registration process?	*Yes, for advance registration*	*Yes, for advance registration*	*Yes, for students registering for advance registration*	

Were there any systems overriding functions being exercised during this process?	*Yes, for advance registration*	*Yes, for advance registration*	*Yes, during advance registration*	
Did the administrator issue the finally registered student with any proof of registration?	*Yes*	*Yes*	*Yes*	
Did the administrators issue students with a system-generated class timetable after being registered?	*Yes*	*Yes, it is on the proof of registration form*	*Yes*	
Has the minimum programme promotion credits been set correctly on the system for each programme?	*Yes*	*Yes*	*Yes*	
Online registration				
Has the online registrations been processed or attended to?	*N/A*	*N/A*	*Yes*	
Memo	*Academics signing off wish lists and then according to the rules of combination it is incorrect, especially with advance registration thus confusing students. Academics seem to agree to students selecting modules during advance registration which they latter then deregister for unable to cope. In this way academics are not considering students entire journey.*	*Students come with wishlists that are not signed expecting to register. Academics must apply themselves better during the registration process by consulting ROC and other governance issues surrounding student credits, electives and compulsory modules. Timetable clashes in the cases of advance registration. Teaching venue capacity being reached resulting in additional groups being created for more seating.*	*Rules of combination and modules must be corrected before registration. Student Credit management services systems negatively affects the registration process of returning students with financial problems thus resulting in unnecessary overrides, allowing for registration of first semester and yearlong modules only. Thus, creating unnecessary anxiety tension between student credit management and faculty staff. Other*	

Annexure 4: Permission /Consent letter

UNIVERSITY *of the*
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Dear Colleague

Requesting your permission

As part fulfilment in completing my Maters thesis, I have decided to apply a formative evaluation process at the University of the Western Cape. The purpose of this study seeks to evaluate the effectiveness of an Integrated Student Administration System Integration (SASI) within the university but more specifically the Faculty of Community and Health Sciences.

I herewith would like to request your permission to allow me to include you as a participant to this process and that all information/data gathered throughout this process will be handled with great discretion and consideration. Your decision not to participate at any given time will be respected and honoured. Ethical clearance was obtained from the EBE Faculty: assessment committee at UCT and the ethics research committee at UWC for this research project as well as permission from the Dean and the Registrar.

I would like to make it clear at this stage that during this process I will be acting as a researcher and a manager but under no circumstance will my position as a researcher compromise my position as the manager. My responsibilities and duties towards the staff, faculty and the university will always be my primary concern.

Thanking you

M Simpson

x Vincent Morton

I hereby give permission for M. Simpson to include (me)_____ as one of his participants for his research project.

Signature Removed

Date 8/7/15