THE USE OF TECHNOLOGY
FOR IMPROVING THROUGHPUT RATES
IN AN ODL CONTEXT BY LECTURERS IN THE
SCHOOL OF COMPUTING

by

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DECLARATION

I declare that

THE USE OF TECHNOLOGY FOR IMPROVING THROUGHPUT RATES IN AN ODL CONTEXT BY LECTURERS IN THE SCHOOL OF COMPUTING

is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.

10-02-2018

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(THEOPISTA NAZZIWA MUKASA-LWANGA)

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ABSTRACT

The improvement of throughput rates is a crucial factor at higher education institutions; hence, university departments focus on improving pass rates per module. This study investigated how lecturers in the School of Computing (SoC) at the University of South Africa, use technology for improving throughput rates in an Open Distance Learning (ODL) context. The study sought answers to the main research question on how lecturers in the SoC use technology for improving throughput rates in an ODL institution. A mixed research methods approach was used, where quantitative data was extracted from the university systems and integrated with the qualitative data collected from interviews. Thirteen lecturers for the thirty modules under investigation were interviewed. A thematic analysis was used on the qualitative data, and quantitative data was analysed using rankings and correlation coefficients, leading to the interpretation that the use of *my*Unisa technology assisted to improve throughput on the modules.

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KEY   CONCEPTS

Open and Distance Learning (ODL), Distance Education (DE), Higher Education, Lecturers, Computing Context, Throughput Rates, Pass Rates, Technology, *my*Unisa Technologies, Modules/Courses.

CHAPTER 1

OVERVIEW OF THE STUDY

1.1   Introduction

In the modern world, current advancements in technology have changed the way people live and how they do things. In education, the use of technology can lead to enhanced teaching and learning. Numerous researchers have written about the use of technology in education. Collins and Halverson (2009) advise that education systems should understand how technologies are essential in driving changes in education. Englund, Olofsson, and Price (2017) refer to the importance of conceptual change in order to achieve effective use of education technology. Advantages of technology in education can be experienced through numerous activities e.g. interactions both with students and lecturers and feedback is almost immediate. According to Thorsteinsson and Olafsson (2015), technology extends human possibilities and enables people to do things they could not otherwise do. Heitink, Voogt, Verplanken, van Braak and Fisser (2016) in their study about pedagogical use of technology postulate that technology is used in education to strengthen pedagogy like using it as a transfer model of teaching. Kali, McKenney and Sargy (2015) talk about how technology enhanced learning materials developed by teachers can improve students' learning. This is in line with the research carried out by Tondeur, Roblin, van Braak, Voogt, and Prestridge (2017) regarding how teacher educators motivated teacher trainees to use technology in their teaching.

The impact of technology teaching and learning in general in ODL is particularly noted by a number of researchers.   Technology makes learning more productive, creative and interactive (Kem, 2018) and in an Open and Distance Learning (ODL) system, there is added benefit of making learning reachable and effective. The use of technology-enabled learning in ODL is increasing and Ahmed, Sangi and Mahmood (2017) propose that more technological advancement is required to make learning in ODL more interactive and engaging. At the University of South Africa (UNISA), *my*Unisa technologies are used as online technology to provide support for teaching, learning and collaboration between

lecturers and students. Ramdass and Masithulela (2018) alluded to the need for UNISA to improve ICT solutions in order to achieve more and improve teaching and learning. Technology is popular due to its resourcefulness and of late, technological tools are used to provide equal opportunities in the education domain (Kem, 2018). Kem (2018) further explains that in ODL, poor people can access education through the use of technology-enabled systems that are flexible. Pangeni (2016), with particular reference to distance education in Nepal, states that technology promotes online learning and transforms the process of education delivery and student support. UNISA has a social mandate of opening up access to education and researchers like Makoe (2015) have observed that digital technologies have increased access for UNISA by removing barriers thus improving accessibility to education.

There are success indicators of using technology in various educational sectors that demonstrate improvements in performance. In the research carried out in middle schools, Blanchard, LePrevost, Tolin and Guiterrez (2016) noticed that when students are more engaged, interested and excited when interacting with technologies, they achieve higher assessment scores. Student support services at higher education institutions play a big role in assisting students with their studies. In a study carried out by Swart (2016), it was affirmed that student support coupled with student access to a learning management system could have a positive impact on the pass rate. As it is understood that learning can take place anywhere, mobile technologies come into play. One of the findings from a study that investigated the use of mobile technologies to increase throughput and success rate at UNISA, was that effective student support through mobile technologies could lower drop-out rates and increase the pass rates (Mafenya, 2014).

There are reported challenges on how academics are expected to acquire sufficient knowledge on technologies used in teaching. Researchers like Islam, Beer and Slack (2015) referred to how instructors need a good grip on technology to achieve the intended learning objectives. Lack of knowledge about the available technologies may lead to insufficient utilisation of technology for both teaching and learning. In addition to training, Islam, Beer and Slack (2015) state that students need to have the right attitude and experience to be able to use technology for learning purpose. In their research at UNISA on biodiversity issues in ODL, Pretorius, Brand and Brown (2016) ascertained that students encounter problems in virtual learning and accessing internet readily.

The study investigated how lecturers use technologies to improve throughput rates within the School of Computing (SoC). Lecturers interact with students through e-mails and telephone calls, and in some cases through one-on-one interaction with students who are able to come to the respective lecturer's office. Further interaction between students and their lecturers is through the *my*Unisa educational technologies thought to bring about improvement in the throughput rate. Whereas this study focuses on the use of technology by lecturers, a research study carried out by Ngugi and Goosen (2018) focused on the use of technology by students. This chapter has referred to related studies that would assist to delve into this particular study.

1.2   Statement of the problem

This study aims to seek a deeper understanding of the various uses of online technologies, specifically *my*Unisa, with which to improve students' academic performance. Lecturers' commitment to this endeavour is essential, as pointed out by researchers such as Cant and Bothma (2010), so much so that the extent and effectiveness of technology usage lies with the lecturers. It is, therefore, the intention to direct efforts towards improving the throughput rate.

While referring to trends, progress and challenges relating to open and distance learning (ODL) contexts in the developing world, Pityana (2009) specifically mentioned the constant pressure put on higher-education institutions (HEIs) to increase their throughput rates. Sondlo and Subotzky (2010) supported the opinion that improving success and the throughput rates is a priority of the national government. This study will therefore be in line with finding a solution to fulfil the requirement of the national government. Since the national government is the main funding agency of the HEIs, there is a need to try everything possible that can lead to improving the throughput.

1.3   Purpose of the study

The purpose of this study was to investigate how lecturers in the SoC use technology for improving throughput rates in an ODL context. Improving throughput is a major challenge in universities, and as recognised by Davis and Venter (2010), one of the drivers for doing

so is to improve performance. The study was limited to 30 modules that were offered between 2005 and 2010, the period before a major curriculum review was carried out on SoC modules. 13 lecturers for the 30 modules participated in this study. The main research question was how lecturers in the SoC in an ODL institution used technology to improve throughput rates. Mixed research methods were used and quantitative data extracted from the university systems were integrated with the qualitative interviews conducted with the lecturers to gain understanding of the problem. Issues of validity and reliability were considered from both the quantitative and qualitative methods and consistency was observed. Quantitative data was analysed using rankings and correlation coefficients. A thematic analysis used on the qualitative data assisted with finding answers to the research question. Ng (2015) postulates that technology motivates and engages students. Following this reasoning, it is anticipated that if students use technology for study purposes, improved performance could be expected. It is through the lecturers' efforts to improve performance on their modules that the overall throughput rates could be improved. Comparisons of quantitative and qualitative data led to the interpretation that usage of *my*Unisa technology helped to improve throughput on the modules. One of the recommendations for further studies is to investigate challenges encountered by ODL students in a technology-assisted environment.

1.4   Research questions

In order to achieve the aim of this study, the focus was on finding answers to the following research questions:

Primary research question

How do lecturers in the SoC (at an ODL institution) make use of technology for improving the throughput rates?

Research sub-questions

Below are the sub-questions that helped to answer the primary research question:

i.   What is the pass rate of the modules in SoC in 6 yers (2005-2010)?

ii.   How did lecturers use *my*Unisa tools in these modules to improve throughput/pass rates in an ODL context?

iii.   What are the challenges encountered by lecturers in using *my*Unisa for effective teaching?

1.5   Objectives of the Study

The objectives focused on in this study were as follows:

- determining the pass rate of the modules for the period 2005-2010.
- understanding how lecturers made use of *my*Unisa tools for improving the overall throughput rates on the specified modules.
- understanding the challenges encountered by lecturers in their quest for improving teaching.

1.6   Research Methodology

This was a mixed research study that was conducted using interviews to collect data from lecturers in the School of Computing (SoC) at the University of South Africa (UNISA). Mixed research method is a deliberate combination of the quantitative and qualitative research methods to derive the strength from each method to answer the research questions (Kaur, 2016). Mixed research is important for the broader results that can be proved through reference to available literature (Shannon-Baker, 2015). A sample of 13 lecturers (76%) participated in the interview process. Data analysis was completed on both the institutional and interview data. This study explored lecturers' use of *my*Unisa technologies in an ODL context in order to improve the pass rate for individual modules.   The intention was to generate ideas that would lead to recommendations for improving the SoCs throughput rates. Quantitative institutional data and qualitative data collected through interviews with the lecturers were used to assist with answering the research questions.

1.7   Population and Sampling

The target population for the study was the 75 academic staff in the SoC. This study was limited to undergraduate modules offered within the SoC during 2005-2010. This specific period was the choice of the researcher because there was a major review of all modules in

the SoC after 2010. Therefore, this study focussed on 30 modules that were offered during that period. A purposeful sample of 13 lecturers teaching the 30 modules was selected for investigation using interview questions.

1.8   Data collection

Data were collected according to how the SoC lecturers used various *my*Unisa technologies for improving throughput rate on their modules. An interview protocol designed by the researcher was used during the interview meetings with the individual lecturers. The researcher took notes during interviews and used her smartphone for recording and assisting to capture the details of the proceedings. Quantitative data were obtained from records of 30 modules that were under investigation. The required attributes were extracted from the institutional system and presented in a table format (Table 4.1) for ease of reference and analysis. More institutional data extracted from the university systems were included on the interview protocol (Annexure B) to guide the researcher during the interviews.

1.9   Data analysis

A mixed research study refers to the combination of both quantitative and qualitative data to generate credible and convincing conclusions about the research questions (Ivankova & Greer, 2015). Quantitative and qualitative data were analysed separately and a combination of the findings culminated in the final interpretation. Quantitative data was analysed using rankings and the Pearson Correlation Coefficient.

Qualitative data was analysed according to the two themes:

- Using technology for teaching in an ODL environment
- Using technology for increasing pass rates on each respective module.

Themes were used to identify commonalities and differences in the interview responses (Mukasa-Lwanga & Goosen, 2014). Meanings were conveyed in terms of themes, which were repeating ideas (Vaismoradi, Jones, Turunen & Snelgrove, 2016) to assist the researcher with answers to the research questions. For increasing validity (McMillan & Schumacher, 2010), qualitative data was independently analyzed by a senior researcher.

1.10   Significance of the study

The significance of this study was to establish, from the lecturers' perspectives, how *my*Unisa technology as a model of support and collaboration could escalate throughput rates in an ODL computing context. According to Mabunda (2010), it is generally accepted that technologies can help improve teaching and learning. Botha (2010) explained how each lecturer has a role to play in student throughput - if lecturers work towards improving the pass rate for their respective modules, it would eventually lead to an improved throughput in the study programmes. Improving throughput rate is the ultimate goal of every institution as indicated by Pityana (2009).

Similar to the work of Mbatha and Naidoo (2010), the results of this research work could be used to promote the use of *my*Unisa technologies within the SoC, which may ultimately lead to improved throughput rates for the study programmes. The outcome of the study will induce lecturers to reflect on their aims of using technology as a teaching style for improving learning. Altun (2015) supported this idea that information technologies are powerful tools for teaching, motivating and making learning more interesting. The university will also be reminded of training lecturers for effective and efficient use of technology as an integral part of their teaching methodology.

1.11   Scope and limitations of the study

The study was limited to the 30 undergraduate modules in the SoC that were offered between 2005 and 2010. This scope resulted in interviewing 13 lecturers who were involved with teaching the 30 modules. Lecturers' usage of *my*Unisa technologies to improve pass rates on their modules was investigated. The aspects that were considered were twofold:

- How lecturers used technology for teaching in an ODL environment;
- How lecturers used technology to increase pass rates on their modules.

The period of the study was limited to 6 years between 2005 and 2010 because of the major review of the curriculum that took place after 2010. Some inevitable limitations were:

- Some lecturers were offering more than one module and they preferred to be interviewed on the technology usage of one module. The reason behind this was that their technology usage on all their modules was similar.

- 3 lecturers were working from home and could not be reached and one lecturer had resigned.

1.12   Definition of terms

- **Technology**

The study specifically refers to educational technology as defined by AECT committee in Januszewski and Mondela as cited in Englund, Olofsson and Price (2016, p.84). "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources."

In this research study, technology is distinctively referred to as *my*Unisa technologies or tools used by lecturers to improve learning. *my*Unisa is an online management system used by both lecturers and students for supporting teaching and learning in an ODL environment.

- **Throughput Rate**

The term throughput rate in higher education has been defined by Taylor, Fleisch and Shindler (2019) as the ratio of graduates to initial enrolments within 6 years of a four year programme.

 In this study, throughput rate refers to the successful completion of programmes and subsequent graduation of registered students.

- **Open Distance Learning**

ODL –   Kanwar and Cheng (2017) portray the meaning of ODL by defining the two concepts of distance education and open learning. They define distance education as the delivery of learning or training to students who are separated, mostly by time and space, from the teachers and trainers. Further definition according to Kanwar and Cheng (2017) is that open learning aims at minimal barriers to entry in terms of age, gender and prior qualifications. Their deduction is that the definition of ODL is when the two terms are brought together.

There are various definitions of ODL from different researchers, which are also applicable to the term used in this study. ODL specifically refers to the learning environment defined by a method of education, involving a lecturer and students who are separated

geographically and must rely on one or more methods of long-distance communication (Bargellini & Bordoni, 2001). Therefore, ODL is a multidimensional concept involving the institution, students, lecturers and training materials (Mphahlele & Tafesse, 2015). The approach is more student-centred with personal organisation of the learning process and allowing flexibility to the student. ODL provides opportunities for access to learning, updating of knowledge and retraining.

- **Lecturers**

Lecturers are qualified academics developing insights into the academic ability of students and thus responsible for devising ways of improving the students' academic performance. Lecturers have the knowledge, skills and ability to identify students' weaknesses that need focus. Through such insights, lectures are able to help students improve their performance.

1.13   Structure of the dissertation

The dissertation is divided into five chapters.

Chapter 1 provides an introduction, which seeks to give the context that led to the development of the research interest. It introduces the statement of the problem with reference to relevant educational studies that pinpoint the importance of the problem. This is followed by the purpose of the study that is supported by the primary research question and sub-questions to which the study attempted to find answers. Then follows an outline of the specific significance of the study. Subsequently, the scope of the study is discussed, with specific mention of the expected limitations. The section ends with operational definitions of terms used in this research study to guide the research process.

Chapter 2 contains an analysis of related literature in order to supply existing knowledge about the research. The literature search was done according to topics forming the various sub-headings of the literature review. The topics were based on keywords related to the main objective of the study. These keywords are technology, throughput and ODL. Comparisons were made between this research and the existing knowledge from previous studies, and gaps were to be identified as the research progressed.

Chapter 3 focuses on the research design and methods. It contains a description of the method and design used to outline the reliability and validity of the procedures used. This is

where the subjects - that is, the population and sample, are stated. In this study, a random sampling technique was used. An ethical clearance to proceed with the study was sought from the university's ethics committee. Data were collected using questionnaires and thereafter analysed to get answers to the research question and sub-questions through interpretation.

Chapter 4 presents the findings of the study. Factors outlined in the literature review were compared with the results of the study to find out what the data represent.

Chapter 5 contains a summary, recommendations and conclusion of the study. Explanations, a discussion and an interpretation of the findings formed the basis for establishing solutions to the research question and sub-questions.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

This chapter contains a review of studies that are relevant to the topic of this research study. Extensive research has already been done on the advantages and disadvantages of Open and Distance Learning (ODL) and Distance Education. The review focuses on the use of technology to improve academic performance in an ODL environment. According to the United States Department of Education (2017), technology has the capability to improve learning. It was also affirmed that technologies assist with transforming teaching and learning (Dichaba, Malale, & Gomba, 2018). Various studies have also reiterated the importance of technology to improve access, learning and student support in ODL institutions (Goosen, 2014a; Asamoah & Mackin, 2016; Goosen & Naidoo, 2018; Halabi, Essop, Carmichael & Steyn, 2014).

From the literature, reference is made to underlying pedagogical principles such as those of Piaget's stages of cognitive development regarding constructivism and self-regulated learning, as they form part of independent studying, which forms the basis of distance education. Therefore, it follows that the challenges of ODL require students to be autonomous individuals.

2.2   Constructivism

Constructivism is a learning theory about the active construction of new knowledge based on a learner's prior experience (Koohang, Riley, Smith, & Schreurs, 2009). Learning therefore incorporates the transformation of existing understanding.

According to Koohang *et al.* (2009), from the constructivist point of view, the student plays a central role in the mediating and controlling of learning - a characteristic of constructivism that justifies the relationship between the theory and this search. Ruey (as cited in Wang, 2014) enlightens on the constructivist concept and states that learning can be attained if

students have refined their thinking and gained knowledge constructive skills. Knowledge is thus constructed according to the students' experiences. Amineh and Asl (2015) recommend that teachers should take cognizance of the constructivist theory and consider what students know and allow the students to put their knowledge in practice. ODL requires students to take control of their learning, whereas lecturers conduct assessments and can help students integrate their preconceptions with the concepts learnt. Jha (2017) refers to personal constructivism as learning on individual basis depending upon individual needs.

The conceptual framework of this literature search was based on the following themes related to the main objective of the study: Open and Distance Learning (ODL), Distance Education (DE), student throughput rates, measures of academic efficiency, *my*Unisa and benefits of technology. This is therefore a thematic review, structured according to the key words relating to this particular study.

2.3 Open and Distance Learning (ODL)/Distance Education

2.3.1 Background Information

Kanwar and Cheng (2017) define distance education as the delivery of learning to students who are separated by time and space from their teachers. Furthermore, they refer to open learning as encompassing policies and practices permitting entry to learning with few barriers. Open learning is referred to as having minimal barriers to entry in terms of age, gender, prior qualifications and therefore the two terms are combined to form ODL. ODL entails the acquisition of knowledge through an easily accessible and flexible system of education (Jordan, 2009). According to Raza (2008), distance education, encompassing e-learning or online learning, is learning not bound by space and time. This study specifically focuses on ODL, as opposed to traditional on-campus learning.

A number of uses or advantages of ODL as stipulated by Fozdar (2015) are as follows;

- Accessibility – with reference to offering flexible learning;
- Cost efficiency – referring to ODL as having the potential to lower costs;
- Improving quality – ODL can be used for in-service and pre-sercvice training;
- Offering technology-supported teaching and learning – one example is that learning management system in the ODL context draws the students together and provides shared experience.

Further explanation on the advantages and type of students who enrol in ODL institutions and the teaching methodology follows below.

2.3.2   Advantages of ODL

In comparing the ODL environment with the typical distance-learning environment, Mbatha and Naidoo (2010) postulate that in the former the transactional distance is minimised and students engage with their peers by forming a learning community, whereas in the latter this engagement is limited.

Collectively, most definitions stress some special ideals coherently identified with ODL, and as stated by Jordan (2009), ODL programmes allow great flexibility of learning. This is in line with the statement of Dennen and Wieland (2007), namely that distance education expands the access to education by helping students who would not enrol in a traditional contact format to study while at work or with families, thus eliminating space and time constraints.

Fozdar (2015) elaborates on ODL's improved accessibility, especially for students from rural areas, and cost efficiency for developing countries. El-Bakry and Nikos (2009) consider distance learning in the form of e-learning an excellent method for reaching adult students who desire a high degree of flexibility, whereas Yukselturk and Bulut (2007) consider ODL suitable especially for more mature students, due to the convenience, flexibility and self-pacing offered. According to Breetzke (2007), distance education is envisaged as a means whereby previously-disadvantaged members of society of all ages can enrol either directly or remotely at a tertiary-education institution at a reduced cost, to which Pretorius, Prinsloo, & Uys (2009) add that distance education has the ability to cross all kinds of borders, be it national or international.

According to Neuman and Blodgett (2009), distance education offers the opportunity to increase student enrolment and promote diversity. These authors also state that distance students in remote locations often indicate tremendous satisfaction, reflecting a general appreciation for bringing the programme to them. Block (2007) states that the most common reason for taking an ODL course is to develop or upgrade the skill and knowledge needed in employment. This is true for South Africa, considering its prevailing high rate of unemployment. Generally speaking, people have a desire to further their education through distance learning so that they can obtain employment and become economically independent.

Ng (2007) agrees with the above and states that because of the major reasons of personal development, career advancement and socialising, interest may be said to be a common motive for learning among adult students. As noted by Zhang (2005), distance-education students are more independent in their learning styles than students who attend contact lectures, so that distance education can be viewed as a means of promoting students' independence or freedom and of providing lifelong learning.

The above is further confirmed by Andersson (2008), who states that distance education allows people to learn from where they are, as people in most need of education are the ones most needed at home or at work. Simonson and Schlosser (2010), add that distance education is an institution-based formal education where the learning group is separated and where interactive telecommunication systems are used for connecting students, resources and instructors. Therefore, open and distance learning/distance education gives non-traditional students the opportunity to study further.

2.3.3 Challenges of ODL

In a study by Jordan (2009), the most demotivating factors about ODL pointed out by students are as follows: a feeling of isolation, a need for increased formative feedback, and insufficient preparedness for their studies. Therefore, often much more effort is expected from ODL students than from their counterparts at residential universities (Pretorius, Prinsloo, & Uys, 2009). It may be added here that according to the Higher Education Quality Committee (HEQC) Institutional Audit of 2008, distance-education students take at least 50% longer to complete their studies and to graduate than students in contact situations (UNISA, 2008).

The virtual nature of ODL and the anonymity of students present some challenges as far as the system of education is concerned. Block (2007), for instance, states that distance-education students need to learn how to prioritise their life and educational endeavours. It is also stated by both Block (2010) and Ng (2008) that distance education requires students to consistently regulate their learning process because of the multiple goals that they may have, and the fact that some goals may take precedence over others.

Among the many challenges posed by ODL, one of the major ones that students may have to tackle is interaction. Liu (2008) distinguishes four types of interaction, namely

- student-content interaction
- student-instructor interaction
- student-student interaction, and
- student-technology interaction

Although Chen and Tsai (2007) do not agree that virtual interaction (e.g. on the internet) can develop adequate lecturer-student and peer relationships, they do state that it can advance understanding that enables students to be more involved in the learning process. In ODL, peer interaction is vital, as affirmed by Dennen and Wieland (2007), who state that students should truly engage with each other to gain insight that they may not have gained on their own.

Another challenge in ODL environments is that, due to physical separations, opportunities for active interactions between learner and instructor or between learner and other students are often limited (So & Brush, 2008). Feelings of alienation and isolation experienced by students being left to self-studies are commonly stated reasons given for not passing a course or dropping out (Andersson, 2008). From the results of the course evaluation on e-learning by Wang (2014), it was found that interaction was rated highly by students. In an earlier work on student perspectives in a distance-education degree and certificate programmes in public health, it is recommended by Cannon, Umble, Steckler and Shay (2001) that distance-education programmes continuously diagnose learner satisfaction and improve operations as needed. While Battista, Forrey and Stevenson (2008) are of the opinion that it takes a virtual community to promote collaboration through student activities in online and distance education, Bekele and Menchaca (2008) offer a review of research on internet-supported learning for distance education. Their review concluded, among others, that students exposed to ODL need to be more self-motivated than students in an ordinary campus setting and it was vital for them to adopt adult learning styles. Nel and Ndeya-Ndereya (2011) identify the lack of face-to-face contact between ODL students and their lecturers as one of the important reasons why such a learning environment is often experienced as being impersonal, lonely and lacking social presence.

2.3.4 Self-Regulated Learning and ODL

Schunk and Zimmerman (2008) define self-regulated learning as controlling one's own conduct in order to achieve a goal. According to these authors, students who make use of self-regulation set better learning goals, implement more effective learning strategies and exert more effort and persistence. Self-regulation is a personality trait considered to be important for students to make progress in an ODL environment. Rahayu, Widodo and Darmayanti (2018) advise about the positive effect of self-regulated learning in the success of distance education students. ODL students' self-regulated learning skills could be enhanced through training because this is an important skill for a distance-learning student (Rahayu, Widodo & Darmayanti, 2018). As stated by Tuckman (2007), many students treat the opportunity for self-pacing as an invitation to procrastinate. This is because the absence of an on-site lecturer makes this behaviour difficult to control. According to Hung, Chour, Chen and Own (2010), students need to make decisions about, and exercise control over, their learning activities in terms of pace, depth and coverage of content, type of media accessed and time spent on studying. Yukselturk and Bulut (2007) confirmed the above notion when they found out that successful students generally make use of self-regulated learning strategies, which help them monitor and control their learning process, an important aspect of learning clearly expected of ODL students. Self-regulation thus has a positive effect on students' learning outcomes (in this particular study alluded to as performance).

Taylor (2008) notes that for distance education students early engagement is more elusive than for on-campus students, meaning that they often commence their studies only when an assessment task is due. Self-regulation therefore makes students aware of their responsibilities and makes them gain control of their learning through self-discipline (Yukselturk & Bulut, 2007).

2.4 Measures of academic efficiency and factors to increase throughput rate

2.4.1 Measures of academic efficiency

Welsch (as cited in Dreyer, 2010) refers to throughput as the number of students originally enrolled who complete the whole programme successfully. Throughput and retention rates can be referred to as measures of efficiency of the teaching and learning process (Council on Higher Education (CHE), 2010). This council (CHE, 2010) prescribes a funding formula

that penalises universities where students take longer to complete a qualification, and this is why throughput rate is one of the current important themes in education. Student retention is very crucial, and researchers such as Subotzky and Prinsloo (2011) emphasise the fact that enhancing retention is a priority in improving overall success. Academic efficiency can also be determined by pass rates. As stated by Subotzky and Prinsloo (2011), the graduate rates of ODL institutions are disturbingly poor. The HEQC Institutional Audit of 2008 highlights one of the factors considered to lower the pass-rate (UNISA, 2008), namely absenteeism, mainly referring to students who complete assignments and obtain fairly good results but find preparation for examinations a daunting task and then either because of that reason or various personal reasons do not sit the examinations. Some studies have come up with suggestions for how to improve the pass rates in institutions. Wang, Peng, Huang, Hou and Wang (2008), for instance, recommend that lecturers provide specific learning methods to help improve pass rates. A questionnaire to identify students' characteristics, for example, would help lecturers to provide appropriate support.

Dropout rates can also be considered as one of the measures of academic efficiency. In this study, dropout students refer to students who discontinue their studies by not registering for the modules necessary for completing their programme. Dreyer (2010) refers to dropout students as students who enrolled, but failed to complete their qualification. Dropout rates have a significant impact on the subsequent throughput rate. According to Wigforss (2002), dropouts pose a problem in that they stay registered but are not included in the performance statistics, thus lowering the pass rate and the overall throughput rate. The CHE (2010) distinguishes two types of dropout rates in universities. The first one, used by the University of Pretoria, refers to all students who do not complete their qualification. The second one, used by other institutions, refers to students who choose not to return, rather than those who are excluded on academic or financial grounds and are not given the choice to re-enrol. High dropout rates have funding implications for an institution. Maathuis-Smith *et al.* (2010), stating that there are academic and non-academic reasons for students to withdraw from modules, single out the transition to higher education as one of the major problems that may require students to have special assistance with study skills suited for distance education. Tait (2003) affirms that if proper student support is provided, students gain confidence and self-esteem is reinforced with remarkable study progress, and this may effectively contribute to a reduction in the dropout rate. According to Killen *et al.* (2003), lecturers find the

following student characteristics or actions to most likely lead to student failure: insufficient effort, poor preparation for examinations, lack of self-discipline, and inefficient time management.

2.4.2   ODL factors to increase throughput rate

In this study, throughput explicitly refers to the completion of a qualification, but according to Nichols (2010), some non-traditional students in ODL may be interested in completing only a module. Tyler-Smith (2006) adds that students also need to be committed to completion with perseverance and academically integrate with peers and their respective institutions in order to secure retention. It is therefore obvious that with such varying intentions from registered students in ODL institutions' throughput rates will be affected.

However, as stated by a number of researchers (Botha, 2010; Sondlo & Subotzky, 2010; Pityana, 2009), pressure is put on ODL institutions to increase their throughput. Martins (2007) adds that distance tertiary-education institutions have even a greater struggle with the problem of student failures and low throughput rates than residential tertiary-education institutions. It is important for students to be committed to their studies. Here student characteristics such as interaction, motivation, self-efficacy, age and gender can be considered, as stated by Yukselturk and Bulut (2007), for online education student characteristics can be viewed as one of the important factors for that type of education being successful.

Student retention is very crucial, and researchers such as Subotsky and Prinsloo (2011) emphasise the fact that enhancing retention is a priority in improving overall success. ODL institutions pose unique challenges as far as student retention and throughput are concerned. Academic, administrative and socio-economic challenges here all play a role. Maathuis-Smith, Wellington, Cossham, Fields, Irvine, Welland and Innes (2010) assert that the retention rate is calculated from the total number of students enrolled in a course or programme at the beginning of the enrolment period. They therefore define retention as participation in a course until it is completed. Determining student retention is a very difficult exercise, but as stated by Allen (2006), student-retention and degree-completion issues are hot topics among academic administrators.

There are a number of barriers in ODL institutions that may pose challenges for student retention. One such a barrier may be the costs involved for students wishing to contact their lecturers, which was overcome by the Open Polytechnic of New Zealand by introducing a free telephone number (Maathuis-Smith *et al.,* 2010). Also, Nichols (2010) makes mention of a deliberate and targeted retention strategy with the appointment of academic-support coordinators in an effort to improve student retention and success.

The complexity of dropout rates makes it difficult to regulate the throughput rate in ODL institutions. Tyler-Smith (2006) advises that because most distance-learning students are already employed, they tend to think about growth on the job and register at institutions only to withdraw after achieving what they think that they wish to achieve. Woodley (as cited in Nichols, 2010) states that a dropout rate is likely to be determined by both the nature of the student and the characteristics of the host module/institution. This may be true if one considers the type of barriers met by distance-learning students in comparison with those experienced by students in contact institutions. According to Nichols (2010), students' reasons for dropout are complex and numerous, with personal reasons being more significant than others.

Pass rates have to be considered when one talks about throughput rates. Raza (2008) states that a pass rate refers to course or programme assessment - specifically the number of students out of the total entry, or those who sat an examination and actually passed, and that pass rates indicate only how students fare in a set of examinations. Raza (2008) further notes that ODL has been more successful either at certificate- or post-graduate-level modules in non-technical subjects. Martins (2007) has the same view, namely that distance tertiary-education institutions struggle with the problem of student failures and low throughput rates even more than residential tertiary-education institutions. At the University of South Africa (UNISA), the completion of assignments has been found to be the only way of measuring the effort put in by students (Pretorius *et al.,* 2009). Although Bower (2001) states that student feedback in distance learning is often delayed and indirect, Pretorius *et al.* (2009) stress that feedback from assignments is required for students' self-evaluation.

In another study carried out at UNISA it is found that the only way to demonstrate students' active participation in a module is by submitting assignments (Pretorius *et al.,* 2009). According to Pretorius *et al.* (2009), this is because UNISA students are not required to write any official tests during a semester. The more assignments students pass during a semester,

the better their final marks, and this is in line with the belief that the amount of time spent studying a module is a strong predictor of success in the examination.

Hörne and Naudé (2002) refer to their investigation on suggestions for increasing the throughput rate in distance learning, focusing on students of a second-year computer-science module in the School of Computing (SoC) and analysing two sets of assignments and examinations data for two consecutive years. It was found that the submission of assignments increases students' chances of passing. In contrast, Goosen and van Heerden (2018) in their research on the assessment of students in high education assert that non-submission of assessments by students has a negative effect on both the year marks and the consequent throughput rate.

Wigforss (2002) makes the suggestion to offer all new students a general learning guide with the aim of improving the student performance rate. Killen, Marais and Loedolff (2003) add that whether the lecturers' expectations are unrealistically high or not, they should be made explicit and the reason for them should be explained to the students. Although students may find the high expectations confusing, the approach may be appropriate and deemed fit for the specific level of education. Pretorius *et al.* (2009) encourage stimulation of student effort in a distance-learning environment through assignments and other strategies in order to increase students' chances of success. Whilst there is a concern whether all these students seriously work through their assignments, the assignments are supposed to offer continuous evaluation through giving students feedback about their progress and suggestions on how to improve their learning skills. Pretorius *et al.* (2009), on the basis of their specific research on an introductory microeconomics course, refer to three variables considered to increase the probability of passing: a higher mark in matric mathematics, studying through the medium of a home language, and matriculation exemption.

According to Killen *et al.* (2003), having researched success and failure in distance education, the following post-enrolment factors strongly influence students' success: interest in the course, motivation, self-discipline and effort, approach to studying, cultural expectations, psychological factors, academic literacy, time-management skills, peer culture, quality of teaching, self-belief and student-support structures offered by the university. While all these factors have to be considered, the authors maintain that students themselves put greater emphasis on the personal value that they attach to a course.

While Wigforss (2002) agrees with Wang, Peng, Huang, Hou and Wang (2008) that motivation is one of the factors that affect learning results, she argues that if students need the course for their professional career they succeed – otherwise they tend to drop out from assignments. Wigforss adds that drop-outs cause problems because they stay registered but will not be included in the performance statistics, thus lowering the pass rate.

Ng (2008) further states that students focusing on work-related goals obtain better examination results than those focusing on multiple or mastery goals. On the contrary, the findings of Martins (2007) show that work-related issues are much to blame for student failure, possibly because of the extent of the workload and the time spent at work, thus leaving students with little time for their studies.

Wigforss (2002) further highlights students' simultaneous enrolment in parallel modules as a cause for low pass rates, and also that health problems are often given as reasons for drop-out during a course.

According to Tait (2003), student characteristics such as gender, age, employment or unemployment, disposable income, education background, geographical situation, special needs (e.g. disability), language, ethnic and cultural characteristics, and communication-technology connectedness need to be assessed in order to establish the services required for any student cohorts (Tait, 2003). Burke and Hutchins (2007) add to the aforegoing that a learner's characteristics affect training outcomes, because the individual's ability and motivation affect performance. Among related literature presenting opportunities for further investigation were the findings of Ergul (2004), namely that there is no significant relationship between student characteristics such as age and gender and academic performance in an ODL context, but those findings relate to the students of the Anadolu University in Turkey only. According to Fan and Lee (2007), the quality of students on entry will affect their study outcomes, with their research results showing that students' background characteristics have a significant effect on their completion of a module.

2.4.2.1   Interactivity in ODL

Liu (2008) states that student interaction involves either direct interaction (such as face-to-face interaction or e-mails) or indirect interaction (such as the use of discussion boards) and defines interaction as a kind of action occurring between two or more objects that in each

case has an impact on them both. According to So and Brush (2008), interaction can be defined as a reciprocal communication process between human and human or between human and non-human, for example human-computer interaction.

According to Liu (2008), a lack of interaction is one aspect that may have a negative impact on the learning outcomes of distance-education students. Yukselturk and Bulut (2007) also stress that interaction with peers and instructors plays an important role in ensuring students' success, while Jordan (2009) confirms that isolation is one of the setbacks in distance education and states that limited contact among students precludes cooperative learning. Taylor (2008) states that on-campus students have the advantage of regular engagement through the classes that they attend.

While Bower (2001) stresses the importance of student interaction because it leads to students learning from each other, he is of the opinion that distance learning deprives the instructor of the most gratifying aspect of seeing a struggling student beginning to gain confidence.

According to Fan and Lee (2007) informal groups such as discussions arranged within tutorial groups to promote student participation and interaction offer students a valuable opportunity to form peer-support groups and develop supportive relationships. Menchaca and Bekele (2008) have similar findings, namely that some face-to-face interaction is significant for building a learning community. They find this to be crucial at the onset of the programme, so that students do not feel isolated. This is in agreement with the statement of Bower (2001), namely that there is a need for student learning communities and group tasks. Battista *et al.* (2008) also support the formation of student communities to build relationships based on common interests, which are critical to academic success. Picciano (2002) also stresses the importance of interaction for a course to be successful, but advises that the nature and extent of the interaction have to be considered to equate the learning outcome.

Bower (2001) summarises the situation by stating that distance education requires more planning on the part of the lecturer and more effort on the part of the student. Loh and Smyth (2010) state that online discussion greatly enhances team members' ability to communicate with each other in their own terms, own place and own time and note that for the virtual team to achieve its goals, each team member needs to have a clear role and

responsibilities. This confirms Cook's theory of social facilitation as cited in Loh and Smyth (2010), namely that people often tend to perform better in the presence of others than alone.

Working in groups enhances students' learning perceptions, problem-solving skills and overall learning abilities more than learning alone (Hiltz et al., as cited in Loh & Smyth, 2010). This is in line with the constructivists' view of learning and the zone of proximal development (Vygotsky, 1978), which proposes that a learner's cognitive development is highly dependent on social interaction and collaboration with more capable and knowledgeable others. According to Loh and Smyth (2010), the benefits of working in virtual teams are self-discovery, empathy and self-awareness. Where Muilenburg and Berge (2005) find a lack of social interaction to be the single most important barrier to students studying online, So and Brush (2008) are of the opinion that distance-education courses should be designed to provide students with meaningful opportunities for collaboration and social interaction.

When considering learner-learner online interaction, Dennen and Wieland (2007) state that students should truly engage with each other to gain insight that may not have been possible on their own. However, in their research summary Chen and Tsai (2007) do not agree that virtual interaction (e.g. on the internet) can develop adequate teacher-student and peer relationships, but do advance the understanding that it enables students to be more involved in learning. From the above it is clear that it is impossible to address the student-throughput problem without making reference to the challenges of retention, drop-outs, pass rates and the various aspects of student characteristics.

2.4.2.2 The use of technology in ODL

ODL students are separated by time and space from their lecturers. This implies that with the current technology advent, ODL students can be assisted to enable easy communication with their host institutions. Kanwar and Cheng (2017) refer to three aspects of 'openness' in ODL and these are access, content and technology. In their deliberations, they state that technology is a pillar of openness that make the world a connected classroom allowing online courses to many students around the world (Kanwar & Cheng, 2017). Technology enables both the teacher and the student to discover new sources of knowledge at a reduced expense (Ramadass, 2016). Information and Communication Technology (ICT) in ODL provides opportunities for interactivity and access to instructional resources (Gowthaman,

Singh, Awadhiya & Miglani, 2017) and leads to the provision of timely support to the students.

In a study on the efficacy of ICT in enhancing quality ODL teaching, Mapolisa and Khosa (2015) recognised that ICT is the cornerstone of ODL institutions. Reference was also made to Plante and Beattie (2004) who carried out a study in Canadian schools and they observed that ICT:

- allows teachers to broaden and enrich the curriculum (96%)
- enables the curriculum to be more challenging and enriching (93%)
- enables students to go beyond the prescribed curriculum leading to increased knowledge base (92%).

Although technology has a lot of benefits for the ODL institutions and education in general, there are challenges experienced by both the teachers and the students. e.g. easy access, maintenance, availability of hardware and software and technical support (Mapolisa & Khosa, 2015) . In a study about the challenges of ODL students at the Zimbabwe Open University, Musingafi, Mapuranga, Chiwanza and Shupikai (2015) discovered that students have difficulties in access and use of ICT and are challenged with ineffective feedback from their teachers with lack of study materials. Das and Biswas (2018) conducted a research that probed into the challenges of student support services in an ODL system in developing countries and identified poor technology competency of teachers as one of the challenges because teachers lacked skills to create and facilitate e-learning courses. Poor internet connectivity was another a problem that was identified.

2.5 *my*Unisa and the benefits of technology

*my*Unisa is an online learning-management system which, as described by Mabunda (2010), provides association and support for learning and teaching. Launched in January 2006 after the merger of Technikon South Africa (TSA) and the University of South Africa (UNISA), *my*Unisa replaced the Co-Operative Online Learning (COOL) system of the former and the Students On-Line (SOL) system of the latter. The new system runs on the Sakai framework version 2.0.1 (Sithebe & Myburgh, 2006).

With UNISA as an ODL university, learning relationships can be developed through the use of the *my*Unisa technology. The use of technology in education implies active involvement

of students leading to meaningful learning. Van Eeden and Dewar (2010) refer to the use of technology in an ODL institution to facilitate support and interaction among students. Their view was also supported by Van Rooyen (2010) in her research on the use of instant-messaging application.

*my*Unisa offers functions for discussion forums, module administration, announcements, schedules and others in addition to wikis and blogs that can all be utilised by lecturers for improving their students' learning experience. The system is capable of linking lecturers, students and tutors. As the system is believed to be underutilised, it is recommended (Van der Merwe, 2010) that both lecturers and support staff acquire new skills to reap the full benefits of online teaching and learning. Malale, Gomba and Dichaba (2018) talk about some lecturers not being fully assisting students due to lack of required knowledge of e-learning technologies and in their research; they recommend compulsory training of lecturers and tutors on basic computer skills and *my*Unisa.

This led to the introduction of weekly training sessions for UNISA staff. It is therefore anticipated that lecturers can integrate the *my*Unisa functions into their teaching commitments as alternative ways of imparting knowledge to students. Students using *my*Unisa technology can also develop learning relationships with their peers. Emelyanova and Voronina (2014) affirm the beneficial approach of using learning management systems for knowledge acquisition and supporting active learning. They postulate that learning management systems support active involvement in the learning process that leads to student-centred education.

While according to Jung (2000) it is instructional design, and not technology, that is at the centre of quality distance education, Bower (2001) states that distance-education technologies create a major change in the way instruction is delivered.

According to Yukselturk and Bulut (2007), technologies create an anywhere-and-anytime learning environment. In his research study, Risenga (2010) qualifies this notion by affirming that in an ODL environment students who are not able to meet their lecturers heavily depend on the communication technology available. In agreement with the above, Maphorisa, Sebalathlheng and Khupe (2017) maintain the belief that learning in ODL institutions takes place at any time and place decided by the students thus lowering the cost of accessing quality education. So and Brush (2008) add that problems related to geographical distances are minimised through the use of modern technology, which gives

distance students several means for interacting with lecturers/tutors and their peers. This shows that a number of researchers consider technology as a means for improving distance education. Therefore, technology orientation is a necessity in increasing students' distance-learning receptivity (Zhang, 2005). Also, the online environment may level the playing field where shy or timid students can also participate (Patterson, 2009). Moody (2004) suggests that a lack of technology background may be one of the barriers to learning for a distance-learning student. Thus it is suggested that distance-education universities address student needs such as being technically competent to increase skills that make students more successful with their studies. Therefore, in ODL technology should be used as a means of communication and engagement with students. Maphorisa *et al.* (2017) qualify this sentiment in their research study about the quality of education delivered through ODL by referring to the anticipated benefits of technologies that improve lifestyles, calibre and mind scopes of students.

2.6 Summary of the literature review

The literature search was done using keywords related to the main objective of the study. These keywords are as follows: ODL, *my*Unisa, technology, student throughput, pass rates, dropout rates, retention rates and student characteristics. Researchers such as Ferreira and Venter (2011) confirm that *my*Unisa, as a web-based system, is meant to improve academic interaction and communication between UNISA staff and students and to expand engagement among students. As stated by Van der Merwe (2010), *my*Unisa users will have to acquire skills to reap its full benefits.

From the review it was established that independent studying as explained by the theory of self-regulation forms the basis of ODL. Various studies reiterate the importance of student support, specifically in ODL institutions, to enhance overall student performance (Frankola, 2001; Nichols, 2010; Maathuis-Smith et al., 2010; Tinto & Pusser, 2006; Swanepoel & Mays, 2010; Van Schoor, 2010). The studies consider insufficient student support as one of the major barriers to ODL. Furthermore, the literature reveals that pass rates are lowered by dropouts that stay registered and do not sit examinations.

It was stated that within UNISA, a number of studies have been carried out on student throughput, dropout and retention rates (Botha, 2010; Dreyer, 2010; Subotzky & Prinsloo, 2011; Risenga, 2010). According to Hörne and Naudé (2002), also from UNISA, their

research study affirmed that if students work through various assignments, this practice would lead to increased pass rates in individual modules. This research therefore seeks to find out how the lecturers in the SoC intend to improve throughput in their individual modules by using *my*Unisa technology.

In summary, most studies stressed the combined factors affecting student success, retention and dropout rates have a direct impact on the overall student throughput rate. From the literature, *my*Unisa is a communication and engagement electronic link between students and their lecturers. This study intends to find out how lecturers can improve the throughput rate in the SoC through using the *my*Unisa web-based technology. In Chapter 3, research design and research methods are discussed.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1   Introduction

The **purpose** of this study is to discover how lecturers in the School of Computing (SoC) use the *my*Unisa web-based technologies to improve the throughput rate of the programmes offered in the School.

An outline of the methodology and the appropriateness of the design is presented in this chapter, including the target population and sample as well as a description of how the data were analysed. This chapter also covers all the steps followed to ensure the reliability and validity of the research study.

3.2   Pragmatism Paradigm

A paradigm determines the method (Makombe, 2017), thus it is important to state a research paradigm before choosing the appropriate method. Shannon-Baker (2016) refers to a paradigm as a guide used by researchers to ground their research. Further explanation on the paradigm is given by Makombe (2017) as a worldview, which leads to the method that determines the research design   A paradigm can help to frame one's approach to a research problem and offer suggestions for how to address it given certain beliefs about the world. (Shannon-Baker, 2016). The pragmatist paradigm is appropriate to guide this research study, because it allows the researcher to use a mixed method approach which is essential for finding the best techniques and procedure of research that solve the problem statement (Rahi, 2017; Makombe, 2017). This study used a mixed research method with the aim of having in-depth findings to address the research problem. Ivankova and Greer (2015) assert

that the pragmatism paradigm involves combining multiple methods to gain comprehensive answers to the research questions.

3.3   Mixed Methods

A mixed methods approach is a mixture of qualitative methodology, which is grounded on interpretivist paradigm and quantitative methodology which is grounded on positivist paradigm (Antwi & Hamza, 2015). Whereas the quantitative method describes the data, rather than to interpret it, according to Lorenzini (2017) a qualitative method is used to answer a research question that explores why or how a given phenomenon occurs. Qualitative method is commonly used to understand people's experiences and express their perspectives (Antwi & Hamza, 2015). A mixed research method is useful when the qualitative or quantitative approach is inadequate to best understand a research problem (Creswell, 2014). Creswell (2014) further clarifies that the mixed research method provides a more complete understanding of a research problem than either approach alone. Based on the aforementioned, the mixed research approach, which incorporates both the qualitative and quantitative methods, was deemed suitable for this research study.

The mixed research method was used to ensure that the evidence obtained would be an enabling factor for answering the research questions as unambiguously as possible (De Vaus & De Vaus, 2001). This research method was specifically chosen due to the need to explore the views of the lecturers, in order to gain the required understanding of their responses. Although the study used a mixed research method, the main research methodology was qualitative in nature. Goosen and Mukasa-Lwanga (2017a) and Goosen and Mukasa-Lwanga (2017b) carried out similar research on the qualitative perspective of using technologies for improving teaching and learning in a distance education environment.

3.4   Research Design

A research design determines how data will be collected and analysed. In his report on the relationship between paradigm, method and design in research, Makombe (2017) clarifies that research design provides an instrument or combination of instruments by which the research will be conducted. Makombe (2017) further advises that although designs should not overtly be associated with certain methods, but qualitative and quantitative methods tend to be associated with certain designs, for example; ethnography, phenomenology, grounded

theory, etc. are associated with qualitative research only whereas both qualitative and quantitative methods can be done by experimental design. Betram and Christiansen (2014) illustrate that a research design should provide the following information:

- Evidence or data to be collected by a researcher to answer the research question.
- The data collection method to be used or how the researcher will collect the data.
- How the researcher will analyse and make meaning from the data.

3.4.1 Phenomenological Design

According to Christensen, Johnson and Turner (2010), the primary objective of a phenomenological study is to explicate meaning, structure and essence of the lived experiences of a person or a group of people, around a specific phenomenon. As an example of a research design implemented in previous studies, Liu (2008) used a phenomenological study as part of a qualitative, interactive design in order to investigate student-interaction experience in distance-education courses in an easy and convenient manner. This study also uses aspects of a phenomenological study and attempts to describe participants' perceptions, perspectives and understanding (Goosen & Mukasa-Lwanga, 2017a). The study followed the interpretive qualitative design approach. Therefore, the phenomenological design was preferred using interviews so that participants would share details of their experiences in teaching. The interviews took place in either the office of the lecturer or a convenient location. With the permission of the lecturer concerned, the interview was recorded using the researcher's smartphone, and the researcher also made notes during the interview. In order to address the research question, the researcher used an interview protocol for guidance during the interviews with the participants. This is in line with Vogt, Gardener and Haeffele (2012) when they outline aspects of conducting interviews according to the following guidelines:

- when in-depth exploration of participants' meanings is a key part of the research question;
- when a researcher can gain access to informants willing to talk about points to answer the research question.

The interview questions, notes taken during the interviews and the recorded interviews all formed part of the data-collection techniques relevant to the research problem. Information was gathered from the explanations and views of the lecturers selected.

3.4.2 Triangulation Design

Triangulation is the use of multiple methods mainly qualitative and quantitative methods in studying the same phenomenon for increasing study credibility (Hussein, 2009). The same researcher further states that data triangulation, as one of the types of triangulation, renders the use of multiple data sources in the same study for confirmatory, completeness and validation purposes (Hussein, 2009). In this study, a triangulation design strategy was used to help increase validity. Lecturers' perceptions were established through triangulation – that is, qualitative interviews were combined with quantitative data to gather opinions. A combination of the two research methods formed part of the interview protocol which provided information on lecturers who use *my*Unisa technologies, how these technologies are used and the frequency of use. This information enabled the researcher to make comparisons based on the provided quantitative data and the gathered lecturers' qualitative information from the interviews. This was in line with the findings from the research study of Maree and van der Westhuizen (2007) stating that several resources have to be employed for comparing findings with each other for ensuring internal validity of qualitative research.

3.5 Population and sampling

A population is an entire group from which some information is required for research purpose. This research is a single-site study in the SoC, one of the schools in the College of Science, Engineering and Technology (CSET) at the University of South Africa (UNISA, 2010), which offers online and open distance learning and therefore draws its student population from all over the world (UNISA, 2010).

The primary data reported on in this study comprise the quantitative data for the 30 modules for which there were comparative performance data for a period of six years, from 2005 to 2010. The target population was comprised of 75 permanent academic staff members. These staff members were junior lecturers, lecturers, senior lecturers, associate professors and full professors.

A sample is a part of the defined population, implying that a sample is a subset of the population. A sample of 13 lecturers from the population of 75 lecturers participated in this study. Unfortunately, three professors responsible for some of the modules in question were

working from home at the time and could not be reached for interview purposes. One senior lecturer had resigned and was not available for an interview. Therefore, 13 lecturers (76%) were available for interviews, and 4 lecturers (24%) were not available.

Lecturers are university staff entrusted with the students' academic performance. They set both assignments and examinations as a means of evaluation and rating of performance. Lecturers interact with students through e-mails, telephone calls and one-on-one interaction with some students who are able to come to their office.

Lecturers, through discussion forums, supported their students by using online collaboration through *my*Unisa. This was why lecturers were thought to have ideas on how to use available technology for improving the performance and throughput rate in the SoC in an ODL context. The lecturers' perceptions about their students' performance abilities were therefore of great value to this research**.**

3.6   Data Collection

Data is the information researchers collect in order to answer their research questions (Court, Seymour, Riecken, Abbas, & Le Tran 2017). Therefore, data collected has to be relevant to yield crucial results for the research study. A mixed research methods approach was used in conjunction with a phenomenological design that used personal interviews as a data collection technique. Data collection instruments included the completed questionnaires (Annexure A) and the interview protocol (Annexure B). The data used in this research were both the quantitative data from the institution and the qualitative data from the interviews.

Quantitative data were obtained from the UNISA website for Department of Institutional Statistics and Analysis (DISA) – the department name was changed later. Permission was sought and data obtained were arranged in table form (Table 4.1). The quantitative data in Table 4.1 included a list of the 30 courses mentioned above and the performance rate in each course for the six years (2005-2010) under investigation. The performance rate per course is expressed in percentages and is referred to as the gross survival rate. Comparison of performance rates per year for all the courses was made and included in the table as rankings. Performance rates for each course for the six years were compared and the averages were presented in the average column. Averages for the 30 courses were compared and given rankings. The frequency of using *my*Unisa technologies by each lecturer was referred to as

*my*Unisa usage and was indicated in the respective column. Rankings were also made for the *my*Unisa technologies usage and were reflected in the last column of Table 4.1. These quantitative data were of an institutional nature, containing the pass rates for the 30 modules for the six-year period under study. More quantitative data used in the study were obtained from *my*Unisa website and were included in the interview protocol that was drawn by the researcher. The data were included in the table with *my*Unisa usage by each lecturer showing how many times the different *my*Unisa technologies were used per course during 2010. This information was given as event count in one column (Annexure B). During the interviews, quantitative data taken from *my*Unisa about lecturers using various *my*Unisa technologies and the frequency of use were discussed with each of the lecturers concerned.

The data collection technique used in this study was the use of open-ended interview questions. Data collection technique of using interviews provides a researcher with an opportunity to deepen the discussion with the participants (Bengtsson, 2016). This was face-to-face interviews and was the choice of the researcher because at the time the researcher was working in the SoC and some of the advantages were convenience, no transport costs would be involved and it would be easy to secure interview appointments with the lecturers. However, according to Oltman (2016) there are some disadvantages associated with face-to-face interviews, like confidentiality may be compromised, availability of time for respondents and the geographical distribution of respondents. These disadvantages were minimised in this case, because there was a written undertaking and participants were guaranteed confidentiality, the time spent on interviews was limited to not more than thirty minutes and the travelling was not a problem because lecturers would still have to come to work as usual.

The lecturers were all qualified professionals in the field of computing. Since lecturers were assumed to be aware of the performance or non-performance on their specific modules, the interview protocol was designed to establish how the lecturers made use of *my*Unisa to improve the pass rates for those modules. Similar data collection and sampling techniques were discussed in the research conducted by Mukasa-Lwanga and Goosen (2014). A table containing detailed information on lecturers that made use of *my*Unisa, the various technologies used, when used, and the frequency of use, was drawn up, with two columns

containing detailed descriptions of the lecturers' ODL working context and usage of each technology (event) for improving the pass rates for the modules that they teach. A semi-structured interview protocol was developed and data were gathered as shown in annexures A and B. Each lecturer responsible for an applicable module was given annexure A for the biological data to complete and Annexure B was used for recording responses during the interview. These two annexures were separated because annexure A was standard and each participant would fill in personal information. Annexure B was customised according to the modules taught per lecturer. Also, because the interview questions were based on the research questions, there was adequate space for the participants' answers and observations on Annexure B. The researcher was subjective and closely engaged with the participants during the whole data-collection process. 15 minutes were allocated for interviewing each lecturer. An appointment was secured with each of the lecturers (respondents) concerned. Each lecturer first completed annexure A concerning biographical data, including gender, age, highest academic and educational qualifications and experience with using *my*Unisa technology. Only the biographical data (Annexure A) was completed by the lecturers but all the information in Annexure B was covered during the individual interviews.

The researcher collected data through taking notes whilst recording. Interviews were conducted and the responses were both noted down in writing and recorded on the researcher's smartphone. The recorded interviews helped to capture details that might have been missed during note-taking. Recorded interviews and notes taken were compared during transcription to ensure that the data were valid and reliable. Some limitations were expected in the sample selection, such as the following:

- Differing experiences with a module, as the lectures may not teach the same modules every year.
- Variations in students' performance, due to the level of the module offered (Raza, 2008).

3.7   Validity and reliability of data collection

Validity and reliability are crucial aspects of a research study. A variety of strategies were used for enhancing the validity, since the research design combined qualitative and quantitative data, including the extent to which interpretations and perceptions had a shared meaning between the respondents and the researcher.

The system generated quantitative data used in this research was from a secure managed and monitored institutional system. Heale and Twycross (2015) state that quality in a quantitative study can be measured by reliability or accuracy of the instrument. Extraction of data from the institutional system would consistently generate the same data if the same enquiry was applied. Data was considered to be stable for this study and the extracted data was specifically reliable for the stipulated period of the research study. Lueng (2015) postulates that reliability in quantitative research refers to exact replicability of the processes and the results. McMillan and Schumacher (2010) agreed that validity in quantitative research includes issues of reliability.

In terms of qualitative data collection, Maree and Van der Westhuizen (2007) raised the argument that the intensely personal participation and comprehensive replies from participants capture adequate levels in terms of validity and reliability. As stated by McMillan and Schumacher (2010), the researcher had the qualitative data analysed independently by another more experienced researcher who had not been involved in obtaining the data - this was one method of enhancing the validity. Validity was further enhanced through consulting an expert researcher on the questions used. Detailed descriptions regarding respondents and their ODL working contexts also facilitated external validation. It therefore follows that triangulation-design strategies are critical for helping facilitate increased interpretive validity (McMillan and Schumacher, 2010).

Reliability with regard to qualitative studies can be regarded as findings being consistent with data collected (Maree & Van der Westhuizen, 2007). Grossoehme (2014) states that the reliability of qualitative research lies with consistency. An appropriate sample of participants was selected from the population of qualified lecturers and the description of how the interviews were conducted addressed the authenticity of this study. Connelly (2016) had the same sentiments in his qualitative medical research study. Dimensions towards reliability were therefore ensured throughout this research study. Reliability was also ensured by triangulating data and paying attention to establishing and increasing data trustworthiness. The research strategies implemented allowed lecturers' perceptions to be analysed through data triangulation across inquiry techniques. This provided mechanisms for mutual support between qualitative data obtained from the responses during the semi-structured interviews and quantitative data gathered. Thus research results were consolidated by considering both of these perspectives in combination. This enabled the researcher to verify the degree to which assumptions based on qualitative information were

reinforced by quantitative perspectives, or the other way around. One such assumption was that the lecturers of the SoC have information about students' performance or non-performance in the specific courses.

Trustworthiness in qualitative research is planned ahead of time with a protocol (Amankwaa, 2016). In this respect, the researcher noted the date and time interview meetings were held with each participant. Once an agreement was reached on the descriptive data collected, results were compared and integrated to obtain a full representation of how lecturers use *my*Unisa technology for improving throughput in an ODL computing context.

3.8   Data analysis

Mixed method analysis requires analysis of both quantitative and qualitative data. In such a case, the intention of using quantitative methods is to achieve breadth of understanding and with qualitative methods is to achieve depth of understanding (Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2015). The analysis using both methods depends on the aim of the research study.

Approval was granted by DISA to access the quantitative institutional data through the website where a username and password were used. An Excel template was used to record all the required information (Table 4.1). Accessed quantitative data was extracted according to the information that the researcher needed to assist with answering the research questions. The extracted data set had to be suitable for the objective of the study. A response to the primary research question, regarding how lecturers in the SoC use technology for improving throughput/pass rates, was guided by creating a table containing a column listing the 30 modules under investigation and another column on *my*Unisa usage which showed the frequency of usage of the *my*Unisa technologies per module by each lecturer in 2010.

A response to the first sub-question, regarding the pass rates for selected SoC modules in a specified timeframe, was covered by creating columns from the year 2005 to 2010 and recording pass rates for each year in the respective column. These statistics were compared with the interview responses of the participants to enable proper analysis. More quantitative data was extracted from *my*Unisa and combined with the interview protocol. This is reflected on Annexure B in number 11. The technologies used were recorded in a table with the list of modules, lecturer's name per module, the date *my*Unisa technology was accessed

and the number of instances when the lecturer used the technology was recorded as event count. This was part of the interview protocol.

The choice of data collection methods affects the depth of the analysis (Bengtsson, 2016). Responses to the interview questions were written on the interview protocol by the researcher. Predetermined themes of how the lecturers used *my*Unisa for ODL and how they used it for increasing pass rates on their specific modules were both reflected on the interview protocol. De la Croix, Barret and Stenfors (2018) support this notion saying that semi-structured interviews with questions to address pre-determined themes can be used whilst participants are allowed to follow their line of thought during the interviews. On the interview protocol there were also a number of technologies referred to as events, extracted from the quantitative data, indicated by each lecturer's usage of the *my*Unisa system. The interview protocol was designed to explore the respondents' responses regarding the use of *my*Unisa technology for improving performance, pass rates and throughput rates of the SoC in an ODL context. Data were analysed by coding, organising and combining related information into themes and categories (Brazeley, 2009).   Responses to the interview questions were recorded in any of the two columns where they befitted most. During transcription, the audio information was compared with the written response to ensure validity and reliability. During the interview sessions, each lecturer was asked about how he/she used a particular technology for each stated theme - that is, how the event was used for ODL and how it was used for improving the pass rate of the module. During the data analysis, similarities and differences in the lecturers' responses were identified and likened to information stipulated in the literature review.

During data analysis, performance rankings and the frequency rankings for *my*Unisa usage in Table 4.1 were compared with the interview responses of the lecturers to ascertain the effect of using technology on the pass rate of each module. Correlations (Table 4.10) were used to obtain the relationship between the 2010 averages and the *my*Unisa usage.

3.9 Ethical issues

A letter seeking permission to carry out research in the SoC was forwarded to the then director of the School, after personally briefing her on the intended study. The researcher

was then granted permission from the director to interview the specific participants and to proceed with data collection (Annexure C).

An ethical clearance to proceed with the study was sought and granted from the Ethics Committee of the university through the Institute of Science and Technology Education (ISTE).

The lecturers were informed that participation in this particular research would be of a voluntary nature, and that the responses would be used only for the purposes of this study. They were also notified of the interview that would take about 15 minutes, and that the data would be used only for the purposes of academic research.

3.10   Summary of the chapter

This chapter described the research design and methods followed in the study. A mixed research method was considered appropriate, because it would suit the problem more than when either the qualitative or the quantitative methods were followed separately. The 30 courses were specifically selected because all the courses in the School were reviewed after 2010. This led to only the lecturers offering the 30 courses being interviewed, with some of them teaching two or more of these courses. It was anticipated that some challenges, such as the availability of lecturers, effect of the level of study on the students' performance, and variation of web-based technologies used by individual lecturers, would derail the achievement of the study objectives. The results of the interviews with the lecturers teaching the above-mentioned 30 courses are given in the next chapter.

CHAPTER 4

RESEARCH FINDINGS AND DATA ANALYSIS

4.1   Introduction

This chapter presents the analyses and findings of the study. The primary data of this research study were the quantitative data drawn from the institutional data. The institutional data used were data extracted from the institution's website to assist the researcher with meeting objectives of the study. The secondary data consisted of responses of the qualitative interviews. Data were analysed to identify, describe and explore how lecturers in the SoC make use of *my*Unisa technologies for improving throughput/pass rates. The findings were linked to the research questions that guided this research study.

4.2   Quantitative results

4.2.1   Quantitative institutional data

The quantitative data in Table 4.1 were obtained from records for the 30 modules from SoC for the period of 6 years. The term gross survival rate refers to the pass rates in percentages over the 6 years of the study.   The pass rates in percentages for the 30 modules were extracted from the records and presented in columns under the respective years. Average pass rates per module over the 6 years were calculated and presented in one column. The average for each module was ranked in comparison with the other modules and and the ranking was reflected in the next column. The usage of *my*Unisa technology by lecturers was given based on the 2010 activities. The term *my*Unisa refers to a secured UNISA website that gives staff and students direct access to information and other resources. The frequencies of access per module to *my*Unisa technologies during 2010 were extracted and recorded in one column. These frequencies of access to the *my*Unisa technologies were given ranks referred to as ranking in the last column. Data in this table were analysed using rankings and correlations.

Table 4.1: Gross survival rates and *my*Unisa usage for selected modules

Modules	\ Gross survival rate (percentages)										
Modules	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Ranking**	**Average**	**Ranking**	***my*Unisa**	**Ranking**
INF3E	70	65	61	56	63	80	1	66	4	23	9
COS3C	76	70	71	74	70	78	2	73	2	5	25
INF1A	60	42	57	53	77	77	3	61	8	9	19
COS2E	53	52	64	62	55	72	4	59	11	20	10
IAD3A	41	55	39	17	21	71	5	41	23	4	26
INF3J	77	74	70	73	78	70	6	74	1	6	21
INF3D	59	62	58	62	70	70	7	63	6	15	14
COS3F	66	73	58	49	59	69	8	62	7	0	
INF1B	59	49	45	45	61	68	9	55	12	0	
INF3F	56	63	64	47	66	65	10	60	10	6	23
COS1W	45	46	43	39	59	64	11	49	14	74	6
COS2X	41	52	47	45	47	63	12	49	13	90	4
COS3Y	65	61	61	51	64	60	13	60	9	6	22
INF3G	40	44	53	57	38	60	14	49	17	103	1
INF3H	72	76	71	72	73	59	15	70	3	18	12
COS2C	71	71	54	71	59	58	16	64	5	13	17
COS2D	39	41	48	39	56	57	17	47	19	7	20
MNI2A	53	39	51	44	57	49	18	49	16	6	24
COS1S	38	44	32	34	42	47	19	40	24	98	2
COS3A	44	32	27	37	47	44	20	38	25	15	16
COS3B	55	56	37	32	36	44	21	43	20	0	
COS2V	40	41	46	38	46	43	22	42	21	18	13
IAD3B	16	45	51	54	43	43	23	42	22	40	7
COS3D	52	55	29	69	46	43	24	49	15	15	15
COS1V	33	29	23	29	39	40	25	32	28	20	11
COS2A	41	36	31	56	25	32	26	37	27	12	18
IAD2B	43	53	52	62	43	31	27	47	18	96	3
IAD2A	17	46	42	44	46	29	28	38	26	24	8
COS2F	22	12	15	17	25	24	29	19	30	0	
COS1U	33	32	32	18	18	19	30	25	29	82	5

The 2010 pass rate percentages, average pass rate percentages for the 6 years, and the frequencies of *my*Unisa technologies usage per lecturer per module were given rankings. It should be noted that the actual course codes are not indicated, but rather coded "pseudonyms", with COS indicating Computer Science and INF Informatics subjects, while the number indicates whether it is a first, second or third year course. Also shown is the average per course across the years indicated, as well as the number of times that the lecturers assigned to each course used various technologies on *my*Unisa. *my*Unisa is a learning management system which offers various tools to assist teaching and learning. The 2010 and average percentages, as well as the *my*Unisa technology usage, had been ranked, with, for example, "INF3E" ranked number one for 2010, as 80% was the highest gross survival rate. Note that although rounded percentages are given, the rankings are based on more decimal places than those shown.

4.2.2 Quantitative findings from the interviews

The population of 30 modules that formed the basis of this research study mapped to a complement of 17 lecturers, with some of the lecturers teaching more than one module. As reflected in the biographical data, 13 lecturers (76%) were available. This implies that the results are based on 13 lecturers. Table 4.2 shows that 8 of the lecturers, that is the majority (62%), were female, and 5 (38%) were male. The majority of the respondents were between 36 and 40 years of age (Table 4.3). The results in Table 4.3 revealed that there is no one younger than 36 years of age.

Table 4.2: Gender

Element	Number	Percentage
Female	8	62%
Male	5	38%

Table 4.3: Ages of the participants

Element	Number	Percentage
Younger than 36	0	0
36 – 40	6	46%
41 – 45	1	8%
46 – 50	3	23%
Older than 50	3	23%

Table 4.4: Highest academic qualifications of the participants

Element	Number	Percentage
Bachelor's degree	2	15%
Honours degree	3	23%
Master's degree	8	62%
PhD degree	0	0
Others	0	0

The results in Table 4.4 shows that 8 of the interviewees each had a master's degree as highest academic qualification, two bachelor's degrees and three honours degrees.

The results in Table 4.5 show that 4 (30%) of the interviewees had a Higher Education Diploma as a formal educational qualification. These were 3 lecturers with an honours degree and one lecturer with a master's degree. Apart from the Higher Education Diplomas, no participants had other educational qualifications.

Table 4.5: Educational qualifications of the participants

Element	Number	Percentage
PGCE	0	0
HED	4	30%
FDE	0	0
BEd	0	0
Others	0	0

Table 4.6: Experience of teaching in an ODL environment

Element	Number	Percentage
Fewer than 5 years	0	0
5 – 10 years	6	46%
11 – 20 years	6	46%
21 – 30 years	0	0%
More than 30 years	1	8%

Table 4.6 shows that most of these lecturers either had 5 to 10 years' experience or between 11 and 20 years' experience of teaching in an ODL environment, with only one lecturer having more than 30 years' teaching experience.

Table 4.7: Years of experience in using *my*Unisa

Element	Number	Percentage
1 year or less	0	0
2 years	0	0
3 years	0	0
4 years	0	0
5 years	4	30%
More than 5 years	9	70%

It may be observed from Table 4.7 that all lecturers had either five or more years' experience of using the *my*Unisa technologies.

At the time of this research study, the same lecturers were still teaching seven of the applicable modules. Although the module codes had been changed since 2010, the content remained largely unchanged. Most of the lecturers taught two or more modules. They were the primary lecturers responsible for the allocated modules during 2010 and had a secondary role in other allocated modules.

In Table 4.8, the number of responses is higher than the number of lecturers interviewed, because some lecturers were interviewed for more than one module that they had been involved with. The majority (six) of the lecturers interviewed had an average of between 100 and 250 students taking these modules per semester/year. Twenty per cent of the lecturers (including two programming lecturers) had more than 1000 students taking their module. As will be explained in the qualitative findings, student numbers had an effect on the lecturers' preferred technologies.

Table 4.8: Average number of students per module

Element	Number	Percentage
Fewer than 100	0	0
100 – 250	6	30%
251 – 500	5	25%
501 – 750	3	15%
751 – 1 000	2	10%
More than 1 000	4	20%

Table 4.9: Years of experience in teaching a particular module

Element	Number	Percentage
Fewer than 3 years	0	0
3 years	1	8%
4 years	2	15%
More than 4 years	10	77%

Only one lecturer had three years' experience in teaching one module, two lecturers had four years' experience in teaching their modules and the majority (ten) had more than four years' experience in teaching their modules.

As an example of what was discussed in the interviews, the primary lecturers of two or three modules chose to be interviewed on only one of these, because they used the same technology for all the modules.

4.2.3 Discussion of quantitative findings from the interviews

The data collected from individual lecturers were compared and integrated to obtain a full presentation of how technology is used in an ODL environment for improving the pass rate on each module in the SoC. The researcher is of the opinion that if the pass rate for every module in a programme is improved, it would improve the throughput rate for every study programme. Therefore, the researcher finds it necessary to discuss both the quantitative and qualitative findings. Below is the discussion of quantitative findings from the interviews.

Lecturer A, who had been teaching between five and ten years and had five years' experience of using *my*Unisa, was in charge of a second-year course (COS2V) with between 251 and 500 students. Kpolovie and Awusaku (2016) affirm that years of teaching experience affects the level of technology competence. In terms of the actual use of ***my*Unisa technologies**, lecturer A added two new **announcements** in the course of one semester under review. Four new **announcements** were added over a period of two semesters. According to the lecturer, sometimes **announcements** were supplemented with the use of **additional resources,** and the quantitative figures showed that she used them six times, inserting new contents and reading the contents twice. In two months of the second semester, the lecturer added new contents twice and read through the rest three times. It should be added that according to the quantitative data available from the university, the survival rate of this course was among the median.

A qualified computing lecturer B was assigned two third-year courses to teach. For the purpose of the interview, lecturer B preferred to be interviewed on one of these courses for which he had been the primary lecturer for more than four years. At the time of the interview, he was still teaching that course. During the first semester, lecturer B added four new **announcements**, and during the second semester, he added one new **announcement**. According to the records, he used **announcements** about ten times during 2010. He constantly (47 times, according to the recorded figures) checked under **additional resources** for the correctness and validity of study materials deposited on the system for the students. This is reflected on the system as **content.read**. According to the quantitative data supplied in Table 4.1, this particular course was slightly above the median in terms of the number of times that *my*Unisa technologies had been used. This course ranked among the top averages of results, although the 2010 results were the lowest

for this particular course for the six years under review. The course usually had between 251 and 500 registered students.

Lecturer C was in charge of COS1U and COS1V.   The two courses combined had approximately over 1 000 registered students. Lecturer C had over four years' experience of teaching the two courses as the primary lecturer.   According to the quantitative figures, during the first semester this lecturer added two announcements each on two different occasions, and during the second semester added one new announcement on two different occasions and revised them twice. COS1U was among the top rankings with 82 times of *my*Unisa usage and COS1V was among the median rankings with 20 recorded *my*Unisa usage.   Although COS1V had a survival rate of 40%, poor performance was rated for COS1U with a survival rate of 19% in 2010.   The general poor performance on these programming courses was well explained by the lecturer in the qualitative results given in the next section.

Statistics showed how lecturer D made use of various *my*Unisa technologies on her allocated three courses. During the first semester, she posted new announcements for the three courses on seven occasions and revised announcements on six occasions, while during the second semester she posted more announcements on eight occasions. Quite a number of additions to contents were made to the modules during the first semester. On one occasion, the lecturer for instance made 34 additions on two different days. She also read through those contents during both the first and the second semesters. Although the gross survival rate of the third year module (IAD3A) was among the highest in 2010 with a ranking of 5, poor performance was recorded for both second year modules with rankings of 28 for IAD2A and 27 for IAD2B. As will be noted in the qualitative results, the lecturer's intention was to improve module contents as a way of assisting to improve the pass rates on these modules.

Lecturer E had more than four years' experience of teaching module INF3H, and between 11 and 20 years' experience in teaching in an ODL context. She had also been using *my*Unisa technologies for more than five years.   During the first semester, she sent out two **announcements**, and on the same day revised another one. Among other efforts directed at improving the pass rate for her modules, lecturer E added new contents to the study material

five times during the first semester, and four times during the second semester. She also revised the contents once during the first semester and thrice during the second semester. In addition, she updated the website six times to attract more activities from students. According to this lecturer, the average number of students taking this module was between 751 and 1 000, making it one of the modules with a large number of students.

Lecturer F had more than four years' experience of teaching his module, which had a student number averaging between 501 and 750. The quantitative reports showed that lecturer F read the contents of the study materials as displayed on the website once during the second semester, and looked at the statistics on the module site on three different occasions. *my*Unisa usage of 6 had a ranking of 21. The survival rate for INF3J during 2010 was 70 per cent with a ranking of 6. This module had an average of 74 per cent with a ranking of 1 meaning it had the best average percentage mark.

The quantitative reports showed some of the instances when lecturer G made use of **announcements**. During the first semester, she added six new announcements on different occasions. At the beginning of the second semester, she looked at the site statistics for the module on two occasions. The aim was to improve students' performance on her modules, because the statistics would for instance give her an indication of the students' involvement with their studies. The usage of *my*Unisa technology for INF3G was 103 with a ranking of 1. The survival rate of COS2E was 72 per cent with a ranking of 4. Except for 2009, there was an annual remarkable improvement in performance on both of these modules, which tallied with the effort of the lecturer to improve students' performance.

Quantitative reports showed that lecturer H sent out new announcements ten times during the first semester and eight times during the second semester. During the second semester, she also revised the announcements twice, added new study contents 12 times on three occasions in different months. She read the contents of the module site, revised them ten times, and updated the module site in two different months on eight different occasions. She also looked at the statistics four times in two different months towards the end of the second semester. Although COS1U had 82 times for *my*Unisa technology usage putting its ranking among the top technology usage on the modules, the average ranking for 25 per cent was 29 and the 2010 survival rate of the module was 19 with a ranking of 30, that is, it was the

lowest ranking. Statistics revealed the lecturers' effort in trying to improve the pass rate although this was not fruitful as explained in the qualitative results.

Lecturer I had between 11 to 20 years' experience of teaching in an ODL environment and four years' experience of teaching module MNI2A, a managerial course with an average number of 100 to 250 students. Both the survival rate and the average were 49 per cent on this module resulting in a median ranking for both. *my*Unisa usage was 6 times with a ranking of 24. The lecturer expressed her disappointment in the performance of approximately 1% increase in the pass rate.

According to lecturer J, both COS1S and COS1W had more than 1 000 registered students, and COS2V had between 751 and 1 000 registered students. The lecturer had more than four years' experience in teaching these three modules. From the quantitative statistics, it was evident that lecturer J had the highest event counts for the use of **discussion forums**. During the first semester there were 36, and during the second semester 38 interactions with her students by way of the **discussion forums**. This was her way of helping students to prepare for the examinations. As shown by the records, during the second semester, lecturer J made use of announcements four times, read the contents of the module site two times, and added new module contents four times. Statistics show the extent of effort expanded by the lecturer through the *my*Unisa usage of 98 and 74 times on each module to yield rankings of 2 and 6 respectively. The gross survival rate for COS1W rose from 45 per cent in 2005 to 64 in 2010 resulting in an improved ranking of 11 for the module in 2010. Although CO1S was still low in performance, there was an outstanding improvement from 38 per cent in 2005 to 47 per cent in 2010 with a ranking of 19.

According to lecturer K, whereas COS2X had between 501 and 750 students, COS3Y had between 251 and 500 students. The lecturer had more than four years' experience of teaching COS2X, and two years' experience of teaching COS3Y. From the statistics, performance on COS2X was lower than COS3Y. Through more use of the *my*Unisa technology on COS2X (90) than COS3Y (6) by the lecturer, performance on the two modules was

remarkable in 2010 with the survival rate on module COS2X being 63 per cent and the one for COS3Y being 60 per cent.

Lecturer L had more than four years' experience of teaching COS2F, which had between 251 and 500 students, and had five years' experience of using *my*Unisa technologies. He had between 11 and 20 years' experience of teaching in an ODL environment. Performance on this module was very low, with gross survival rate being below 26 per cent every year, during the 6years under investigation. The average survival rate for the 6 years was 19 positioning the module at a ranking of 30, which was the lowest performing module. The lecturer's reasons for poor performance on the module were articulated in the qualitative results.

Lecturer M was only a secondary lecturer working under a primary lecturer for modules COS2E and INF3G. He mainly concentrated on assisting students through the *my*Unisa technology by using the discussion forums. He used *my*Unisa technology on COS2E 20 times and 103 times on INF3G. His use of technology on module INF3G had a ranking of 1 implying that it was the best ranking. The resulting gross survival rates on the two modules were 72 per cent on COS2E and 60 per cent on INF3G. This showed improvement in performance on the two modules in 2010.

4.3 Qualitative results

Qualitative findings were based on the lecturers' responses to questions addressing the two themes of how technology was used for ODL purpose and how it was used for increasing pass rates on the respective modules.

The examples of interview questions used to address the qualitative aspects of this study were:

- Which *my*Unisa technologies are you using to assist students taking your module?
- How do you use these tools?

Lecturer A

Lecturer A mentioned that she made a great deal of use of the **announcements** tool and e-mails. This was a second-year course, for which she was a primary lecturer. Lecturer A expected her students to revise the course work by using past examination papers. This lecturer also believed in using printed copies for effective studying.

Lecturer A helped to improve the pass rate for this course by, for example, telling students to check the **announcements** on *my*Unisa. As far as activities for this course were concerned, they included deleting some of the contents and reading through the rest. Lecturer A was also interviewed about a third-year course, for which she was an interim lecturer. She said that **discussion forums and announcements** were specifically used for this course. The secondary lecturer made frequent use of discussion forums in order to attend to students' queries as a way of improving the pass rate for the course.

Lecturer B

One of the male academics, lecturer B, was the primary lecturer for course INF3H and the secondary lecturer for course INF3F. Although there was some activity on the *my*Unisa usage for course INF3F, this lecturer preferred to be interviewed about the *my*Unisa usage for course INF3H, because he was the primary lecturer for that course and in that context could explicitly discuss his activities using *my*Unisa technologies. Being the primary lecturer for the course, lecturer B was heavily involved with using *my*Unisa technologies for ODL. Since this was an ODL environment, he particularly made use of **announcements** for sending students general messages such as reminders about due dates for assignments and corrections to documents that had been forwarded, and for informing students of the availability of examination results, etc.

Lecturer B said that he **used discussion forums** mainly for encouraging interaction among his students. He would initiate a discussion on a particular academic topic, after which the students would continue with the discussion, assisting or informing their peers about what they deemed to be right. Lecturer B specified how he used each tool for improving the pass rate for his course. He for instance used **announcements** for updating information relating to his particular course and reminded students of deadlines to ensure that assignments were submitted at the required time.

Since assignments count towards the year mark, by posting reminders about due dates the lecturer was indirectly urging his students to ensure that they hand in their assignment work for marking. Lecturer B would check all study materials posted for students of his module under **additional resources** to ensure that the information was reliable and valid. Although lecturer B would allow students to learn from each other through interaction on the **discussion forum**, he would sometimes follow students' discussions to give guidance and correct any mistakes. According to lecturer B, the pass rate could vary from year to year, depending on the type of students taking the course – sometimes there may be a number of brilliant students taking the course, and sometimes the performance may be poor, thus adversely affecting the pass rate. The lecturer confirmed that the current pass rate for this course was 60%.

Lecturer B specified that he did not use any **other *my*Unisa technologies**, but indicated that he used **other technologies** such as the short message service (SMS) for any urgent message requiring students' attention.

Lecturer C

Lecturer C was the primary lecturer for both COS1U and COS1V. COS1U was a pre-requisite for students to register COS1V. It was the lecturer's choice to be interviewed on the first course because she treated both courses in the same way. During the interview, lecturer C explained how she used various *my*Unisa technologies to help her impart knowledge to her ODL students.

The lecturer used **announcements** for clarifying assignment questions that might have appeared unclear to her students. She also used **announcements** to inform the students on how she expected them to submit their assignments for marking. **Announcements** were also used for notifying students about extensions for the submission of assignments, and about the availability of study materials and assignment solutions, etc, on the system. In general, the lecturer would use **announcements** for any administrative message requiring students' attention.

The two courses were programming courses, and according to the lecturer, the performance was generally poor, the pass rate usually being between 21 and 25%. Using *my*Unisa technologies, lecturer C made various efforts to improve the pass rates of the two modules.

Lecturer C introduced the use of a trace program as a better option. She also developed a tutorial for teaching registered students how to program. When the lecturer realised that the students were not using the programs intended to assist them with programming, she started using tutors to help interested students work through the programs. Students who tried out tutorials would be given solutions. Since the pass rate for this module was below 30%, this outcome can be related to the findings of Killen et al. (2003), namely that a lack of self-discipline and effort is one of the factors that have a negative effect on students' success in distance education.

Lecturer C affirmed that she also used other *my*Unisa technologies such as **discussion forum**, **additional resources** and *my***Unisa Admin Support**. She admitted that students mostly used the **discussion forum** for discussing the module with fellow students. She frequently checked on the forum to give guidance to the students using it. She also used **additional resources** for loading software required for her students. According to the lecturer, she would use the *my***Unisa Admin Support** tool to look up students' marks to help her compare performances in the assignments.

The other *my*Unisa technologies used by this lecturer were also intended for improving the pass rate of the two modules. Using the **discussion forum**, she would for example give her students emotional support and encourage them to continue with the module concerned. Lecturer C also used other measures to help improve the pass rate on her modules. She would for instance encourage students to e-mail her when experiencing a problem with one of her modules. The lecturer would forward previous examination papers and feedback to the students for practising. She found this practice more feasible than using the actual programming solution. She would also give feedback on marked assignments to avoid students making the same mistakes in the examinations.

Lecturer D

Lecturer D was a primary lecturer for three modules, namely IAD2A, IAD2B and IAD3A. She chose to be interviewed about the first-mentioned module, because she used the same tools for all three of her modules. Based on the concept of ODL, lecturer D would augment the module content using **additional resources**. She would use **announcements** to pass on any new information about the module. She regarded **announcements** as a means of bridging the communication gap between lecturer and students. Students would also be

informed of where to access or buy the prescribed books. Lecturer D regarded **discussion forums** as an important means of promoting interaction among students. As for other *my*Unisa technologies, lecturer D made use of **Frequently Asked Questions (FAQs)** whenever possible. At the time of the interview, this lecturer was designing **learning units** to be used when her modules were fully functioning online. The lecturer also wished to make use of **blogs**, but because blogs proved not to be popular among students, she abandoned the idea.

When asked about improving the pass rates for her modules, the lecturer stated that improving the module contents would also have a positive impact on the pass rate. The lecturer did her best to inform students about the availability of prescribed books, so that they would be more prepared for their studies. She assisted students by uploading a prescribed book on the system, which she believed, would give all students access to the book and would most likely result in improved performance.

Announcements were seen as a good means of communicating with students and **discussion forums** would eliminate the loneliness normally experienced by distance-learning students. During the second semester, lecturer D was much involved with the **discussion forums**, adding some, replying to others, introducing new topics for discussion and deleting one of the forums.

According to the lecturer, all the above-mentioned strategies were implemented to help improve the pass rate for each of the three modules.

Lecturer E

Lecturer E was the primary lecturer for module INF3H. This lecturer used mostly **announcements** for helping her communicate with the students registered for this module. To her, this was one way of using *my*Unisa technologies for ODL. She would for example use **announcements** for forwarding any information required by students before they had to submit their assignments. She would also use the **announcements** tool for forwarding any general information about the module.

Lecturer E also preferred using **announcements** for disseminating information to all students through the MyLife e-mail account. She saw this function as a way of improving the pass rate for her module and would thus alert students to pay special attention to a specific question included in an assignment.

Learning units, **self-assessment, podcast** and **discussion forums** were among the other tools that she would use for her module. While module INF3H covers database design and implementation, lecturer E was also responsible for programming modules, for which she mostly used the **learning-units** tool.

The lecturer created a **self-assessment** tool and would urge students to use it for individual self-assessment before sitting examinations. She would put past examination papers on this tool to assist students with self-assessment and they would simultaneously get feedback. The lecturer would use mostly **podcast** for difficult aspects of programming modules and would leave **discussion forums** for student interaction and interaction between e-tutors and students. According to her experience, the discussion forums were used mostly towards the end of a semester, when students were preparing for the upcoming examinations.

Although lecturer E had always used *my*Unisa technologies, there had not been any remarkable change in the pass rates on her module, which had always been between 45 and 53%.

Lecturer F

Lecturer F preferred encouraging student interaction using **discussion forums**. He would initiate various topics centred on the contents of the module and would then encourage the students to discuss these topics among themselves. This would lead to students sharing knowledge about the respective topics, thus giving them a sense of "togetherness" despite the ODL environment. Lecturer F would use **announcements** for forwarding reminders or information about due dates for assignments and any other information that he wished to communicate.

Other tools used by lecturer F were **additional resources**, **wikis**, **dropbox** and **learning units**. **Additional resources** would be used for informing students of vital information redirected through their e-mail account. **Wikis** were used mainly for student-group work, enabling students to either assist each other or request help from their lecturer. The lecturer preferred using **dropbox** because of its fast response time when compared to **discussion forums**. Lecturer F used **learning units** for making study materials and past papers accessible to students.

According to the lecturer, the use of all the above-mentioned tools would improve the pass rate for the module, because

- the students worked through the solutions early enough and shared their knowledge
- the students corresponded with fellow students and encouraged each other.

Lecturer G

Regarding the use of *my*Unisa technologies in an ODL context, lecturer G identified both **discussion forums** and **announcements** as her main tools for communicating with her students. She stated that because of some students not having access to *my*Unisa, she mostly made use of e-mails for relaying announcements.

Lecturer G explained some of her strategies for improving the pass rate for modules COS2E and INF3G, for both of which she was the primary lecturer and lecturer M the secondary lecturer. Activities referred to above were effected on both modules. Lecturer G made the latest information more accessible to students by uploading it on the modules' home page, and by forwarding very important communications to all students via SMS.

This lecturer also made use of tutors, who helped her forward assessment material to students and also gave the students feedback on their work. The above resulted in better performances, with students obtaining more than 60% in the examinations.

Lecturer G used other *my*Unisa technologies as well, but said that since her modules were not fully online, she did not use tools for assessment. The tutors would use **blogs** for giving students exercises for reflection and would respond to all blogs received from the students. A list of **Frequently-Asked Questions (FAQs)** drawn up would be used in a similar way. Students would also be encouraged to post questions on the **Questions-and-Answers (Q & As)** tool, where each question posted was required to be answered.

Lecturer H

Lecturer H explained how she used the various events for helping her students to effectively study in an ODL environment. She used **announcements** for informing students of any corrections made to forwarded study materials and for reminding them of the due dates for assignments. She also used the same tool to remind students of future dates for discussion classes and any other information that she wished them to be aware of.

Lecturer H used the **additional-resources** tool as a repository of work covered during discussion classes for future reference by students who could not attend, or by any other interested student. Examples of programming constructs were also deposited under **additional resources** to help students practise and improve their coding skills. Some of the tools were used specifically for improving the pass rate for the module: important information for revision, for example, was put under **additional resources** for easy access by the students. Because of the complex nature of this programming module, lecturer H would use tutorial letters to explain every line of coding as part of an effort to help students better understand the concepts.

Lecturer H would use the **discussion forum** for discussing past examination papers with her students. Students would also use the **discussion forum** for the necessary interaction with fellow students and for guidance from the lecturer. According to the lecturer, **discussion forums** could help improve the pass rate for the module as students would learn from each other and the lecturer would assist during revision discussions aimed at preparing students for the examinations.

Lecturer H would forward any urgent message to students via **SMS**, as this was a facility accessible to all students, whose frequent involvement in this regard would lead to improved performance in the examinations.

Another way of improving performance on the module was by way of learning activities in the **learning units**. Lecturer H would provide activities, and the students would work through them. Constant revision of such activities would lead to an improved pass rate for the module. The lecturer would also arrange meetings with either individual students or groups to assist them with any problem regarding the module.

Lecturer H would also use **e-tutors** for this module. Here are some of her suggestions for improving the pass rate by making use of **e-tutors**:

- I make a list of common mistakes made by students and ask the e-tutors to discuss these mistakes with the students on the discussion forums.
- I tell the e-tutors why students lose marks in the examinations so that the tutors can discuss with the students how to answer questions in an examination and how to achieve high marks by answering the questions appropriately.
- The e-tutors discuss essential programming functions with the students so that the students can learn to program properly and become more confident programmers.

- I am in constant contact with the e-tutors, who send me weekly reports on activities done with the students regarding the module.

Lecturer I

Lecturer I pointed out that generally speaking, students of this particular module were not very active on *my*Unisa. Some of the reasons mentioned here, were as follows:

- Internet access seems to be too expensive to be frequently used by students for study purposes.
- Students prefer working from printed copies instead of going online.
- The higher the level of the module, the less active students make use of *my*Unisa, because they are already familiar with the system and know how to access the required study information.
- By the time that they reach their final year of study, students are too busy to frequent *my*Unisa.

Lecturer I would use **discussion forums** by creating specific sections for encouraging dialogue on important matters such as assignments and examinations or any other essential study concepts requiring students' attention. This was done because the learning took place in an ODL environment and students had to be encouraged to work together and form learning communities. The lecturer would thus frequent the system to give guidance and assist students with any discussion topics that might seem to be difficult.

Lecturer I used a number of other *my*Unisa technologies to help students study in an ODL context, namely:

During the interview, she indicated that she would create **learning units** at the beginning of the academic year. She then realised that students preferred to use hard copies of study materials rather than the **learning-units** tool that proved to be expensive, as it required students to be fully online. The **learning units** would direct students to a **self-assessment** tool where their knowledge of what they had learnt would be tested automatically.

Lecturer I would also draw up a set of **Frequently-Asked Questions (FAQs)** on various topics such as examinations and other subject contents of the module, with answers to the questions also being available. At the beginning of the academic year, the lecturer would

use a **syllabus tool** as a repository for the syllabus, to be accessed by students registered for the module.

Lecturer I would use the **announcement** tool and attach files with important information for students that could be e-mailed directly to the students' account. She would also use the **dropbox** for giving feedback on students' portfolios submitted to her.

Lecturer I devised several ways to help improve the pass rate for this module. She would ensure that the **learning units** covered the contents of the whole syllabus. She would also clearly restate the benefits of studying this **syllabus** to make it easy for students to comprehend, and would prepare a **glossary** to clearly explain the terminology used in the syllabus. The **self-assessment** quizzes generated for revision purposes also helped to improve students' performance.

According to lecturer I, despite the above efforts there had been an increase of approximately 1% in the pass rate for this module.

Lecturer J

At the time of the interview, lecturer J was the primary lecturer for module COS1S, whereas during the period covered by this research she was the secondary lecturer. She was also the secondary lecturer for two other modules, namely COS1W and COS2V. She preferred to be interviewed about module COS1S, because she used similar activities for the three modules. UNISA being an ODL institution, lecturer J used mainly **discussion forums** and **announcements** for teaching her modules. The students were divided into study groups, using **discussion forums**, and she would give them revision questions on different study topics from the curriculum.

Messages concerning dates for video-conferencing sessions, making students aware of the registration function on *my*Unisa, and any other information that the lecturer wished to pass on to her students were also forwarded in the form of **announcements**. **Announcements** would also be used for informing students of corrections to be effected in study materials forwarded to them. **Announcements** would still be used for reminding students to participate in **discussion forums**. Gradually, assignment marks were to contribute a certain percentage towards the final examination marks, which according to the lecturer helped to improve the pass rate on her modules. The lecturer would first include simple examples in

study guides, and would later add more difficult ones to help students gain better understanding of the module work. This was also a way of trying to improve the pass rate on the modules.

Lecturer J used various other *my*Unisa technologies for helping her teach specifically in an ODL environment, and for improving the pass rate for her modules. To help her students master the symbols used on the modules, she would put them under **additional resources**. **Video-conferencing** sessions would also be put under **additional resources** for the use of all students, especially those who had been unable to attend the sessions. The **MyLife tool** was used by students for contacting the lecturer, and **podcast**s contained **discussion classes** converted into videos, helping students to revisit the recorded classes for revision purposes.

Lecturer K

Lecturer K was involved with two modules: COS2X, for which he was a secondary lecturer, and COS3Y, for which he was the primary lecturer. Since he used similar *my*Unisa functions for the two modules, the interview responses provided applied to both of them. In the ODL environment, lecturer K would for instance use mostly **discussion forums** for the necessary interaction between him and his students. He used this tool more often than any other tool, mainly for introducing topics to the students. He interacted with students through question-and-answer sessions and encouraged them to ask questions so that he could give them in-depth explanations.

Lecturer K did the following to improve the pass rate for his modules:

He encouraged his students to participate in **discussion forums**. He would also go through past papers with the students and would give them answers to assignments so that they could learn the correct and expected ways of answering examination questions.

The lecturer used **announcements** for any supplementary information that required students' attention. He would ensure that the students focused on their studies by sending regular reminders about deadlines and any other important information through **announcements**. This was another way of communicating with students in an ODL environment. Under **additional resources**, the lecturer would put **videos** containing in-depth explanations of certain concepts. He preferred using videos because he believed visual aids would be more understandable than information posted on **discussion forums** and in **announcements**.

Lecturer L

Lecturer L considered **discussion forums** as important for student interaction in an ODL context. The lecturer preferred students to discuss study questions among themselves with him giving guidance when necessary.

Module COS2F was a programming module with a very low pass rate of below 50%, which led to the lecturer being required to submit improvement plans on a yearly basis. The lecturer tried to improve the pass rate by writing supplementary study materials and sending out weekly **announcements**. Through the announcements, the lecturer thought to encourage student participation and remind students of set deadlines for their study activities. He was of the view that the arrangement would help the students to study effectively and would improve the pass rate.

After a great deal of effort, this intervention did not yield the expected good results. The lecturer believed that instead of being a semester module, it should have been structured to cover the whole year to give students adequate time to practise programming and the lecturer would have ample time to fully cover the curriculum.

Lecturer M

Lecturer M was a secondary lecturer for the two modules of which lecturer G was the primary lecturer. He had three years' experience of teaching these two modules. Lecturer M was mostly involved with **discussion forums** for both COS2E and INF3G as a way of assisting students in an ODL environment. His involvement with the discussion forums included answering students' questions, providing explanations with examples for difficult concepts and inciting deeper thinking by asking more questions. The lecturer saw this activity as one of his ways of improving the pass rate for the respective modules.

Among other *my*Unisa technologies used by lecturer M were the **Questions and Answers**, **Self-Assessment** and **Grade book** tools. The lecturer explained that with the **Question and Answers** tool he answered the students' questions, and that this interaction was then forwarded to the website to be used by all students. Questions for self-assessment were posted per chapter using the **self-assessment tool**, helping students to summarise the contents of each chapter. The **self-assessment** tool was linked to the **grade book**, where all

the students' marks for answering these questions were collected. The self-assessment practice helped students to review the learnt material per chapter, resulting in a better understanding of the concepts and eventually in improved pass rates.

4.3.1   Discussion of qualitative findings from the interviews

Here information gathered from the lecturers' responses to the interview questions are compared according to the two themes identified. The information is based on the various *my*Unisa technologies (events) used by lecturers for either promoting ODL or improving the pass rates for the modules in question.

- **Lecturers' perception of using *my*Unisa technologiess for ODL**

The lecturers' responses regarding the use of the ***my*Unisa announcement tool** revealed that all the 13 lecturers used this tool for communicating with students registered for the modules that they were teaching.

Lecturer A specifically referred to the fact that she used the **announcement tool** in the same way that a face-to-face lecturer at a residential university would announce in class that previous examination papers and/or their solutions were available for making copies. This lecturer, however, felt strongly that students could not study from a personal computer or SMS, but needed printed material in order to study effectively. Knowing that many students did not have money for printing out materials, and as part of her objective to improve the pass rate for this course, the lecturer e-mailed past examination papers to students. This practice was in line with the observations of Davis and Venter (2011), namely that some distance education students appreciate e-mails because that is their only way of communicating. By e-mailing these papers and solutions referred to in the **announcements**, she tried to help students who did not have access to the *my*Unisa technologies.   Since the module that lecturer C was teaching had a low pass rate of below 30%, she would use **announcements** for providing more information on assignments in case the students found the questions to be vague, and she would post any other administrative information required by students as **announcements**. Lecturer D would use **announcements** for informing students of new developments regarding the module. Lecturer F would for example use **announcements** for reminding students of forwarded e-mails so that they could check their inbox in time.

Lecturer J would use the **announcement tool** for requesting students to participate in the **discussion forums**. Lecturer K would forward communication on **announcements** and **discussion forums** to students' e-mails. This could be referred to as proper student support (Tait, 2003), which may help students make progress with their studies. As confirmed by Botha (2010), **announcements** and/or **discussion forums** on the course website as well as SMS can increase accessibility. Dreyer (2010) agreed that lecturers should try to keep in touch with their students electronically through *my*Unisa, using **announcements** and **discussion forums**.

The study also revealed how the different lecturers made use of the **discussion forums**.

Lecturers A and K were of the opinion that students should use **discussion forums** to help each other through discussions among themselves, with a lecturer providing guidance. Lecturer K reported that he used **discussion forums** more than any other tool. He, for instance, used them for introducing a topic to the students and interacting with them by answering their questions or pointing them in the right direction during their discussions.

Lecturer B would initiate discussions on topics that attract student interaction and students would discuss their study experiences with their peers. Through the **discussion forums** students could help each other solve their study problems. According to the lecturer, **discussion forums** were meant mainly for students interacting, solving problems and learning from each other. Lecturer B would further discuss previous examination papers for revision purposes.

Lecturer F would create topics for the **discussion forum** based on the contents of the module, and lecturer I would create specific sections, for example assignments, examinations, etc. She would then check whether the students had posted comments regarding difficulties with certain concepts, and she would advise them accordingly. Ferreira and Venter (2011) proposed the implementation of technologies such as **discussion forums** via institutional learning-management systems in order to provide new options regarding distance-education support.

Lecturer J used **discussion forums** for examination preparations by posting different topics or questions for discussion by study groups.

The **additional-resources tool** was used mostly for adding module content.

Lecturer D would use this tool for informing students about the availability of a prescribed book, or where to buy it. Currently she said that she used **additional resources** for uploading all tutorial letters.

Lecturer F would use **additional resources** for notifying students of any important information forwarded through e-mails, whereas lecturer I would convert the contents of learning units to PDF documents and put them under **additional resources**. Lecturer H also put some programming constructs under **additional resources**, plus any work covered during discussion classes. Lecturer J identified **additional resources** as the most active tool for her module – she for example stored there copies of video-conferencing sessions held during the semester and put symbols for use by her students.

Some lecturers appreciated using **learning units** while assisting students.

Lecturer E, for example, used **learning units** like an online textbook, and students could also download documents. Lecturer F put all tutorial letters, study guides and past examination papers online using the **learning units**, whereas lecturer H put a number of activities in the **learning units** for students to work through by applying what they had learnt.

There were other *my*Unisa technologies used by some lecturers, and not necessarily by all of them.

Lecturer C would use the *my*Unisa **Admin Support tool** for comparing performances in a particular assignment. Students could use a **questions-and-answers tool** for asking questions. These questions were updated frequently. Lecturer H usually gave self-assessment questions for every chapter.

Some lecturers made use of **dropbox**, but lecturer F used it for individual responses to students, and lecturer D for responses to study groups.

Although lecturer A conducted discussion classes through **video conferencing**, she found that students preferred face-to-face discussion classes.

Apart from the above-mentioned *my*Unisa technologies, lecturers also made use of SMS, tutors, podcasts and Facebook to assist students in various ways for different purposes.

- **Lecturers' perception of using *my*Unisa technologies for improving throughput rates**

The lecturers' responses to the question of how they used the various *my*Unisa technologies for improving the pass rate for their specific module(s) showed how each of them spent their time trying to improve performance.

As far as using **announcements** for improving pass rates was concerned, lecturer B stated that his students were always given the latest information about the module. This helped students to meet deadlines for handing in assignments. By communicating with his students through **announcements**, he also urged them to be responsible students. He further ensured that students knew what was expected of them by going through the contents of the study material. As part of increasing the pass rate for his module, lecturer B followed students' discussions to give them guidance where required. Lecturer E found the **announcements tool** very beneficial because the information put on there would go out to all students taking that module, using the students' MyLife e-mail account. Lecturer E believed in updating the website to attract more student activities. The assumption was that more updates would attract students to the website, thus making them more involved with their studies through the various messages posted by the lecturer. Lecturer I used **announcements** as reminders, and when students could not trace specific information through their e-mails, they could always get it from the **announcements**. Although during the interview lecturer I stated that she could not see any correlation between the pass rate and the use of *my*Unisa, she indicated that there had been little or no visible improvement in the pass rate for the module. According to lecturer K, reminders encouraged students to be more focused and they would concentrate on their studies. Lecturer F supported this statement when he reiterated that **announcements** improve communication with students and help students focus on their work. Lecturer K used **announcements** for reminding students of the due dates for assignments, preparations for the examinations and other important information about the module that required urgent attention. It was noted that although lecturer K used **announcements** for reminding students what they should have covered by the end of the week, that idea did not yield good results. Lecturer L would use **announcements** for

reminding students of their studies and for encouraging them to work through their tutorials in order to meet deadlines.

Some lecturers considered the use of **discussion forums** as one technique, which could enhance their students' performance. Lecturer B believed that students learn from each other and sometimes he joined the **discussion forums** for revision purposes and helped students to prepare for their examinations. Lecturer C used **discussion forums** to give her students emotional support and encouraged them not to give up. Lecturer K used **discussion forums** for discussing past papers with students, encouraging them to ask questions and giving in-depth explanations. He also gave them solutions to assignments so that they could compare them with their answers. Lecturer M made use of **discussion forums** as question-and-answer sessions where he asked questions to induce deeper thinking and students could ask more questions. He also explained areas that students found to be more problematic in nature.

Lecturer F considered the **learning-units** tool to be appropriate, as it was interactive and the contents could be upgraded immediately, thus improving students' performance. In addition, students could go through the solutions at an early stage and share knowledge by corresponding with one other. Furthermore, lecturer F focused on allowing students to discuss various topics. She designed a section where students could leave their contact details and create their study groups - for example, with students residing in the same area. She tried to answer students' questions and advised them about further reading. Some lecturers pronounced that **learning units** improved students' performance on their module(s). Lecturer H found **learning units** to be useful, because frequent revisions of the activities in this tool would improve students' programming skills. Lecturer I stated that **learning units** would lead to self-assessment. Self-assessment quizzes would then provide immediate answers, thus helping students revise **learning units** that were covered.

Lecturer A put past examination papers and solutions on **additional resources** for her students to use for revision purposes. Lecturer D used **additional-resources tool** to lead to more information that would enhance the studying of the module. She thought that if all students knew where to get the prescribed books, it would make it easy for them to prepare

for assignments and examinations. Lecturer H put any important information that would help students revise the module under **additional resources** and used tutorial letters for explaining every line of code in programming. Lecturer I believed that students preferred working from printed copies to going online, because they found it expensive to use the internet. Students would rather download information from **additional resources**. Lecturer J put videos under **additional resources** to enable students who could not attend classes to listen to what was discussed.

Lecturer F used wikis to group students for selecting discussion topics. This promoted team spirit among students because they would be assisting one another and could contact their lecturer only if they had problems that they could not solve.

From the interviews with various lecturers, it was clear that the lecturers were committed to increasing the pass rate on each module. Despite the lecturers' effort to increase pass rates, some modules still had poor performance and this outcome could be related to the findings of Killen et al. (2003), namely that a lack of self-discipline and effort is one of the factors that have a negative effect on students' success in distance education.

4.4   Document and system analysis

Quantitative data were presented in two documents. Data that was extracted from the system was put together in a spreadsheet for use during data analysis (Table 4.1). More data was part of the interview protocol (Annexures A and B). Two categories emerged from the data collected, the first relating to whether the course was a computer-science or an information-systems course, and the second whether it was a first, second or third year course. The relevance of the two categories was linked to the various technologies (events) that had to be connected to the two themes of promoting ODL and improving pass rates. Table 4.11 further clarifies this analysis.

An analysis in terms of the Pearson correlation between the percentages for 2010 and the average was a high 0.815, while the correlation between the rankings of these same columns was slightly lower, at 0.782. This implies that the gross survival rates per course across the time period under investigation were fairly consistent. The relative ranking of various courses, however, showed more variance – indicating that while a rate of 70% in 2010 would

correspond to a ranking of 6th or 7th in, for example, 2009, this same rate would correspond to a ranking of 4th or 5th, as the rates for different courses vary across the years.

Since the range for the number of times that *my*Unisa technologies had been used (0 to 103) was similar to that of the gross survival rate percentages (0 to 100), Pearson correlations were also completed across these variables – all correlation values obtained in this regard were negative (see Table 4.10). A way to explain this would be that for courses with relatively high survival rates less effort would be expected on *my*Unisa, and the other way around. These figures also support the researcher's assumption that lecturers, with high survival rates on their modules, spent less effort on the use of myUnisa technology.

Table 4.10: Correlations for 2010 and averages compared to *my*Unisa usage

	Numbers	**Rankings**
2010 compared to *my*Unisa usage (including no *my*Unisa usage)	-0.239	
Averages compared to *my*Unisa usage (including no *my*Unisa usage)	-0.259	
2010 compared to *my*Unisa usage (excluding no *my*Unisa usage)	-0.308	-0.409
2010 compared to *my*Unisa usage (excluding no *my*Unisa usage)	-0.371	-0.341

Table 4.11: Pictorial presentation of the data analysis
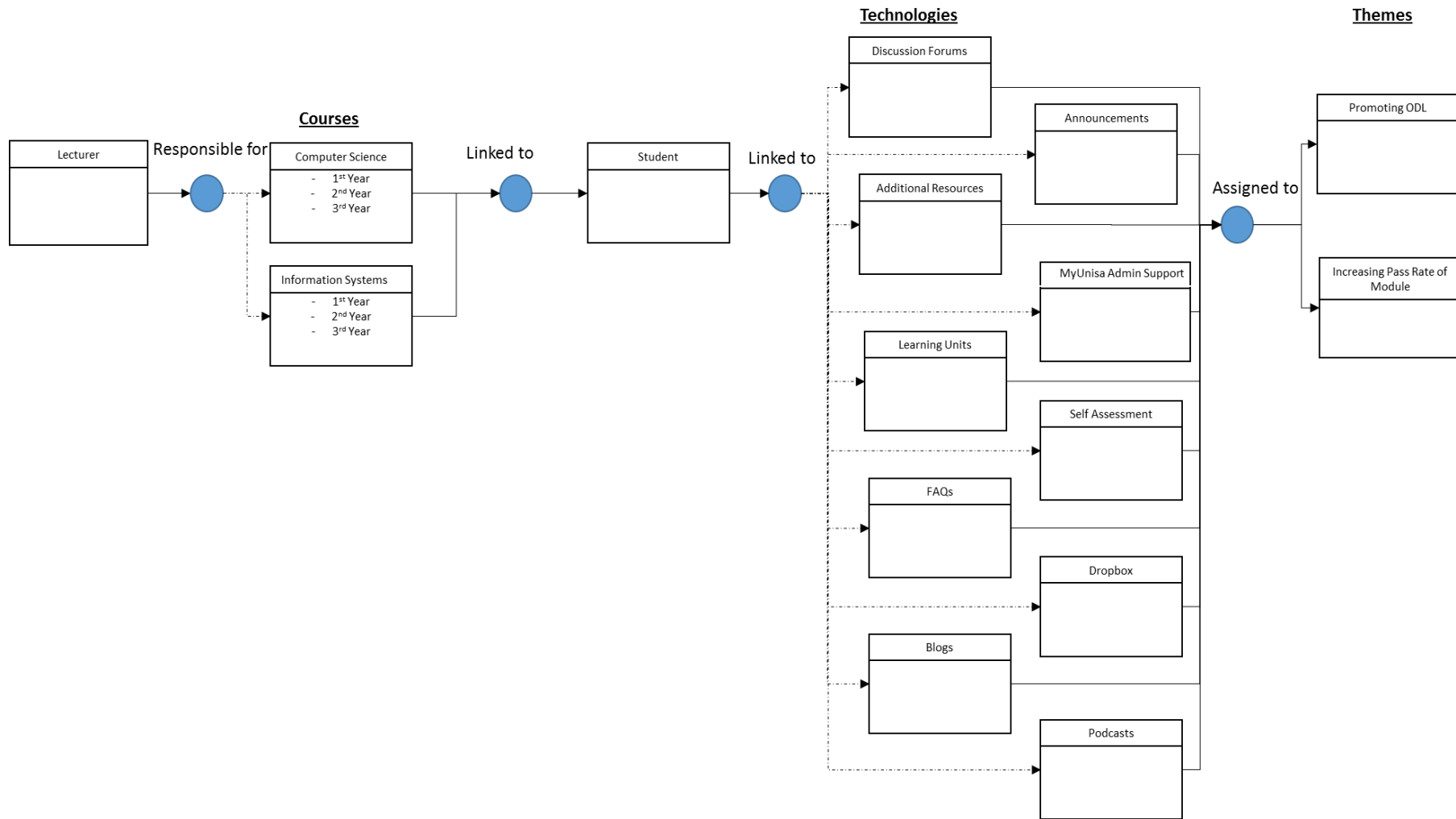
4.5   Qualitative data analysis

The main source of qualitative data for the study was from the lecturers' responses during interviews. The predetermined themes guided the formulation of interview questions used for this research study. Participants' responses during the interviews were linked to either the theme of using technology for teaching in an ODL environment or using technology for increasing pass rate on the applicable module. Thematic analysis used was to identify commonalities and differences in the interview responses. The thematic analysis was chosen, because it would assist with finding answers to the following research questions:

- What is the pass rate of the modules in SoC in 6 yers (2005-2010)?
- How did lecturers use *my*Unisa tools on these modules to improve throughput/pass rates in an ODL context?
- What are the challenges encountered by lecturers in using *my*Unisa for effective teaching?

The analysis included familiarisation with interview responses, transcription, and interpretation of the data. The researcher read the transcriptions to familiarise herself with the participants responses. Comparison of responses with the recorded interview data assisted with establishing accuracy during transcription.

The qualitative data obtained from interviews with the lecturers were compared with the quantitative data of previous years obtained from the institutional database. This comparison indicated how the use of *my*Unisa technologies helped improve the throughput on the modules under study.

From this study, it was noted that most lecturers with smaller student numbers on their modules preferred using **announcements**, **discussion forums**, **Frequently-Asked Questions (FAQs)** and SMS for assisting or communicating with their students. Lecturers with larger numbers of students seemed to prefer using **additional tools**.

For example:

> Lecturer E, with between 751 and 1 000 students on her module, stated the following: "Every year I copy a podcast from the previous year to the next year. But if a need

arises and I see that students are really battling with their work, I create a podcast and publish it on the *my*Unisa website." This shows how important it is to improve pass rates through systematic efforts directed by individual academics to their particular courses where underperformance is identified (Wang et al., 2008).

Lecturer F, with an average of 750 students for his course, stated the following: "I use wikis for group work – students are grouped and they select topics for discussions. In so doing, students assist each other and whatever problem they can't solve they are free to contact me and I solve their problems. I also use **dropbox** for individual responses to students as compared with the **discussion forum** where all students can discuss and if I give a response it's to the whole group."

Lecturer F also mentioned that he puts all tutorial letters, study guides and past examination papers online under **learning units**. According to this lecturer, using these tools had the following benefits:

- Students work through solutions early enough and share knowledge.

- Students correspond with fellow students and encourage each other.

- The **learning-units** tool is very good as it is interactive and the contents can be upgraded immediately, thus improving performance.

Lecturer J, who on average had over 1 000 students for her module, stated the following: "In addition to using **announcements** and **discussion forums**, I also use podcasts where I convert discussion classes into videos. I put videos on *my*Unisa under **additional resources** so that students who didn't attend the classes have an opportunity to listen to what was discussed." She further stated the following: "**Additional resources** is the most active tool for this module. Symbols used on the module are posted on **additional resources** to help students understand them better and I also use video-conferencing once a semester, and this is also put under **additional resources**."

The lecturer also revealed that she scheduled visits to UNISA centres in order to have discussion classes with her students. This was in line with the recommendation of

Wang et al. (2008), namely that academics provide specific learning methods for improving performance in their courses.

This was a first-year course, and the lecturer indicated that the pass rate for the module had risen from 47 to 55%.

4.5.1 Interviews

Qualitative data for this research study consisted of lecturers' explanations and views gathered from the interviews. The researcher organised the data to identify patterns, themes and categories in order to make comparisons and analyse the data. All questions asked during the interviews were to prompt feedback on these two themes:

- How *my*Unisa technologies were used for ODL.
- How *my*Unisa technologies were used to increase pass rates.

Tables 4.12 and 4.13 below show the similarities and differences between the lecturers' responses as identified during the data analysis. An analysis of responses was also compared with information obtained from the literature review.

4.5.1.1 Similarities

Table 4.12: Analysis of the lecturers' responses

	Technology (event)	Lecturer	Lecturer's comments	Literature
1	Discussion forums	A	Lecturer A used discussion forums to tell students to check what was announced on *my*Unisa. She stated that she was not very active on the forum – she thought that students should use it to help each other.	Student interaction involves either direct interaction, eg face-to-face interaction or e-mails, or indirect interaction, such as the use of discussion boards (Liu, 2008).
		D	Discussion forums were used mainly among students for discussing the module. The virtual group helped students not to feel lonely in the ODL environment.	
		E	Discussion forums were mainly for students and lecturer E would advise them to use the e-tutors' discussion forums so that it was a smaller group discussing specific questions.	
		H	Discussion forums were used mainly by students for interaction and advice, or for learning from/with each other, or for solving problems together, and lecturer H would join in to advise or give them direction. Lecturer H might also join in to help students prepare for the examinations.	

	Technology (event)	Lecturer	Lecturer's comments	Literature
2	Announcements	B	Lecturer B made use of announcements for sending out general messages to students - eg reminders about due dates, etc. These reminders were meant to help students take responsibility for their studies.	According to Yukselturk and Bulut (2007), interaction with peers and instructors play an important role in ensuring students' success.
		C	Lecturer C would also announce any extension of due dates for the submission of assignments.	
		F	Lecturer F would use this tool for reminding students about the availability and due dates for assignments or any other information that the lecturer would like to pass on. Lecturer F would also mention specific e-mails sent out to all students so that they could quickly check their e-mail accounts.	
3	Use of other methods	H	Lecturer H made use of the SMS facility because she believed that it was readily available to all students. She thus found it useful for forwarding urgent messages and reminders to students.	So and Brush (2008) affirmed that modern technology offers distance students several ways of interacting with lecturers/tutors and their peers, thus minimising the distance.
		I	Lecturer I mentioned that she preferred her students to use the dropbox for submitting their portfolios. She would then also use the dropbox for feedback on the portfolios submitted.	
		J	Using podcasts, lecturer J would convert discussion classes into videos to help students who had missed the discussions.	

From the analysis of the lecturers' responses, it was evident that most lecturers believed that it is important for students to use such events as **discussion forums** for interacting with their peers. This was seen as a way of forming learning communities to minimise the isolation experienced by ODL students. Mbatha and Naidoo (2010) confirmed these sentiments in their research when they stated that to minimise the distance in ODL, distance students engage with their peers by forming a learning community. Below are some of the remarks from the lecturers who were interviewed:

Lecturer A: "I think students should use it to help each other … ."

Lecturer C: "Discussion forums are mainly used by students to discuss the module with fellow students ... ."

Lecturer D: "The virtual group comforts students not to feel lonely in an ODL environment ... ."

Lecturer F: "The focus is mainly on students discussing various topics, sharing information and areas of interest."

Lecturer H: "Students are able to learn from each other and I may join to advise or give them direction."

The lecturers were also of the view that students have a pivotal role of mediating and controlling their learning. This view was supported by Koohang et al. (2009), in their research on e-learning and constructivism. Some of the lecturers' responses in connection with this view were as follows:

Lecturer C: "I now ask tutors to only give out solutions to those students who try out tutorials."

Lecturer E: "I'm sure all students on this module receive the announcements but I can't confirm that they all read them."

Lecturer K: "I give them solutions to assignments so that they can compare with their personal answers thus identifying their mistakes."

4.5.1.2   Differences

Table 4.13: Examples of differences of opinions in the lecturers' responses

	Technology (event)	Lecturer	Lecturer's comments	Effect on increasing the pass rate for the module
1	General comments on the use of *my*Unisa technologies for programming modules	C	• A trace program is used, which is a better variable program. • I also developed a tutorial for teaching programming. • Unfortunately, I realised that students do not use it. • This module has a poor pass rate - usually between 21 and 25%. In general, the pass rate is below 30%.	*my*Unisa is a useful tool for teaching programming, but it does not improve students' understanding of the programming concepts. Generally, the pass rate for this module is poor - below 30%.
		E	• I have always used these tools, but the pass rate is always between 45 and 53%. • I cannot say if there is any improvement, because I have always used these tools. • Since my modules are programming modules, I have to use the tools. • I have not seen any change since this diploma was introduced.	*my*Unisa tools are suitable for teaching purposes, but is not very conducive to learning how to program. There is no noticeable improvement, as the pass rate is always between 45 and 53%.

	Technology (event)	Lecturer	Lecturer's comments	Effect on increasing the pass rate for the module
	General comments on the use of *my*Unisa technologies for programming modules (continued)	H	• I give students a number of activities in the learning units on *my*Unisa. • Students work through the activities by applying what they have studied. • This offers students constant revision and improves their programming skills.	myUnisa technologies are good for both teaching and learning when used for revision of programming. The pass rate improved from 20% to 56% although at first this was a year module but changed to a semester module
2	Discussion Forums	B	• I use discussion forums mainly to initiate the discussion of topics/activities that attract student interaction with fellow students. • Students also start discussions with peers based on experiences with their studies. • Students may assist or inform each other regarding what they think is the right way of solving a specific problem.	Discussion forums are mainly used to encourage student interaction. Lecturer B offers guidance during discussion forums to improve students' understanding.

Technology (event)	Lecturer	Lecturer's comments	Effect on increasing the pass rate for the module
Discussion Forums (Continued)	I	• I try to create specific sections, eg Assignment 1, 2, examinations, etc. • I check if students post comments regarding problems with certain concepts. If they do have problems, I create an additional document or I send it out with the announcements. Then I advise the students accordingly.	Discussion forums are useful for both teaching and learning, as they make it easy for the lecturer to give feedback to the students. Lecturer I thinks that there is not much correlation, although the estimated improvement in the pass rate is about 1%.
	J	• I give students different topics to use for study groups, and also study guides and questions for discussion to prepare them for the examinations. • At the beginning of every week, I post questions for students to discuss. At the end of every week, I post the answers/solutions to/for the questions.	Lecturer J used announcements to remind students to participate in discussions using the discussion forums. This assisted students to gain high marks in assignments. Assignment marks contributed a certain percentage towards the final examination-marks, this led to improved pass rates on her modules.

As shown in Table 4.13, lecturers had varying strategies/approaches and opinions regarding the use of the available *my*Unisa events for meeting specific ODL requirements and improving the pass rate for their module(s).

From this research, it was evident that the lecturers recognised the need to improve the pass rates. Some lecturers mentioned new strategies introduced by them in order to improve the pass rates - for example:

> *Lecturer I:* "I try to create specific questions on the discussion forum and check if students post comments regarding their difficult experiences with certain concepts – if they have problems then I create additional documents … ."
>
> *Lecturer J:* "I put discussion questions for each academic week for students to discuss. I post answers/solutions at the end of every week."

One lecturer for a third-year module preferred wikis to discussion forums. He commented as follows:

> *Lecturer F:* "Wikis are used for group work – students are grouped and they select topics for discussions. In so doing, students assist each other and whatever problem they can't solve they are free to contact me and I solve their problems."

This research revealed that programming modules pose the biggest challenge as far as the improvement of pass rates is concerned. These were the opinions of different programming lecturers:

> *Lecturer C:* "I also developed a tutorial to teach them programming. Unfortunately, I realised that students do not use it. Poor performance is noticed on this module ... In general the pass rate is below 30%."
>
> *Lecturer E:* "I've always used these tools but the pass rate is always between 45% and 53% a year. I therefore can't say if there is any improvement ... ."

One of the programming lecturers seemed to have devised a fruitful approach:

> *Lecturer H:* "I give a number of activities in the learning units on *my*Unisa. Students go through the activities by applying what they've studied. This offers students constant revision and improves their programming skills."

4.6   Summary

Similarities and differences found in the lecturers' responses were identified through data analysis. The detailed information obtained from the interviews identified lecturers who made use of *my*Unisa, as well as the various technologies used, when used, and the frequency of use. The frequencies of the responses to each question were determined and the analysis of the responses was compared with the information obtained from the literature review.

Furthermore, from the gathered information, it would be clear whether lecturers who made a great deal of use of *my*Unisa had noticed some improvement in the students' performance. The rationale for and merits of this study were further justified in the light of the frequent changes in technology that lecturers in computing had to contend with, as detailed in the literature review. The fact that there were found to be various initiatives for assisting students through the use of various technological systems on *my*Unisa attested to the lecturers' commitment to improving the pass rates on their module(s).

The qualitative data obtained were compared with the quantitative data of previous years obtained from the university in order to indicate whether the use of technology had any effect on the throughput rate of the School. As was the case with Mbatha and Naidoo's study (2010), the results of this study could thus make a significant and original contribution regarding the emerging trends in, and the promotion and development of knowledge through, the use of technology for improving the throughput rates for modules taught by lecturers in computing in an ODL context.

This chapter presented the findings and analyses of this study. From the interviews with the lecturers it was discovered which *my*Unisa technologies were used for improving students' performance on the module(s) that they taught. The next chapter, chapter 5, contains a discussion of the recommendations and conclusion regarding this study.

CHAPTER 5

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1   Introduction

This chapter presents a summary of the findings from the results as presented in chapter 4, the subsequent recommendations for further studies and the conclusion drawn. Proper emphasis regarding the improvement of the throughput rate is accorded to the findings as a summary of the research study. The conclusion section is limited to the selected SoC courses in a specified period and how the academics made use of various *my*Unisa technologies for improving the performance in these courses. The recommendations section comprises suggestions for future research, based on whether there was improved performance in the courses concerned.

5.2   Summary of the study

The purpose of this study was to ascertain how lecturers in the SoC use *my*Unisa technologies to improve throughput in an ODL context. As explained in chapter 1, it is imperative for educational institutions to persistently improve the throughput rate for their study programmes. This study therefore focused on the changing roles of SoC lecturers as far as supporting their students using the *my*Unisa online technologies is concerned. To be more specific, a total of 30 courses formed the basis of this study, which mapped to a complement of 13 lecturers, some of whom being responsible for more than one course. Interviews with individual lecturers were conducted in their offices.

Both **quantitative** and **qualitative** research methods were used. **Quantitative** research studies concentrated on the data of gross survival rates for the selected SoC courses in a specified time frame, as reflected in Table 4.1. The gross survival rates for each course during the six years under review were ranked, first according to the survival percentage in 2010, and secondly according to the average survival percentage for the six years. Included in this table were the frequencies of usage by lecturers of the *my*Unisa technologies in the

selected courses. These frequencies were ranked from highest to lowest, as shown by the figures in Table 4.1.

Using the Pearson correlation, quantitative illustrations included an analysis between the percentages for 2010 and the average for the six years, resulting in an elevated correlation. With the help of this analysis, it was evident that for courses with relatively high rates, less effort would be expected on *my*Unisa, with the other way around being also true. However, in the latter case, the correlation between the rankings of the two columns was marginally lower.

Furthermore, the relative ranking of various courses during the individual years showed some inconsistency, resulting in the same rates being ranked differently - for example, whereas 64% was ranked 11th in 2010, the same rate was ranked 6th in 2009. Additionally, the range for the frequency of *my*Unisa technologies usage (0 to 103) was similar to that of the gross survival percentage (0 to 100) and the correlation values obtained between the two ranges were negative, as shown in Table 4.10.

A summary of the illustrative **qualitative** results of this study was organised according to the structure of the objectives. The study focused on this primary research question, namely: How do lecturers in the SoC use technology to improve throughput rate in an ODL context? The secondary questions that helped to explore the primary research question were as follows:

- What is the pass rate of the modules in SoC in 6 yers (2005-2010)?
- How did lecturers use *my*Unisa tools on these modules to improve throughput/pass rates in an ODL context?
- What are the challenges encountered by lecturers in using *my*Unisa for effective teaching?

To answer the above questions, data were gathered using a carefully-planned interview schedule. Individual interviews involved direct interaction with lecturers responsible for lecturing the 30 selected courses under study. Information was gathered on a one-to-one basis with the specific academics lecturing one or two courses on a first-, second- and third-year level. A questionnaire linked to the research questions was designed to explore the participants' responses to the issues of *my*Unisa technologies usage for improving both the pass and the throughput rates for the SoC courses.

According to the lecturers interviewed, there were several opportunities for using technology in an ODL environment. During the interviews, all lecturers mentioned how easy it was to reach their students using *my*Unisa technologies such as announcements and discussion forums. Dreyer (2010) also confirmed that increased accessibility is essential for ODL. Furthermore, one of the lecturers specifically stated that reminders forwarded to students using various technologies, for example announcements or the SMS, make students more focused and make them concentrate on their studies.

Some of the lecturers also indicated flexibility. For example, by using *my*Unisa technologies, one of the lecturers sent recorded videos of discussion classes to students who could not attend the scheduled classes by posting the videos under additional resources to be watched at the students' convenience. It was also specified that students who are not able to meet their lecturers depend on the *my*Unisa technologies for any necessary consultations. This is in line with the opinion of Dennen and Wieland (2007) that ODL eliminates space and time.

Two lecturers mentioned the prospects of addressing student loneliness by using discussion forums whereby students form learning communities. Mbatha and Naidoo (2010) also mentioned such engagement among students. From the interviews, it was evident that the use of technology by the lecturers brings about vital interaction among students, resources and lecturers, thus promoting participation and students gaining the ability to develop supportive relationships. Patterson (2009) further mentioned that shy and timid students could participate in the learning process by making use of ODL technology.

The lecturers' responses during the interviews confirmed the effectiveness of technology usage for improving the pass rate per course, consequently leading to an enhanced throughput rate. One of the programming lecturers devised a way of providing ample programming constructs supported with explanations for every line of code in order to help students gain a better understanding of the course. Wang et al. (2008) recommended such initiatives that helped improve pass rates. According to the lecturers interviewed, online technology facilitates learning in an ODL environment by enabling students to study their materials carefully and work through assignments and past examination papers. In addition, difficult topics could be discussed online using discussion forums.

From chapter 4, it is evident that the *my*Unisa technologies led to improved communication between lecturers and students. One of the lecturers for instance sent out reminders about the availability of study materials and due dates. Another lecturer affirmed that reminders

forwarded to students made them more focused and made them concentrate on their studies. Yet another lecturer emphasised the fact that she used the discussion forum to give support and encouragement to her students because of the low pass rate on the module. She also used additional-resources tools to load software required for her programming course.

The lecturers made mention of a number of ways in which the use of *my*Unisa and other technologies can improve the pass rate for their course. Some of the points mentioned by the lecturers are as follows:

- Lecturers can communicate with their students from an early stage - for example, as soon as students are registered, study materials can be forwarded to them using **additional resources**.

- Students can post any burning questions under the **Frequently Asked Questions** (FAQs) tool, and either e-tutors or lecturers attended to these questions. Students can also be advised about further readings, and past examination papers can be discussed through the **discussion forum**, thus improving students' understanding of the concepts.

- Lecturers can either inform students of addresses where prescribed books may be found or upload prescribed books on the *my*Unisa system. The latter way ensured that the books were readily available to all students registered for the specific module, helping students to easily prepare for the examinations because they do not have to look for books, either in the library or in the bookshops.

- As pointed out by one of the lecturers, the **learning units** technology was used as the main source of course information when a prescribed book was not available in the bookshop or too expensive to purchase by the students.

- One of the lecturers used **wikis** for group work, allocating different topics to each group. The students helped each other with the work, with the lecturer being available in case any further assistance was required.

- Another lecturer posted some programming constructs under the **additional resources** technology to give students more programming practice. In such cases, constant revision results in improved performance, especially in challenging courses such as programming.

- The *my*Unisa **additional resources** technology has the advantage of making all study materials forwarded to students available online, enabling the lecturer to check for correctness and validity and to ensure that students received updated information

about the course so that they could focus on the correct learning material when preparing for the examinations.

- To help students revise their work for the examinations, one of the lecturers posted various questions on different topics on the **discussion forum** at the beginning of the week, and then posted the answers to those questions at the end of the week.

- Another lecturer used **discussion forums** for discussing past examination papers with students so that these students could understand how such questions should be answered.

- Yet another lecturer used a **self-assessment** technology with self-assessment questions for students to review the material learnt, thus summarising each chapter and making it easy for students to understand and prepare for the examinations.

- Lecturers reminded students of the deadlines for the assignments by using **announcements**, **discussion forums**, SMS, etc.

- E-tutors, using **discussion forums**, assisted lecturers by helping students revise their work for the examinations.

- E-tutors, used **announcements** and **discussion forums,** also helped students with assessment activities. One lecturer who had tried this specifically reported an improvement in the pass rate for his course, with most students now getting above 60% in the examinations.

- A number of lecturers mentioned using the **SMS** for forwarding current information, for example about discussion classes to be held, causing students to get involved and being more likely to obtain a good pass mark in the examinations.

Using technology in ODL also has its challenges. So and Bush (2008), for instance, mention the physical separation that exists between student and lecturer or student and student. Although, as stated by one of the lecturers that this gap is bridged by the use of technology, there is still a lack of social interaction (Dennen & Wieland, 2007). Additionally, there are also feelings of isolation among students as pointed out by Andersson (2008), and more effort is expected from ODL students than from students at residential universities (Pretorius et al., 2009).

As pointed out by one of the lecturers, for students especially those from rural areas who struggle with printing, affordability is a problem. Purchasing a personal computer and

software may prove to be too costly for many because technology requires constant improvement; for example, the frequent upgrading of software.

ODL requires good time-management skills from students, who, especially the young ones, need to learn to prioritise and regulate their learning in order to succeed (Block, 2010; Ng, 2008). During the interviews, lecturers expressed the need for constant monitoring of student interaction on discussion forums to ensure that the interaction is primarily for learning purposes. Moody (2004) also mentioned the fact that students may not be technically competent and may require initial training in computer skills before commencing with their studies.

5.3   Recommendations and suggestions for further studies

SoC lecturers are qualified professionals in the field of computing, meaning that they are proficient in the use of technology. However, since each course presents its own challenges for the students, these challenges have to be addressed by the lecturer(s) concerned. Based on the findings of this study, it is recommended that one item for future research should be to find out what individual lecturers have to offer regarding the use of *my*Unisa technologies that will suit the needs of students registered for their specific course(s).

Two possibilities for further studies would be to investigate challenges encountered by ODL lecturers while using technology for assisting their students and to investigate challenges encountered by ODL students in a technology-assisted learning environment. Possible findings from these two studies may lead to university management interventions that may improve the situation and may help improve throughput rates.

5.4   Conclusion

This study was intended to find out how SoC lecturers use *my*Unisa technologies to improve throughput rate for the academic programmes offered by the School. *my*Unisa is an online learning-management system that offers a range of technologies aimed at maximising the collaboration between lecturers and their students. A comparison between the quantitative data from previous years and the qualitative data obtained from the interviews showed that the use of *my*Unisa technologies indeed improved performance. A good example was lecturer K who was in charge of COS2X. With reference to Table 4.1, this lecturer used *my*Unisa technologies 90 times and the survival rate on this module rose from 41% in 2005 to 63% in 2010.

As shown by the quantitative data, courses with a high rate of survival required less effort from the lecturers concerned than courses with a low rate of survival. Furthermore, as suggested by the findings of this study, lecturers whose course(s) had a low rate of survival had to make full use of e-tutors to help students make use of *my*Unisa technologies such as **discussion forums**. The use of *my*Unisa for those courses was ranked highly, indicating how much effort was put into improving the pass rate for those courses.

It was indicated by the lecturers that accessibility, flexibility and social intercessions such as interaction among both students and lecturers were some of the benefits of using *my*Unisa technologies, and indirectly had a positive impact on the students' performance, resulting in improved pass rates.

From this study, it was evident that most lecturers considered technology usage in an ODL environment as an effective way of improving students' success on their course(s). It was also clear that from the available *my*Unisa technologies, the academics mostly preferred using **announcements** and **discussion forums**. Almost all the lecturers mentioned the need for forwarding reminders to their students, finding ways of encouraging students to participate in the discussions and trying to control the discussions to prevent students using the discussion forums for discussing social events instead of their studies.

The findings suggested that students still needed to be more dedicated and control their learning, but that proper time management could hugely improve their performance. This finding was in agreement with what was stated by Koohang et al. (2009) and Schunk and Zimmerman (2008).

During the interviews, some lecturers raised concerns about the fact that some students had no access to the technology required. As stated by Quan-Baffour (2005), because many students come from rural areas, they should be identified as such by the lecturers concerned so that proper means of forwarding study materials to them can be devised. This would eliminate poor performance due to a lack of access to information by students from rural areas. The researcher is of the opinion that such students, especially students taking programming courses, should also be encouraged to use the computer laboratories at the Unisa regional centre nearest to them. Any upgrading of the computers at such centres is paid for by the university, so it would be cheaper for students to make use of those facilities. The above two options may help improve students' performance, which may lead to enhanced throughput rates.

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ANNEXURE A

Section A: Biographical data

1. Gender:

Female	1
Male	2

2. Age:

20 – 25 years	1
26 – 30 years	2
31 – 35 years	3
36 – 40 years	4
41 – 45 years	5
46 – 50 years	6
Older than 50 years	7

3. Your highest academic qualification:

B degree	1
Honours degree	2
M degree	3
PhD	4
Other (please specify)	5
………….……	

4. Your highest educational qualification:

PGCE	1
HED	2
FDE	3
BEd	4
Other (please specify)	5
………………………	

5. Experience of teaching in ODL context:

Less than 5 years	1
5 – 10 years	2
11 – 20 years	3
21 – 30 years	4
More than 30 years	5

6. Years' experience of using *my*UNISA:

1 year or less	1
2 years	2
3 years	3
4 years	4
5 years	5
More than 5 years	6

ANNEXURE B

7.   **Module code:** IAD2A _____   **8.** **Role:** PRIML _____

9. **Average number of students on module:**

Less than 100	1
100 – 250	2
251 – 500	3
501 – 750	4
751 – 1000	5
More than 1000	6

10. Years' experience of teaching this module:

1 year or less	1
2 years	2
3 years	3
4 years	4
More than 4 years	5

11. *my*Unisa usage by lecturer (2010)

Course Code	Person	Event	Month	Event Count	How used for ODL?	How used to increase pass rate?
IAD2A-10-S1	Lecturer D	content.new	10-Apr	2		
IAD2A-10-S1	Lecturer D	content.read	10-Apr	2		
IAD2A-10-S1	Lecturer D	pres.begin	10-Jun	2		
IAD2A-10-S2	Lecturer D	annc.new	10-Aug	6		
IAD2A-10-S2	Lecturer D	annc.new	10-Oct	2		
IAD2A-10-S2	Lecturer D	discussionforums.addreply	10-Oct	2		
IAD2A-10-S2	Lecturer D	pres.begin	10-Jun	4		

12. Are you still teaching this module? Y   N   **If yes, current role: ………………………**

13. Are you now using any other *my*Unisa technologies?

	Which?	How often?	How used for ODL?	How used to increase pass rate?
1	Blog			
2	Announcements			
3	Additional Resources			
4	FAQs			
5	Learning Units			

Which other technologies/tools are you using? ………………………………………………………………………………………

08th April 2013

Prof S B Buckley

The Director

School of Computing

UNISA

Dear Prof Buckley

Request for permission to conduct research in the School of Computing

I am a registered MSc (Computing Education) student with the Institute of Science and Technology Education (ISTE) at UNISA. The research I wish to conduct for my master's dissertation involves the use of technology by lecturers to improve the throughput rates in an ODL context. This research will be conducted under the supervision of Prof Leila Goosen from the School of Computing (SOC).

I am hereby seeking your consent to approach SOC lecturers to be the participants for this research study. Lecturers who will volunteer to participate in this study will remain anonymous and the information provided will be accorded the confidentiality it deserves.

My proposal and ethical clearance form were submitted and approved by the ISTE research/ethical committee.

Your approval to conduct this research study will be greatly appreciated.

If you agree, kindly sign below to depict your consent and permission to conduct this research study at the SOC.

Yours sincerely

T N Mukasa-Lwanga

Approved by:

PROF S B BUCKLEY

DIRECTOR: SCHOOL OF COMPUTING

23rd May 2013

DATE

TO WHOM IT MAY CONCERN

l, Aida Johanna Kuhnast, hereby declare that I did the professional language editing of

THE USE OF TECHNOLOGY FOR IMPROVING THROUGHPUT
RATES IN AN ODI- CONTEXT BY LECTURERS IN THE SCHOOL OF COMPUTING

by Theopista Nazziwa Mukasa-Lwanga,

submitted in accordance with the requirements for the degree of

Master of Science in Mathematics, Science and Technology Education in the subject Computing Education at the University of South Africa

(Supervisor: Professor L Goosen)

Name of editor AJ Kuhnast (Mrs)

Qualifications

BA (Languages — distinction in English Ill), HED

Completed the practical part of an MA degree in editing and translation (English) at the University of the Witwatersrand.

Experience

More than 40 years' experience in editing and translation (English) for the
Directorate: Language Services, Unisa

Referee

Mr R Sonntag (manager, Directorate: Language Services, Unisa, retired at the end of 2017)
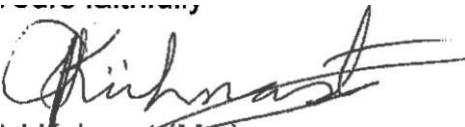
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Yours faithfully

AH Kuhnast (Mrs)

Signed at Centurion, on 9 February 2018