NAMIBIA UNIVERSITY
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DEPARTMENT OF COMMUNICATION

AN INVESTIGATION INTO THE CONTEMPORARY ENGLISH LANGUAGE NEEDS OF SECOND YEAR STUDENTS OF THE DEPARTMENT OF COMPUTER SCIENCE AT THE NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY

BY

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SUPERVISOR: PROF. HAILELEUL ZELEKE WOLDEMARIAM

03 March 2021

Declaration of original work

I, **Lazarus Gawazah**, hereby declare that the work contained in the thesis, entitled '**An Investigation into The Contemporary English Language Needs of Second Year Students of the Department of Computer Science at the Namibia University of Science and Technology'**, is my own original work and that I have not previously in its entirety or in part submitted it at any university or other higher education institution for the award of a degree.

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_____

Prof. Haileleul Zeleke Woldemariam. (Supervisor)

Dedication

In the words of my father

'Realise your opportunities because you are young. If I were young like you, I could have gone back to school but this time to become a pilot'. I miss you dad.

Acknowledgements

A message of gratitude to my role models:

Growing up, I did not have role models in the academic field. Role models are people that one would try to emulate. However, there are a few turning points that became significant in my life. When I was on a tour of Germany and The Netherlands in 2013, I met Prof. Christian Stangl, a Professor of Economics at Hochschule Heilbronn in Baden-Württemberg. I had a conversation with him where we stayed at the same hotel. I was curious to know what he does for work. He then told me that for him to be able to lecture at the university, he first had to work for 10 years in the industry to gain experience before he could be accepted to lecture at the university. I thought to myself that if he said 10 years, then I can also try. My only problem was that I did not have a degree in Art, Science or Economics like him. He then invited me on a tour of the University campus and his office (I liked his office), across campus and the cafeteria. There were many African students from Cameroon that he introduced me to. After about an hour, I bid farewell to him and went back to my hotel. I have not met Prof Stangl since that day but his encounter with him was a turning point for me.

When I returned to Namibia, I then met Ms Helen Vale whom I briefly told about my ambitions to apply at the local university. I always assisted her with carrying shopping bags to her car at a vegetable market in Klein Windhoek. She was very encouraging. I learnt that she had studied the same degree that I wanted to study. I was excited as she told me that she had taught English to undergraduate students at the University of Namibia for 16 years. Over the years, Helen Vale has given me free access to her personal library collection. She became a friend and a mother. Outside her mother tongue (she is British and I am a Shona mother tongue speaker), our common language of communication is IsiSwati, a variation of the IsiZulu and isiNdebele languages spoken in South Africa and Zimbabwe.

While I sat in class over a period of 6 years, I had the privilege to be taught by many distinguished professors and among them is my research supervisor, Prof Haileleul Zeleke Woldemariam. He is passionate about the academic development of his students. He told me that he spent a cumulative total of 28 years as a student in class for him to become a professor. I was very motivated. I give him credit for his immense contribution in teaching me

research methods and this includes statistics. Research is the yardstick that measures the success of every academic. It was for his contribution that when I was doing my honours degree, I graduated with a Cum Laude, and that is the highest achievable score awarded to a graduate student at NUST based on merit. This was the first time the award was being given in 17 years since the inception of the degree programme. Currently, my immediate need is to complete my PhD degree in Applied Linguistics, then I will cease to work as an assistant to professors or as a research assistant, but as a professor just like all my three role models. Because of these role models, I decided to make it a moral obligation to identify, recruit and assist with university applications and the enrolment processes of young people of school going age who qualify to enrol. I want them to graduate. With such a determination, I have never failed in this task; I have succeeded with several so far and for that I express my gratitude to my three role models.

My actions against gender based violence and the oppression of women

I decline to associate myself with men who use violence and raise their hand to beat women.

Retention and use of thesis

I, Lazarus Gawazah, being a candidate for the Master of English and Applied Linguistics Degree, accept the requirements of the Namibia University of Science and Technology relating to the retention and use of theses deposited in the Library. In terms of these conditions, I agree that the original of my mini-thesis be deposited in the library was accessible for the purposes of study and research, in accordance with the normal conditions established by the librarian for the care, loan or reproduction of mini-thesis.

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ABSTRACT

The contemporary English language demands for the information and technology (IT) industry are largely motivated by developments in modern digital communication technology. Modern computerised machinery with complex operational and installation manuals require high levels of literacy in all language skills as more and more machines are constantly being developed. It is for this reason that IT students need to be taught field specific English language courses that prepare them to perform well in their academic language related tasks and as future Computer Scientists. The purpose of this study therefore, was to investigate the contemporary English language needs for Computer Science students at NUST. The study determined the extent of the existing language needs and gaps. The material design model (Hutchinson & Waters, 1987) was applied as a framework for this study. The model assumes two aspects, the Target Situation Analysis (TSA) and the Present Situation Analysis (PSA). Target needs refer to what the learners need to do in the target situation for them to be able to learn. The Present Situation Analysis addresses students' lack in language proficiencies. A mixed methods study design was applied. The quantitative method analysed data using the descriptive statistics method while the qualitative method analysed data through explanatory means. A total study population of 170 (ΣN = 170) was studied. The sample size was (ΣS = 118) derived using the convenience sampling method. The data were collected using three mixed methods research instruments. An essay competency performance evaluation scale and two questionnaires were employed. The study findings revealed that there is a need to develop the essay competency writing skills for IT students. The students lacked the knowledge of technical vocabulary, which ultimately weakened their scientific arguments. They need to be taught field specific language courses as a way to prepare them for their current academic and future occupational language needs. Furthermore, the study revealed that there is a gap between what is currently offered to Computer Science students and the tasks that they are expected to perform in the IT industry. The study recommends the assignment of trained English for Specific Purposes practitioners to teach English for Science and Technology courses. IT students can be taught with examples of texts related to their field of study. Lastly, the study recommends that Computer Science language lecturers should be encouraged to use science related academic language in the classroom.

Key words

Needs analysis, target needs, English for Specific Purposes, ESP practitioner, language competencies, Computer Science

LIST OF ABBRIVIATIONS

AI	Artificial Intelligence
AVRs	Audio-Visual Resources
EAP	English for Academic Purposes
EBP	English for Business Purposes
EFL	English as a Foreign Language
EMP	English for Medical Purposes
EOP	English for Occupational Purposes
EScP	English for Scientific Purposes
ESL	English Second Language
ESP	English for Specific Purposes
EST	English for Science and Technology
EVP	English for Vocational Purposes
GPE	General Purpose English
LANA	Language Needs Analysis
LSA	Learning Situation Analysis
MRC	Machine Reading Comprehension
MTC Namibia	Mobile Telecommunications Company Namibia
NUST	Namibia University of Science and Technology
PCA	Principal Content Analysis
PSA	Present Situation Analysis
PVE	Pre-Vocational English
TSA	Target Situation Analysis

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CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Soon after Independence in 1990, the Namibian government introduced English as the "only official language of the country" (Buschfeld & Schröder, 2019, p. 334). The main reason was to create a formal break with the colonial legacy and to develop an international language that is relevant for business and education (Plonski, Teferra & Brady, 2013). As opposed to choosing German or Afrikaans, the English language represented Namibia's new independence that was meant to unify the country under a single language. This change in official language triggered the current needs related to English language learning in the Namibian schools as a vast majority of the population could not even speak English (Ola-Busari, 2014). In the last 30 years since Namibia's independence (1990-2020), the country would require English for specific purposes (ESP) models that are relevant to bridge the academic and occupational needs (Uys, 2017). The academic variety is the English that is needed for learning purposes in schools while the occupational variety is the English needed by workers in various industries ranging from reading manuals to speaking with international business partners (Evans, 2012).

While Mungongi (2018) identifies English language skills concerns raised by the Namibian government and employers in both the public and private sectors who were discontented with Namibian graduates employed in various sectors, one possible solution could be the compulsory teaching of English literature in primary schools and in all levels of secondary school education because it is viewed as a rich resource for language learning (Haimbodi & Woldemariam, 2019). The lack of proper training of the English language skills needed is detrimental to the success of an organisation. An example is that of the English language reading skills of a postal services employee who delivers parcels and lacks proper training in the language. Hypothetically, if a parcel is sent to the wrong address, the policy is to return it to the depot for resending, and by so doing the parcel is delayed by about two days. As a consequence, the owner of the parcel would call the depot only to be disappointed after being told that the parcel was sent to a wrong address. The customer may end up losing interest in the services of that particular postal service provider and would opt for a different service provider the next time. In this event, the postal service losses a customer because of

the lack of English language reading skills of an employee who is required to post parcels to the correct address. The employee would have been better equipped with the needed reading skills by taking an English for Business Purposes (EBP) course. A local Namibian study that investigated the causes of the underachievement of Grade 12 learners of English in the Oshikoto region revealed that the Namibian education system does not offer equal education between rural and urban schools because of socio-economic factors (Kamati & Woldemariam, 2016). The reasons identified in that study besides the socio-economic factors were poor teacher training of the English language, subject content, lack of the latest teaching methods, learner self-esteem and lack of motivation. The reason why in the example given above the postal services worker might be affected may emanate from the inequality in the socio-economic factors of the Namibian education system. Students who acquire their high school leaving certificates in rural schools are likely to be disadvantaged. Therefore, it was the objective of the present study to investigate the contemporary English language needs of Computer Science students at the Namibia University of Science and Technology. These students become workers of the Computer Science industry where they will be presented with matching practical English language challenges. The results of the study may reflect the current English language needs of science university students in the country considering that Namibia has been independent for the last 30 years.

1. 2 The importance of needs assessment in ESP

Needs assessment is the process of identifying existing gaps in ESP in order to come up with a solution to resolve these gaps (Jendrych, 2013).). The needs analysis identifies existing gaps in ESP to find a solution to these gaps. Deviations can be determined between the current situation and the desired result of the requirements. When studying ESP, it is important to carry out a needs analysis to determine and identify the students' lack of language skills (Alsamadani, 2017). In other words, Hutchinson and Waters (1987) proffer that the meaning can be explained by defining needs as "the gap between the learners' real needs and what needs to have taught them". This means that what the students must learn is determined by the need gap. Needs assessment can help the ESP practitioner to develop a course and identify the specific skills that students need to complete tasks. Students should be assessed so that the teacher may know the level of tasks that can be assigned to them to participate in

activities that enable them to understand and use language structures appropriately. An example of a needs assessment in medical terms is the kind of investigations that are conducted by a medical doctor. Samples are collected from a patient to establish a diagnosis. The doctor will then receive test results and finally prescribe the actual medication that is needed by the patient. It is similar with an ESP needs assessment where the ESP practitioner assumes the diagnostic role of a medical doctor while the learner is the patient. ESP practitioners or teachers identify the existing language gaps which the learner needs and then devise suitable tasks that can fulfil the learners' language needs.

The study of linguistics combined with techniques of computer science is a growing trend of English for Specific Purposes (ESP) in Africa and the global scene. The present study thus sought to demonstrate the practical application of the English for Specific Purposes (ESP) Materials Design Model based on the skills-centred approach by Hutchinson and Waters (1987), with the goal of assessing the needs of computer science students at the Namibia University of Science and Technology (NUST). The Materials Design Model's Target Needs Situation Analysis Framework (TNSAF) assumes two aspects: the target needs and learning needs. The current study applied both where necessary. The target assessment needs address the English language necessities, wants, and lacks as problems that respond to the three main objectives. Since an ESP model that is designed for computational linguistics is not available as commercial study material, the current study sought to recommend a suitable linguistic model that is relevant. On the other hand, the study attempted to expose the nascent interface between the discipline of applied linguistics and computer science. This was done by considering the fact that when the two disciplines are studied together they merge to become computational linguistics.

1.3 Statement of the problem

There is a mismatch between the English language skills that are delivered to students and what is required by the world of work in the computer science industry in Namibia. The ever-changing Information Technology industry demands more modern English language skills while the skills currently offered at most universities' Faculties of Science remain dormant. There are some new technological words that keep on coming into the mainstream of the English language vocabulary, most of which are less formal and less grammatical, and this

requires new strategies for coping with the ever-changing world of language (Peer, 2014). The highly formal structured traditional English language taught to university students has become stagnant, obsolete, and redundant (Means, 2017). As such, the needs of the students are not usually addressed. These problems require new strategies that can solve this kind of a mismatch. Study materials that were once used will no longer be relevant. In most cases new ESP materials are not usually available for commercial consumption and this requires new materials to be designed. Therefore, this study sought to assess how ESP can be applied to assist computer science students. There is a demand for ESP models that can address the needs gap between the current English language that is offered to computer science students at universities and what needs to be offered (Fadel & Rajab, 2017). An example is that of the English language needed in software development. Consequently, the current study was conducted to investigate the English language needs of second year undergraduate students studying computer science at Namibia University of Science and Technology (NUST).

1.4 Research objectives

Main objective

The main objective of this study was to investigate the English language needs of second year undergraduate students studying computer science at the Namibia University of Science and Technology (NUST).

Three specific objectives of the study are to:

- investigate the existing English language needs, gaps and challenges of Computer Science students at NUST;
- evaluate the English language mismatch between the academic and the occupational varieties; and
- determine the extent of the English language needs of IT students at NUST.

1.5 The significance of the research

Since the developments in ESP began in the 1960s following the industrial revolution, there is a new age of technological applications such as the digital 4.0 revolution, and as such there is a solid need to keep up with these changes (Maisiri, 2020). As it is in the aforementioned study, Language and ESP practitioners have the role to seek new discoveries and share their knowledge with other researchers across the world. ESP is a field of study that still has many areas to be studied and as such, future scholars could stand on this current study. The success of this study could benefit Namibian universities to distinguish between the general offering of English language courses to computer science students and the specific language skills that are needed. These specific English language needs can be used to bridge the gap between what is expected as the occupational variety that is useful in the IT industries and the academic variety that is currently being taught in universities.

1.6 Motivation for the study (Industry 4.0)

A plain study of linguistics leads linguists to only watch and get amused by the wonders that computer-based language analysis tools can perform (Gardner, 2021). Grammarly spell check, SPSS, N-VIVO and F5 transcription software are some examples that linguists usually depend on. These are also termed linguistics analysis software. Linguistics analysis software is a tool that enhances the comprehension of information that is present in documents or across a set of documents (Ponzanelli, Bacchelli, & Lanza, 2013). However, when these linguists are asked to explain how the tools they are using have been developed or made, they refrain from giving accurate responses. This study thus sought to invigorate the role of linguists to be in tandem with developments in the Fourth Industrial revolution (4^{th} IR) where computers are now being taught to perform tasks as required by human beings. Graphs, pie charts and histograms can be used to analyse data from similar software.

1.7 Delimitations of the research

The study was conducted on Computer Science students at the Namibia University of Science and Technology and at the Mobile Telecommunications Company (MTC) head office located in Olympia, a suburb in Windhoek, Namibia. The target subjects were the students that began their second year of study in February 2020. A sample size of 118 was selected from a total

study population of 170 (Σ*N* = 170) participants using the convenience sampling method. The convenience sampling method collects data from a conveniently available pool of participants (Etikan, Musa & Alkassim, 2016). Three research instruments were used to collect the data. These are two questionnaires and one competency essay. The first questionnaire was for students and the other one was for IT industry workers. A competency essay was used to collect data from the computer science students to evaluate their competencies. The collected essays were graded for competencies in essay content, language accuracy in grammar and vocabulary, communicative achievement and language technical skills.

1.8 Limitations of the study

At the end of the year 2019, the Covid-19 (SARS-CoV-2) pandemic hit the world. The virus was difficult to contain across the world population because it mutated into multiple variants. In the succeeding year, 2020, almost the entire world went into lockdown. Namibia as a country was not spared. Subsequently, universities in Namibia were also forced to shut down. As such, the academic progress of this project had to be delayed by three months until the university moved to online teaching and learning. The intended data collection was also delayed because the participants were absent from campus. Data collection questionnaires had to be converted into digital forms. There was also limited access to data because students had problems with gadgets and sufficient data to go online. Moreover, the respondents of the digital forms were less motivated which further delayed the data collection process. Lastly, there is currently a dearth of previous studies on English for Specific Purposes in Namibia.

1.9 Definition of technical terms

- **Gobbledegook**: is the language that becomes meaningless when it is made unintelligible by excessive use of technical terms (Begley, 2019).
- **English for Science Purposes (EScP):** is the English course that focuses on the occupation or profession of students who are studying science related subjects (Liu et al., 2014)
- **Needs Analysis (NA):** is the systematic and ongoing process of gathering information about students' needs and interpreting the information in order to have an effective course to determine and meet the needs (Graves, 2016).

- **Target Situation Analysis (TSA):** refers to a form of needs analysis which centres on identifying the learners' language requirements in the occupational or academic setting (Basturkmen, 2014).
- **Target needs**: this is the knowledge that the learner needs to do in the target situation (Basturkmen, 2014).
- **Learning needs**: is the gap between the learner's current level of knowledge and skills, and the level of knowledge and skills required to perform a task or a set of tasks (Basturkmen, 2014).
- **Lacks analysis (deficiency analysis):** this is a diagnostic test used by ESP practitioners in the analysis and evaluation to establish the language skills that students lack (Hutchinson & Waters, 1987)
- **English for Specific Purposes (ESP):** is the methodology of teaching English for professionals in various fields, focusing on the types of expressions, vocabulary, standards and formal structures. For example, the most common ESP is Business English, English for Law, English for Medical Purposes, English for Tourism and English for Science Purposes (Hutchinson & Waters, 1987).

CHAPTER TWO: RELATED LITERATURE REVIEW

2.1. Introduction

This chapter reviews literature related to the study of English for Specific Purposes (ESP) to assess the needs of Computer Science students. The literature discusses how the study of language can be combined with the techniques of English for Science and Technology to address the needs of the students. The review responds to the main research objective and the three specific objectives of the study. The main objective of the present study is to investigate the English language needs of undergraduate students studying computer science.

Language plays an important role in the study of computer science (Rozenberg & Salomaa, 2012). The ever-changing Information Technology industry demands more modern English language skills while the skills currently offered at Universities Faculties of Science in general remain unchanged (Fareri, Fantoni, Chiarello, Coli, & Binda, 2020). They are always new technological words that keep on coming into the mainstream of the English language vocabulary, most of which are less formal and less grammatical. This therefore, requires new strategies for coping with the ever-changing world of language (Chen et al. 2013). The highly formal structured traditional English language taught to students becomes stagnant, obsolete, and redundant (Means, 2017).

2.1.1 Definition of English for Specific Purposes

Major proponents in the development of ESP agree with the definition that it is the English that constitutes a specific register that is different from that of general English. The emphasis is on the difference between the register of the varieties of the English language. Some of the main proponents in the development of the study of ESP are Munby (1978), Hutchinson and Waters (1987), Robinson (1991), Dudley-Evans and St. John (1998), Strevens (1988), Bhatia (1981) and Swales (1990). Munby (1987) developed the Communicative Syllabus Design on needs analysis. Munby (1987) introduced a set of procedures for discovering target situation needs and called this set of procedures the Communication Needs Processor (CNP). His definition of ESP is formed by a group of questions related to key communication variables (topic, participants, medium etc.) which can be used to spot the target language needs of any group of learners. According to Hutchinson and Waters (1987), ESP can be defined as the

learner's language requirements and the learning context as the reasons for which the learner is learning English. Strevens (1988, as cited in Dudley-Evans & St John, 1998) defines ESP based on the distinction between two characteristics, the absolute and the variable. The four absolute characteristics are that English language teaching is designed to meet specified needs, must be related to the learner's particular discipline, centred to the language appropriate to linguistic related activities such as syntax, semantics, and discourse analysis and lastly it must be in contrast to General English. The two variable characteristics is the English language that is restricted as to the learning skills to be learnt. One example is reading only. The other point is that there is no pre-ordained methodology applied in the teaching and it depends on the needs of the learner.

Dudley-Evans and St John (1998) defines ESP as the teaching of English that is linked to a particular profession or discipline which makes use of a methodology that differs from that used in General Purpose English (GPE) teaching. In all the above definitions, it is evident that the scholars agree that ESP is the English taught to a learner for a particular purpose. The English must be specific such that it is different from General English. The purpose must be related to the learner's specific profession or area of study. The purpose of the present study is to investigate the English language needs of computer scientists in two settings: for study and for the purposes of work.

2.1.2 The roles of the ESP practitioner

The role of an ESP practitioner is determined by the needs of the study situation. The major role of an ESP practitioner can be one of these but not limited; these are to teach, design course material, collaborate, do research, and evaluate the language needs (Dudley-Evans & St John, 1998). On the other hand, Ibrahim (2019) also agrees that ESP is a multi-dimension approach which requires a variety of roles to perform. Ibrahim (2019) specified the following as the roles of an ESP practitioner; a researcher, course designer and material developer, language instructor, learning assessor, course evaluator, collaborator, facilitator, creative, and motivator. This view suggests that ESP practitioners fully function when they are cautiously trained in all the roles. Teaching only without the knowledge of onsite needs assessment and tailor-made implementation does not fully yield expected outcomes that benefit the learner. The present study thus assumes the role of an ESP practitioner in all

spheres although the role of the practitioner as a researcher is the main component of the study.

The other important duties of an ESP practitioner are the teaching of professional and occupational specialisations of language. A good example is that of the Namibian education system where the English teacher uses an English syllabi prescribed by the government. When the ESP practitioner assumes the role of a high school teacher, they are expected to deliver the English syllabus in the classroom. The English teacher is responsible for teaching English grammar, how to write essays, reading, listening and speaking comprehension. Learners will now then be given an English examination at the end of their grade 12 year to evaluate their performance. The examination results act as feedback to check whether the teacher delivered the English syllabus correctly to the grade 12 learners. This is one of the most important duties of an English teacher in the Namibian high school education system.

2.1.3 Previous ESP studies in Namibia

Considering that ESP in Namibia is mainly used for academic purposes (EAP) and for occupational purposes (EOP) (Makamani, 2012), several studies have been conducted towards the development of ESP. For example, in the Namibian context, a business that manufactures and sells building tools, the businessman might need to understand different types of invoices, writing techniques, business letters, to communicate effectively when conducting sales or at a sales conference (Hutchinson & Waters, 1987). The business English is termed English for Specific Business Purposes (ESBP). The same necessity of needs applies to Computer Science or any other university studies that need students to engage in specialised uses of vocabulary such as oliguria, decreased skin turgor and tremor in medical terms. In order for a language need assessment study to commence, the existing knowledge of the student must be established as a necessity. This section reviews previous local studies on needs assessment and continues to review studies done elsewhere in the world.

Makamani (2012) advocates for the teaching of English for Academic Purposes (EAP) and English for Professional Purposes (EPP) as alternative higher-level courses that can be offered to university students. This view contrasts with the teaching of presumed varieties of English courses which fail to equip students with the needed English language skills. Despite names such as Language in practice (LIP) and Professional Writing (PWR), given to a variety of the

English courses, they are in fact generalised (Frans, 2014) as they do not fully address the requirements of the target situation as suggested by Mukoroli (2016). In relation to teaching, Mukoroli (2016) explored the pedagogical dynamics of teaching EAP at university level. The study identified EAP students' perceptions and experiences regarding the current EAP pedagogy at the University of Namibia and concluded that there is a distinct lack of critical, meaningful, and experiential pedagogy in the Namibian classroom. Another study in Namibia investigated lecturers' and students' perceptions of speaking and writing skills in the English course titled Language in Practice (Mungungu-Shipale, 2016). The study observes that corrective feedback is perceived by both lecturers and students as an essential aspect of developing ESL productive skills. In a separate study, Mungongi (2018) raised concerns about the role of English for specific purposes in tertiary education. The skills do not meet the needs of employers and the workplace. The study concludes that the English for Academic Purposes (EAP) was inadequate to address many work-related, language literacies and competencies. The study concludes that Dudley-Evans and St John's (1998) theories about ESP can help provide a rationale for the rapid growth of ESP courses worldwide and also in Namibia. The scholarly evidence of studies that have been conducted in Namibia reveal that there is still a need for more research on ESP in the discipline of science related English. The next part of the review looks at ESP in the study of academic, business and science.

2.1.4 A review of ESP studies conducted in the African continent

There are several ESP studies that were conducted in the African continent. The English language is used on the African continent either as a foreign language or as a second language. Most of the 54 countries in Africa use English as their official language and this makes it the language of government, education, business, and the language of science. Considering this context, it is relevant to review some of the ESP studies that were conducted in the African continent.

A study that was conducted in Ethiopia investigated the English language needs of business students at the university (Mognhode & Woldemariam, 2015). The study applied a mixed methods data collection and analysis and the findings reveal that there is a gap between the English courses taught to business students and the target needs (Mognhode & Woldemariam, 2015). The lacking language skills identified were language contexts and

vocabulary. On the other hand, the study also evaluated the needs of business graduates, their employers shared dissatisfaction as they expected their employees to be proficient in specific English language skills. Another separate study investigated the needs of ESP needs for Engineering university students. The focus of the study was on accessing the technical writing skills of the students. The study findings identified the high demand of the English language for both academic and professional use (Tesema & Woldemariam, 2016). There was a gap between present competencies and future English language skills needs. These two studies are relevant to the present study on similarities about investigating the contemporary English language needs of Computer Science students and what they are expected to perform in the IT industry.

A separate study was conducted in Botswana to investigate the role of academic institutions to cater for the development of language (Otlogetswe, 2010). The study observed that the Setswana language is widely used in education, media, legal, parliament, religion and as a business discourse. The advantages of establishing a centre for Setswana studies includes aiming to increase staff participation in research, to enhance student research training and to increase the volume and quality of research outputs. This means that establishing a centre for Setswana studies can be emulated by other African universities where centres of language needs still need to be established. It is not only the English language that must be set at the pinnacle of research, but African indigenous languages equally deserve a needs assessment study. The study concluded that the Setswana language can be implemented in several important domains such as law, medicine, business, journalism, Setswana linguistics as well as computational linguistics (Otlogetswe, 2010).

2.1.5 Needs in English for Science and Technology (EST)

Students who are studying Science and Technology related courses need specific English language skills for them to be able to perform tasks that come with their learning objectives (Hart, 2012). Examples of these tasks include the reading of scientific documents, speaking with other scientists at international conferences, listening to a presenter at an international conference or in a lecture and writing scientific articles for a journal publication (Bowater & Yeoman, 2012). All these specific tasks are the same in nature to specific tasks they can be asked to perform at the workplace. Liao and Chen (2012) define English for Science and

Technology (EST) as English for the workplace. The duo evaluated EST teaching materials with the purpose of contributing to the development of ESP educational needs of students in Taiwan. The study's data collection methods were a questionnaire and focus group interviews. The study revealed that a positive attitude was attained by the students towards the study materials that they were given to read. This study about students' attitudes can be important for EST learners in Namibia to emulate so that they can excel in their studies. In support of the role played by EST, Bennett (2013) addresses ESP as the language for scientific revolution. The scientific revolution is associated with an important era in the sixteenth century that saw the emergence of modern science (Smith, 2018). While EST teaching materials and the attitude of the learner are important, Rao (2014) indicates that English Language Communication skills are needed to enhance the industrial technological advancement and boost employability. The study further suggests that technical vocabulary needs to be taught for the purpose of a more effective communication. A good EST course is one that stimulates the interest and stimulate the learners' critical thinking to perform well in their studies.

English for Scientific Purposes is crafted to address the needs of the scientific world. When students have left the study scene to participate as workers, they are challenged with the gobbledegook language (Maverick, 1944) of speaking, listening, reading, and writing skills that are used in the science and technology industry. The lack of English academic literacy leads to a gobbledegook. Gobbledegook is the language that is made unintelligible by the excessive use of technical terms. It is meaningless to an ordinary listener or reader. In other words, it is a language and statements that seem difficult or seem to mean nothing because the reader is not trained to understand it (Stribling et al., 2005). The term gobbledegook was first used by Maury Maverick in an article that was published in *The New York Times* in 1944. Stribling et al. (2005) use the terms *stochastic*, *cacheable*, and *interposable* in a meaningless manuscript journal article. The purpose of the study was to maximum amusement by aping the jargon of the less illustrious papers in computer science (Ball, 2005). The second reason was to test whether such a meaningless paper can pass the screening procedures for conferences. However, it did. The point that Stribling (2005) made was that the language of science can be made unintelligible by the excessive use of technical terms.

(Lodhi, Shamim, Robab, Shahzad & Ashraf, 2018) asserts that students and doctors need English in their professional settings in skills such as the reading of books, journals and magazines, to understand lectures, to participate in seminars, to communicate with natives and to read medical texts. The main question of the study was to ask the English language needs of medical students in their academic activities and as doctors in their professional career. The study found out that both as students and doctors, they need English for reading books, journals, and magazine, to understand lectures, to participate in seminars, to communicate with natives and to read medical texts. Above all, English is used as a lingua franca in the international community of medicine.

In the view of the fact that the English language has become a global tongue with millions of speakers, non-English speaking countries have now adopted English as a language of instruction mainly in education (Jordan, 1997). In a study by Fadel ad Rajab (2017) etitled 'Investigating the English language needs of the female students at the Faculty of Computing and Information Technology at King Abdulaziz University in Saudi Arabia', female computer science students were studied to investigate their English language needs. The study questioned the English language 'Technical writing' that the faculty offered to female computer science students and observed that these courses did not sufficiently equip students to function in their areas of specialisation. These students were offered an English language course book for business students. The study concluded that the technical writing English courses offered were irrelevant to the needs of computer science students. Another rare observation was discovered, that students faced challenges of communicating with non-Arab instructors or engineers. This is because the Arab speaking instructors usually deviated from the English medium of instruction to occasionally using Arabic for additional explanations.

Lodhi et al. (2018) evaluated the English language needs for doctors at academic level and as health professional practitioners. The study conducted a survey to establish the communicative needs for doctors and the quantitative research method was used. Data were collected through questionnaires that were administered to student and practicing medical doctors. The study revealed that there is a huge needs gap between the acquired English skills for doctors and their desired level of English proficiency skills. The participants informed the

research the need to cope with a variety of tasks such as reading books, journals, and magazines to understand lectures.

2.1.6 English for Academic Purposes (EAP) in education

The study of EAP in Namibia greatly reflects the developments of the English language as the language of education in Namibia. Soon after independence in 1990, Namibia introduced the English language as the language of government, which means that it would be used in education as well. Thirty years ago, Namibians who were born after independence and enrolled into primary school, have now completed university education, and they are using English language emanating from their studies. However, there is still a need for better strategies to teach the English language to Namibians to the satisfaction of the national grade 12 English examinations. According to Nkandi (2015), there are some factors affecting the pass rate of the English grade 12 results year in and year out, and these are mainly learners' and teachers' attitude towards the language, government policy, resources, and curriculum relevance. With regards to teachers, Nkandi, (2015), states that the quality of teaching is strained by the shortage of English language teachers. On the other hand, some of the teachers lack the needed English language content knowledge. The learner's attitude towards the use of the English language is another factor, they lack motivation. English language learners are less motivated when their parents at home are not involved in their learning (Nkandi, 2015).

2.1.7 English for Business Purposes (EBP) as the economic language

English for Business Purposes (EBP) has developed the capability of a successful working language in Namibia (Lesiak-Bielawska, 2015). A businessman might need to understand business letters, to communicate effectively at sales conferences (Hutchinson & Waters, 1987). English is widely spoken in the Namibian business circles with some people still using Afrikaans and immediately switches to English when needed (Buschfeld & Kautzsch, 2014). Afrikaans has been used as the language of government for almost a century, and this explains why some local business people still find it difficult to go by without the Afrikaans language. However, the English language dominates the Namibian business scene as an essential means of communication for spoken and written communication. English is used to negotiate business deals and to communicate with international business associates from outside

Namibia. When businesspeople negotiate in their communication, the most proficient speaker with good knowledge of business English is likely to have an advantage. Words such as *minutes*, *cold call*, *balance sheet* and *start up*, are terms that are related to business English, hence a good English speaker usually incorporates such words. Fluent English speakers who have the knowledge of such vocabulary are likely to gain advantage in a business discussion. In response to the technological advances, businesspeople in Namibia have now adopted the use of computers and the internet, and all that needs Basic English skills. This means that businesspeople in Namibia stay updated with some international English business trends.

2.1.8 The contemporary English language demands of IT industries

Prachanant (2012) attempts a need assessment on English language use in Tourism Industry in Thailand. The findings of the study revealed that speaking is most important than listening, reading, and writing. The three most relevant functions in using English language were giving information, followed by providing services and offering help. English use problems include the inability to understand foreigners' accents, inappropriate words and expressions, inadequate vocabulary, and lack of grammar knowledge. A questionnaire was used and data were analysed by frequency, percentage, mean and standard deviation. The lack of these English language skills presents a mismatch challenge that can be addressed by a need analysis intervention. The present study adopted descriptive statistics method that uses of percentages to analyse data. Descriptive statistics was used as a summary statistic that quantitatively describes and summarises features from graphs, histograms and pie charts that were collected during the study (Kaliyadan & Kulkarni, 2019).

A mixed method approach study titled, 'Designing English for Specific Purposes course for Computer Science students' (Irshad & Anwar, 2018) was conducted to design an English for Academic Purposes (EAP) course for university students enrolled in the Computer Science Department at the University of Gujrat. The research tools of the study were a 5-point Likert scale questionnaire and interviews. Participants were four faculty members of the department and the data were analysed qualitatively. Using the two sets of tools makes the study a mixed method. The results of the analysis of the questionnaire and interviews indicate that the four language skills, namely, listening, speaking, reading, and writing are frequently used in students' academic contexts and among the four, speaking is the most frequently

used skill. Considering the setting of the study, Pakistan, the students were found deficient in writing and speaking skills as compared to listening and reading; therefore, speaking and writing should be given preference while designing the syllabus. The study concluded that technical vocabulary must be included in the course offering of all the four language skills.

Oral communication is relevant to ESP studies. In a study titled; 'Needs analysis of English literature students in English oral communication', Maulana and Lestari (2017 identified the oral needs of English literature students using English. The study data collection methods were questionnaires, interviews, and literature review. Findings showed that the English literature students feel that participating in a formal discussion is more important than an informal one. However, the study concluded that the students perform better in informal discussions compared to formal ones.

2.1.9 English language needs in the 4th Industrial revolution (Industry 4.0)

Using language in the age of the 4th Industrial revolution has its greater share in the use of modern digital practices. Previous industrial revolutions liberated humankind from animal power. This made mass production possible and brought digital capabilities to billions of people (Bianchi & Labory, 2018). Using robots, artificial intelligence, big data, Internet of Things, Quantum Computing and Quantum Communications, the replacement of humans by machines will take place in a myriad of different areas (Silva, 2018). These developments have also been visible and relevant to the study of language. The modern demands of the fourth industrial revolution require English language for nations to access resources and expertise for survival (Basturkmen, 2012).

2.1.10 Techniques of computer science in the study of language

In a related study conducted at Harvard University, an essay that was published by the Mathematical Association of America, Oettinger (1965) discussed the relationship between language and computers. In this case, the concept of studying computational linguistics is associated with mathematical linguistics which is also concerned with specialised technical jargon, mathematical or chemical notations, the formal symbol systems of logic, or the various systems for instructing computers which, as products of more self-conscious and deliberate human creation, are called artificial languages. While computational linguistics is a

branch of linguistics in which the techniques of computer science are applied to the analysis and synthesis of language and speech, it is important to define other related concepts that can be used to understand how computers can be manipulated to process natural language. Mathematical linguistics includes the application of statistical techniques to the central linguistic problems of describing the structure of languages and their development, problems which are the domains of conventional historical and descriptive linguistics (Oettinger, 1965). The essay agrees with the present study that ESP practitioners are linguistic problem solvers who contribute to research and new theoretical discoveries by concluding that Computational linguistics, as the subset of mathematical linguistics, deals with the application of computers to linguistic problems and with the application of linguistics to computer problems (Oettinger, 1965).

Hutchinson and Waters (1987) argue that the role of English for Specific Purposes (ESP) is not a 'coherent' type of teaching but is an evolution that responded to the needs of learners of language for science, technology and business, especially after the Second World War (1937-1946). They stress that English for Specific Purposes is not for prestigious purposes of pleasure but to suit the world of work. The present study fully agrees with this position.

In a related study, the table below discusses 50 years of developments to different approaches of Language for Specific Purposes (LSP) models based on needs, language analysis, materials methods, and the focus for each model (Upton, 2012). These models are presented in chronological order in the developments of the models. Munby's communicative syllabus design model (1981) and that of Hutchinson and Waters (1987) were left out. The suggested reason could be that the scholar did not find enough sources to support their scholarly claims. For which the later was employed in this study. Significant changes over the 50-year period reflected is evaluated: (1) needs analysis, (2) language analysis, and (3) materials and methods (Upton, 2012). The study reflects on four different leading scholars and their contributions; Halliday, Strevens and McIntosh in the 1960s, Strevens in the 1970s, Dudley-Evans and St. John in the 1990s, and Belcher in the 2000s.

Figure 2.1 Proponents of ESP

	Halliday, Strevens & McIntosh (1964: 189)	Strevens (1977: 150)	Dudley Evans & St. John (1998: 4)	Belcher (2004, 2009)
Needs	Identify the "specialized" language used in specific contexts that learners need to know	Focus on "language-using purposes of the learner"	"Designed to meet specific needs of the learner", including wants, skill/ knowledge gaps, etc.	"First and foremost (before, during, and even after instruction) finding out what learner needs are" (2009: 3)
Language Analysis	"Detailed studies of restricted languages and special registers (…) used by the particular persons concerned"	Focus on "communicative needs" and "language-using purposes" that are restricted (by vocabulary, language skills, themes, etc.) to those "required by the learner's purposes"	"Centred on the language (grammar, lexis, register), skills, discourse and genres appropriate to these activities"	Emphasis on "social-situatedness" of language use (2004: 166); understanding of language use in specific contexts is essential – using a variety of analyses
Materials & Methods	Determine "appropriate" and "extra specialized" teaching materials	Use of methodology "appropriate to the learning/teaching situation"	"Makes use of the underlying methodology and activities of the disciplines it serves"	"Developing or adapting materials and methods to enable needs-responsive instruction" (2009: 3)
Focus	Words and structures	Texts and purposes	Learners and genres	Contexts and interactions

Table 1. Fifty years of evolving LSP theory as reflected by leading scholars.

Source: Upton (2012)

IT industries constantly transform as discussed in the study; 'English for Scientific Purposes (EScP): Technology, Trends, and Future Challenges for Science Education' (Liu, et al., 2014). The study deliberates on computer-assisted language learning to identify the use of learning technologies in science-based literacy. The purpose of the study was to investigate at the time, the current trends in ESP, methodologies, and results. In other words, the study was a literature review of ESP for scientific purposes. The study also included opportunities, advantages and challenges that science students face when learning ESP. The study concluded by recommending that there is a need for newly designed EScP materials and curriculum such as linguistic gaming, textual chats and video-conferencing collaborations with scientific literacy developments. Because ESP continuously evolves, there is a need to keep up with these changes when delivering English courses to students studying science related fields. The literature that was reviewed in the study was adopted for reference purposes for the current study.

A previous study that was conducted in Bulgaria (Zamfirov & Saeva, 2012) investigated the teaching of English to students with hearing loss using a computer program developed for learners defined as either hard of hearing or deaf. The research was conducted at one of the three specialised schools in Bulgaria. The software was tested for a period of one academic year by students ranging from sixteen to twenty-three years of age. The program included two video screens; one for lip-reading English phrases and one for interpreting them into Bulgarian Sign language with sentences classified into topics and pictures representing each phrase. The study concluded that teaching English as a second language to students with hearing loss is a challenge. The main interest of reviewing this study are the computer-based findings in computer aided learning. The similarities drawn from computer aided learning offered to deaf students can be equated to the English language needs for computer science students. The application of computer-based teaching strategies with students with hearing loss in English classes is highly effective. The study results showed a tendency for acquiring English language skills better with the computer programme than with traditional foreign language teaching methods. The meeting point for this study and the current study is that the students being studied are all use English as a second language. A similar model can also be emulated for this study.

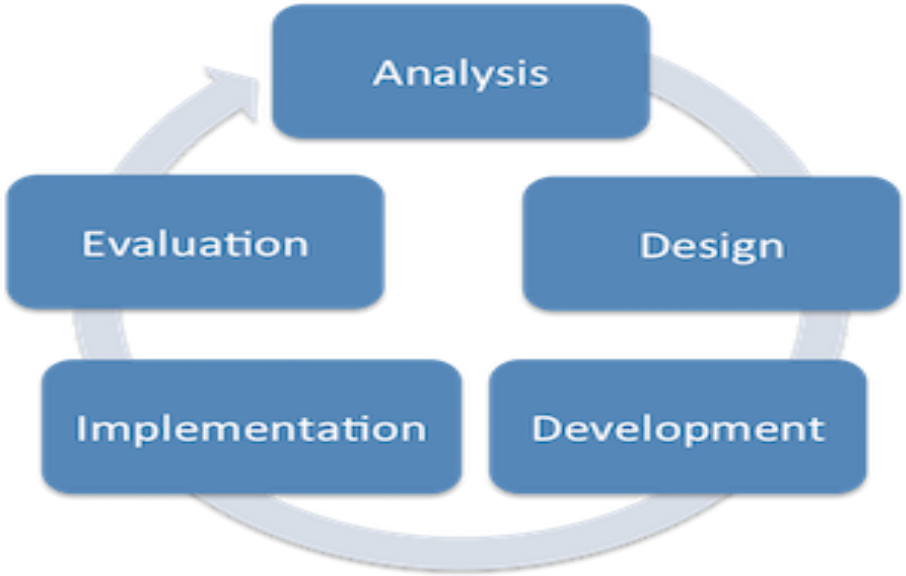
2.1.11 Current models in ESP and proposition for the present study

Hutchinson and Waters (1987) emphasise on student needs, learning models and the ways of describing the language as the three most relevant. In addition to that, Dudley-Evans and St. John (1998) further add discipline, teaching situation, age, and socio-cultural status of the students as well as their proficiency level of the English language. Fortanet-Gomez and Raisanen (2008, as cited in Laborda & Litzler, 2015) suggests that nationality may also influence the approaches to ESP based on experience and language proximity. For instance, students in Sweden whose L1 is closer to English may need to improve their writing and use a different approach from Spanish learners whose L1 is quite different and may need to improve their listening comprehension.

The formulation of a computational linguistic model in the present study was based on the study; 'Developing English for Specific Purposes (ESP) Module for Computer Science Students' Vocabulary Mastery' (Kusumawati, 2018). The study aimed at developing a learning module

for students of Computer Science, to determine the feasibility of the module, and to determine the students' response towards the module. The Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model is applied in five stages: Analysis, Design, Development, Implementation, and Evaluation. Since an EScP model that is designed for computational linguistics is not available as commercial study material.

Figure 2.2 ADDIE model



Source: Dick and Carey (2004).

The present study therefore proposes to apply the Target Needs Assessment Framework (TNAF). Hutchinson (1991) states that there are two kinds of needs: The target needs and the learning needs. Target needs implies what the learner needs to do in the target situation and the learning needs which implies what he needs to do in order to learn. The learning needs tries to answer the question 'why are the learners taking the ESP course?' that is explained by assigning students a task that is enjoyable, fulfilling, manageable and generative. Target needs studies three specific aspects; necessities, lacks and wants. ***Necessities*** are the demands of the target situation, what the learner must know in order to function effectively in a language use situation. ***Lacks*** is about what the learner already knows, we decide what necessities are missing (Hutchinson and Waters (1987). There is a gap between the existing proficiency and the target proficiency. Finally, ***wants,*** is about what we have considered from an objective point of view, we have to say that a need does not exist independent of a person.

It is a needs assessment study that sought to address the English language demands for computer science students at NUST.

2.2 Research gaps

The English language needs assessment for computer science students at Namibia University of Science and Technology has not been studied. This study presents a new understanding of a possible problem that requires a solution. The English language mismatch between what is offered and what should be offered is necessary to be established. Language needs assessment is a kind of study that is conducted to evaluate missing English language needs to try and come up with possible methods to bridge the lacking needs. The study of ESP requires a great deal of knowledge and resources. Despite all odds, this study presents new knowledge that contributes to the study of ESP in Namibia. Future researchers can make reference to this study.

2.3 Theoretical application, conceptualisation, and implementation

The present study applied the Target Needs Assessment Framework (TNAF). Hutchinson (1991) states that there are two kinds of needs: The target needs and the learning needs. Target needs implies what the learner needs to do in the target situation and the learning needs which implies what he needs to do in order to learn. The learning needs tries to answer the question, 'why are the learners taking the ESP course?' that is explained by assigning students a task that is enjoyable, fulfilling, manageable and generative. Computer Science students were given a written essay competency test to assess their current knowledge and their English language needs (academic needs). In addition to that, the students were given a questionnaire to respond to depending on their needs. On the other hand, IT professionals were also given a similar questionnaire to respond to depending on their occupational needs. The results were then compared to find out the gap between what English language skills the Computer Science students actually need and what they are taught in class.

Target Situation Analysis (TSA) refers to form of needs analysis which centres on identifying the learners' language requirements in the occupational or academic setting. 'Target needs' is a term with three distinctions; necessities, lacks, and wants. When conducting need

analysis, a variety of procedures can be used, and the type of procedures selected determines the information acquired (Richards & Renandya, 2002).

The present study deliberates on the application of the target situation and the learning needs analysis framework as relevant to the objectives of the study. The theory responds to the research questions of the present study. The main objective of the study is to investigate the contemporary English language needs of Computer Science students at NUST.

2.3.1 Origins of English for Specific Purposes (ESP) Theory

A response to demand of technology and commerce after World War II in 1945 (Hutchinson & Waters, 1987) prompted the initial development of English for Specific Purposes (ESP). Although the study of (ESP) theories began soon after the World War II that ended in 1945, Munby (1978) developed the target situation analysis in his book titled 'Communicative Syllabus Design' where he detailed a set of procedures of target situation needs. Munby's model addressed learners' needs in terms of communication purposes, communicative setting, and the means of communication, language skills, functions, and structures. However, the model was criticised for failing to account for learner needs of a target language. While Munby's model is acknowledged, the duo of Hutchinson and Waters (1987) alongside St Johns and Dudley Evans (1991) further contributed to the development of ESP. The former contributed to target and learning needs while the later contributed to business language needs. These sets of ESP practitioners all wrote books that give scholarly detail on how to conduct an ESP study while discussing many issues surrounding the study of ESP. They are two notable causes that inspired the developmental history and the rise of ESP during the 1960's, namely the progress of technology, the economic power of oil-rich countries, and the increasing number of overseas students in English-speaking countries. (Hutchinson & Waters, 1987). The time period after World War 2 required language capabilities in skilled labour that was to be trained in vocational institutions. This meant that new terminology that was to be used in science manufacturing had to be established. Industrial manuals began to be written in a specific type of English that would be used to operate machinery and the naming of scientific chemicals, tools and experiments. These instruction manuals that were prepared were sent to all newly industrialised countries, beforehand, there was a need to train ESP to

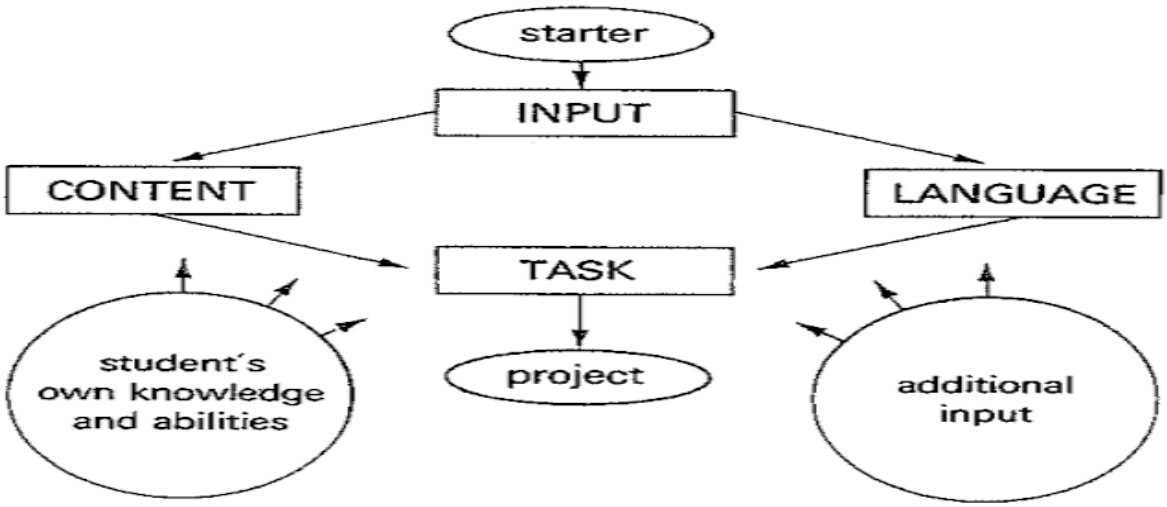
workers in vocational schools. This would prepare the labourers to use the manuals as required by the industrial needs.

ESP covers a wide range of designed types of English that are suitable for different purposes (Woodrow, 2017). As the industry grew, the rich businessmen around the world needed to communicate with each other using a common goal English language (Rahman, 2015). This included English for Business Purposes and as for students who wanted to study outside their homeland had to be equipped with English for Academic Purposes. A variety of ESP skills are designed to serve different needs.

2.3.2 A review of the materials design model: Hutchinson and Waters (1987)

A material design model as described by Hutchinson and Waters (1987) consists of four elements: input, content focus, language focus, tasks. “Language is not an end in itself, but a means of conveying information and feelings about something. Non-linguistic content should be exploited to generate meaningful communication in the classroom” (Hutchinson & Waters, 1987, p. 109). The ultimate aim for the learners is to be able to communicate orally or in written form in genuine work settings. Thus, the contents of all the texts are relevant to the participants' professional needs and personal interests. This study follows the target situation needs analysis framework derived from the Materials Design Model.

Figure 2.3 A materials design model



Source: Hutchinson and Waters (1987).

2.3.3 A target needs situation analysis framework

The materials design model can be implemented based on the English language needs of the target group. An example is that of science students who need specific vocabulary that is used in experiments. Materials development studies the principles and procedures of the design, implementation, and evaluation of language teaching materials. Although the materials design model consists of four elements: input, content focus, language focus, tasks. Hutchinson (1991) states that there are two kinds of needs: The target needs and the learning needs. Target needs implies what the learner needs to do in the target situation and the learning needs which implies what he needs to do in order to learn. The learning needs tries to answer the question 'why are the learners taking the ESP course' that is explained by assigning students a task that is enjoyable, fulfilling, manageable and generative. This study applies the target needs and the learning needs where application is relevant.

Figure 2.4 Necessities, lacks and wants

Source: Hutchinson and Waters (1987)

2.4 Chapter summary

Chapter two reviewed the literature related to the present study. The reviewed literature generated the research gap applicable to the study. The roles of the ESP practitioner as the teacher and the course designer were also discussed. Previous ESP studies in Namibia and the

African continent were reviewed. Lastly, the current models in ESP and the theoretical framework were reviewed with relevance to the present study. The Material design model examines the target needs situation analysis where the current knowledge of a language learner is evaluated. The model allows the study to establish the gap between what the learner currently know and what they are expected to perform given English language tasks (Hutchinson & Waters, 1987). The next chapter discusses the research methods and procedures of the present study.

CHAPTER THREE: RESEARCH METHODS AND PROCEDURES

3.1 Introduction

This section discusses the research methods and procedures that were used to conduct this study. The research design, setting and research instruments, how they were implemented, research management and applicable data analysis procedures will also be discussed in this chapter. The complexity of doing an English for Specific Purposes (Hutchinson & Waters, 1987) study that is answerable to computational linguistics was conducted on computer science students at NUST and the IT workers at the Mobile Telecommunications Company Namibia (MTC Namibia) premised on the needs of the English language. Existing computer science students' knowledge and study material was collected, assessed, and evaluated to identify a needs gap. The findings will inform how to resolve the target situation needs.

3.2 Research approach and design

Mixed methods were used in this study. This is a type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (For example, use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Almalki, 2016).

3.3 Pragmatic research paradigm

This study employed the pragmatic philosophical research approach to acquire knowledge from conducting an ESP needs assessment study at NUST. The pragmatic research philosophy applies when problems are trying to be solved. It is a real-world practice oriented approach (Creswell & Poth, 2017). The pragmatic approach uses a variety of methods to collect and analyse data versus one fixed method. Pragmatist research philosophy deals with the facts. It claims that the choice of research philosophy is mostly determined by the research problem. (Creswell, 2003). The rationale for employing the pragmatic paradigm is based on the fact that both positivist and interpretivist research paradigms are consistent with a mixed methods research approach which is relevant for this study.

3.4 Research setting

The data was collected from Namibia University of Science (NUST) and at the Mobile Telecommunication Company (MTC Namibia) in Windhoek, Namibia. The physical location of NUST is 13 Jackson Kaujeua Street, Windhoek, Namibia while MTC Namibia is located on the Corner of Mosé Tjitendero and Hamutenya Wanahepo Ndadi Street in Olympia, Windhoek, Namibia. The duration of the field work which includes the data collection and ethical permission, was from 05 June 2020 to 10 November 2020. The process was lengthened due to the COVID-19 national lockdowns.

3.5 Study population

According to NUST enrolment statistics for 2020, Namibia University of Science and Technology (NUST) enrolled 559 undergraduate students who were studying towards a computer science degree, which is the population where the sample was drawn. Out of these students, 226 students were studying in their first year, 135 in their second year while those studying third year were 198 students. Opposed to studying the entire population, this study agrees with six main reasons of sampling: economy, timeliness, the large size of many populations, inaccessibility of some of the population, destructiveness of the observation and accuracy (Creswell & Creswell, 2018). The convenient students' sample was 84 out of a possible student population of 135 who were studying in their second year at the time. After second year, the English language courses was no longer be offered following the curriculum natural progression into their third year. On the other hand, first year students would have just arrived at the institution, which means they could not yet have studied enough courses to be able to deliberate on their current needs. The other group of participants were IT industry employees, and they comprised of those working at the MTC head office in Windhoek, Namibia (occupational group) and lecturers who taught Computer Science students at NUST (the academic teaching staff). The occupational group had a total of 25 selected participants that were legible for participation and the academic had 10 participants. The criteria for selecting the participants of both the occupational and the academic groups were that they must have an IT professional degree, preferably in Computer Science and have taken an English course during their time at the university.

3.5.1 Data collection procedures

Two digital questionnaires that respond to the study objectives and the reviewed related literature were delivered to the Department of Computer Science lecturers for delivery to the target study group, one for second year Computer Science students and the other one for the teaching staff. The two digital questionnaires comprising of open ended and closed questions in each were sent to eLearning platform for each student and lecturer to respond to. Responses were given based on a Likert scale for agreement levels from 1 to 5 as strongly disagree and strongly agree, respectively. Very poor to excellent were also used in the responses to measure participants' opinions, reactions, and attitudes in relation to given statements.

3.5.2 Recruitment of participants on the WhatsApp group

The study required the recruitment of two sets of participants, second-year undergraduate computer science students and graduates who were already working in the IT industry. The first group of student participants were recruited by first identifying their class group. The researcher then asked the class group representative to seek for permission from the main group of the target population (N_1 = 135) on behalf of the researcher to be added onto the WhatsApp group for the student participants. Once the researcher was added to the group, the researcher was introduced to the group members and identified as the researcher. The researcher then explained to the group the purpose of the study and ethical considerations were explained to the group. The researcher then shared the online digital questionnaire with the following URL: https://forms.gle/FwaHycgrp72vXLVj7. The participants responded to the questionnaire up to a maximum of two weeks. The response rate was 84 out of the intended 135 sample size (S_1 = 84). The study achieved a 99% response rate.

On the second group of participants (occupational) were computer science graduates and IT professionals (N_2 = 25), unlike the first group of student participants, the researcher first identified the Corporate Communication Department at MTC. The IT manager was assigned to assist the researcher with administering the questionnaires. The manager found it easy and instructed the researcher to print physical copies and deliver them to the MTC head office. After two months, the manager then called the researcher to collect the completed questionnaires. It is however important to note that the same printed questionnaire was also

available on: https://forms.gle/FwaHycgrp72vXLVj7 for those who could complete it online. The last group of participants, N_3 = 10 (the academic teaching staff) had the digital questionnaire administered to them by the researcher's mentor who was assigned by the Faculty of Computer Science Dean.

3.5.3 Convenience sampling method

Due to the outbreak of the Covid-19 virus, the present study originally intended to use the systematic sampling (Kothari, 2004). The researcher then opted for the convenience sampling method. Convenience sampling is a method adopted by researchers to collect research data from a conveniently available pool of respondents (Etikan, Musa & Alkassim, 2016). The study population comprised of three groups (ΣN = 170); that is, (N_1 = 135) for the first group for second-year undergraduate computer science students and the second group, (N_2 = 25) was that of Computer Science graduates and IT professionals already working in the IT industry (the occupational group) and the third group, (N_3 = 10) was for the teaching staff at NUST (the academic). A total population of 170 subjects participated in the study (ΣN = 170). All the participants have studied more than one English language course at the university as undergraduates or have already graduated.

N = size of study population

S = size of study sample

ΣN = 170

ΣS = 118

N_1 = 135

S_1 = 84

N_2 = 25

S_2 = 24

N_3 = 10

S_3 = 10

3.5.4 Research design

The student participants' population was established from the 2019 NUST enrolment report. A sample size of 118 participants was studied (ΣS = 118). This study applied a mixed method research design where both qualitative and quantitative methods was used. Qualitative data was collected through a competency assessment test while quantitative data was collected through three questionnaires. There was a questionnaire for students and another for computer science industry professionals (the occupational group) who are the study population. The third questionnaire was for the academic teaching staff. The data was analysed thematically by grouping themes that relevantly answers a research question. Thematic analysis for this research was achieved through a rigorous process of data familiarisation, data coding, and theme development and revision. Quantitative data was presented using graphs, tables, and charts. All sources cited were acknowledged by way of the APA referencing style and according to the NUST ethical guidelines.

3.6 Research instruments (see annex)

Essay performance evaluation (A)

Second year computer science students' English language essays were collected from the NUST online submission portal through ethical means (see appendix D). The essays were evaluated using the performance analysis evaluation table to determine the level of the student's competency. The following competencies were evaluated in three stages:

- Identifying competencies;
- Quantifying of competencies; and
- Analysis of identified competencies through descriptive statistics.

Table 3. 1 Written essay performance evaluation scale

Written essay performance evaluation scale						
Assessment criteria		**Excellent**	**Very Good**	**Satisfactory**	**Fair**	**Poor**
Technical skills	• Technical vocabulary • Technical argument • Complex technical words • Variety and appropriateness of vocabulary					
Essay content	• Content must be relevant to the subject matter • Professional discourse					
Language accuracy	• Grammar • Syntactic structure • -ing continuous tense • Subject verb agreement • Spelling errors • Correct use of adjectives (not confusing) • Lexical analysis (word choice)					
Communicative achievement	• Essay should effectively hold the target reader's attention and communicate straightforward and complex ideas, as appropriate • Good transition strategy					

Adapted from: University of Cambridge (2016)

Questionnaire for students (B)

The questionnaire for students comprises of 10 questions, 7 of them are close ended for collecting quantitative data while the remaining 4 are open-ended for collecting qualitative data. Students was asked to complete the forms while they are in class and return them with their permission when they complete filling in.

Questionnaire IT graduates (C)

The other tool was a questionnaire for the IT industry workers which are former graduates of IT graduates and the current computer science lecturers at NUST.

3.7 Mixed methods data analysis

Quantitative data from the structured questionnaires were analysed using descriptive statistics. Descriptive statistics is the term given to the analysis of data that helps describe, show or summarise data in a meaningful way (Kaur, Stoltzfus & Yellapu, 2018). Qualitative data were analysed by using the thematic analysis. Thematic analysis is a process of sorting and organising data into some pattern across a data set whereby the broader data set is split, filtered, sorted, and categorised according to a commonality in context and meaning (Kothari, 2012). The main purpose of conducting thematic analysis is that of identifying patterns of meaning across a data set that relevantly answers a research question. Thematic analysis for this research was achieved through a rigorous process of data familiarisation, data coding, and theme development and revision. The following steps was undertaken as part of the thematic analysis through getting familiarity with collected data, coding and searching for themes, and reviewing and naming themes.

3.8 Validity and reliability in testing ESP

ESP testing focusses on measuring specific uses and effectiveness of the English language such as English for Academic Science Purposes (EAScP) and English for Science and Technology Purposes (EST). The present study incorporated a mixed method approach to respond to the validity and reliability of the ESP generated research questions in studying English language used by IT students. One of the ways in which this was achieved was through the use of three research instruments to triangulate. These are two questionnaires and students' competency essays. The essays collected qualitative data while the two questionnaires had both open-ended and closed-ended questions. Triangulation implies multiple methods or data sources in research to develop a comprehensive understanding of the research problem (Ndanu & Syombua, 2015). Hence, reliability and validity are concepts used to evaluate the quality of research. The methods, technique or test measures for reliability is about the consistency of and the ability of a test to be repeated producing the same results each time the test is performed and validity is about the accuracy of what the test intend to measure (Price, Jhangiani & Chiang, 2015). This means that the purpose of establishing reliability and validity in research is essentially to ensure that data are sound and replicable, and the results are

accurate. The evidence of validity and reliability are prerequisites to assure the integrity and quality of a measurement instrument and the final results of the study.

3.9 Ethical considerations

Ethics is a philosophical inquiry of moral life. Ethics deals with the dynamics of decision making concerning what is right and wrong (Trevino, 1986). Research ethics refers to behaviour that is acceptable amongst the research community when conducting empirical research (Kumar, 2011). Additionally, Saunders et al. (2009) explain that ethics mostly relates to the rights of the research participants and how these are respected in the research process. This study was guided by strict adherence to general research ethics pertaining to the rights of the participants as discussed by Saunders et al. (2009) among other scholars. These are informed consent, anonymity and confidentiality and protection from harm.

3.10 Chapter summary

This chapter presented the research approach and study design. The population, data collection procedures were discussed. The study applied a mixed methods data collection and analysis methods. The quantitative and qualitative data were collected using competency performance essay evaluation scale, and two questionnaires. The data analysis methods were also discussed. Lastly, the chapter discussed the pledge that the study strictly observed research standards ethical considerations. The following chapter will discuss the major findings and presents that study data in the form of bar graphs, pie charts and histograms.

CHAPTER FOUR: MAJOR FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings and descriptive statistical data analyses as generated from research instruments. The analysis is presented thematically in the form of statistical data tables, histograms, pie charts and bar graphs. The chapter discusses related themes that respond to the research objectives. The chapter is divided into four sections. Section A, B, C and D. Section A is the presentation of demographic data. Section B analyses the written essays data that were collected from undergraduate students who were studying computer science at the Namibia University of Science and Technology (NUST). Section C presents the students' questionnaire descriptive statistical data analyses. A total of 10 questions were presented to students to respond. Histograms, graphs, tables, and charts were generated from the Google forms online questionnaire. These graphs have colour codes to mark identify the ratings each question and category according to importance or the extent of performance. Section D presents the data that were collected from a specific questionnaire of Computer Science graduates and IT professionals from NUST and the Mobile Telecommunication Company Namibia (MTC Namibia). Lastly section E discussed the study findings and the chapter conclusion. The criteria for selecting IT professional's questionnaire respondents were that they must have studied an English course during their Computer Science degree. Students must have taken an English language course including English for Academic Purposes (EAP).

4.2 Response rate for questionnaires

The study population comprised of three groups ($\Sigma N = 170$); the first one was for second-year undergraduate computer science students ($N_1 = 135$) and the other second, comprised of computer science graduates and IT professionals already working in the IT industry ($N_2 = 25$). Finally, academic employees working at NUST. $N_3 = 10$ A total population of 170 subjects participated in the study ($\Sigma N = 170$). All the participants have studied more than one English language course at the university as undergraduates or have already graduated. The total

response rate of the study was 118 out of 170 participants. This means that the study achieved a 99% response rate that is acceptable by research standards (Creswell, 2015).

$N_1 = 135$

$N_2 = 25$

$N_3 = 10$

$S_1 = 84$

$S_2 = 24$

$S_3 = 10$

$\Sigma N = 170$

$\Sigma S = 118$

Table 4.1 Response rate statistics

Target population ΣN = 170	**Total population ΣN = 170**	**Available sample ΣS = 118**	**Number of respondents**	**Response rate**
Computer science students	$N_1 = 135$	84	84	100%
IT graduates and professionals (occupational)	$N_2 = 25$	25	24	96%
Teaching staff (the academic)	$N_3 = 10$	10	10	100%
Total	**170**	**118**	**117**	**99%**

The table above presents the total population of the participants ($\Sigma N = 170$), target sample ($\Sigma S = 118$), number of respondents (117) and the response rate of 99%.

SECTION A

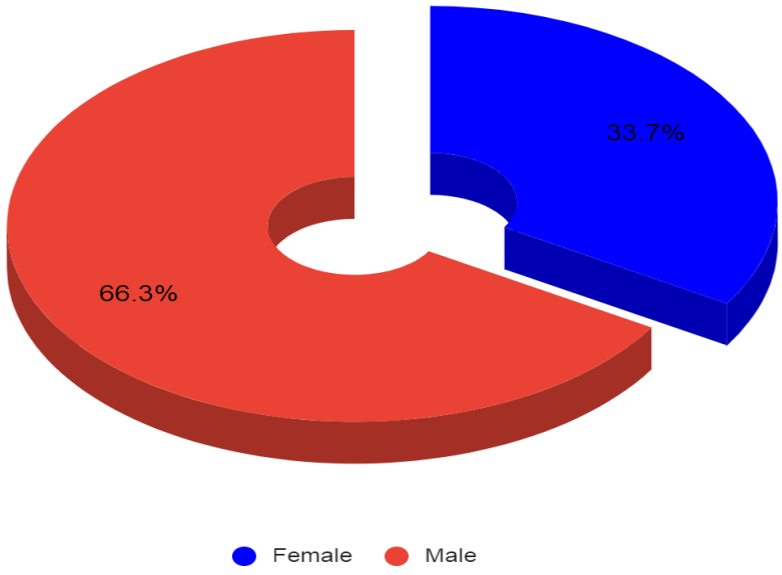
4.3 Presentation of biographical data for IT students

This part of section A details the gender statistics generated from the study findings. The participants were provided with three options to select their gender. These are female, male, and other. The figure below presents the statistical results in terms of percentage.

4.3.1 Gender of student participants

The pie chart below presents statistical data on students' gender. The gender was identified as male and female. A male is a person bearing an X and Y chromosome pair in the cell nuclei and normally having a penis, scrotum, and testicles, and developing hair on the face at adolescence as a boy or man (Hamerton, 2013). On the other hand, a female is a person bearing two X chromosomes in the cell nuclei and normally having a vagina, a uterus, and ovaries, and developing at puberty a relatively rounded body and enlarged breasts and retaining a beardless face as a girl or woman (Hamerton, 2013).

Figure 4.1 Gender demographical data



The study findings of the gender participants indicate that most of the participants were of the male gender with 66.3% while the female gender participants were 33.7%. The reason for the lesser number of female participants as compared to the male. Shapiro and Sax (2011), and Hart (2016) identified the following 4 reasons why there is a lack of women in Science,

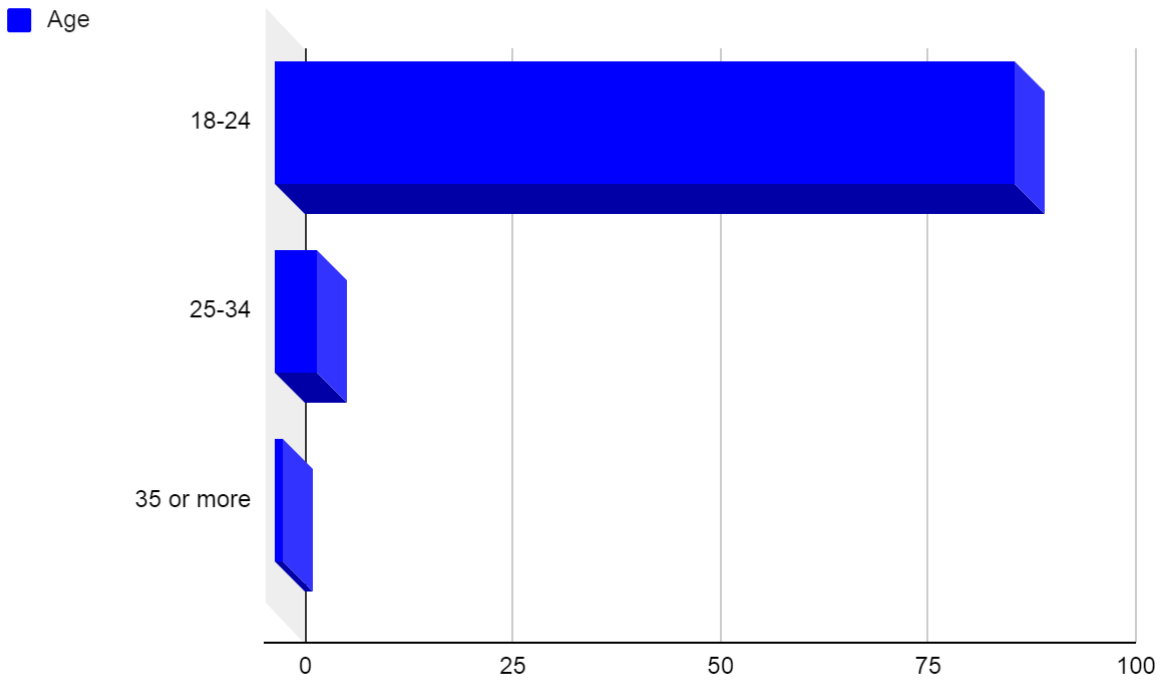
Technology, Engineering, and Math (STEM). These reasons may be justified considering the African environment that makes it even worse for the girl child to study STEM:

- The environment shapes girls' interest and motivation in STEM;
- Social bias affect women's progress and career choices;
- Colleges, universities, and workplaces are not making enough necessary changes to accommodate female students; and
- Lack of role models.

4.3.2 Age of participants for students' questionnaire

The bar chart below presents the age distribution of the participants in three categories as generated by the study findings.

Figure 4.2 Age demographical data



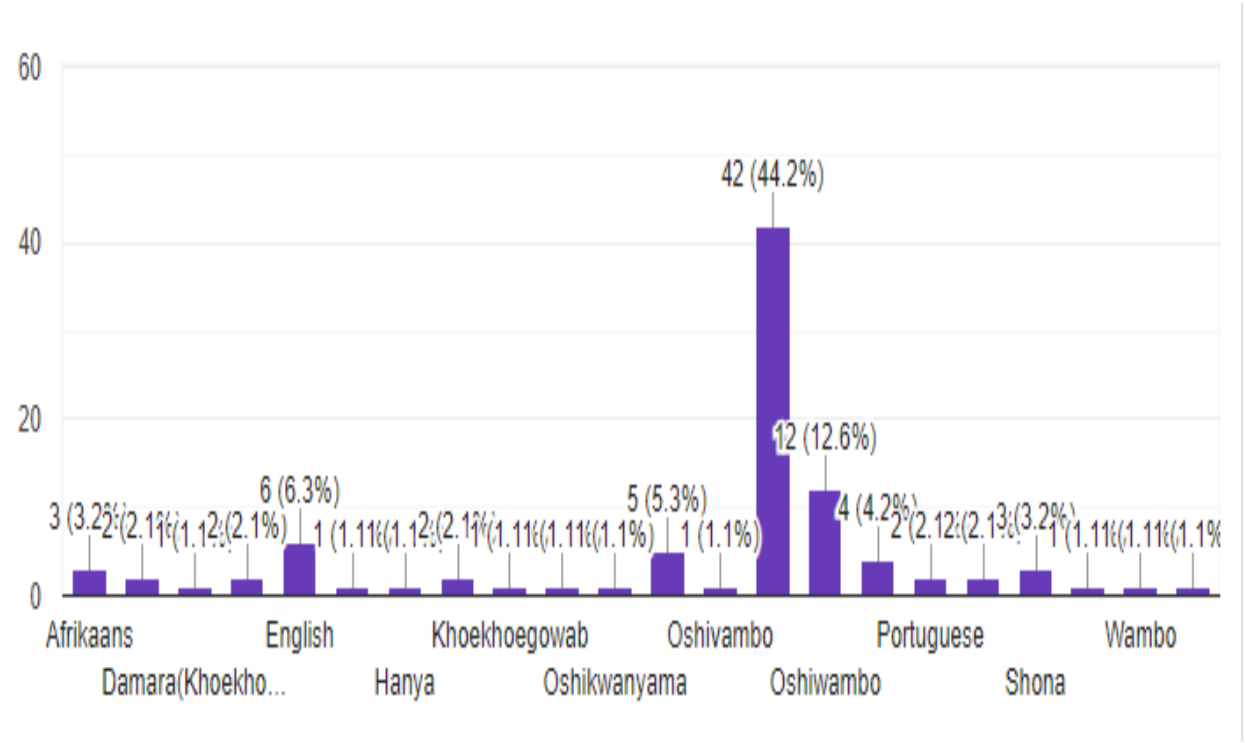
The bar chart above indicates that 93.7% of the student participants were aged between 18 and 25. The natural progression of the participants from high school to university agrees with why they form the largest number of all the participants. The number of the participants decline as their age increases to above 25. The age group ranging between 25 and 34 forms

5.3% of the participants. The least age group was that of students with 35 years and above totalling only 1%.

4.3.3 Mother tongue of the participants

The figure below presents the respondents' mother tongue statistical data. They are about 30 indigenous languages that are spoken in Namibia (Frydman, 2011). The languages spoken in Namibia are categorised into three language families. These are the Niger-Congo, Indo-European, and the Khoisan language family (Haingura, 2020). The most spoken of the languages are represented in the histogram below. The data were analysed through descriptive statistics.

Figure 4.3 Mother tongue statistical data



The study findings reveal that the Oshiwambo language is the most that is spoken by the participants with (45) 47.5%. It is worth stating that the spellings Oshivambo, Wambo or Oshikwanyama, are variants of the same language, but mean the same thing and all the spellings are acceptable. The open ended-questionnaire generated several different spellings, the correct form of the word is spelled as Oshiwambo. Afrikaans and Khoekhoegowab were

represented in the study by speakers with (3) 3.2% and (2.5) 2.1% respectively. The statistics that were generated from the present study reflect the true representation of what is found on the ground. The languages Oshindonga and Oshikwanyama are variants of the Oshiwambo languages. The study also reflects the presence of other African languages that represent the presence of international students at NUST. These languages are the Shona language that is spoken in Zimbabwe and the Zulu language from South Africa. Less dominant languages such as Hanya, Otjiherero, Gricuku and German are also represented in the group of the student participants. The English language is the language of government, business, and education in Namibia. It does not fall under indigenous languages, therefore, the people who use it as mother tongue as presented by the data comprise of (6)6.3% of the respondents. The Portuguese language is also represented with (2.5)2.1% mainly because of some students from the neighbouring African country of Angola. They have a substantial presence in Namibia. These statistics shows why the English language is studied as English second language (ESL) in Namibia. This reason makes it relevant for the present study to investigate the needs of second year students who are currently studying for the computer science degree at NUST.

SECTION B

4.4 Written English essays performance evaluation

This section of the study investigates the existing English language gaps and challenges. This was achieved by evaluating the current performance of the students' written essays. One of the methods used to evaluate students' performance of written essays is to set up a benchmark to measure the students' language skills performance (see appendix A). In the present study, 113 essays were collected from students that have studied the English for academic Purposes (EAP) course and evaluated using the essay performance evaluation scale. The essays results were then analysed through descriptive statistics by referring to percentage and the numbers scored by the participants. Descriptive statistics summarises the results of a given data set (Cooksey, 2020). The data can be broken down into measures of central tendency and measures of variability (spread).

The section was analysed in the following three stages:

- Identifying competencies;
- Quantifying of competencies; and
- Analysis of identified competencies through descriptive statistics

4.4.1 Identifying written essay competencies

There are four English language competency skills identified in the written essays. These are technical skills, essay content, language accuracy and communicative achievement. It is important to note that the four competency skills were identified from the written aspect of the English language skills. These competencies were identified and adapted from the University of Cambridge Performance Assessment (2016). The English technical skills included the correct use of technical vocabulary and the application of complex technical words. The use of a variety of vocabulary and the appropriateness were also evaluated in the written essays. The essay content was another area of competency assessed. The essay content had to be relevant to the subject matter. The language accuracy skill was identified as one of the central aspects. Under this area of competency, the correct use of English grammar, spellings and correctly sentence syntax were evaluated. The wrong use of a sentence has a bad effect on the entire essay because it distorts meaning (Mukařovský, 2014). The essay will not be able to communicate effectively. Therefore, the communicative achievement is affected. The communicative achievement is the last of the assessed English language skills. Under this skill, an essay should effectively hold the target reader's attention and communicate straight forward some complex ideas in an appropriate manner.

4.4.2 Quantifying written essay competencies

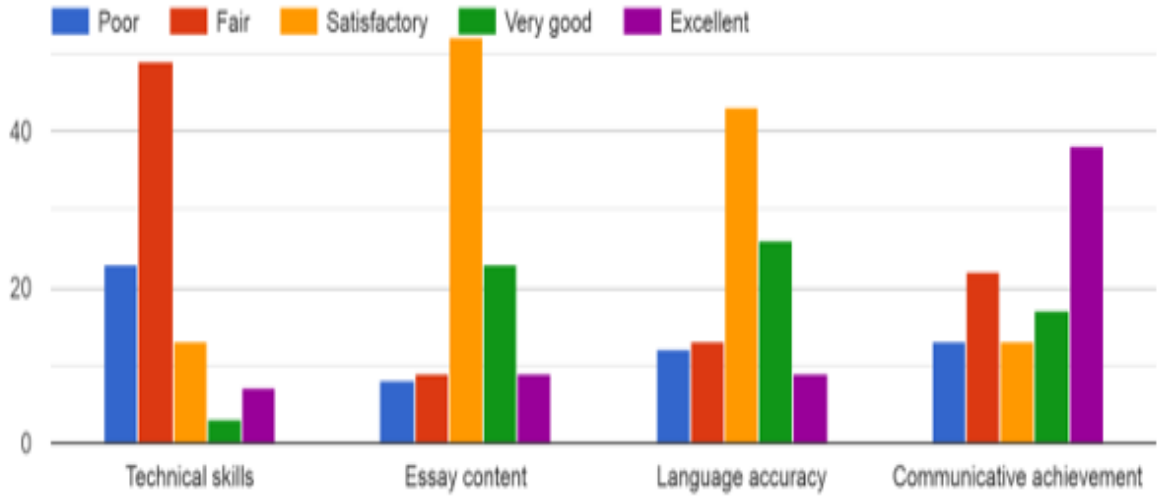
The figure below presents the quantitative data that were obtained after evaluating the written essays according to the written essay performance evaluation scale (See appendix A). The rating was classified in the following classes: poor, fair, satisfactory, very good and

excellent. The bar graph presents the statistics according to the four classes stated of the written essay competencies following the evaluation scale.

4.4.3 Results of the evaluated essays from the essay performance scale

The following bar graph was generated from the questionnaire and the data were analysed through descriptive statistics to evaluate written essays competencies using the performance scale (please refer to appendix A).

Figure 4.4 English essay performance scale statistical data



The data in the bar graph above were analysed through descriptive statistics. Out of all the 103 essays evaluated, the students essay writing technical skills were the least rated with most of the students (49%) in this category graded as fair. They were followed by 23% who were graded as poor. The technical skills included the pronounced use of technical vocabulary relevant to the given essay topic. Most of the students could not adequately use complex technical words or avoided these words altogether opting for simple words which could not adequately explain a concept. Only 10% of the students achieved the classes of very good and excellent combined. The evaluation of the written essays content indicated that 52% of the students scored the satisfactory grading class. The excellent and fair classes scored equal with both 9% each. In any academic grading system, students who are graded satisfactory and better are regarded to pass the course. This means that in the category of written essays, students graded satisfactory, very good and excellent scored 52%, 23% and 9% respectively.

Only 8% of the students performed poorly in the essay content category. The students performed well in the language accuracy category. The use of grammar, spellings, and correct syntactic structures were graded as satisfactory with 43%, very good with, 26% and excellent with 9%. The performance was generally well done. the communicative achievement had the best results where 38% of the students' essays scored 38%. The essays communicated effectively to the targeted readers in a straightforward manner.

SECTION C

4.5 English language demands for IT students

The data presented and analysed in section C were obtained from the students' questionnaire on needs analysis. The questionnaire responds to the study objectives that seeks to investigate the English language needs of Computer Science students at NUST. The analysis is presented thematically in the form of statistical data tables, histograms, pie charts and bar graphs.

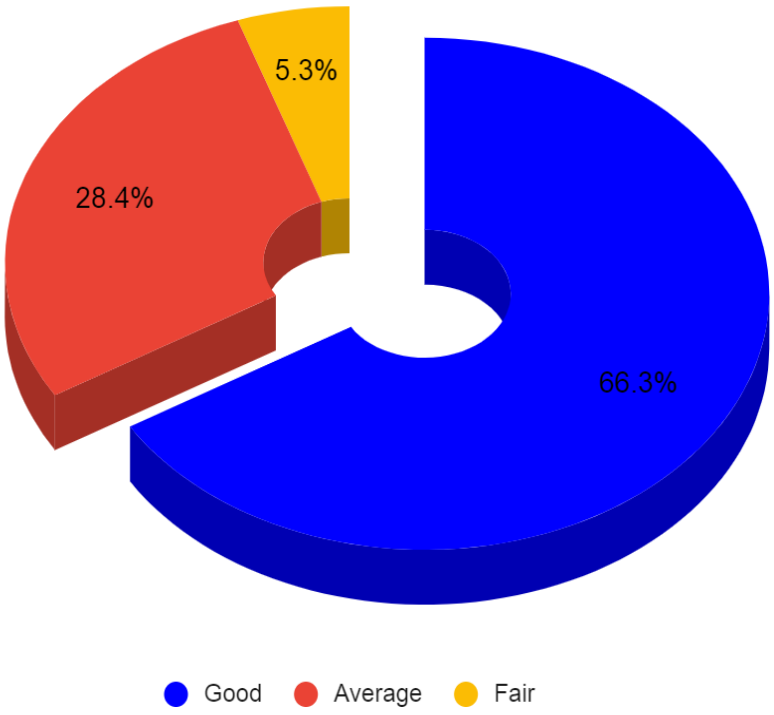
4.5.1 Students' self-rating of English language skills

Students were asked to rate their own English language skills based on four categories, reading, writing, listening and speaking. This question would prepare the students to respond to the next question using their understanding of the present question. The question also introduced the students some direction on what they were expected in the follow up questions. The students had to respond to the four combined categories as good, average, fair or poor. The pie chart below details the study findings.

4.5.2 Statistical presentation of students' self-rating of English language skills

The figure below presents statistical data generated when the participants were asked to self-rate their English language skills. They were asked to select a suitable rating from a scale ranging from good, average, fair and poor. None of them self-rated poor.

Figure 4.5 Students' self-rating

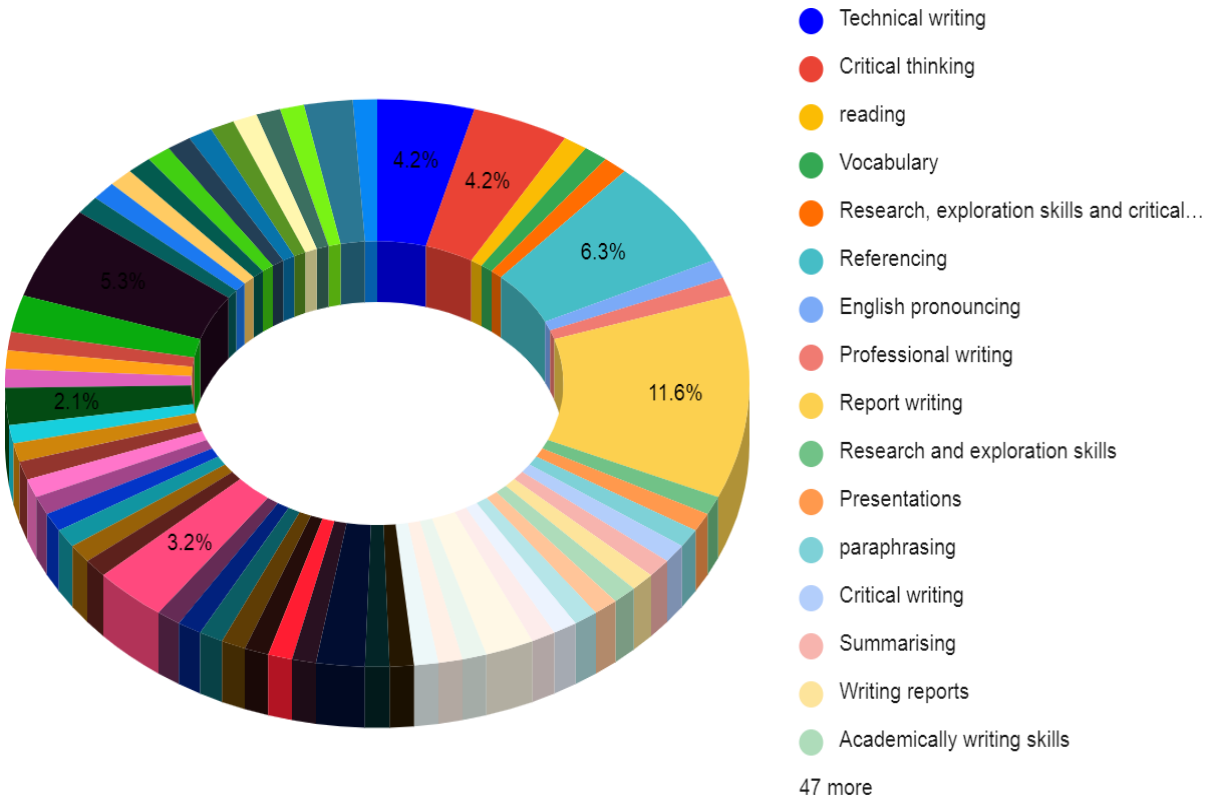


A total of 66.3% of the student participants indicated that their English language skills were good in all the four skills, that is in reading, writing, listening and speaking. The rating category 'poor' did not get any score. The lowest rating was that of the respondents with 28.4%. Only 5.3% of the respondents indicated that they had a fair knowledge of the English language skills

4.5.3 Technical writing skills students learnt from taught English courses

The following data was taken from the questionnaire and the data was analysed through descriptive statistics to access technical writing skills which the students have learnt from the English courses that they were taught at NUST.

Figure 4.6 Learnt technical writing skills



The student participants were asked to mention the technical writing skills which they learnt from the English courses that they were taught at NUST. Their responses are presented in the pie chart below. It is important at this stage to restate the purpose of the present study. The aim of the present study was to investigate the English language needs of computer science students. The needs can be established by asking the students what they currently know or what they have been taught, then ask them to inform the study about what they feel lacks in the English language courses carriculum. As informed by the theory that guides the present study, Hutchinson and Waters (1987) define that target needs study three specific aspects; necessities, lacks and wants. Necessities are the demands of the target situation, what the learner must know to function effectively in a language use situation. Lack is about what the learner already know, then decide what necessities are missing. There is a gap between the existing proficiency and the target proficiency. Finally, wants, is about what the study has considered from an objective point of view, the study assumes that a need does not exist independent of a person (Hutchinson & Waters, 1987). It is a needs assessment study that seeks to address the English language demands for computer science students at NUST.

Understanding the necessities, lacks and wants of the students helps the study to establish the needs gap.

The study findings revealed that the majority of the students of 11,6% responded that they were taught various technical methods of writing skills. These include critical writing, professional writing and report writing. Technical writing is a type of writing where the author is writing about a particular subject that requires direction, instruction, or explanation (Hyland, 2019). The word cloud below summarises the frequency of the skills that the students were taught. It is important to note that the results presented in the word cloud reflects the exact responses that were given by the respondents.

4.5.4 Presentation of word cloud frequency effects of technical writing skills

The figure below presents a word cloud frequency effects of the participants' technical writing skills. The number in brackets against each word indicates how frequent students mentioned a language skill. The most mentioned word means the consensus agreed by the participants as the most language skill on demand.

Figure 4.7 Word cloud frequency effects of technical writing skills

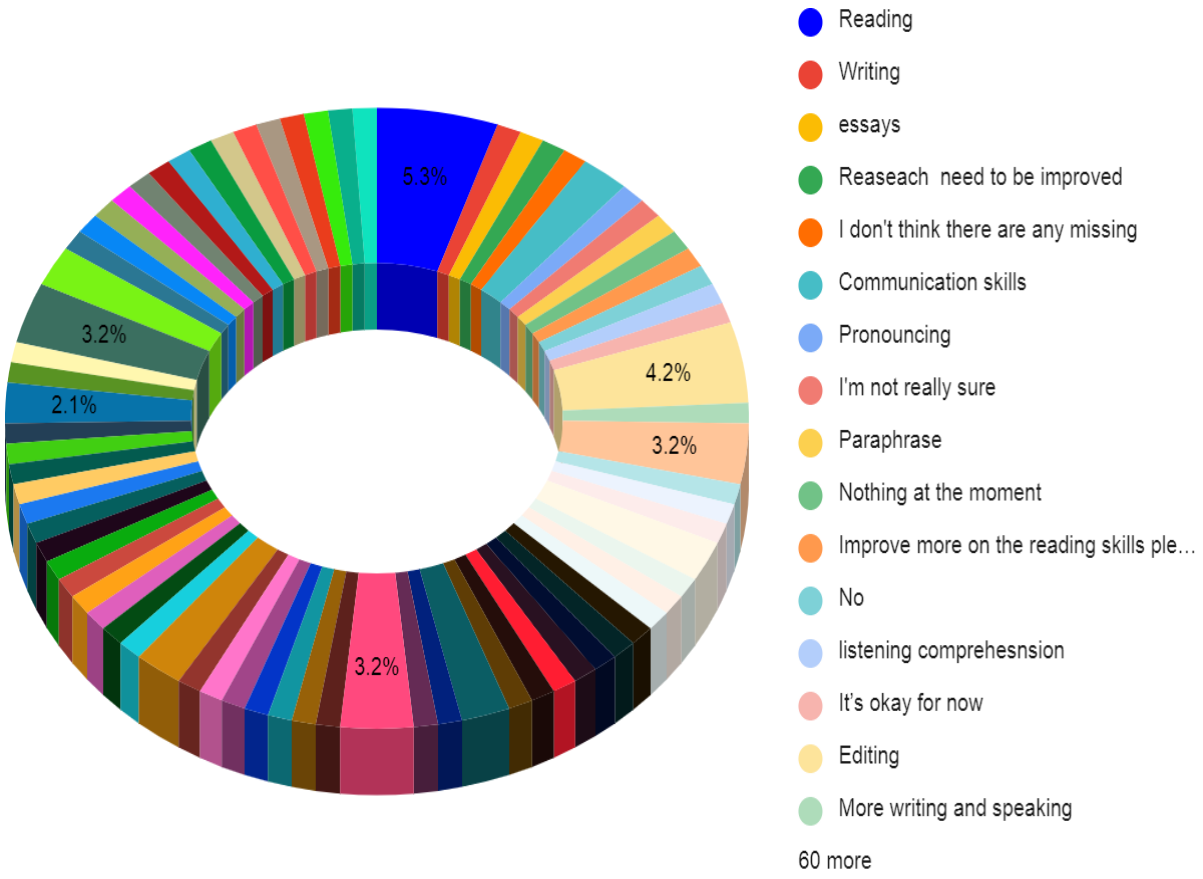
The word cloud frequency effects above summarises the responses given by the students. The data presented reveals that the writing skill was the most frequent response given by the students. The writing skills were stated as follows: report writing, writing test, academic writing, research writing, research writing, essay writing, critical writing and writing essays.

The writing skill was the most frequent with 28 out of 95 given responses (29% of the participants). The students also reported that research, vocabulary, referencing and how to tackle examinations were some of the skills that they were taught at NUST.

4.5.5 Students' suggestions of the EAP missing language skills

The following data were taken from the questionnaire and the data were analysed through descriptive statistics to evaluate the suggested missing language skills that can be added to the EAP course.

Figure 4.8 Students' suggestions on missing skills



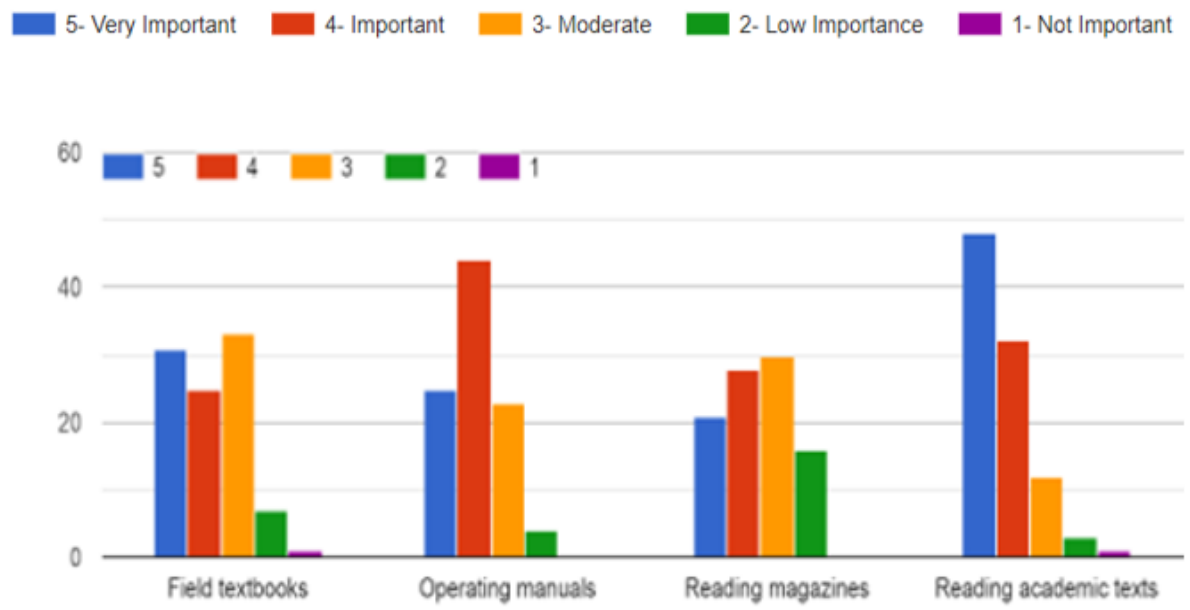
The participants were asked to suggest some of the missing language skills that can be added to the EAP course. The study findings as presented by the pie chart above indicate that the opinion of the student participants is spread out across many spheres. The students identified reading with 5.3% with the most frequency as the English language skill that they want to be added to the EAP course. Other reading related skills suggested by the students are

pronunciation and editing. The reason for the suggestion may be in reading comprehension. Reading with comprehension is very important for a student because it allows them to respond and perform a given task. The relationship between reading and writing cannot be ignored.

4.5.6 Students' rating of reading tasks according to importance

The following data was generated from the questionnaire and the data was analysed through descriptive statistics to evaluate the students' rating of reading tasks according to importance.

Figure 4.9 Rating of students' reading tasks



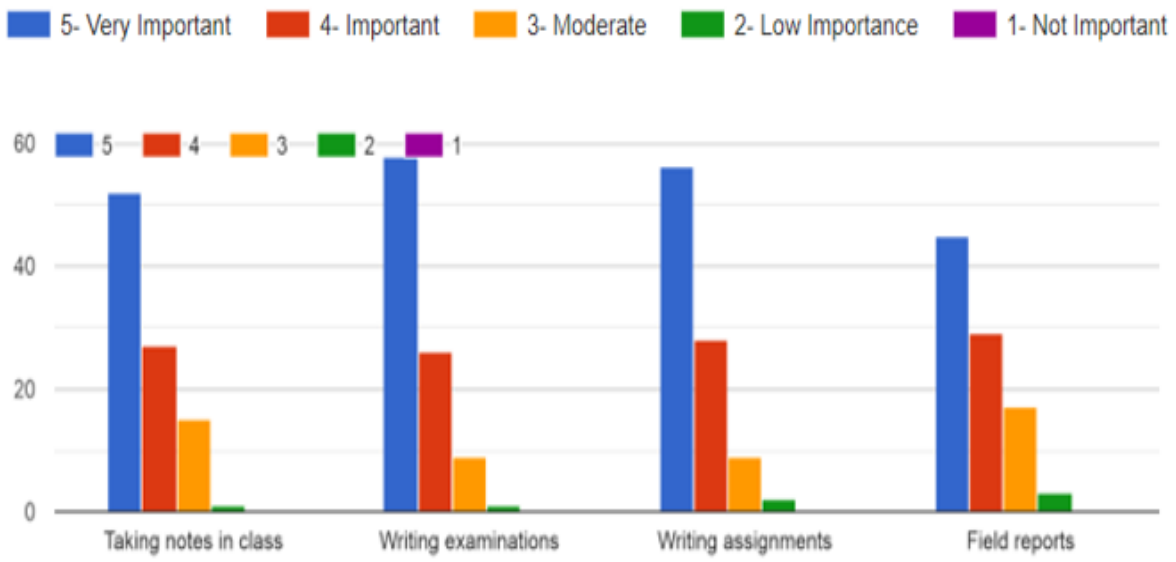
The study findings from the graph above were analysed through descriptive statistics in the form of percentages by rating the importance of reading tasks. The reading tasks presented to students included academic based texts, work related and those for computer science related informative entertainment. Students were asked to rate the importance of reading tasks according to importance. The students responded to the ratings by importance according to the following Likert scale; 5 – Very important, 4 – Important, 3 – Moderate, 2 – Low importance, and 1 – Not important. The results of the responses were used to generate the graph above. The study findings indicated that reading academic texts was the most

important of the reading tasks with the highest score of 48%. The rating suggests that students are less likely to read for entertainment because 0% of the students rated the reading of lecture notes as not important. The reading of operating manuals also proved to be an important task because it was rated 44%. The study findings agree with Chan (2013 that the reading of academic related tasks is the most important for university students. The reading of magazines were rated the lowest. The reason for the low score could be that the content that is found in magazines do not contribute to the scoring of the students' graded examination mark. University sudents do not have much time to spend on a subject matter that does not contribute to their semester mark.

4.5.7 Students' rating of writing skills according to importance.

The following data was generated from the questionnaire and the data was analysed through descriptive statistics to evaluate the students' rating of writing skills according to importance.

Figure 4.10 Rating of students' writing skills



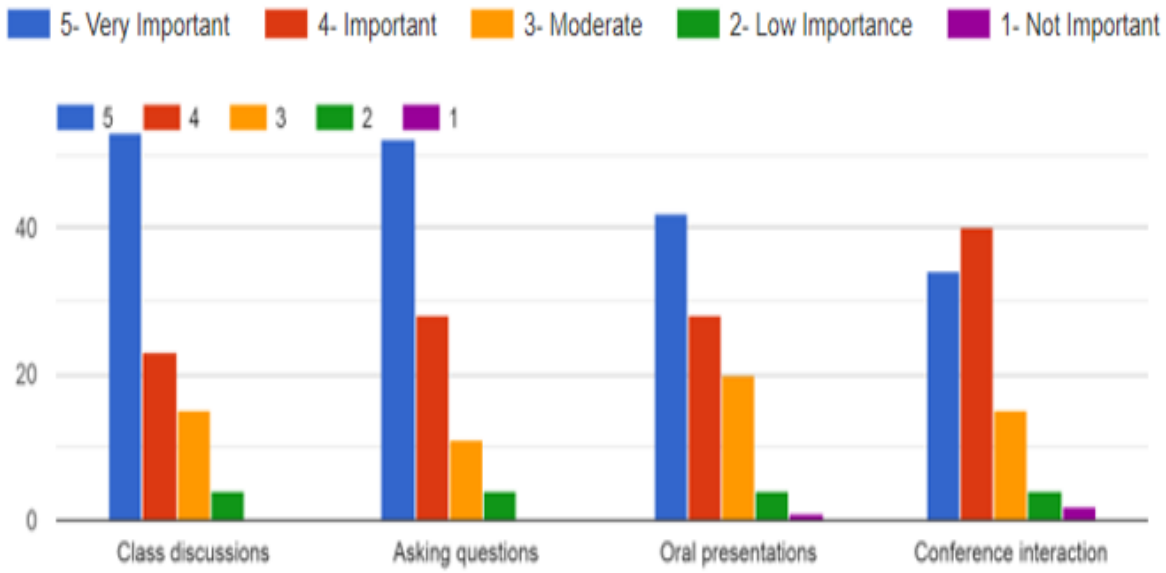
This part analyses the writing tasks data that is presented in the graph above. The data is analysed using descriptive statistics in percentage form. The responses indicate that 59% of the students rated writing of examinations as the most important task. This was followed by writing assignments with 56% of the students rating the importance as closely important as the writing of examinations with a difference of only 2%. Among the four writing tasks rated

by the students, the rating '1-Not important' recorded a 0% rating. This means that students cannot function in their performance at the university without the knowledge of the writing tasks. The task of writing examinations and assignments yielded a higher score than taking notes in class and writing field reports.

4.5.8 Students' rating of speaking tasks according to importance.

The following data was generated from the questionnaire and the data was analysed through descriptive statistics to evaluate the students' rating of speaking tasks according to importance.

Figure 4.11 Rating of students' speaking tasks



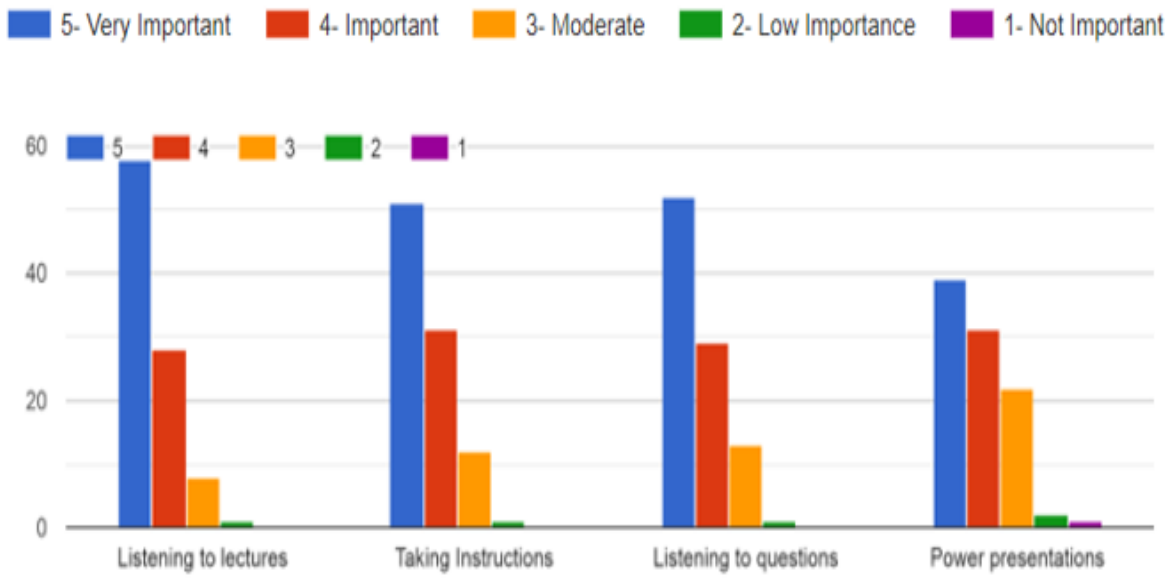
The study findings presented in the graph above reveal that the "very important" rating scores the highest in four of the speaking tasks according to importance with a group average score of 45%. On the other hand, the students rated speaking task for class discussions with the "very important" scoring 53%. The not important rating scored 0%. The reason could be that students saw a need in the speaking task of class discussions as it facilitated their learning process. When the students were asked to rate the importance of asking of questions and oral presentations, they responded positively with a score of 52% and 42% respectively. There is another similarity of these two tasks on the rating of "important". They both scored 28%,

this means that the two tasks are of equal importance to the students' speaking tasks. The lowest rated on the "very important" score with 34% was the conference interaction speaking task. This study finding may be related to the status of the participants as students as compared to graduates who are already employed. Graduates may find the speaking task at conferences to be very important for them.

4.5.9 Students' rating of listening skills according to their importance

The following data was generated from the questionnaire and the data was analysed through descriptive statistics to evaluate the students' rating of listening skills according to importance.

Figure 4.12 Rating of students' listening skills

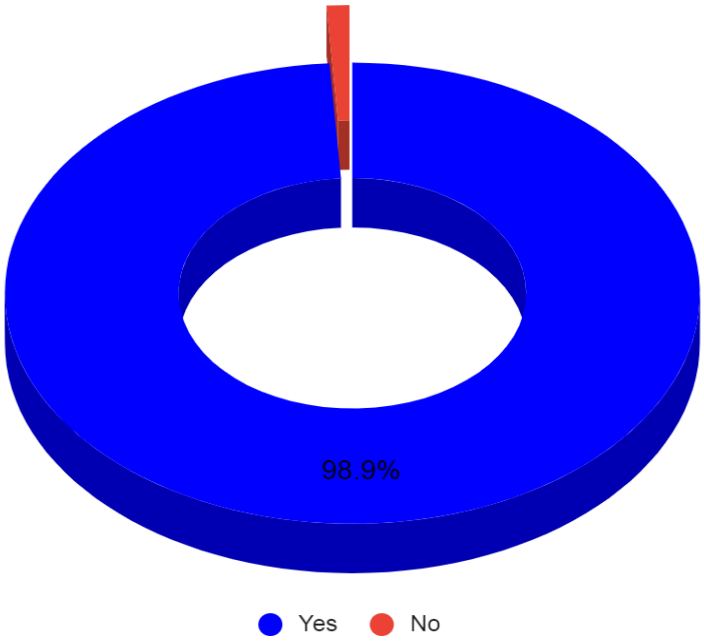


The participants were asked to rate the following listening skills according to their importance, listening to lectures, taking notes in class, listening to questions, and listening to power presentations. Listening to lectures (58%) was rated as the most important of all the listening activities. The least rated on average with 39% was the listening to power presentations activity. Taking notes and listening to questions were rated 51% and 52% respectively. The higher rating for the listening to lectures task may be related to the students' need to acquire knowledge.

4.5.10 Responses if the students' English skills improved after studying the EAP

The figure below presents the data from the respondents when they were asked if their English skills improved after studying EAP at NUST.

Figure 4.13 Improvement of English skills after EAP course



The data reveals that 98.9% of the student participants agreed (Yes) that their English language skills improved after studying the EAP course. Only 1.1% responded in disagreement (No). This means that they were generally satisfied despite having indicated some of the language areas which they needed to be improved among the four language skills of reading, writing, listening, and speaking.

4.5.11 Students' demands on the improvement of the EAP course at NUST.

The Cloud word frequency below presents the data that was collected from the questionnaire and analysed through descriptive statistics. The best way to present and analyse the data from this question is through word frequency cloud effects. The cloud word frequency effects refer to the observation that high-frequency words appear the most than low-frequency

words (Brysbaert, Mandera & Keuleers, 2018). The data was analysed through descriptive statistics. The study findings are presented in the cloud word frequency effects and were analysed.

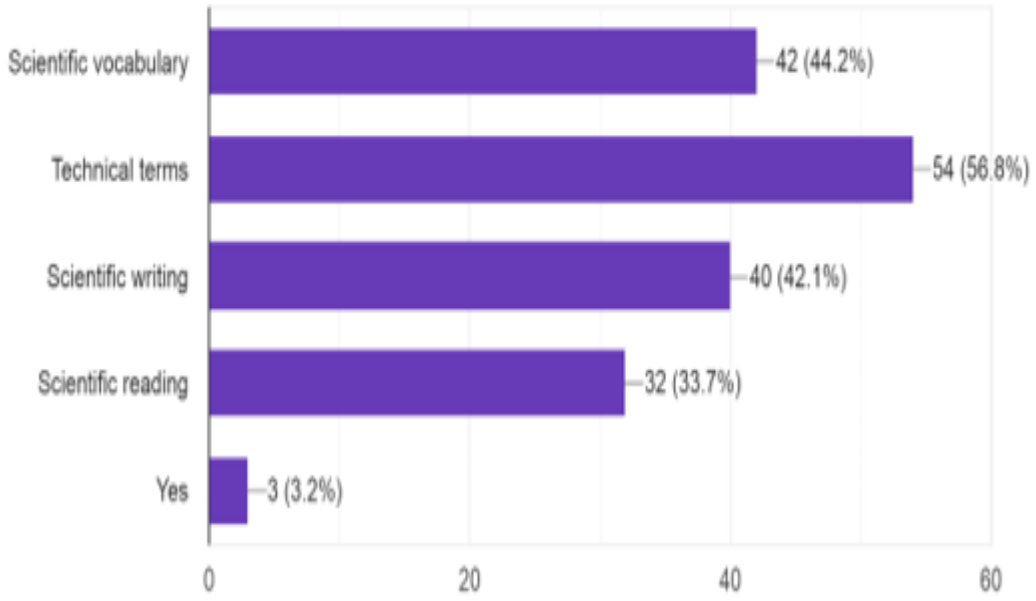
Figure 4.14 Cloud word frequency effects of students' demands

The cloud word frequency effects above reveal that the participants have a high demand of language skills in the order, writing 10.5% (10), presentations 6.3% (6), research 5.2% (5) and speaking 4.2% (4) as the most frequent mentioned words. The reason for mentioning the writing skill the most could be that academic writing serves as a tool of communication that conveys acquired knowledge in a specific field of study (Fareed, Ashraf & Bilal, 2016). A student who does not know how to write finds it very difficult to read and comprehend a given academic instruction.

4.5.12 Students' considerations of the EST language areas in need of emphasis

The data presented in Figure 4.15 below was collected from the students' questionnaire to find out what language areas they would like to be emphasised if the English for Science and Technology (EST) course were to be introduced. The study findings are discussed below.

Figure 4.15 Skills students need to be emphasised



Students were asked to consider the introduction of the English for Science and Technology (EST), which language areas they would you like to be emphasised. EST is the English that is taught and used by students and professionals in Science, Technology, Engineering and Math (STEM) to carry out their study and work related duties (Honey, Pearson & Schweingruber, 2014). It is relevant to the study and professional life of Computer Scientists. Out of the five options given to students to select the most appropriate language skill they consider the most useful, students opted for the English technical terms which has the highest score of (54) 56.8%. The reason for the choice may be attributed to the strong need in their speaking, reading, listening and wrting of academic tasks relevant to their studies. The lowest response with only 3 (3.2%) means that the students agreed to the introduction of the EST course. It is worth to note that scientific vocabulary is closely related to technical terms. A totoal of 42 (42.2%) of the students responded positively for the need to emphasise scientific vocabulary in the EST course. The response show the demand for the EST course to be introduced at NUST. The respondants also favoured scientific reading and scientific writing with 40 (42.1%) and 32 (33.7%) respectively. The overall responses suggest that there is a very strong demand for the EST course to be introduced at NUST.

SECTION D

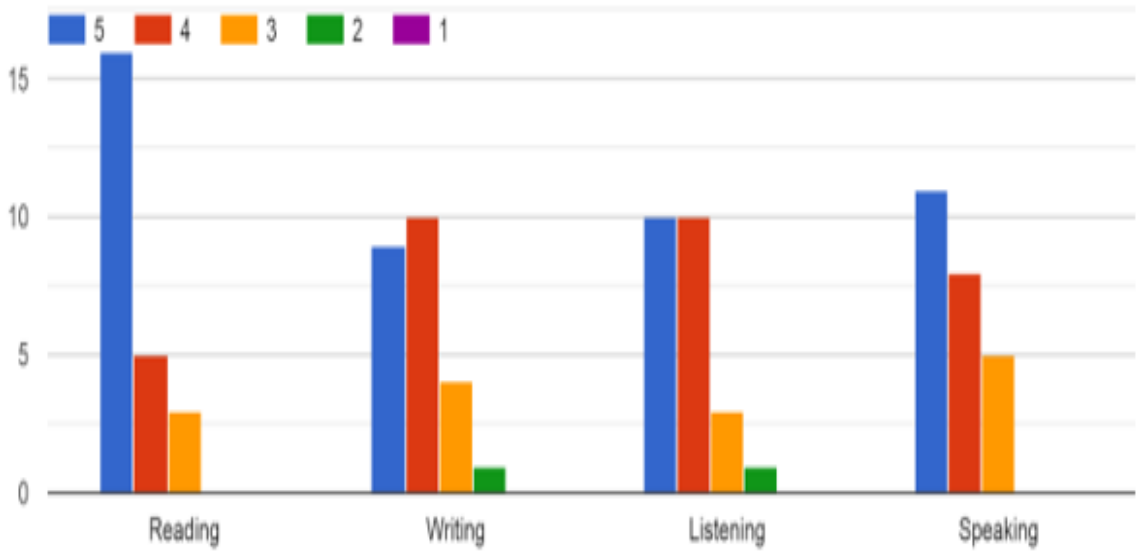
4.6 English skills gap analysis between IT professionals and students

In this section of the study, IT professionals at Mobile Telecommunications Company Namibia (MTC Namibia) and NUST were asked to rate English language skills according to importance and the demands of their work-related activities. The two groups identified to represent the IT industry were the participants working at the MTC Namibia and those working as the teaching staff at NUST because of their convenience during the Covid-19 pandemic situation. The IT professionals at the MTC represent the English language used for occupational purposes while the teaching staff at NUST represent the academic. The purpose of this section is to establish the English language needs gap between what is currently offered to Computer Science students at NUST and what is needed in the IT industry workplace, the study formulated and collected the following responses. The participants' selection criteria required the participants to be an IT graduate already working in the industry. They must have studied an English language course during their time as students. The study population and data for the IT professionals were collected through the convenience sampling method.

4.6.1 Self-rating of IT professionals' English language skills

The figure below presents statistical data generated when the participants self-rating of four English language skills. Participants were asked to select a suitable rating from a scale ranging from ,5-excellent, 4-good, 3-average, 2-fair, 1-poor. None of the participants self-rated poor.

Figure 4.16 Self-rating of IT professionals

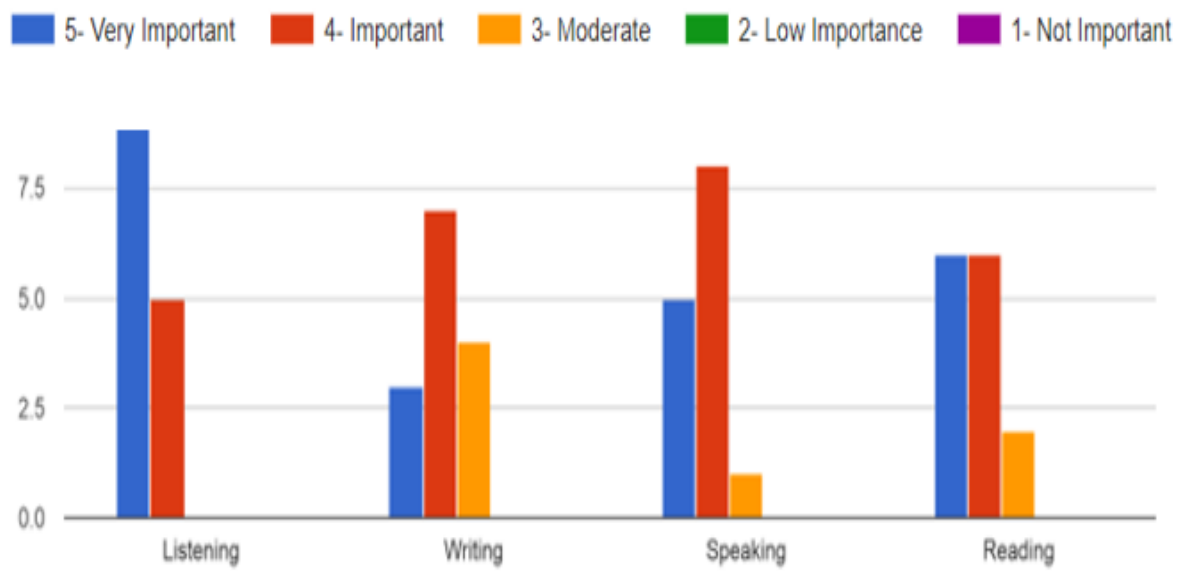


The study findings reveal that 64% of the IT professionals self-rated their reading skills as excellent. The highest rated on the writing tasks was rated as 'good' with 40% of the participants. It is an indication that there is a slight demand in the industry's writing skills. The listening skills were equally rated by 40% of the participants as excellent and good. The self-rating poor received a zero score in all the four language skills. The speaking skills were rated as excellent by 44% and good by 32% of the participants. It is important to note that the participants are all IT graduates who are already working as professionals.

4.6.2 IT professional language skills that allows effective work performance

The following data was generated from the IT professionals' questionnaire and the data was analysed through descriptive statistics to evaluate language skills they perceive to be the most important that allow them to perform your work effectively.

Figure 4.17 Four language skills that allows effective work performance

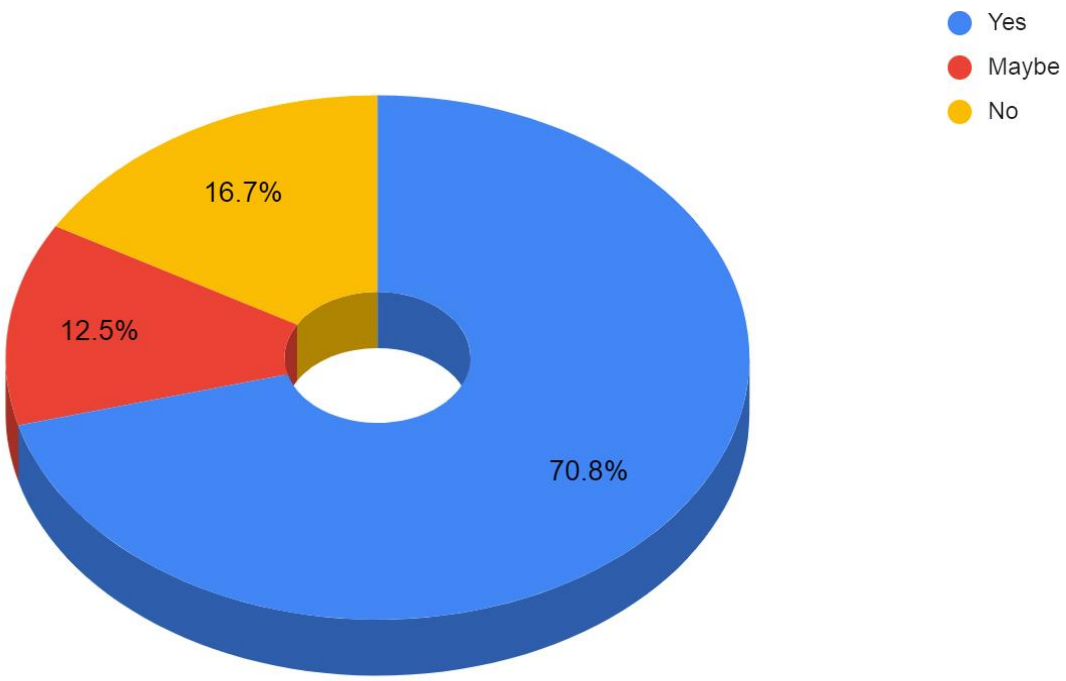


The data presented in the figure above was obtained when the participants were asked which language skills, they perceive to be the most important that allow them to perform your work effectively. The language skill of listening was rated as the most important was task by 65% of the participants.

4.6.3 The opinion of IT experts in performing their duties effectively

Figure 4.18 below presents the data as responded to by IT professionals to suggest if they think that IT experts need to be taught field-specific terminology to be able to perform their duties effectively. The data were analysed using descriptive statistics and presented below.

Figure 4.18 IT experts' field-specific terminology demands

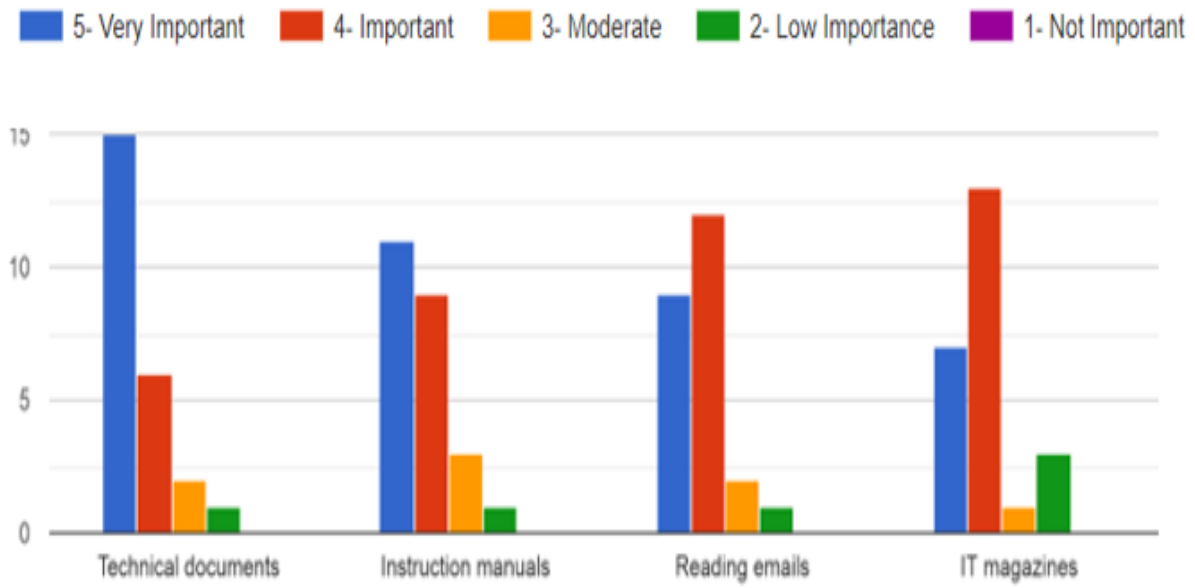


Most of the respondents (78.8%) agree by indicating with the response 'Yes' that IT experts need to be taught field-specific terminology to be able to perform their duties effectively. A total of 16.7% responded with 'No'. This response may mean that the field-specific terminology that they were taught at university was adequate for them. The remaining 12.5% of the participants responded with 'Maybe'. They imply that they neither agree nor disagree or they were simply undecided.

4.6.4 Rating of the extent of importance of reading of work-related tasks

IT professionals were asked to rate the extent of the importance of English language skills when performing work-related tasks. The tasks rated were reading, writing, speaking, and listening skills. The descriptive statistical data presented in figure 4.19 below was generated by the question that asked the IT professionals to rate the extent of importance of reading work-related tasks that allow them to perform their work effectively.

Figure 4.19 Reading of work-related tasks

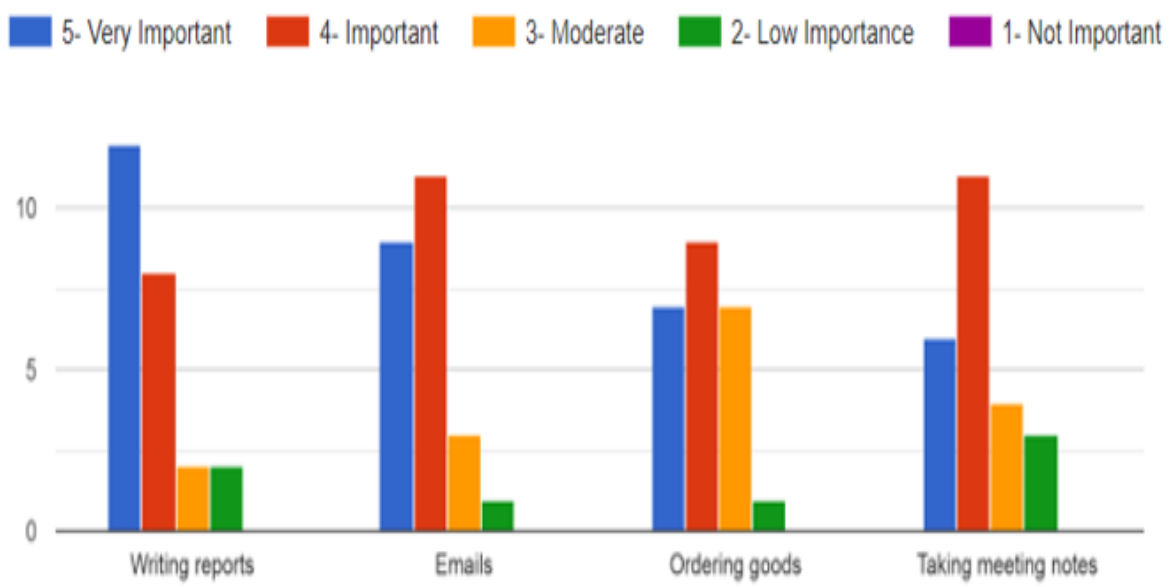


Reading of technical documents was rated as most important by 60% of the participants. Reading manuals and emails was followed in the rating of most important with 44% and 36% respectively. Workers in the IT industry are expected to perform multiple reading tasks as required by their job. The technological development of the email as a modern method of communication replaced letters from the postal services (Milne, 2012). The digital mail has now become the easiest and fastest way of communication for most of the working professionals. The reading of the IT magazines was rated the rating of important by 52% of the participants. IT magazines are a source of technological development news among the community of professionals. The ratings of low importance and not important scored less than 10% each among all four reading tasks.

4.6.5 Rating of the extent of importance of writing of work-related tasks

The descriptive statistical data presented in figure 4.20 below was generated by the question that asked the IT professionals to rate the extent of importance of writing work-related tasks that allow them to perform their work effectively.

Figure 4.20 Writing of work-related tasks

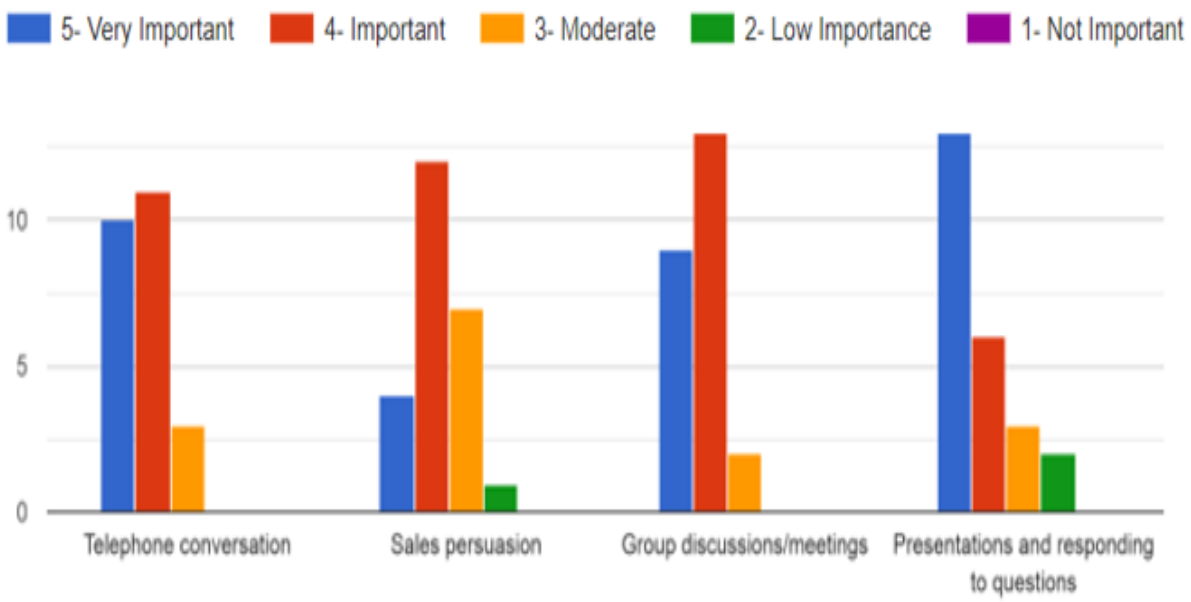


The writing of reports and emails were rated as most important by 48% and 36% of the participants, respectively. The ordering of goods and taking meeting notes is largely performed by employees with specifically assigned to do so. The ordering of goods for example is performed by the store clerks and procurement officers while the taking of notes is likely to be performed by company secretaries. This reason may suggest why these writing tasks were rated as important and moderate. The preliminary average rating of the writing tasks strongly indicate that it is a skill that is on demand compared to reading and listening. IT companies are likely to employ workers with a perfected writing skill because it is a necessity, especially the writing of emails and compiling of field reports.

4.6.6 Rating of the extent of importance of speaking of work-related tasks

The descriptive statistical data presented in figure 4.21 below was generated by the question that asked the IT professionals to rate the extent of importance of speaking work-related tasks that allow them to perform their work effectively.

Figure 4.21 Speaking of work-related tasks

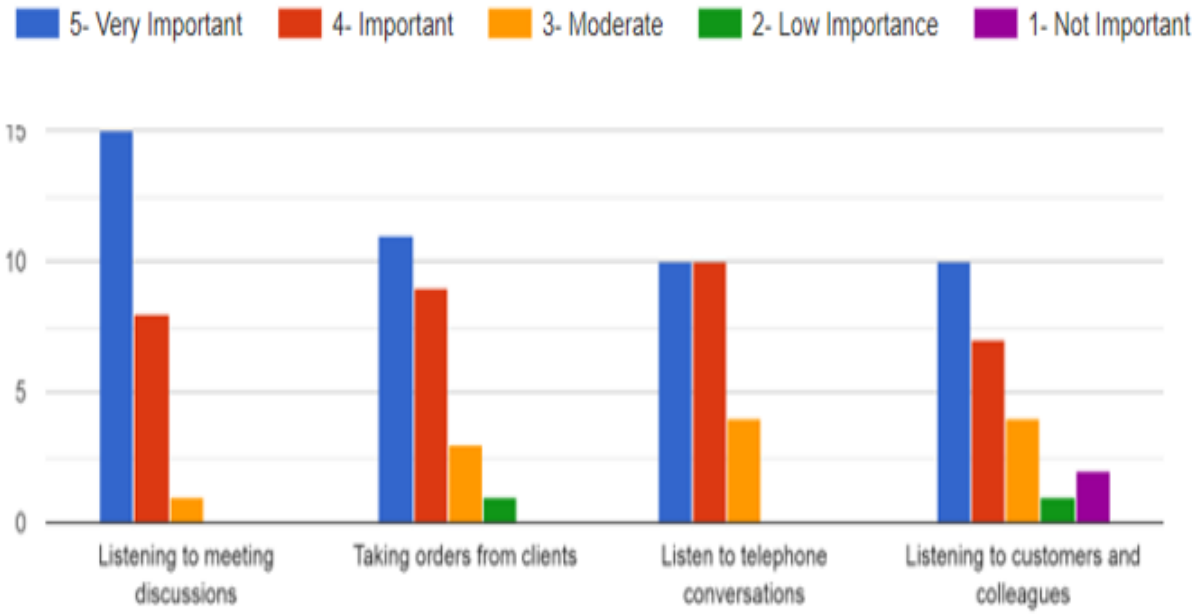


The speaking of work-related tasks is very important for the oral communicative aspect of the IT industry. Clients need to be given oral information while employees liaise with clients to negotiate and strike a sales deal. The speaking of presentations and responding to questions task was rated by 52% of the participants as the most important task. This rating is above the telephone conversation which was rated by 40% as most important. The sales persuasion task was rated as important by a sizeable number of participants (48%). This rating agrees with earlier comparisons above because the employer hires an employee for the business to earn money through sales.

4.6.7 Rating of the extent of importance of listening of work-related tasks

The descriptive statistical data presented in figure 4.22 below was generated by the question that asked the IT professionals to rate the extent of importance of listening work-related tasks that allow them to perform their work effectively.

Figure 4.22 Listening of work-related tasks

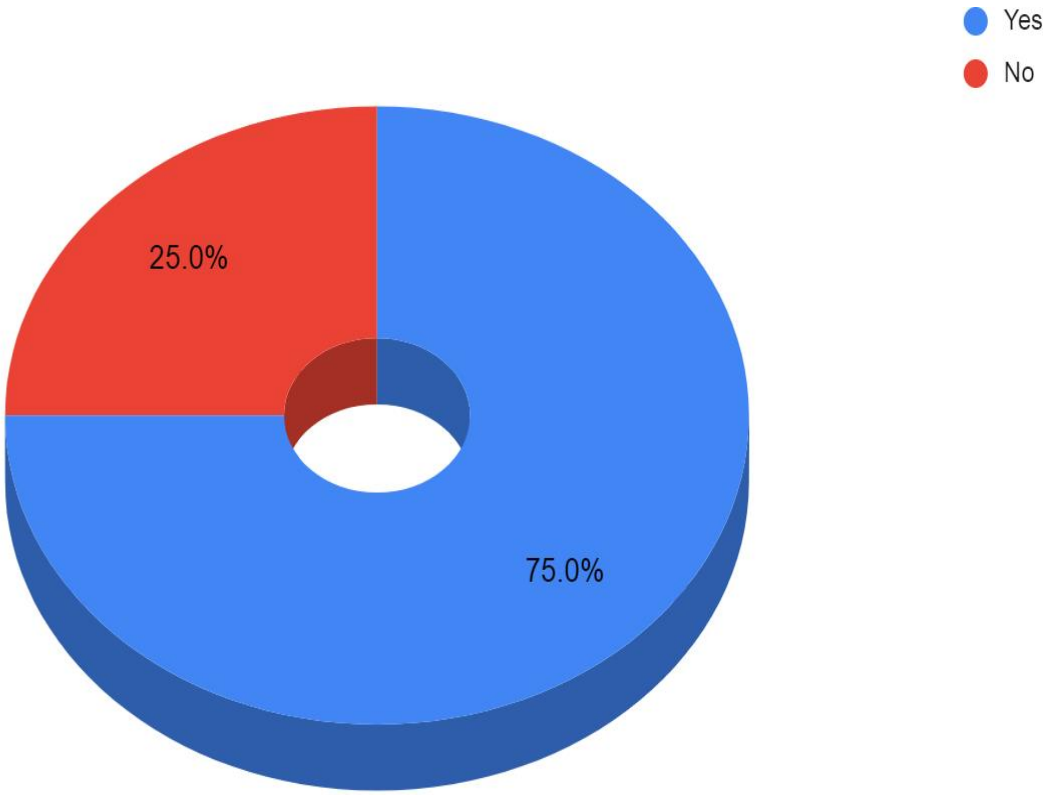


Listening skill provides the transfer of information from one person to another. A total 60% of the participants rated the task of listening to meeting discussions as the most important task. The respondents (44%) rated taking orders from clients as very important which is much lesser than the listening to meeting discussions. This suggests that listening is the easiest of all the language skills that were presented to the participants. Listening to telephone conversations and customers were rated equally with 40% each. Only 8% of the participants rated the listening to customers and colleagues as not important. The rating suggests that listening is a language skill that humans unconsciously acquire and use but value the importance unconsciously too.

4.6.8 Opinion of IT experts to better prepare them for the work environment

Figure 4.23 below presents the data as responded by IT professionals to give their opinion if the English for Science and Technology (EST) course can better prepare IT experts for their work environment. The data were analysed using descriptive statistics below.

Figure 4.23 Can EST better prepare IT experts for their work environment

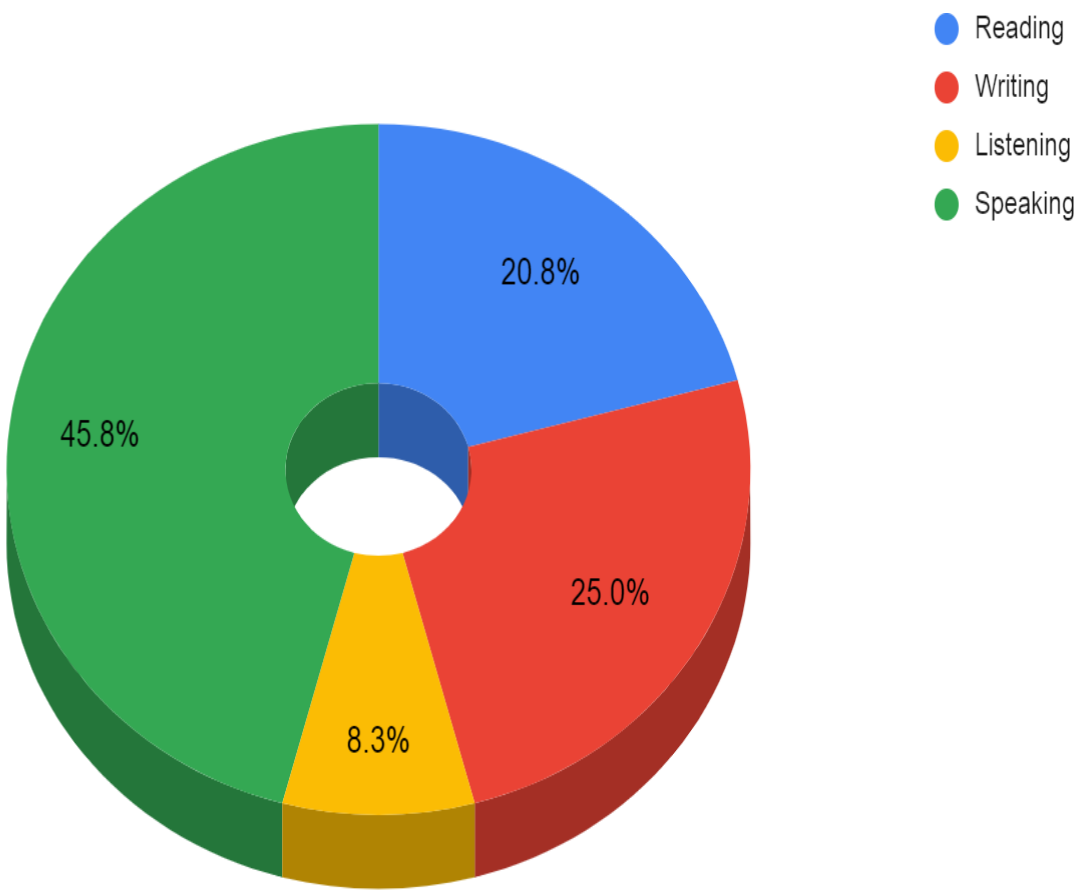


The majority of the participants (75%) agreed that English for Science and Technology (EST) can better prepare IT experts for their work environment. On the other hand, 25% of the respondents responded in disagreement. The higher rating suggests that the EST course is in demand. The responses from the IT industry employees reflects the skills gap between what is offered at university and what is needed by the industry. Had the response disagree been higher than the those who agree that (EST) can better prepare IT experts for their work environment, then it would mean that there is no skills gap.

4.6.9 IT experts identified language gaps that prevent effective performance

Figure 4.24 below presents the data as responded to by IT professionals to suggest what they think which areas of the English language they can identify that prevents them from performing their duties efficiently. The data were analysed using descriptive statistics as presented below.

Figure 4.24 Areas of the English language that prevents effective performing of duties



4.6.10 IT experts suggested English course content recommendations

IT professionals were asked to suggest any recommendations related to the content of English courses. The responses that were collected were analysed through qualitative data analysis. This question got 83% (20) of responses, however 10% (4) of the participants did not respond to the question. Most of the participants recommended language related to technology can be added to the English courses. The following are some of the responses given by the participants:

- I think the English language problem is mostly with the students from the northern part of the country. Be very careful not to generalize

- I think experts learn the terminologies within their professions by interacting technologies not necessarily by having a course that exclusively teaches them these
- I don't think this course is necessary
- English courses are important for all fields of study, but they need to be more specific on each field, for example they must use words or stories related to my field of study.
- The field terminology used in the specific field of study is required when English is taught as a course of subject. This will help students to be familiar with the English in their career.
- Educational technology, computer assisted instruction, instructional systems, language, and languages software
- Technology writing skills
- Nothing at this point. Close peers and I have not faced English language challenges in our IT profession.
- English plays a major role in the work environment as a medium for communication for almost 90% of the workplaces. So English courses are vital.

4.7 Discussions

Needs analysis allows the ESP practitioner to conduct research by accessing the current knowledge of ESP students. The evaluation can be done from the documents that already exist or by giving them a performance competency test. The present study evaluated the current knowledge of Computer Science students by collecting English language essays that they wrote. It is imperative to report that the study identified the lack of essay competency writing skills. The present study findings agree with those of Haimbodi and Woldemariam (2019) that the teaching of English literature must be made compulsory in the Namibian schools. Reading English or that of other Namibian languages enhances the language learner's reading and writing skills. It is a surprising discovery that the Namibian Education system and English language curricula developers have not yet realised the importance of offering English literature as a school subject in all levels. English literature is only taught combined with grammar and reading comprehension to grades 8 to 11 students who are studying English as a First Language. In the light of this students leave high school while they are not adequately

prepared. The English courses designers assume that when students leave high school, they are already competent enough in most of the English language skills, thereby omitting essential areas such as technical vocabulary and spellings. Written essays from students that are studying for a science degree must use field specific technical terms that strengthen or precisely elaborate their scientific argument (Cope, Kalantzis, Abd-El-Khalick, & Bagley, 2013). The lack adequate technical vocabulary in the students' essays provided the study with a prospective view that these students are likely to be challenged when they go to work at the IT industry. The use of incorrect spellings was also identified as a challenge. Incorrectly spelt words may alter the intended meaning. The study recommends that spelling tests and exercises must be included in the English language courses to improve Computer Science students spelling skills. In a related study, it was found out that technical vocabulary should also be included in the course offered to Computer Science students to enhance their competence skills (Irshad & Anwar, 2018). The present study agrees with these study findings.

The study revealed that considering that NUST is an International University, lecturers come from different parts of the world. In comparison with a study that was conducted in Saudi-Arabia, Fadel and Rajab (2017) discovered that students faced challenges of communicating with non-Arab instructors or Engineers. This is because the Arab speaking instructors usually deviated from the English medium of instruction to occasionally using Arabic for additional explanations. The practice of codeswitching can take place when the lecturers and the learners speak the same language, in this case Arabic. The difference of this situation in the Namibian context is that Namibian university students comprise of different language and cultural groups. Namibia is the home of multilingual people with over 30 languages (Mostert, et al., 2012). Therefore, language instructors and lecturers speak the English language as the sole language of instruction in a formal way.

The four language skills presented to students for this study have equal importance depending on the need of the language user. These skills are reading, writing, listening, and speaking. The results from the students' questionnaire revealed that students have less interest in language skills that will not contribute to their performance of the semester mark. The listening and speaking skills were rated as less important compared to reading and writing tasks. The study findings reveal that there is a needs gap of the English language skills between what is currently offered at NUST and what is required by the industry. These findings do not

agree with the findings of Mognhode and Woldemariam (2015) when they evaluated the English language needs of business students. Students reported that although they have learnt some language skills to be able to perform some of their tasks, they strongly feel that they need English for Science and Technology (EST) can better prepare them for the IT industry.

4.8 Chapter summary

The English language is the backbone that lays a foundation for students to succeed in their studies. This chapter discussed the study findings and presented the data in four sections: A, B, C, D and E. The data was presented in charts, graphs, histograms, tables, and explanatory text analysis. Section A presented the demographic data. Section B analysed the written essays data that were collected from undergraduate students who were studying computer science at the Namibia University of Science and Technology (NUST). Section C presented the students' questionnaire descriptive statistical data analyses. Section D presented the data that were collected from a specific questionnaire of Computer Science graduates and IT professionals from NUST and the Mobile Telecommunication Company Namibia (MTC Namibia). Lastly section E discussed the study findings and the chapter conclusion. The next chapter draws conclusions and recommendations of the study. Recommendations for future research topics will be made.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.2 The existing English language gaps and challenges

Current NUST computer science students' English language essays that were evaluated revealed that among the four identified writing competencies, there are challenges. The competencies are technical skills, essay content, language accuracy and communicative achievement. Among these, the technical writing skills were the least rated on performance with most of the students (49%) in this category graded as fair while 23% were graded as poor. Students showed a general weakness in the use of technical vocabulary. This means that they could not precisely articulate the language of science to project a meaningful opinion because they were not fluent in the disciplines use of technical terms (McComas, 2014). They did not attempt to use some complex technical words that strengthens their technical argument. Their essay content, language accuracy and communicative achievement were generally graded as good and excellent. In the language accuracy competency skill, the students showed a notable lack of correct spellings and the inappropriate use of the present continuous tense ending with the suffix-ing. The lack of the use of the subject/verb agreement grammatical function was also identified. These existing challenges affect students in their current and future academic performances. The competency gaps identified in the present study means the students will not be competent enough to perform various English language related tasks currently needed as students and as future employees. The IT industry continues to demand the knowledge of modern scientific language related technological texts. The results of the present study strongly agree with Mungongi (2018), who revealed that the role of English for specific purposes in tertiary education does not meet the needs of employers and the workplace. In addition, he concluded that the English for Academic Purposes (EAP) was inadequate to address many work-related, language literacies and competencies needed in Namibia. In other words, there is a needs gap between the students' perceived needs and the target situation need (Mognhode & Woldemariam, 2015).

5.3 The English language mismatch between the academic and the occupational

Outside the native English language speaking countries, English has taken the lead in the IT industry labelling of goods, instruction manuals and even audio instruction manuals. Other languages are usually translated from English. To prepare a future competent workforce, IT students need to be fully equipped with the language for science and technology before they leave the university. Computer science students and IT professionals responded to separate questionnaires that asked about the importance of the English language knowledge a set of similar language related skills. Among other questions were the four main language skills of reading, writing, listening, and speaking. The study findings reveal that among the four language skills, students rated reading and writing as the most important skills. On the other hand, the IT professionals rated the speaking and writing of various work-related tasks as the most important. The present study concluded that there is a mismatch between the academic and the world of work in the IT industry. This concurs with a similar study by Mognhode and Woldemariam (2015) that found out that there was a gap between ratings of perceived needs of students and those of working professionals. The rating of difficulty of given tasks is based on their experiences and knowledge. Students normally give high ratings for those tasks which are to be performed daily, such as academic writing, listening to lectures and speaking during a class presentation. Their lowest ratings are on tasks which do not contribute to their semester assessment mark

5.4 The extent of the English language needs

Student participants were asked to rate the extent of the English language needs that allows them to carry out their daily tasks effectively. The study revealed that there is a great demand of the English language skills. The two critical skills rated with the most demand was the reading and writing skill. The speaking and listening skills were rated with a lower extent. However, the IT professionals rated the speaking and the writing skills as the most important. The present study concluded in agreement with Tesema and Woldemariam (2016), that the degree of importance of the language skills depends on the intended task.

5.5 Recommendations for the current study

The present study recommends the following:

- It is recommended that IT students be given regular spelling tests as part of their curricula to strengthen their English language technical vocabulary. This can help to resolve the needs gap.
- The inclusion of field specific English literature in the language courses curriculum which includes science novels and magazines to boost students' knowledge of vocabulary. Field related magazines can be used as a source of vocabulary and study material.
- The university needs to conduct a regular needs analysis study between the academic and professional settings to keep in line with current trends in language use.
- The introduction and teaching of English for Science and Technology course that is specifically designed to cater for IT students. This will resolve the breeding of illiterate scientists attending a scientific conference proceeding elsewhere in the world.
- Language tutors and lecturers teaching student groups from specific science students are encouraged to use science related academic language in the classroom.
- Designing a natural language processing tool such as ADIS that can assist to make it easier for IT students to learn field specific vocabulary faster.
- Employers of IT graduates may need to hire an ESP practitioner to train employees onsite for specific English language skills that are needed to bridge the skills gap.
- Universities can open language laboratories solely dedicated to the study of ESP and other language related experiments for use by the current IT students and IT alumnus.
- Employers can subscribe for computer applications which assist users to correct grammar and learn vocabulary. Examples of these tools are Grammarly, Ginger, Whitesmoke, Hemingway, and Correct English.

5.6 Recommendations future research topics

- A different language acquisition theory such as the nativist, interactionist or learning theory can be applied to study the English language needs of a separate field such as tourism, nursing, or agriculture.

- The English language needs of a paired group of students can be studied by using a pre and post-test and the findings analysed through inferential statistics.
- The language transition of students from high school to university can be studied using Krashen's language acquisition model.
- Computational methods that assist English second language learning can be studied.

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ANNEXTURES

RESEARCH INSTRUMENTS
APPENDIX A

Essay performance evaluation

Second year computer science students' English language essays were collected from the NUST online submission portal through ethical means (see appendix E). The essays were evaluated using the performance analysis evaluation table to determine the level of the student's competency. The following competencies were evaluated in three stages.

- Identifying competencies
- Quantifying of errors
- Analysis of identified competencies

Written essay performance evaluation scale

Written essay performance evaluation scale						
Assessment criteria		**Excellent**	**Very Good**	**Satisfactory**	**Fair**	**Poor**
Technical skills	• Technical vocabulary • Technical argument • Complex technical words • Variety and appropriateness of vocabulary					
Essay content	• Content must be relevant to the subject matter. • Professional discourse					
Language accuracy	• Grammar • Syntactic structure • -ing continuous tense • Subject verb agreement • Spelling errors • Correct use of adjectives (not confusing) • Lexical analysis (word choice)					
Communicative achievement	• Essay should effectively hold the target reader's attention and communicate straightforward and complex ideas, as appropriate. • Good transition strategy.					

Adapted from: (University of Cambridge, 2016)

APPENDIX B

QUESTIONNAIRE FOR COMPUTER SCIENCE STUDENTS

This questionnaire was available digitally on: https://forms.gle/FwaHycgrp72vXLVj7

ENGLISH LANGUAGE NEEDS ASSESSMENT QUESTIONNAIRE FOR COMPUTER SCIENCE STUDENTS

Dear Participants

My name is **Lazarus Gawazah**. I am a Master's student at the Namibia University of Science and Technology (NUST). I am requesting your consent to participate in the study aimed at **investigating the Contemporary English Language Needs of Second Year Students of the Department of Computer Science at The Namibia University of Science and Technology.** As a Master's student, my institution requires me to conduct a thesis research for which the present questionnaire forms part of the thesis.

Confidentiality

The study guarantees anonymity and all data collected shall be confidentially restricted only for the purpose of the study. NUST research ethics will strictly be observed.

If you would like to ask any questions about this research, please contact Lazarus Gawazah at +264 81 229 8110 0r email at: bengnust@gmail.com and my supervisor Prof Woldemariam at +264 85 637 5304 or email at: hwoldemariam@nust.na

Thank you for your consideration. I would, therefore, request your consent by filling in the questionnaire.

Email address

……..

☐ **I agree**

Biographical information

Age

☐ 18-25
☐ 26-35
☐ 36- and above

Gender

☐ Female
☐ Male
☐ Other

Please indicate your response by an X.

THE ENGLISH LANGUAGE NEEDS ASSESSMENT

1. **How would you rate your English language skills?**

○ **Good**

○ **Average**

○ **Fair**

○ **Poor**

2. **Which technical writing skills did you learn from the English courses that you were taught at NUST?**

……

……

……

……

……

3. **Would you please suggest some of the missing language skills that can be added to the EAP course?**

……

……

……

……

……

4. Please rate the following reading tasks according to their importance

5 – Very important 4 – Important 3 – Moderate 2 – Low importance 1 – Not important

	5	4	3	2	1
Field textbooks	○	○	○	○	○
Operating manuals	○	○	○	○	○
Reading magazines	○	○	○	○	○
Reading academic texts	○	○	○	○	○

5. Please rate the following writing skills according to their importance

5 – Very important 4 – Important 3 – Moderate 2 – Low importance 1 – Not important

	5	4	3	2	1
Taking notes in class	○	○	○	○	○
Writing examinations	○	○	○	○	○
Writing assignments	○	○	○	○	○
Field reports	○	○	○	○	○

6. Please rate the following speaking tasks according to their importance

5-Very important. 4-Important. 3-Moderate important. 2-Less Important. 1-Not important

	5	4	3	2	1

Class discussions	○	○	○	○	○
Asking questions	○	○	○	○	○
Oral presentations	○	○	○	○	○
Conference interaction	○	○	○	○	○

7. Please rate the following listening skills according to their importance

	5	**4**	**3**	**2**	**1**
Listening to lectures	○	○	○	○	○
Taking Instructions	○	○	○	○	○
Listening to questions	○	○	○	○	○
Power presentations	○	○	○	○	○

8. Did your English skills improve after studying the EAP course at NUST?

☐ Yes ☐ No

9. What do you want to be improved in the EAP course at NUST? Please write comments below.

……

……

Thank you for your participation

APPENDIX C

QUESTIONNAIRE FOR COMPUTER SCIENCE GRADUATES AND IT PROFESSIONALS

This questionnaire was available digitally on: https://forms.gle/HABnNquvL3guZJKV6

ENGLISH LANGUAGE NEEDS ASSESSMENT QUESTIONNAIRE FOR COMPUTER SCIENCE GRADUATES AND IT PROFESSIONALS

Dear IT Professionals and Computer Science Graduates

My name is **Lazarus Gawazah**. I am a Master's student at the Namibia University of Science and Technology (NUST). I am requesting your consent to participate in the study aimed at **investigating the Contemporary English Language Needs of Second Year Students of the Department of Computer Science at The Namibia University of Science and Technology.** As a Master's student, my institution requires me to conduct a thesis research for which the present questionnaire forms part of the thesis.

Confidentiality

The study guarantees anonymity and all data collected shall be confidentially restricted only for the purpose of the study. NUST research ethics will strictly be observed.

If you would like to ask any questions about this research, please contact Lazarus Gawazah at +264 81 229 8110 0r email at: bengnust@gmail.com and my supervisor Prof Woldemariam at +264 85 637 5304 or email at: hwoldemariam@nust.na

Thank you for your consideration. I would, therefore, request your consent by filling in the questionnaire.

Email address

……..

☐ **I agree**

Biographical information

Age

☐ 18-25
☐ 26-35
☐ 36- and above

Gender

☐ Female
☐ Male
☐ Other

Please indicate your response by an X.

THE ENGLISH LANGUAGE NEEDS ASSESSMENT

1. **As an IT professional or related, how would you rate your English language skills?**

Please rate the following: 5-Exellent 4-Very Good 3-Good 2-Average 1-Cannot say

	5	4	3	2	1
Reading	○	○	○	○	○
Writing	○	○	○	○	○
Speaking	○	○	○	○	○
Listening	○	○	○	○	○

2. **What language skill do you perceive to be the most useful that allows you to perform your work effectively?**

	5	4	3	2	1
Reading	○	○	○	○	○
Writing	○	○	○	○	○
Speaking	○	○	○	○	○
Listening	○	○	○	○	○

3. **Do you think that IT experts need to be taught field-specific terminology to be able to perform their duties effectively?**

☐ Yes ☐ No

4. **To what extent are the following English language skills when performing your work-related tasks?**

Please rate the following according to importance:

5-Very important. 4-Important. 3-Moderate important. 2-Less Important. 1-Not important

Reading work-related tasks

	5	4	3	2	1
Technical Documents	○	○	○	○	○
Reading Manuals	○	○	○	○	○
Reading Emails	○	○	○	○	○
Reading IT Bulletins	○	○	○	○	○

Writing work-related tasks

	5	4	3	2	1
Writing Reports	○	○	○	○	○
Emails	○	○	○	○	○
Ordering Goods	○	○	○	○	○
Writing Meeting Notes	○	○	○	○	○

Speaking activities at the workplace

	5	4	3	2	1
Telephone Conversation	○	○	○	○	○
Sales Persuasion	○	○	○	○	○
Group Discussions	○	○	○	○	○
Making Presentations	○	○	○	○	○

Please rate the following according to importance:

5-Very important. 4-Important. 3-Moderate important. 2-Less Important. 1-Not important

Listening exercises at the workplace

	5	4	3	2	1
Listening to Meetings	○	○	○	○	○
Taking Customer Orders	○	○	○	○	○
Telephone Conversation	○	○	○	○	○
Listening to Colleagues	○	○	○	○	○

THE ENGLISH LANGUAGE NEEDS ASSESSMENT

Multiple choice questions

5. **Do you think that English for Science and Technology (EST) can better prepare IT experts for their work environment?**

☐ Yes ☐ No

6. **As an IT professional, which areas of the English language can you identify that prevents you from performing your duties efficiently?**

☐ Reading
☐ Writing
☐ Speaking
☐ Listening

7. **Would you please suggest any recommendations related to the content of English courses? Please write below. Please write your response below.**

……

……

……

……

Would you like the study findings to be shared with you? ☐ Yes ☐ No

Thank you for your participation

APPENDIX D
Ethical Certificate Approval from NUST

NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY RESEARCH ETHICS COMMITTEE (F-REC)

DECISION: ETHICS APPROVAL

Ref: S005/2020
Student no.: 215075234

Issue Date: 02 June 2020

RESEARCH TOPIC

Title: An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology (NUST)

Researcher: Lazarus Gawazah
Tel: +264 81 229 8110
E-mail: bengnust@gmail.com

Supervisor: Prof Haileleul Z Woldemariam
E-mail: hwoldemariam@nust.na

Dear Mr Gawazah,

The Faculty of Human Sciences Research Ethics Committee (F-REC) of the Namibia University of Science and Technology reviewed your application for the above-mentioned research. The research as set out in the application has been approved.

We would like to point out that you, as principal investigator, are obliged to:

- maintain the ethical integrity of your research,
- adhere to the Research policy and ethical guidelines of NUST, and
- remain within the scope of your research proposal and supporting evidence as submitted to the F-REC.

Should any aspect of your research change from the information as presented to the F-REC, which could have an effect on the possibility of harm to any research subject, you are under the obligation to report it immediately to your supervisor or F-REC as applicable in writing. Should there be any uncertainty in this regard, you have to consult with the F-REC.

We wish you success with your research, and trust that it will make a positive contribution to the quest for knowledge at NUST.

Sincerely,

Dr Hennie J Bruyns
Chairperson: FREC
Tel: +264 61 207-2988/7
E-mail: hjbruyns@nust.na

Prof Alinah K Segobye
Dean: FoHS
Tel: +264 61 207-2418
E-mail: asegobye@nust.na

APPENDIX E

REQUEST TO CONDUCT RESEARCH AT NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY (NUST)

Lazarus Gawazah

P. O. Box 26388

Windhoek

Namibia

30 September 2020

The Registrar

Namibia University of Science and Technology

Private Bag 13388

13 Jackson Kaujeua Street

Windhoek

Namibia

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT THE NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY (NUST)

Dear Sir/madam

My name is Lazarus Gawazah, a current student at Namibia University of Science and Technology (NUST). I am studying towards the Master of English and Applied Linguistics Degree. I have recently received an Ethical Clearance Certificate from the Faculty of Human Sciences Research Ethics Committee (F-REC) to conduct research on my topic titled: "An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology" The study requires data collection from second year students who are currently studying Bachelor of Computer Science Degree and Staff members in the Faculty of Computing and Informatics at NUST. My supervisor is Professor Haileleul Z. Woldemariam from the Faculty of Human Sciences at NUST.

I am hereby seeking your consent for the following activities within your institution:

1. To collect data from staff members who are lecturing and working as IT professionals at the Faculty of Computing and Informatics through the following Uniform Resource Locators (URL):

https://forms.gle/HABnNquvL3guZJKV6

2. To collect data from staff members who are lecturing and working as IT professionals at the Faculty of Computing and Informatics through the following Uniform Resource Locators (URL): **https://forms.gle/FwaHycgrp72vXLVj7**

3. To collect English for Academic Purposes (EAP) written assignments and essays that were written by the second-year students who are currently enrolled in the Bachelor of Computer Science Degree programme from the Faculty of Human Sciences in the Department of Technical and Vocational Education Training (DTVET)

4. To approach the Faculty officer at the Faculty of Computing and Informatics to retrieve the names and student numbers of second year students who are currently studying for the Bachelor of Computer Science degree programme that will be used to retrieve assignments and essays mentioned on point 3.
5.

Please find attached my Ethical Clearance Certificate issued by the Faculty of Human Sciences Research Ethics Committee (F-REC) at the Namibia University of Science and Technology and the Summary of proposal for further details about the study. The ethical clearance approval was granted after the NUST ethics committee was satisfied that all NUST ethical guidelines were strictly followed. These include confidentiality, voluntary participation and the right of the participant to withdraw without any questions asked.

If you require any further information, please do not hesitate to contact me on cell: +264812298110. Email: bengnust@gmail.com or my Supervisor, Prof Haileleul Z. Woldemariam, Tel: +264 61 207 2999. Email: Hwoldemariam@nust.na

Your consideration is greatly appreciated.

Yours sincerely

Lazarus Gawazah

Student Number: 215075234

APPENDIX F
APPROVAL PERMISSION TO CONDUCT RESEARCH WITH NUST STUDENTS

NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Office of the Registrar

13 Jackson Kaujeua Street
Private Bag 13388
Windhoek
NAMIBIA

T: +264 61 207 2016
F: +264 61 207 9016
E: registrar@nust.na
W: www.nust.na

02 October 2020

Mr. Lazarus Gawazah
Email: bengnust@gmail.com
Windhoek
NAMIBIA

Dear Mr. Gawazah

RE: CONSENT TO CONDUCT YOUR RESEARCH WITH THE NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY STAFF AND STUDENT

The email dated 30 September 2020, has reference.

Approval is hereby granted for you to conduct the research on *"An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology (NUST)"*.

Any information gathered during the research is to be used for the purpose of the study only and must be treated as confidential. The results of the study should be shared with the University. Individual information of staff and students will not be made available, nor will biographical information of students be made available in such a way that individual students can be identified.

I wish you all the best with your research.

Yours sincerely,

Ms. Selma Heelu
ACTING REGISTRAR

CC:
Deputy Vice-Chancellor: Research and Innovation
Assistant Registrar

NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY
P/Bag 13388 Windhoek NAMIBIA
2020 -10- 02
REGISTRAR
OFFICE OF THE REGISTRAR

APPENDIX G

REQUEST TO CONDUCT RESEARCH WITH NUST STAFF MEMBERS

Lazarus Gawazah

P. O. Box 26388

Windhoek

Namibia

30 September 2020

The Director

Department of Human Resources

Namibia University of Science and Technology

Private Bag 13388

13 Jackson Kaujeua Street

Windhoek

Namibia

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH FROM STAFF MEMBERS AT THE FACULTY OF THE FACULTY OF COMPUTING AND INFORMATICS AT NUST

Dear Sir/madam

My name is Lazarus Gawazah, a current student at Namibia University of Science and Technology (NUST). I am studying towards the Master of English and Applied Linguistics Degree. I have recently received an Ethical Clearance Certificate from the Faculty of Human Sciences Research Ethics Committee (F-REC) to conduct research on my topic titled: "An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology" The study requires data collection from Staff members in the Faculty of Computing and Informatics at NUST. My supervisor is Professor Haileleul Z. Woldemariam from the Faculty of Human Sciences at NUST.

I am hereby seeking your consent for the following activities within your institution:

1. To collect data from staff members who are lecturing and working as IT professionals at the Faculty of Computing and Informatics through the following Uniform Resource Locators (URL):
   https://forms.gle/FwaHycgrp72vXLVj7

2. To approach the Faculty officer at the Faculty of Computing and Informatics to retrieve the names and student numbers of second year students who are currently studying for the Bachelor of Computer Science degree programme that will be used to retrieve English for Academic Purposes Essays (EAP) assignments and essays.

Please find attached my Ethical Clearance Certificate issued by the Faculty of Human Sciences Research Ethics Committee (F-REC) at the Namibia University of Science and Technology and the summary of proposal for further details about the study. The ethical clearance approval was granted after the NUST ethics committee was satisfied that all NUST ethical guidelines were strictly followed. These include confidentiality, voluntary participation, and the right of the participant to withdraw without any questions asked. I have also attached a letter of approval from the Faculty of Computing and Informatics.

If you require any further information, please do not hesitate to contact me on cell: +264812298110. Email: bengnust@gmail.com or my Supervisor, Prof Haileleul Z. Woldemariam, Tel: +264 61 207 2999. Email: Hwoldemariam@nust.na

Your consideration is greatly appreciated.

Yours sincerely

Lazarus Gawazah

Student Number: 215075234

APPENDIX H

APPROVAL TO CONDUCT RESEARCH AT WITH NUST STAFF MEMBERS

NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY
Department: Human Resources

13 Jackson Kaujeua Street
Private Bag 13388
Windhoek
NAMIBIA

T: +264 61 207 2255
F: +264 61 207 9255
E: hrs@nust.na
W: www.nust.na

03 November 2020

Mr Lazarus Gawazah
P. O. Box 26388
Windhoek
Namibia

Dear Mr Gawazah,

RE: APPROVAL AND PERMISSION TO CONDUCT RESEARCH WITH STAFF MEMBERS AT NUST

With reference to your request dated 02 October 2020, approval has been granted for you to conduct a study with staff members on the following research title: "**An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology (NUST).**"

Take due note that you are allowed to do research with staff members on condition that all NUST ethical guidelines are strictly adhered to and the data collected must be for study purposes **only**. Upon completion, the results of your research should be shared with the University. Individual and biographical information of staff will not be made available and must be treated confidential and in a manner that do not expose or invade their privacy. The participants shall have the right to withdraw at any time without questioned.

I wish you all the best.

Sincerely,

Ms Riëtte Duvenhage
Director-Human Resources

RD/adw

APPENDIX I

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT MOBILE TELECOMMUNICATIONS COMPANY (MTC) NAMIBIA HEADOFFICE

Lazarus Gawazah

P. O. Box 26388

Windhoek

Namibia

06 November 2020

The Manager

Cnr. of Mosé Tjitendero and

Hamutenya Wanahepo Ndadi Street

Olympia

Windhoek

Namibia

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH WITH COMPUTER SCIENCE GRADUATES AT MTC HEADOFFICE

Dear Sir/madam

My name is Lazarus Gawazah, a current Master of English and Applied Linguistics student at Namibia University of Science and Technology (NUST). I would like to request for permission to conduct research on my topic titled: "**An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology**" The study requires data collection from IT Professionals and Computer Science graduates. My supervisor is Professor Haileleul Z. Woldemariam from the Faculty of Human Sciences at NUST.

I am hereby seeking your consent for the following activities within your institution:

1. To collect data from a minimum of 10 (ten) IT professionals at the MTC Head office located at Olympia in Windhoek, Namibia through the following Uniform Resource Locators (URL):
   https://forms.gle/FwaHycgrp72vXLVj7

Please find attached my Ethical Clearance Certificate issued by NUST Research Ethics Committee (F-REC) at the Namibia University of Science and Technology and the summary of proposal for further details about the study. The ethical clearance approval was granted after the NUST ethics committee was satisfied that all NUST ethical guidelines were strictly followed. These include confidentiality, voluntary participation and the right of the participant to withdraw without any questions asked.

If you require any further information, please do not hesitate to contact me on cell: +264812298110. Email: bengnust@gmail.com or my Supervisor, Prof Haileleul Z. Woldemariam, Tel: +264 61 207 2999. Email: Hwoldemariam@nust.na

Your consideration is greatly appreciated.

Yours sincerely

Lazarus Gawazah

Student Number: 215075234

APPENDIX J

MTC Mobile Telecommunications Limited

Corner of Mosé Tjitendero and
Hamutenya Wanahepo Ndadi Streets,
PO Box 23051, Windhoek, Namibia

T +264 (0) 61 280 2000
F +264 (0) 61 280 2124

06 May 2021

TO WHOM IT MAY CONCERN

Sir/Madam,

LETTER OF AUTHORISATION TO CONDUCT RESEARCH

This letter serves as authorisation for Mr. Lazarus Gawazah to conduct the research project titled "**An Investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology**", in fulfilment of his master's degree in English and Applied Linguistics.

Upon review of the request by the student, we are glad to offer Mr. Gawazah the opportunity to conduct his research at our organisation. All interviews, surveys, observations around the business and the distribution of questionnaires will be duly overseen by the researcher himself. However, the data collection is restricted to the questions the researcher applied for. This research will be used solely for academic purposes and will in no way ethically or legally implicate MTC.

If you have any concerns or require additional information, please contact Paula Guedes via telephone on (+264 612802021)

Yours sincerely,

Monica Nehemia

Chief Technology and Information Officer