# Performance of learners in Kenya, Nigeria, and South Africa on the Google IYF programme: a framework for future e-learning Programmes.

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Declaration of Authenticity

I declare that this research is my own work and that each source of information used has been acknowledged by means of a complete reference. This research has not been submitted before for any other research project, degree, or examination at any university.

I acknowledge that by submitting this assignment electronically, I have de facto signed the declaration that the work is my own unless otherwise stated.

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"It always seems impossible until it's done." – Nelson Mandela

This master's programme has been my greatest challenge to date and my greatest success. In hindsight, what once seemed impossible transforms into reality when you walk across that podium

To my family: Mom and Dads, thank you for your unwavering encouragement throughout this journey. Thank you for listening to my endless discussions about the victories and challenges along the way and for your constant support. A special thank you to my dad Wynand, who is the inspiration behind this study. You encouraged me to view the world critically and to tackle real problems head-on.

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Finally, to the African learner, whether in Nigeria, Kenya, or South Africa, I hope no learner will be left behind. With technology, I truly believe we can make that a reality.

## ABSTRACT

This study explored the effectiveness of e-learning courses, focusing on a project delivered by the International Youth Foundation in partnership with Infomage Rims Group and Google in South Africa, Kenya, and Nigeria. The problem this study addressed was that the data from the IYF Google soft skill learning programme had not been thoroughly analysed to make recommendations for improving learner success in future iterations of the digital learning programme. Utilising secondary data from this programme, the researcher examined the relationship between learner performance and factors such as the context of study, tools, language, time and experience. The analysis revealed significant correlations between these independent variables and learner performance, offering valuable insights for future e-learning initiatives.

The rationale for this study stemmed from the growing need to understand how diverse factors impact e-learning effectiveness in different African contexts. The study aimed to provide actionable recommendations for enhancing e-learning programmes by analysing these relationships. Emphasising strategic technology use, innovative pedagogies, and inclusive practices, this researcher advocates for continuous innovation and excellence in e-learning to empower learners and bridge educational gaps globally.

The study also addressed the broader implications of these findings for educational stakeholders, including policymakers and programme developers. It underscored the importance of tailoring e-learning strategies to local conditions, leveraging familiar technologies, and addressing specific challenges such as digital literacy and network connectivity. By highlighting these critical factors, the research provided a comprehensive framework for designing effective e-learning programmes that can be adapted to various educational contexts, particularly within Africa. This approach ensures that African learners' unique needs and challenges are adequately met, promoting more equitable and effective learning outcomes.



Key search terms: African context; Educational innovation; E-learning effectiveness; Soft skills development; Technology integration.

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## LIST OF ACRONYMS AND ABBREVIATIONS

4IR – Fourth Industrial Revolution

AI - Artificial Intelligence

CSR - Corporate Social Responsibility

$H_1$ - Hypothesis 1

$H_0$ – Null Hypothesis

ICT - Information and Communication Technology

IRG - Infomage Rims Group

IYF - International Youth Foundation

LMS - Learning Management System

LQ - Likert Question

MERL - Mitsubishi Electric Research Laboratories

MOOCs – Massive Open Online Courses

N1 - Null Hypothesis 1

POPIA - Protection of Personal Information Act, 2013

$R^2$ - Coefficient of Determination (used in regression analysis)

ROI - Return on Investment

SPSS - Statistical Package for the Social Sciences

TIPS™ - Technology, Innovation, People, Systems (DaVinci Managerial Leadership Framework)

UNESCO - United Nations Educational, Scientific and Cultural Organization

# CHAPTER 1: INTRODUCTION AND BACKGROUND

## 1.1 Introduction

The objective of this research was to provide recommendations for enhancing the online learning experience of learners in these three countries (Lempriere, 2019). It explored factors like the context of study, tools, language, time and experience of learners in the Google IYF programme. Furthermore, this study would provide recommendations in the form of a framework. The investigation analysed the outcomes of a soft skill curriculum implemented across three African nations and advocated for the necessity of standardisation and normalisation of e-learning in an African setting. A real-life example demonstrated learners' progress in the soft skill courses. According to Lembani *et al*. (2019), African learners faced a gap between what they studied and the reality they experienced in the world.

This research also found that there was a significant difference in the learning experience of learners from urban and rural areas of South Africa due to the digital divide between them. This digital divide contributed to discrepancies in the success rates of online soft skill programmes. Consequently, the framework to be provided would further bridge the gap between education and real-world application, addressing the disparities and improving the efficacy of e-learning programmes.

The research focused on a programme sponsored by the International Youth Foundation (IYF), Google, and Infomage Rims Group (IRG). This programme aimed to provide unemployed learners with upskilling opportunities, to help them secure host employment or full-time employment. To achieve this goal, the programme offered three courses: Project Management, Information Technology (IT) Support, and User Experience (UX) Design (Sullivan, 2019). These courses were delivered through Coursera, an online learning platform that captured all learner data based on their activity (Coursera, 2023). This main research question was as follows: What are the factors that need to be considered when running an online e-learning programme in the e-learning context? This study would provide factors (variables) that were worthy of consideration for an e-learning programme.

The research aimed to use the Google IYF programme as a case study on the initial offering of these courses in an African context and how well African learners fared in completing them. The researcher analysed the data and used regression analysis to determine recommendations for African online learners and to assess if these requirements were being met (Kallisa & Picard, 2017). The IYF provided the researcher with all the data for this study as well as additional information that extended beyond the boundaries of South Africa. Understanding the effectiveness of these courses was crucial for informing future e-learning initiatives and ensuring they were tailored to meet the unique needs of African learners, improving educational outcomes across the continent.

Essentially, this study was to leverage existing data from the Google IYF programme to extend the applicability of its insights to a broader audience. Specifically, the study sought to validate predetermined assumptions about the key factors that influenced African online learners, particularly those participating in the Google IYF programme. By analysing secondary data, the study would be capitalising on an empirical example of how e-learning programmes were run in the African context. The findings of this research are intended to inform recommendations for similar e-learning programmes and provide valuable insights for programme developers.

## 1.2 Introduction to key role players

Within this section, the researcher introduced key players in this study, starting with his role within the study. A researcher is defined by Merriam-Webster (2023) as being an individual who observes or studies utilising a systematic approach. This is the role and responsibility the researcher abided by. The researcher also made the best possible decisions to eliminate any biases that he might have introduced within this study.

The next key player was the IRG (Infomage Rims Group) organisation, a training provider based in Randburg, South Africa. The IRG organisation was tasked with the job of rolling out the soft skill programme within South Africa. It was important to note that the role of the training provider was split between IRG, and other organisations tasked with rolling out the programme in Kenya and Nigeria. The researcher was not

permitted to mention the other training providers as they did not consent to being named in this study (IRG, 2024).

In continuation, the IYF (International Youth Foundation) was an organisation which was tasked with sourcing training providers and managing the implementation of the soft skill programmes in the African context. The IYF organisation played the role of governing implementation and sponsored programmes for learners to complete. The IYF organisation, in turn, was sponsored by Google. Google played the role of project sponsor and sponsored licenses every year for the implementation of the programme (IYF, 2024).

A pivotal stakeholder was the learner or, more specifically, the African learner. Learners were important to the study being conducted because the researcher built his argument around the notion that there were discrepancies in their educational experiences. Merriam-Webster (2023) defined a learner as an individual who studies with the purpose of developing skills and gaining knowledge. This definition was supported by the South African Department of Basic Education (2021), which stated that learners needed to develop academically, socially, and culturally.

## 1.3 Research context: background

The focus of this study was on online learning in Africa. In a publication by Lembani et al. (2019), the perception that African development and learning trailed behind the rest of the world was discussed. African learners were confronted with obstacles like poverty, deficient infrastructure, and limited access to crucial services, which hurt their progress and development (Idemudia, 2014). To tackle these challenges, numerous global organisations incorporated free learning courses into their Corporate Social Responsibility (CSR) initiatives, which were made available to learners in developing countries (Benedict Ogbemudia *et al*., 2022).

The challenge for the African learner was completing a programme without all the required resources, as supported by Mukuna and Aloka (2020). These authors argued that there was a gap between the African learner's capabilities/resources and the sponsors' expectations (Mukuna & Aloka, 2020). An example of this was giving the African learner a cloud-based programme to complete in a country like South Africa, which has the highest data costs in the world. Alternatively, for example, giving

learners in Kenya the opportunity to do cloud-based learning where computer literacy skills are low (Durodolu & Mojapelo, 2020). In providing learners with the opportunity to learn and grow, reasonable accommodations had to be made to ensure they were best prepared to learn the soft skills offered.

## 1.4 Research context: barriers and contribution of the study

Omwenga (2004) outlined several obstacles to online learning in Africa, including challenges with infrastructure, cost, and lack of staff commitment (Omwenga, 2004). More recently, Mpungose (2020) identified the digital divide as the main reason learners struggle with technology, drawing on Omwenga's work to argue that gaps in African online learning are not a new phenomenon. Additionally, Mpungose (2020) explored the loss of benefits from in-person sessions and how learners from disadvantaged backgrounds may struggle with new technological platforms.

Dube (2020) asserted that the South African Government's promotion of online learning during the COVID-19 pandemic inadvertently excluded rural learners. Poor learner management systems and low-technology software were also identified as barriers limiting the possibilities available to learning platforms. These findings align with the argument presented within the IYF-IRG project, where learners enrolled in soft skill programmes faced similar challenges.

This study will further explore these barriers in Chapter 2, examining how they overlap with the challenges identified in a Google IYF case study. By doing this, the research presented overlapping issues identified in the literature review and the case study, supporting the notion that these barriers are significant. The research then provided a framework aimed at overcoming the identified challenges, offering strategies to mitigate the barriers to effective online learning in the African context.

## 1.5 Research context: Justification of regions

This study utilised secondary data, meaning the researcher had limited control over the selection of data collection sites and participants. Nevertheless, South Africa, Kenya, and Nigeria were strategically significant choices for data collection due to several factors.

In the context of South Africa, the country's diverse population provided a rich environment for understanding how e-learning experiences may vary among different learner demographics (Sekome & Mokoele, 2022). The South African government has also demonstrated strong support for the integration of technology in education (SABEN, 2023). Additionally, the high unemployment rates in South Africa have created a pressing demand for skills development, necessitating continuous reskilling and upskilling within the workforce (Malinga, 2022).

In Nigeria, the large youth population inherently generates a strong demand for education and skills development through accessible e-learning programmes (Oxford Business Group, 2023). Furthermore, Nigeria's rapid expansion of mobile networks presents significant opportunities for mobile-based e-learning initiatives (Onyema, 2019). Nigeria also faces critical educational challenges, such as overcrowded classrooms and teacher shortages, which e-learning delivery modes are well-positioned to address (Ibeh, 2023).

Similarly, in Kenya, the government has introduced incentives to promote the use of digital learning tools, particularly at the primary and secondary education levels—a trend likely to extend to higher education over time (Mwangi, 2024). Kenya's blend of urban and rural populations provides a valuable context for exploring diverse learner needs (Oketch, *et al.*, 2010; Indeed, 2024). Moreover, as the innovation hub of Africa, Kenya offers numerous opportunities for start-up ecosystems that support e-learning technologies (Barii, 2024).

Naturally, because this study focused on learners in these three different regions, there were many opportunities to identify similarities and differences. These comparisons were utilised in a subtle manner, as this study was not aimed at fostering competition. Instead, the study focused on comparing and highlighting areas where the three countries could learn from each other and demonstrating how African countries can be both similar and different at the same time.

## 1.6 Preliminary literature review

In this section, a preliminary selection of literature was examined to introduce the key themes and supporting concepts foundational to the study. From this analysis, the research question was subsequently developed.

Tshazi and Civilcharran (2021) analytically explored technological advancements in South Africa, focusing on how new technologies introduced opportunities and gaps in the market. Their discussion was particularly valuable as it examined technology adoption from a multi-generational perspective within South Africa. It also prompted consideration of factors that may hinder technology adoption, offering insights crucial for understanding the context of this study.

Moreover, Tshazi and Civilcharran (2021) noted that many households continued to adopt new technologies. This observation was pertinent to this research as it underscored the necessity for reasonable accommodations and the need for technology users to familiarise themselves with new systems (Tshazi & Civilcharran, 2021).

Cox (2021) investigated the reading abilities of first-grade learners in Nova Scotia, Canada, encompassing vocabulary, phonological, morphological, syntactic awareness, and prosodic sensitivity. Conducted across eighteen schools with 338 learners, the study categorised participants into two groups: native Nova Scotian learners and Nova Scotian learners of African descent. The findings revealed that African Nova Scotian learners scored lower in various literacy skills compared to their native counterparts, highlighting the unique educational challenges faced by this group. Such disparities underscored the need for tailored assessment practices and educational frameworks to ensure fairness and effectiveness in learning assessments (Cox, 2021).

Further extending this discourse, Kafu (2018) advocated for education in one's mother tongue, highlighting its benefits for social mobility, influence, economic empowerment, and access to further academic opportunities. Kafu (2018) suggested that educators should consider mother-tongue instruction, a principle this research sought to explore further as a crucial aspect of online learning.

Additionally, Abujbara and Worley (2017) examined the success of African online learners in completing soft skill programmes, arguing that such initiatives were effective methods for transferring essential skills. This study highlighted the benefits of delivering soft skill programmes and was instrumental in shaping the research question by considering what constituted the effective delivery of such programmes.

## 1.7 Research philosophy

In this section, the research philosophy, encompassing ontology, epistemology, and axiology, was explored. These foundational concepts were critical as they shaped the researcher's perception of the world and interpretation of knowledge, thereby influencing the research approach. This study employed a mono-method approach to provide a focused holistic framework, which also served as a foundational model for programmes like the Google IYF initiative. Understanding these philosophical underpinnings ensured that the research was conducted with a clear perspective, enhancing the robustness and reliability of the findings.

### 1.7.1 Ontology

Ontology concerns the researcher’s worldview or the conceptual lens through which the world is understood. According to Merriam-Webster (2022), ontology deeply involves the perspective from which an individual perceives their existence. The ontological stance here was rooted in post-positivism, believing that reality was best understood through empirical evidence and scientific observation (Yanow & Schwartz-Shea, 2015; Farrow, 2020). This post-positivist viewpoint presumed that the researcher remained objective, external, and free from social influences, which was crucial for developing unbiased recommendations for educational strategies tailored to African learners. This approach ensured that findings were based on verifiable data, enhancing the reliability of the research outcomes.

Moreover, the adoption of a post-positivist ontological viewpoint, as it best supported the usage of secondary data, strived to maintain an objective focus but still understood that there are limitations to attaining complete objectivity (Farrow, 2020). This study benefitted from having post-positivist ontology, as post-positivism viewpoints placed an emphasis on the need for empirical evidence. This study has been ring-fenced around the Google IYF programme, which would mean that the researcher was able to use the Google Programme as an empirical example, further supporting and validating the findings that could have been attained from this study.

### 1.7.2 Epistemology

Epistemology is related to the nature and scope of knowledge and how it can be acquired. The epistemological stance of this study was objectivist, recognising the existence of a reality that could be empirically observed (Littlejohn, 2018). Although this research predominantly utilised secondary data, the approach remained objective, aiming to provide a clear understanding of the challenges and realities faced by African online learners. The data collected formed the basis for evidence-based recommendations, ensuring that interventions were grounded and effectively catered to educational needs.

The epistemological stance of objectivists was further supported by the fact that the researcher was looking at existing data; this study was able to have data in a format that was a real to the programme as it could get. The researcher eliminated common phenomena that could occur (like observer expectancy effect), which would typically skew the data collection, allowing this study to be as objective as possible and further grounding the study in the reality of the Google IYF Programme.

### 1.7.3 Axiology

Axiology is the study of values and value judgments intertwined closely with ethical considerations (Merriam-Webster, 2022). This researcher valued curiosity, a passion for education, and the ethical implications of knowledge dissemination. Curiosity was segmented into dimensions such as joyous exploration, deprivation sensitivity, stress tolerance, social curiosity, and thrill-seeking (Kashdan *et al*., 2018). Each dimension was explored throughout this report to enrich the understanding and outcomes of the study. Furthermore, a foundational love for education drove the researcher, ensuring a commitment to delivering impactful and meaningful educational outcomes. The values of honesty, transparency, and adaptability were pivotal, guiding the research process to ensure the integrity and applicability of the findings.

Maintaining a link between the philosophy and methodology was of the utmost importance; when looking at the axiology, it was important to note that it linked to the study in the following ways: the value of curiosity linked to the task of setting up hypotheses to test them and confirm theories. The foundational love for education

supported the independent variable, showing that having the right mix of factors working in a learner's favour would allow them to develop a similar passion for education. Finally, when considering the value of education, this was what the study was built around – deriving value from what came before. Using past programme experiences to enhance future programmes that are set to come.

## 1.8 Research problem

The problem this study addresses is the poor analysis of the Google IYF learner performance. This study understood that there was a missed opportunity to understand performance data further and use the recommendations for similar programmes that will follow the Google IYF programme. The question that needs to be further addressed is what programme developers and sponsors can do differently in African contexts (such as Kenya, Nigeria, and South Africa) to get the best possible throughput rates. The imperative for technological integration in education, particularly in Africa, escalated, necessitating adaptive learning interventions.

This study leveraged existing data and insights from the Google IYF programme to propose a framework that enhanced online education delivery across African countries. The project under investigation, a collaboration between IRG, IYF, Google, and Coursera, aimed to equip unemployed youth in South Africa, Kenya, and Nigeria with essential soft skills. This research analysed data from this initiative to develop informed recommendations that addressed the educational challenges faced by African learners. This study would test an independent variable (learner/academic performance) against five different independent variables (context of study, tools, language, time and experience).

## 1.9 Primary objective of the study

This study aimed to provide recommendations for enhancing the online learning experience of learners in these three countries (Lempriere, 2019). It explored factors like the context of study, tools, language, time and experience by learners in the Google IYF programme. By thoroughly analysing these aspects in the aforementioned countries, the researcher sought to develop a detailed framework that provided

actionable recommendations for future online educational programmes of a similar nature.

## 1.10 Research secondary objectives

To ensure that the study's objectives were effectively achieved, and a consistent thread was maintained throughout, the following objectives were set to be addressed:

Objective 1: Determine if there was a relationship between the independent variables (learner performance) and dependent variable (context of study, tools, language, time and experience) using regression analysis.

Objective 2: Determine how strong the relationship was between independent variables (learner performance) and dependent variable (context of study, tools, language, time and experience) (using correlation analysis)

Objective 3: Use findings to provide a framework for programmes of a similar nature.

## 1.11 Hypotheses

A research hypothesis is a concise statement predicting study outcomes (Deeptanshu & Dogra, 2022). In this study, the hypothesis was simple, reflecting the relationship between independent and dependent variables. The research hypothesis guided the presentation of findings, facilitated the formulation of testable predictions, and allowed for the straightforward interpretation of results.

The research hypothesis in this study posited that independent variables negatively influenced African online learners. The hypothesis was based on the premise that addressing the independent variables would enhance learners' performance. This study included three different hypotheses, summarised in Table 1 below:

Table 1: Hypotheses Table

| Hypothesis title | Further detail on the Hypothesis |
|---|---|
| Hypothesis 1 ($H_1$): There was a relationship between independent variables and dependent variable. | There is a significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance). |
| Alternative Hypothesis: Variables had a mutual influence on each other. | There is a mutual relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance), meaning they influence each other. |
| Null hypothesis ($H_0$): There was no relationship between independent variables and dependent variable. | There is no significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance). |

## 1.12 Conceptual framework

In this section, the researcher sought to furnish the study with a comprehensive framework that encompassed the concept at hand. Specifically, a conceptual framework is the interplay between the study's dependent and independent variables (Kent *et al*., 2020). For this study, the conceptual framework fashioned had a clear link between the presented variables and the fundamental concept that grounded the

study. As such, the researcher outlined the variables and essential concepts that shaped the study below.

Learner Performance (Concept Exploration 1): The performance of learners was measured through various assessment methods, also referred to as assessment tools. Rusconi (2023) delved into the distinctions between assessment instruments and tools, highlighting that assessment instruments encompass the overarching methods and approaches used for assessment, while assessment tools are the specific instruments used to evaluate competency (Rusconi, 2023). Learner performance was not only influenced by the measure or instrument but was also influenced by the other external factors presented in the conceptual framework.

Context of Study (Concept Exploration 2): Oliver Ding (2021) explored the correlation between context and ecological reality, developing a model that underscored the significance of the study context in the learning process. Ding's model illustrated the necessity of establishing a robust connection between learners' ontology (their understanding of the world), their linguistic reality (which will be discussed further), and their conceptual reality (their ability to comprehend abstract and academic information). The model, which effectively illustrates these connections, is presented in Figure 1 below for reference.

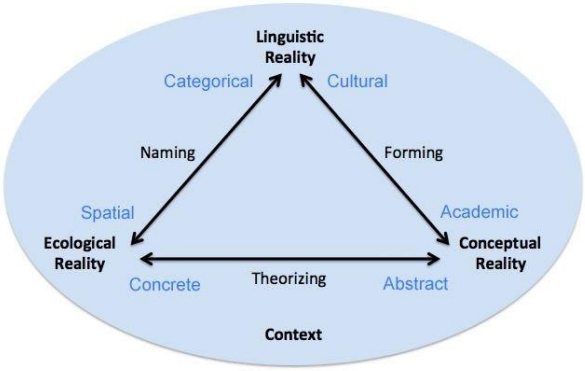


Figure 1: Concept Dynamics extracted from (Ding, 2022)

This model, crafted by Oliver Ding (2021), illustrates the crucial role of the study context in the learning process. It emphasises the interconnection between learners' ontological perspectives, their linguistic realities, and their ability to understand

abstract concepts. The model supports this study's exploration of how contextual factors influence the online learning experiences of African learners.

Tools (Concept Exploration 3): There was a strong linkage between the independent variables and the dependent variable. Concepts found within tools led to an exploration of assessment tools and assessment measures, which was previously explored in the learner performance section. Further research showed that other concepts came to the forefront, such as the mode of delivery and the tools utilised in these deliveries. Olmstead (2023) explored whether online learning or face-to-face was better and found that a blended approach would be best because different learners in a single group have varied needs, which requires a diversified approach (Olmstead, 2023).

Language (Concept Exploration 4): Larsen-Freeman (2011) presented a model that explored the concept of language in learning. The model highlights key questions that should be addressed when evaluating a learner's progress and the role of language in it. These questions encompass aspects such as the learner's linguistic background, the language used for instruction, and the language proficiency required for course comprehension. This model is particularly relevant to this study, as it emphasises the need to consider language accessibility and support in the online learning environments explored in the Google IYF programme.

See Figure 2 below for a visual representation of Larsen-Freeman's model.

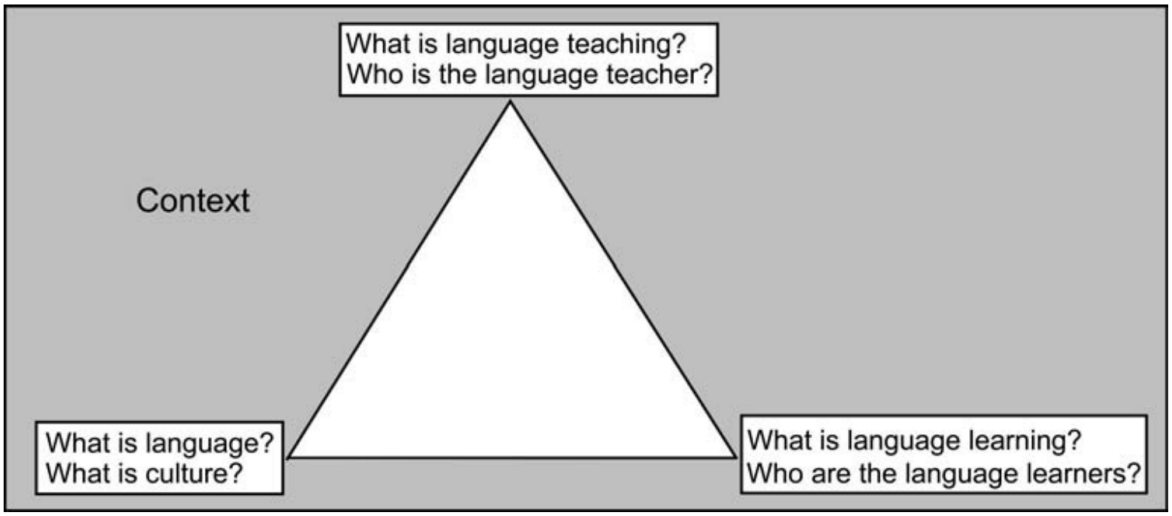


Figure 2: Concept of Language extracted from Larsen-Freeman (2011)

Despite the dated source, the questions presented remain relevant. According to Larsen-Freeman's (2011) depiction, language and context are distinct entities that can aid learners of second or third languages. The crucial first step was to comprehend the interplay between language and culture, followed by an understanding of what was being taught and who was teaching it. Additionally, it was essential to consider the language's evolution and its effects on learners. This holistic approach provided a comprehensive framework for evaluating and enhancing language learning in online education.

Larsen-Freeman's model (2011) addresses critical aspects of language learning, focusing on the learner's progress and the role language plays within educational settings. By examining the interplay between language and culture, this model aids in understanding how language proficiency impacts the effectiveness of online learning programmes in multilingual contexts like those in Kenya, South Africa, and Nigeria. This model supports the analysis of linguistic challenges and opportunities, offering insights into creating inclusive and effective e-learning environments tailored to diverse linguistic backgrounds.

Furthermore, the variable of language introduced other important concepts, such as the Osgood-Schramm model of communication (Yadav & Mishra, 2020), which explains how messages are both received and transmitted between a communicator and recipient (Durant, 2023). This model is illustrated in Figure 3 below:

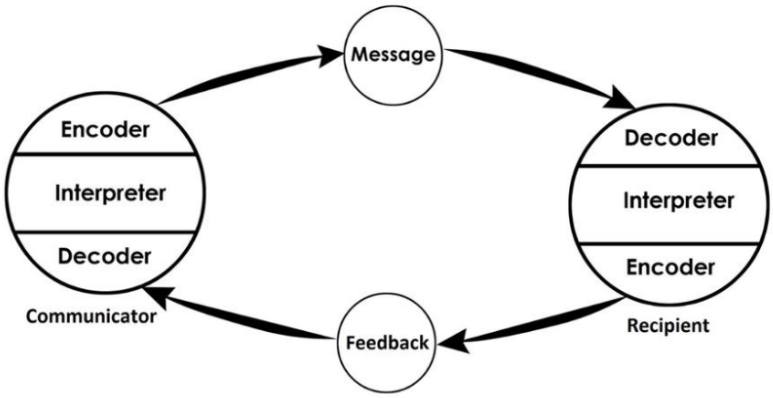


Figure 3: Osgood-Schramm model of communication (Yadav & Mishra, 2020)

The Osgood-Schramm model (Yadav & Mishra, 2020) of communication delineates how messages are transmitted and received between communicators, highlighting the importance of effective communication in education. This model is particularly relevant to the study as it elucidates how communication barriers can impact learning, thereby supporting the development of more effective communicative strategies in online educational programs. By understanding this model, educators can better address language and communication challenges, ensuring clearer and more effective exchanges in online learning environments.

Time (Concept Exploration 5): Dr Atkinson (2020) delved into the concept of notional hours, examining the appropriate amount of time required for effective learning. According to Dr Atkinson (2020), there is a widely accepted notion that one academic credit should equate to 10 hours of active learning. The study of notional hours highlighted that not every hour spent learning can be quantified or documented, as the process of learning is often non-linear and dynamically measured (Atkinson, 2020). This insight underscores the importance of flexible and adaptive learning schedules that cater to individual learning paces.

Furthermore, Buber (2023) explored the importance of routine in learning, emphasising that successful learning is not achieved in one session but through a consistent commitment to a learning routine. Buber explained that allocating time to learning signifies an active change in behaviour, allowing learners to be receptive to new information.

Experience (Concept exploration 6): The learning experience was explored in two parts: the immediate experiences of learning and past experiences. Cherry (2022) described the learning experience as a process where behaviours change as a result of an experience, focusing on the acquisition of knowledge, skills, or information. Additionally, past learning experiences significantly impact current learning experiences, shaping how learners' approach and engage with new material.

Moreover, Zlatkin-Troitschanskaia and Fischer (2020) presented a model for positive and negative learning experiences. This is seen in Figure 4 below:

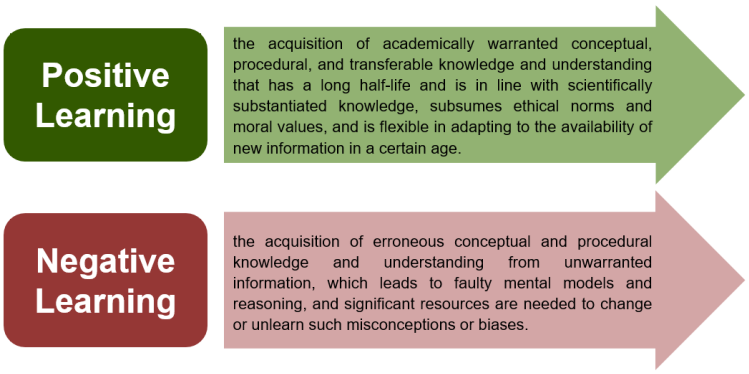


Figure 4: Positive and Negative learning experiences extracted from Zlatkin-Troitschanskaia and Fischer (2020)

Understanding the model, positive learning experiences led to further positive learning experiences, while negative learning experiences were carried forward until corrective measures were put in place. Learning experiences, especially when considered from the learner's perspective, were delicate and had to be handled with care to ensure there were no misconceptions or negative biases about oneself or the process of learning.

This model showcased the effects of positive and negative learning experiences on learner outcomes. It underscored the importance of crafting educational environments that foster positive experiences, which was central to this study's aim of enhancing online learning frameworks for African learners. Understanding these dynamics helped tailor educational programmes that addressed and mitigated negative experiences while promoting positive educational interactions.

With the key concepts explored, the researcher developed a visual representation of the conceptual framework to support this study. The conceptual framework played an integral role by visually depicting a structure that applied to the study, providing a basis for further analysis and organisation. This framework was subject to change and could develop further, to better encompass the study. See the conceptual framework in Figure 5 below:

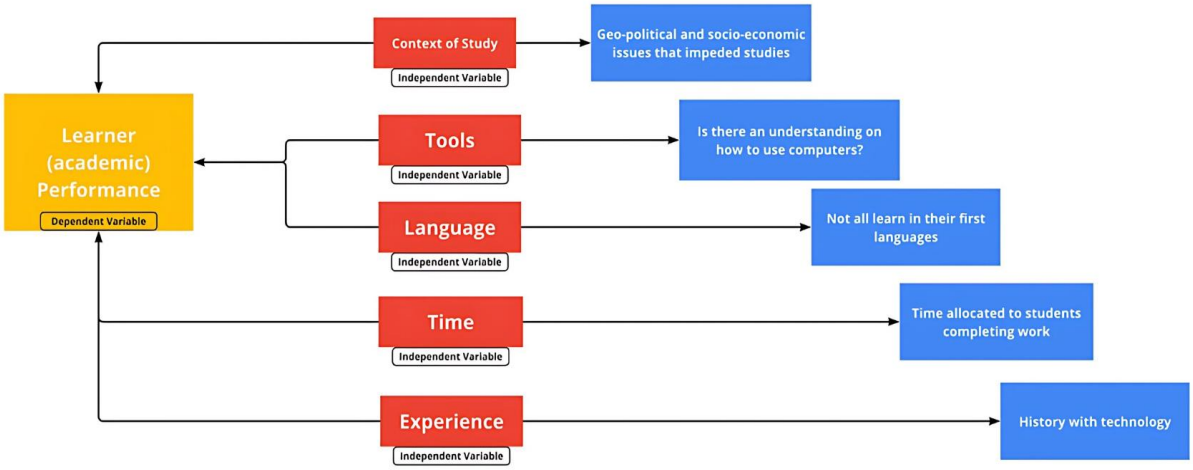


Figure 5: Conceptual Framework

This visual representation synthesises the variables and concepts discussed, highlighting the influence of external factors on learner performance. It is essential for structuring the study and guiding the analysis of how different variables impact the ability of African learners to engage with and benefit from online programmes. This framework will be adjusted as the study progresses, to better encompass the complexities of online learning in African contexts.

This study adopted the perspective that learner performance was a variable dependent on several other factors. Within the context of this research, the variables influencing learner performance included experience, time, language, tools, and the context of study. The study aimed to test the validity of this conceptualisation of learner performance. While acknowledging the possibility of an omnidirectional relationship, where the dependent variable could also influence the independent variables, for the purpose of clarity and consistency in the final findings, the study exclusively focused on how the independent variables impacted the dependent variable of learner performance.

To summarise, the conceptual framework was crafted with a focus on the dependent variable of learner performance, which was influenced by the independent variables. The independent variables in this case are the factors that may either aid or hinder African learners' ability to complete a programme or learn in a manner similar to their counterparts from other continents.

## 1.13 Theoretical framework

The theoretical framework was a structure that could support the theory within this study (Varpio *et al*., 2020). This study had many key concepts and ideas that were used within it, but the research aimed to use learning theory to underpin the study and support it. Learning theory dictated that learning occurred when an individual received, processed, and retained knowledge (Mezirow, 2018). The researcher considered four key learning theories as he developed this study: classical conditioning, operant conditioning, cognitive theory, and social learning theory. These four learning theories were explored below:

Classical conditioning learning theory: McLeod (2024) explained classical conditioning (alternatively referred to as Pavlovian or respondent conditioning) as learning through association. Classical conditioning was strongly reliant on there being neutral, unconditional, and conditional stimuli and responses. In simple terms, classical conditioning focused on getting participants to strongly associate certain responses with specific stimuli, which occurred as a result of a change in behaviours (McLeod, 2024).

Furthermore, the implications that this learning theory had for the classroom were that educators could learn to associate positive emotional experiences with performing well academically. This naturally meant that learning could be negatively reinforced when an educator utilised negative emotional experiences for poor performance or even misbehaviour in the classroom setting (McLeod, 2024).

Operant conditioning (instrumental conditioning) learning theory: This learning theory, first described by B.F. Skinner, involved learning through rewards for good behaviours and punishments for bad behaviours. Cherry (2023) explained that operant conditioning was crucial for shaping individuals to operate in societies governed by rules and legislation (Cherry, 2023).

However, it was important to note that operant conditioning differed from classical conditioning, as it did not rely on a neutral condition or stimulus. Participants undergoing operant conditioning did so voluntarily, while classical conditioning involved more involuntary responses to stimuli. Thus, operant conditioning focused on strengthening or weakening voluntary behaviours (Cherry, 2023).

Cognitive learning theory: Malmstrom (2023) explained cognitive learning theory as learning that was done by means of actively constructing knowledge. Cognitive learning theory differed from other learning theories as it did not focus on outward behaviours presented by candidates. Instead, it concentrated on what was happening in the learners' minds and how they processed the information shared with them (Malmstrom, 2023).

Furthermore, cognitive learning theory emphasised that cognitive development resulted from the interplay between capabilities (nature) and environmental influences (nurture). This learning theory, defined by Jean Piaget, was explored in four phases: Sensorimotor, Preoperational, Concrete Operational, and Formal Operational (McLeod, 2024). The Sensorimotor (ages birth to 2) learning stage was explained as being the stage where infants learn the world through their senses and actions. A key component of this stage of learning included sensory permanence, which was explained as the ability to understand that objects continue to exist even when they cannot be heard or seen (McLeod, 2024).

The next key component was concrete operational, which was the preoperational stage (ages 2 to 7); this was the stage where children engaged in symbolic play and engaged in the task of manipulating symbols; it was further interesting to note that children tended to be egocentric at this stage and did not have a complete grasp of logic (McLeod, 2024). Moving on, the concrete operational stage (ages 7 to 11) is the stage where children start thinking logically, and they also develop an understanding of conservation and reversibility (McLeod, 2024).

The formal operational stage (ages twelve and up) is the final stage, where individuals develop the ability to think about concepts through abstract lenses; they also develop the ability to reason hypothetically (McLeod, 2024). Within this stage, they can utilise deductive logic, think about the future and consider theoretical possibilities. This is the stage that introduces systematic problem-solving and metacognition (the process of thinking about thinking) (McLeod, 2024).

Social learning theory: Cherry (2022) explained that social learning theory was introduced by Albert Bandura as learning that occurs through observation, imitation, and modelling. This theory suggested that learning occurs because people observe

the consequences of other people's behaviours. Albert Bandura proposed that social interactions are where people learn about rewarding actions (those which should be imitated) and which actions are punished (those which should be avoided) (Cherry, 2022).

Albert Bandura had three basic models within his observational learning theory. These three models included: a live model (which involved an actual individual acting out or demonstrating the behaviours); a symbolic model (which involved having fictional or real characters show their behaviours in books, television programs, books, and online media); and a verbal instructional model (which involved descriptions and explanations of behaviours) (Cherry, 2022).

While these four learning theories provided the study with key concepts for the theoretical framework, other theories also contributed. Drew (2023) explored the six principles of andragogy, explaining it as the science of adult learning. Malcom Knowles (Knowles, 1984) found that pedagogy was not sufficient to define adult learning. Knowles developed six key principles: self-concept, role of experience, readiness to learn, orientation to learning, motivation to learn, and a need to know (Drew, 2023).

Caruso (2022) explored Illeris's three dimensions of learning model, explaining that adult learning includes cognition, emotion, and sociality. Other interpretations of this theory suggest content (cognition), incentive (emotion), and integration (sociality). This interpretation is presented in Figure 6 below:

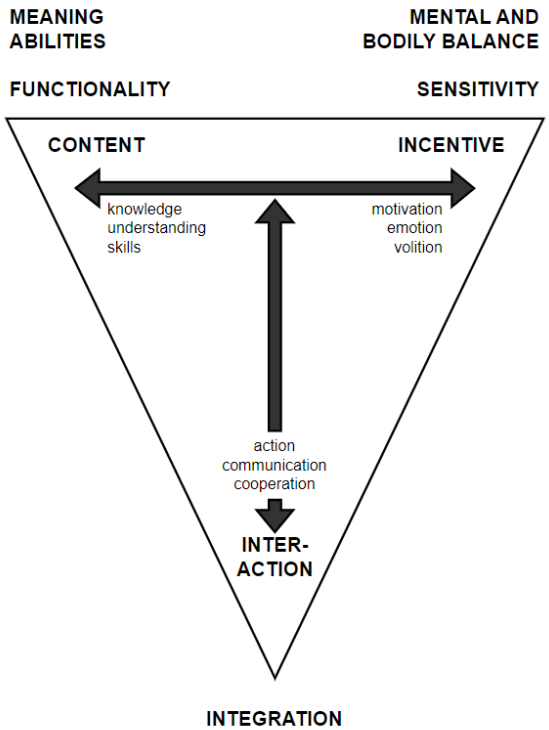

Figure 6: Illeris' diagram (Lack, 2022)

Illeris' diagram depicted a strong relationship between content, incentive, and interaction; this theory supported some of the influences that motivated learners to participate in and complete learning interventions. Furthermore, knowing what drove learners often aided academic institutions to get learners to not only start personal development but also to see it through regardless of the challenges that got in their way (Lack, 2022).

Finally, a theory explained by McLeod (2024), Vygotsky's theory of cognitive development, further emphasised the importance of community and culture in learning (McLeod, 2024). Vygotsky's social development theory challenged traditional learning theories, further emphasising the need for social interaction and culture in learning, which allowed for learning that had an emotional component to it.

### 1.13.1 Presentation of theoretical framework

After a comprehensive review of diverse learning theories, it became evident that these theories collectively played a crucial role in shaping the theoretical framework of this study. Each theory, while distinct, shared underlying principles that significantly influenced the design and delivery of educational content, particularly for adult learners in an online setting.

Pedagogical understanding was fundamental, as it directly affected how learners perceived and engaged with learning materials. The shift towards andragogy was particularly relevant, emphasising the need for educational approaches that acknowledged adult learners' specific requirements. This included recognising their desire to learn, fostering an emotional connection to the content, and ensuring that the learning material was relevant and applicable to their real-world contexts. These aspects were not merely additive; they were essential for crafting learning experiences that were meaningful, engaging, and effective.

This theoretical framework supported the development of online educational programmes that were not only cognitively stimulating but also emotionally resonant and socially relevant, thereby enhancing the overall learning experience for African learners. Through this lens, the study aimed to propose strategies that aligned content

delivery with the intrinsic and extrinsic motivations of adult learners, leading to improved educational outcomes. By integrating these theories, the framework provided a holistic approach to education, ensuring that programmes addressed the diverse needs of learners and fostered a supportive and effective learning environment.

The framework is depicted in Figure 7 below.

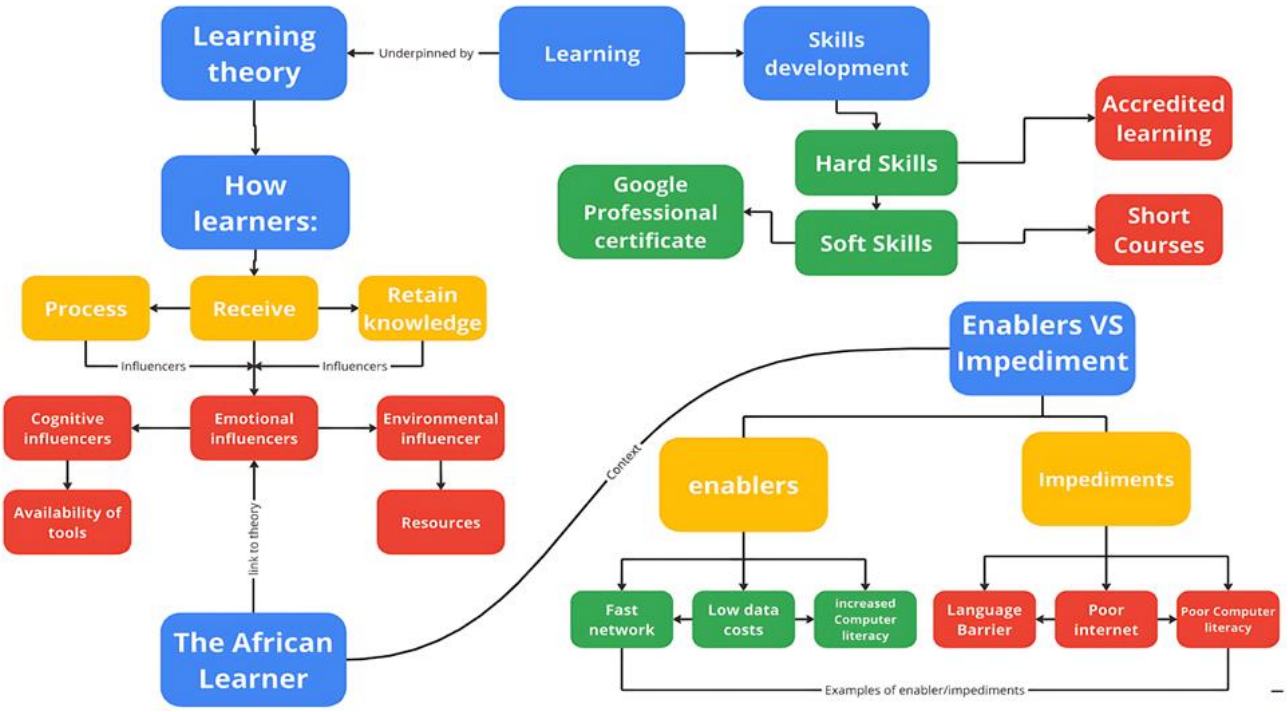


Figure 7: Theoretical Framework (Chapter One)

## 1.14 Research methodology

The research methodology for this study was structured into two main sections: the research design and the methodology, with detailed discussions reserved for Chapter three. This initial overview was designed to set a foundational framework that guided the early stages of the study and outlined the strategic approach to the research.

### 1.14.1 Research design

This study utilised a mono-method, quantitative approach focusing on secondary data obtained from the International Youth Foundation (IYF) because of their collaboration in the Google IYF project. Employing a correlational design supported by regression analysis, the research aimed to delineate and quantify the relationships between identified dependent and independent variables. Correlation was defined by Martin *et al.* (2019) as a tool that measures the strength and direction of relationships between the dependent variable (learner performance) and various independent variables (context of study, tools, language, time and experience). Regression analysis was defined by Hassan (2024) as a statistical process used to estimate and understand the relationships between variables. The goal was to formulate these relationships into comprehensive recommendations that could be applied to develop frameworks for similar educational programmes, enhancing their efficacy and relevance. This research design was further developed in Chapter three.

### 1.14.2 Data collection and variables

The quantitative data collection strategy centred around a single dependent variable: learner performance. This performance metric was influenced by a series of independent variables, including the contextual environment of the study, the educational tools used, the language of instruction, the allocated time for learning activities, and the learners' prior experiences. The investigation assessed how these factors individually and collectively impacted learner outcomes, proposing optimisation strategies to enhance learner engagement and success rates significantly.

### 1.14.3 Data source and sampling

The dataset for this study was sourced from IYF’s implementation of an online learning programme targeted at African learners. The sampling strategy aimed to cover either the entire population of participants or a substantial segment through census sampling, a non-probability method that provided a comprehensive overview of the entire group involved in the Google IYF project. This approach allowed for an in-depth analysis of the available data, giving a broad perspective on the educational impacts

observed (Etikan & Iliyasu, 2021). The methodology for selecting and defining the sample was detailed extensively in Chapter three.

The justification for the use of secondary data in this study stems from the researcher's intent to present an argument grounded in empirical evidence. The decision to employ third-party data was made to mitigate any potential bias that could have been introduced through primary data collection. Moreover, the use of secondary data was driven by practical considerations. Given the scope of the study, it was not feasible for the researcher to directly access all learners across the three different counties.

The utilisation of secondary data allowed for a comprehensive exploration of the potential value generated by integrating empirical programmes with theoretical frameworks, offering diverse perspectives on previous findings and providing insights for future initiatives. Additionally, the researcher aimed to demonstrate how existing secondary data could be re-examined using statical methodologies to uncover insights that had not been previously considered. Data analysis

Data analysis commenced upon receipt of the comprehensive dataset from the International Youth Foundation (IYF). The statistical analysis was anchored in correlation and regression techniques to explore the relationships between dependent and independent variables thoroughly. This approach enabled the identification of both the strength and direction of relationships, assessing how various educational factors correlated with learner performance.

Additionally, regression analysis was used to model these relationships, providing quantitative insights into the impact of specific variables on learning outcomes. This dual approach helped highlight commonalities and divergences within the data, facilitating a deeper understanding of consistent patterns and unique discrepancies across different educational contexts. The researcher utilised an ANOVA analysis and the Kolmogorov-Smirnov test to consider variance to determine whether there are statistically significant differences between the means, and to confirm normality within the datasets (Berger & Zhou, 2014; Kenton, 2024).

The combined findings from the correlation and regression analyses aimed to uncover underlying causes of any observed deficiencies in learner performance, thereby pinpointing significant causal relationships. Ultimately, this detailed examination

informed the development of targeted recommendations and strategies, aimed at enhancing the efficacy of online learning programmes and informing similar future educational initiatives. The data analysis was further developed and explained in Chapter three.

### 1.14.4 Population and sample size

The intended population for this study initially included up to 4,500 participants over three years, with each year contributing up to 1,500 participants distributed evenly among Kenya, South Africa, and Nigeria, with each country receiving five hundred licenses annually, provided by Google via Coursera. However, the actual sample size each year was expected to be less than the number planned due to varying degrees of license utilisation. A more precise estimate of the sample size, adjusted for actual participation rates, was pending further confirmation from the International Youth Foundation (IYF) and IRG (Meraki Research, 2021). The population and sampling were briefly explored in this chapter but are fully presented in Chapter three.

### 1.14.5 Census sampling methodology

Adopting a census sampling strategy, the study planned to analyse data from every available participant in the Google IYF programme. This comprehensive approach was designed to maximise data usage and minimise sampling bias, though it was acknowledged that not every participant might complete the necessary surveys. The target was to achieve a response rate of at least 25%, considered sufficient to provide a reliable understanding of the programme's impact across the three countries involved.

## 1.15 Significance of the study

This study sought to leverage insights from the Google IYF programme to develop a guiding framework for similar educational programmes across Africa. The significance of this research lay in its potential to transform theoretical lessons into practical strategies that enhance the efficacy and reach of online learning initiatives. By critically analysing past implementations, this study aimed to identify and rectify common missteps, thereby ensuring that learners derived maximum benefit from such programmes.

A key contribution of this research was the provision of a robust foundation for future programme developers. It offered evidence-based strategies that addressed the unique educational needs and challenges within the African context. Furthermore, this study enriched the academic discourse surrounding African andragogy and pedagogy, contributing valuable insights to a growing body of knowledge (Assan & Nalutaaya, 2018).

Moreover, this research addressed corporate stakeholders who invested in educational technologies, underscoring that the deployment of online learning platforms required more than just technological provision. It necessitated an understanding of diverse environmental challenges and the formulation of tailored responses to these challenges. By doing so, the study advocated for nuanced approaches to educational design that considered socio-economic backgrounds, prior learning experiences, available resources, and the time learners could dedicate to education.

On a broader scale, this research contributed to global educational practices by challenging the one-size-fits-all approach to learning. It presented a compelling case for the necessity of differentiated learning experiences, advocating for accommodations that reflected local realities rather than standardised metrics. Ultimately, this study aimed to influence how learning was conceptualised globally, emphasising the need for adaptability in educational practices to accommodate diverse learner profiles, especially in varied African contexts.

The DaVinci TIPS™ (Technology, Innovation, People, Systems) framework played a pivotal role in shaping this study's methodology and analytical approach. By emphasising the interconnectedness of these elements, the TIPS framework provided a holistic perspective that was essential for understanding and addressing the complex factors influencing online learning in Africa (The DaVinci Institute, 2019). The integration of the TIPS framework ensured that the study remained comprehensive, considering technological capabilities, innovative practices, human elements, and systemic structures. This approach not only enriched the theoretical foundation of the research but also ensured that the recommendations were practical and adaptable to real-world educational contexts (Adotey & Holcombe, 2022).

## 1.16 Delimitation and scope of the study

Delimitations defined the boundaries of this study, establishing clear distinctions between the included and excluded aspects of the analysis. These boundaries ensured that the study had specified start and end points, which were crucial for maintaining focus and clarity (DiscoverPHDS, 2020). The delimitations of this study were organised into five key areas: time, location, population, and variables, each with specific impacts on the study's scope and outcomes.

(i) Time: The study's timeframe was constrained by the academic requirements of the DaVinci Institute of Technology, necessitating the completion of the Master's in Management of Technology and Innovation within a two-year period. This limitation meant the data only reflected learner performance from 2021 to 2023, potentially excluding trends or outcomes that emerged outside this period. The restricted timeframe limited longitudinal analysis but ensured focused, timely research within the defined scope.

(ii) Location: This study was geographically limited to South Africa, Nigeria, and Kenya, within the Sub-Saharan Africa region. While this focus allowed for a deep dive into these contexts, it did not capture variances applicable to other regions where different socioeconomic conditions or educational policies might influence online learning differently. This regional focus was intended to provide depth over breadth, offering detailed insights into localised educational challenges and opportunities.

(iii) Population: The population examined was restricted to participants of the Google IYF programme in the specified countries, with each allocated five hundred learners, totalling up to 1,500 potential participants. The actual sample size might have varied due to programme completion rates, with a minimum target of two hundred learners annually across the countries. A full population sampling strategy was employed to maximise data utilisation, with more detailed sampling methods and implications discussed in Chapter three. This delimitation helped manage the study's scope, focusing on a specific learner group while acknowledging that findings might not generalise across different populations or programmes.

(iv) Variables: The study limited the investigation to specific variables outlined in the conceptual framework, with learner performance as the dependent variable. Factors

such as time allocation, study context, language, and experiential knowledge were considered independent variables influencing learner performance. While this focused approach allowed for a detailed examination of these factors, it might have excluded other potential variables that could affect learning outcomes, such as technological accessibility or instructor effectiveness. This delineation ensured a concentrated analysis but acknowledged potential gaps in the broader understanding of online learning efficacy.

(v) Limitation of Focus on one case study: The study focused exclusively on the Google IYF programme as a single case study, which provided detailed insights into that one programme's framework but may have limited the applicability of findings to other contexts or programmes. This singular focus enhanced depth and specificity but restricted the broader applicability of the results to different educational settings or models. This approach ensured a comprehensive understanding of the chosen programme but acknowledged potential limitations in generalisability.

## 1.17 Research case study

The research problem was centrally framed and analysed within the context of a Google IYF programme case study, which encompassed a comprehensive review of the events and outcomes associated with the programme. This case study approach enabled a focused examination of existing data to derive insights and develop targeted recommendations for enhancing educational outcomes for African learners. The case study methodology facilitated a detailed understanding of the programme's effectiveness and identified key areas for improvement, contributing to the broader discourse on e-learning in Africa.

### 1.17.1 Purpose of this study

The primary purpose of this research was to gain a deep understanding of the Google IYF programme by analysing the data collected from its implementation. This analysis sought to identify key factors that contributed to the success or limitations of the programme, with an emphasis on how soft skill training was delivered within the African context. By examining these aspects, the study aimed to propose well-founded

recommendations that could be adopted to refine and improve the programme's effectiveness.

### 1.17.2 Programme goals

The Google IYF programme was specifically designed to deliver soft skill courses to African learners, with the ultimate objective of equipping participants with the skills necessary to secure employment upon completion of a Google Professional Certificate. This focus on job readiness was crucial, as it aligned with broader educational and economic development goals within the region, aiming to enhance employability and address workforce demands.

### 1.17.3 Implications of the case study

Analysing this programme provided valuable insights into the practical applications of soft skill training and its impacts on employment outcomes. The findings from this case study not only benefited stakeholders involved in the Google IYF programme but also offered evidence-based strategies that could be generalised to similar educational initiatives across Africa and beyond. This case study thus served as a critical resource for policymakers, educators, and programme developers seeking to implement effective educational interventions in diverse socioeconomic settings.

## 1.18 Conclusion

In conclusion, while this study was in its preliminary stages, it held the promise of advancing to a level where it could exert substantial influence and drive significant improvements in educational practices. The primary aim of this research was to meticulously examine the current challenges faced by African learners in online learning environments, specifically through the lens of the Google IYF programme. This study sought to critically assess the effectiveness and potential inadequacies of existing educational structures.

By doing so, it aimed to ensure that scholarly works and subsequent educational reforms emphasised evidence-based practices that enhanced the learning experience. The goal was to contribute to a body of knowledge that supported effective policymaking and programme development, thereby improving the educational

landscape for African learners. As the research progressed, it strived to offer actionable insights and detailed recommendations. These outputs were intended not just to fill gaps in the academic literature but to provide practical guidelines that could be implemented by educational institutions and policymakers to foster environments where learners could thrive. This study, therefore, not only contributed to academic discourse but also played a crucial role in shaping the future of education in Africa.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

The objective of this study was to enhance comprehension of the correlation between the independent variables and the dependent variable, as outlined in the conceptual framework. By attaining a more comprehensive understanding of the relationship between these variables, the researcher gained valuable insight into learner performance on the Google IYF programme.

The objective of this literature review was to enhance the theoretical framework that was previously introduced in Chapter one. In addition, this review aimed to deepen comprehension of the e-learning evolution within the parameters of South Africa, Nigeria, and Kenya. Furthermore, pertinent literature was considered to reinforce the study's foundation and progression. This literature review adopted a multifaceted approach by examining theoretical literature, conducting a historical review, and analysing empirical studies. This comprehensive method allowed the researcher to gain holistic insights into the existing body of knowledge.

## 2.2 Theoretical framework

In this section, the researcher introduced a theoretical framework before delving into the supporting literature. The framework was specifically developed for this study and was previously presented in the first chapter. After examining the supporting literature, the researcher explored the implications of the theory on this study and presented the final framework. See the theoretical framework in Figure 8 below:

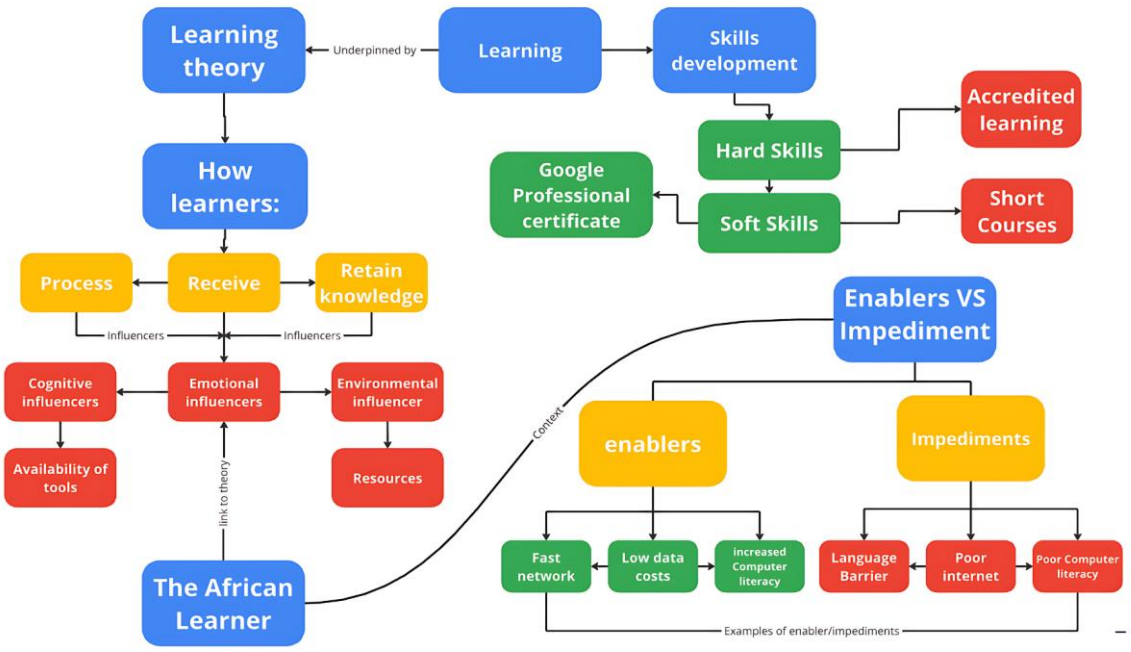

Figure 8: Theoretical Framework (Chapter 2)

### 2.2.1 Theory 1: Learning theory (further developed)

In 2023, Kimble conducted an exploration into the concept of learning theory and proposed that it is a means of explaining changes in behaviour that result from practice. While this definition was intriguing, it did not provide a comprehensive understanding of learning theory (Kimble, 2023). Kelly (2012) offered an alternative definition, suggesting that there were three primary learning theories: behaviourism, cognitivism, and constructivism. Behaviourism involved learning through the implementation of new behaviours or minor adjustments, while cognitivism focused on learning through information retention. Finally, constructivism proposed that learning occurred through the construction of knowledge based on individual experiences (Kelly, 2012). See Figure 9 below.

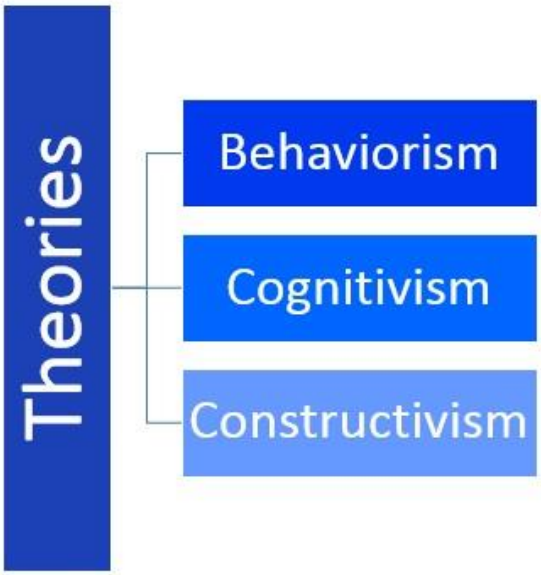


Figure 9: Three theories extracted from Kelly (2012)

According to the Western Governors University (2020), behaviourist learning is characterised by passive learner involvement, requiring learners to be physically present in the classroom while teachers utilise all available resources to create stimuli. The University also noted that this approach was unsuccessful without positive reinforcement (The Western Governors University, 2020). With the rise of online learning, the question arose whether learners were still expected to operate under behaviourists principles, without any positive reinforcement.

Elsewhere, Feder (2022) at the University of Phoenix explained that cognitive learning considered the internal processes surrounding information and memory of that information. Knowledge within the context of cognitive theory was developed through understanding what something is, and what something is not. This approach to learning allows learners to grasp concepts in a manner that would enable them to compare the benefits and disadvantages, which would enable an understanding of cause and effect and forward thinking (Feder, 2022).

Feder (2022) highlighted that constructivist learning theory emphasised active learning by internalising experiences through learner participation. It promoted feedback, collaboration, and hands-on experimentation. Although implementing hands-on components remained challenging in online settings, efforts were underway to bridge this gap (Mauri, 2019). The learning theories contributed to the theoretical framework, as this study, which is empirically built around the Google IYF programme, had to consider these important learning theories. Furthermore, it was beneficial to understand study habits (independent variable) to have a formative understanding of learning theories.

### 2.2.2 Theory 2: Hard and soft skills

Skills development encompassed two distinct categories essential in all professional contexts: hard skills and soft skills. Kenton (2023) defined soft skills as character traits and interpersonal skills that facilitated the achievement of personal and organisational goals. In contrast, Connett (2023) described hard skills as job-specific abilities and knowledge acquired through education, training and practical experience. These typically included technical skills, or a set of expertise required for specific jobs or fields.

In addition, the integration of hard and soft skills in the workplace prompted the development of the T-Shaped skills model. Wale (2023) characterised the T-shaped skills model as combining broad, generally applicable skills with deep, specialised knowledge in a particular area, enhancing an employee's ability to collaborate effectively. This model, presented by McKinsey and Company in an article by Hammer *et al.* (2021), underscored the importance of possessing a blend of both skill sets to

enhance workplace value and adaptability. The T-shaped model is shown in Figure 10 below.

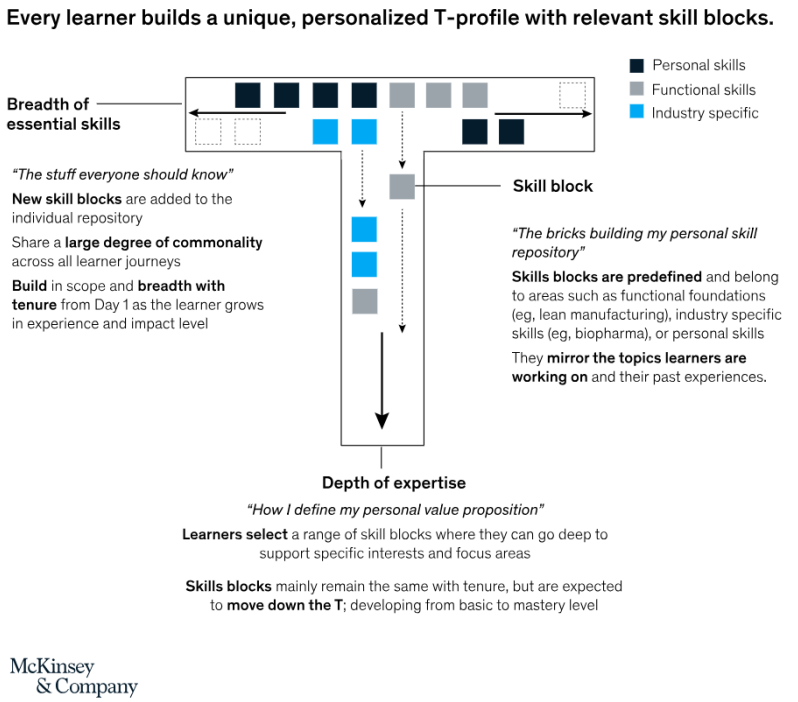


Figure 10: T-Shaped Model explained (Hammer, et al., 2021; Wale, 2023)

Expanding on this discussion, another significant concept in the realm of skills development is transferable skills. Defined by Kaplan (2023) as abilities that can be taken from one job to another, transferable skills are versatile and applicable across various fields, industries, and working environments. Examples include collaboration, time management, creative thinking, and critical thinking. Kaplan and Courtney (2023) highlighted the increasing prominence of transferable skills, as career paths evolved and individuals increasingly sought careers aligned with specific long-term goals, as discussed by Boogaard (2023).

This exploration of hard and soft skills, alongside the theories of the T-shaped model and transferable skills, offered valuable insights into the skills necessary for modern career success and the dynamic nature of workforce requirements. Specifically, in the context of the Google IYF programme and the study's focus, understanding these skill sets was crucial for evaluating the programme's effectiveness in equipping African learners with the competencies required in the global job market.

By integrating this understanding into the theoretical framework of the study, the research aimed to propose enhancements to online educational practices that not only improved the delivery of hard and soft skills but also ensured that these skills were transferable and relevant to the diverse professional environments that programme graduates would enter. This directly addressed the research puzzle by linking educational outcomes to tangible, employable skills, thus underlining the practical implications of effective skills training in online platforms (Majid *et al*., 2019).

### 2.2.3 Theory 3: Enablers and impediments to learning.

#### 2.2.3.1 The Enablers

Krueger (2022) identified crucial enablers within the realm of online education, particularly highlighting how environments conducive to digital collaboration significantly enhanced learning. These environments were supported by untethered broadband connectivity, robust data analytics, and adaptive technologies that ensured learners could remain continuously connected, engage effectively with peers, and receive education adapted to their individual learning curves. Krueger (2022) also emphasised the importance of comprehensive teacher training for online platforms. Understanding and manoeuvring within the online learning space was crucial, as unpredictability was a common challenge, and educators had to be equipped to innovate and creatively engage learners to foster progress and learning retention.

Lynch (2021) built on this by highlighting the critical role of cloud-based technology in online education. This technology allowed learners to make and correct mistakes without the risk of losing all previous work, thereby safeguarding continuous progress. Lynch (2021) also stressed the importance of robust online safety and security measures, arguing that creating a secure online learning environment protected learners in the same way physical security did in traditional schools, which was fundamental to fostering an effective educational setting.

King (2020) addressed the challenge of dwindling attention spans in the digital era by proposing tailored e-learning strategies. He suggested that e-learning technologies offering micro-learning sessions, focused topics, and personalised learning paths

could significantly improve educational outcomes. These technologies provided the flexibility and personalisation necessary to engage learners more effectively and maximise their learning potential without overwhelming them with too much information at once.

#### 2.2.3.2 The Impediments

Conversely, Falout *et al.* (2009) explored how motivation, or the lack thereof, significantly impacted learner performance. They delved into how both internal and external motivational factors, such as the appeal of the course content, the effectiveness of the educational environment, and the appropriateness of instructional approaches, influenced learner engagement and success. They highlighted that negative factors in these areas could severely demotivate learners, undermining the educational process.

Ali and Pathan (2009) continued this discussion by identifying specific educational elements that demotivated learners, including outdated or irrelevant grammar-focused teaching methods, unengaging course content, and personal challenges like poor motivation or lack of interest. These factors were detrimental in both traditional and online classrooms and needed to be addressed to ensure effective learning. They stressed the importance of modernising teaching approaches and aligning course content with learners ' interests and needs, to foster a more engaging and motivating educational environment.

Mwalyagile and Mwakyusa (2016) and Mintbook (2021) discussed the broader implications of the digital divide, noting that without access to necessary technological resources like the internet and computing devices, many learners were excluded from the digital education revolution. They also cautioned that rapid technological advancements, while beneficial, often resulted in complex and costly assessment challenges. These challenges could deter investment and funding in educational programmes, posing significant barriers to the scalability and sustainability of online education initiatives.

#### 2.2.3.3 How theories in the theoretical framework inform the study.

The exploration of diverse learning theories within the theoretical framework was instrumental in shaping the research's approach and its interpretations. The following detailed insights outlined how each theory contributed to a deeper understanding of the dynamics at play in the Google IYF programme:

Conditioning in learning: Early Childhood Development (ECD) and pedagogy theories revealed that conditioning significantly shaped learner behaviour (McLeod, 2024). Understanding these conditioned responses helped in analysing how learners interacted with the online modules of the Google IYF programme, impacting their engagement and retention rates. This insight was pivotal for assessing the effectiveness of certain pedagogical strategies within the programme.

Pedagogy and andragogy: The examination of pedagogical and andragogical theories uncovered similarities and crucial differences in learning approaches (Drew, 2023). This study leveraged these insights to tailor educational content that met diverse learner needs, recognising that adults and children absorbed and processed information differently. The nuanced understanding of these differences enabled the development of more effective adult learning programmes, particularly in enhancing autonomous and self-directed learning practices (Knowles, 2023).

Illeris's Learning Model: Illeris's integration of cognition, emotion, and socialisation within learning processes highlighted the multidimensional nature of effective educational environments (Caruso, 2022). This comprehensive model informed the design of the study's learning framework by ensuring that it addressed not just the intellectual needs of learners but also their emotional and social contexts, which are often overlooked in online education.

Community in Learning: McLeod's theory emphasised the role of community and social interaction in learning effectiveness (McLeod, 2024). The study adopted this perspective to foster a community-centric approach in the online programme, facilitating forums, group discussions, and collaborative projects that mimicked successful physical classroom interactions.

Diversity in Learning Styles: Recognising the diversity in learning styles, as illustrated by Kelly's three learning theories (Kelly, 2012), the study argued for the necessity of adaptive learning technologies. These technologies could dynamically adjust to individual learning styles, thus enhancing the personalised learning experience and accommodating a broader range of learners more effectively.

T-Shaped Skills Model: The T-shaped model highlighted the importance of integrating deep, specialised knowledge with a broad range of soft skills (Wale, 2023). This balance was crucial for preparing learners for modern work environments, which demand both depth and versatility. The study used this model to advocate for educational programmes that equally emphasise both aspects, thus preparing learners for various career paths and enhancing their employability.

Gaps in the Literature: A significant gap identified in the literature is the role of soft skills in e-learning and their impact on employability. This gap emerged in relation to the T-shaped skills model, presenting an opportunity to explore the effectiveness of models like the T-shaped approach in various contexts. Additionally, there are opportunities to investigate the importance of soft skills for employability, particularly within the African context. Another key gap is the lack of research on psychosocial factors in the African context, particularly the potential influence of peer support and mentorship on the outcomes of e-learning programmes, such as the Google IYF initiatives.

By acknowledging both the advancements and ongoing challenges in e-learning, this study identified critical areas for improvement, such as accessibility, technology integration, and learner support systems. Recognising these factors was essential for developing more resilient and inclusive educational platforms that could withstand and adapt to the evolving educational demands. This approach aimed to address disparities in access and provide a more equitable learning experience for all learners, particularly in diverse and resource-constrained settings (Lynch, 2021; Mwalyagile & Mwakyusa, 2016).

This review further strengthened the theoretical framework of this study, particularly in relation to the Google IYF study, thereby providing valuable insights into the optimal processes for theoretical learning. In continuation, it enhanced the researcher's

understanding of key concepts that inform the development of recommendations tailored to the African context.

## 2.3 Historical review

In this section, the researcher delved into the historical progression of skills development within Kenya, South Africa, and Nigeria. This review aimed to contextualise the environments in which the Google IYF programme operated, highlighting how distinct historical, cultural, and educational backgrounds influenced the adoption and effectiveness of e-learning in these countries. Additionally, the section traced the evolution of educational technology in these regions, examining how advancements in digital learning tools had transformed traditional educational systems and practices.

This historical perspective was critical for understanding the current challenges and opportunities in implementing e-learning solutions. By reviewing the development of educational policies, infrastructure, and societal attitudes towards technology and education over time, the study provided insights into the factors that had shaped the current state of skills development and online learning in each country.

### 2.3.1 Skills development acts and policies (contextual review)

South Africa: The Skills Development Act 97 of 1998 in South Africa was a transformative legislative framework designed to enhance the skills of the South African workforce (South African Government, 2023). It established a structured approach to developing occupational qualifications through learnerships, backed by a financial framework through a levy-grant scheme and the National Skills Fund (South African Government, 2023). These mechanisms were not only aimed at enhancing productivity and competitiveness on a global scale but also sought to rectify historical inequities and create more inclusive educational opportunities.

By integrating these initiatives within the South African National Qualifications Framework (NQF) (SAQA, 2012) and under the oversight of the South African Qualifications Authority (SAQA) (SAQA, 2012), the act ensured that skills development aligned with both national and international standards. This context was crucial for understanding the operating environment of the Google IYF programme in South

Africa, as it highlighted the legislative support for upskilling initiatives and the importance of aligning them with established national frameworks (SAQA, 2012).

Kenya: Kenya's approach, governed by the Kenyan National Qualifications Framework Act No. 22 of 2014 (The Republic of Kenya, 2014), emphasised apprenticeships, internships, and learnerships as key components of skills development (Ministry of Education: State Department for Post Training & Skills Development, 2020). This policy framework mirrored South Africa's in its emphasis on global competitiveness but was tailored to the specific educational and economic contexts of Kenya. The framework ensured that skills development initiatives were comprehensive and aligned with the long-term goals of empowering the Kenyan workforce.

This alignment was vital for the Google IYF programme's success in Kenya, as it ensured that the programme's objectives resonated with national skills development strategies and contributed effectively to workforce empowerment.

Nigeria: Nigeria's National Policy on Education, established in 1997 and subsequently revised, provided a broad framework for educational development across all levels (Federal Republic of Nigeria, 2004). The Education Reform Act in Nigeria complemented this policy by covering all aspects of education, including the governance of skills development through various councils and boards (Nigeria Education Ministry, 2023). These frameworks collectively ensured that educational initiatives were comprehensive, addressing everything from resource allocation to quality assurance. For the Google IYF programme in Nigeria, understanding these policies was essential for integrating the programme within the broader educational ecosystem and aligning it with national goals.

Significance of skills development in the study's context: In this study, the importance of understanding and integrating into these national frameworks could not be overstated. Skills development was critical not just for individual success but also for national economic stability and growth. Effective skills development policies, such as those in South Africa, Kenya, and Nigeria, created environments conducive to the implementation of international programmes like the Google IYF project (Faro, 2021; Hedau, 2022).

The study leveraged these frameworks to assess how well international educational programmes were aligned with national goals and how they could be optimised to serve learners better. By understanding the gaps in capability and competency that these policies aimed to address, the study could offer targeted recommendations for enhancing the Google IYF programme's effectiveness and relevance in these distinct contexts (Gaula *et al*., 2022).

### 2.3.2 The history of e-learning and the Fourth and fifth industrial revolutions

The term 'e-learning' refers to electronic learning, which involves the use of technologies to facilitate education (Bouchrika, 2024). Learning itself was defined as the process of acquiring new understanding or skills (Cambridge Dictionary, 2023). The convergence of education with technology became particularly pronounced during the COVID-19 pandemic, as traditional classroom settings were disrupted, pushing schools and institutions to adopt remote learning modalities (The World Bank, 2021).

Tucker (2019) provided a visual history of e-learning through an informative infographic as depicted in Figure 11 below:

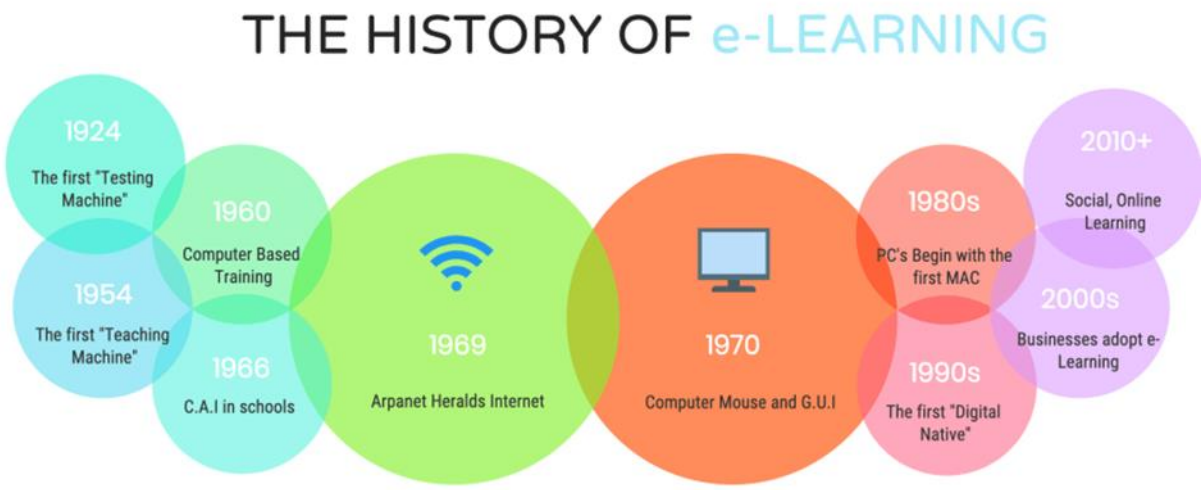


Figure 11: The History of e-learning (adapted from Tucker (2019)

The evolution of e-learning was marked by several significant milestones, each contributing to the shape and scope of digital education today. The journey began in the 1920s with Sidney Pressey's development of one of the earliest mechanical teaching machines (Collins, 2022). This device was a precursor to more sophisticated forms of technology-assisted learning and significantly predated B.F. Skinner's

teaching machine, which would not emerge until the 1950s. Pressey's invention laid the foundational concepts of automated learning aids that Skinner and others would later expand upon (Collins, 2022).

The 1960s heralded the advent of computer-based training, signalling a transformative period in educational technology. This decade was crucial as it marked the beginning of structured e-learning, where educational professionals began to explore and utilise computers as integral tools for teaching and learning (Collins, 2022). This era was characterised by an increased comfort with and understanding of computers among educators, setting the stage for more advanced applications in educational settings (Collins, 2022).

Technological innovations continued into the 1970s with the introduction of the computer mouse, and graphical user interfaces towards the end of the decade and into the early 1980s. These advancements made computers not only more accessible but also more appealing as educational tools. The enhanced user-friendliness significantly lowered the barrier to computer usage in educational environments, making technology a more integral part of learning processes (Collins, 2022).

The 1990s saw further cultural and technological shifts with the emergence of the 'digital native', a term popularised to describe individuals who had grown up immersed in digital technology. This period also witnessed the official coining of the term "e-learning" in 1999, encapsulating all forms of learning that utilised electronic resources, from online courses to digital classrooms (Collins, 2022; Gillis, 2020).

As the new millennium unfolded, the 2000s and 2010s were characterised by the widespread integration of technology in workplace training and educational institutions. These decades were marked by the growing acceptance and reliance on digital tools for learning and professional development, highlighting a significant shift towards embracing technology as a core component of educational strategies (Tucker, 2019).

Each of these periods not only reflected advancements in technology but also shifts in educational paradigms, where each innovation brought with it new challenges and opportunities for learning. As the future continues to unfold, these foundations paved the way for even more dynamic and integrated educational experiences.

The driving force behind the rise of e-learning has been the successive industrial revolutions, each introducing new technological capabilities and skill requirements (Madumo & Kimaro, 2021). The fourth industrial revolution, characterised by advancements in artificial intelligence (AI), robotics, and machine learning, reshaped educational content to be more dynamic and aligned with contemporary global challenges (Schwab, 2016).

The anticipated fifth industrial revolution is likely to be focused on enhancing collaborative interactions between humans and machines, promoting a synergy that could redefine learning and working environments. Despite perceptions that Africa lagged technologically, the continent showed rapid adoption rates of new technologies, particularly in educational contexts (Delport, 2021). This rapid technological adoption, spurred partly by the COVID-19 pandemic, suggested significant potential for future educational innovations and technological integration within Africa.

#### 2.3.2.1 How the historical literature informed the study.

This section explored how insights from the historical review of skills development and e-learning directly influenced the design and objectives of the Google IYF programme. Each point highlighted the relevance of historical contexts and their impact on current programme strategies:

Contextual understanding of skills development: The detailed review of skills development legislation, particularly in South Africa, provided a clear understanding of the supportive frameworks available for programmes like the Google IYF project. Recognising that South Africa had advanced legislation for skills development allowed the programme to leverage this framework for effective implementation and alignment with national skills agendas (South African Government, 2023). This comparative advantage was used to tailor programme interventions to fit better the legislative strengths and weaknesses identified in Nigeria and Kenya (Ministry of Education: State Department for Post Training & Skills Development, 2020; Federal Republic of Nigeria, 2004).

Variability in governmental support: Identifying discrepancies in governmental support for skills development across the countries helped tailor the Google IYF programme's

approach to each specific national context. For example, where governmental support was lacking, the programme focused on strengthening partnerships with local organisations and private sector entities to fill gaps and enhance the programme's effectiveness and sustainability (Ministry of Education: State Department for Post Training & Skills Development, 2020; Federal Republic of Nigeria, 2004).

Education as a tool for global competitiveness: The historical emphasis on education for enhancing global competitiveness underscored the strategic importance of aligning the Google IYF programme with national economic goals. This alignment ensured that the skills taught were relevant and contributed to improving the international labour market competitiveness of graduates from these programmes (South African Government, 2023; Ministry of Education: State Department for Post Training & Skills Development, 2020). This focus on competitiveness is crucial, as noted by Kenton (2023) and Hammer *et al.* (2021), in integrating both hard and soft skills for a well-rounded educational approach.

Evolving nature of e-learning: By understanding the historical advancements in e-learning, the study could predict and adapt to continuing changes in this field (Tucker, 2019). This foresight was crucial for the Google IYF programme as it sought to incorporate the latest educational technologies and methodologies to enhance learner engagement and outcomes. Ensuring that the programme remained at the cutting edge of educational innovation was vital, particularly given the rapid technological advancements outlined by Delport (2021).

Convergence of education and technology: The historical convergence of education and technology provided a framework for integrating state-of-the-art technological tools within the Google IYF programme. This integration was essential for creating interactive and immersive learning experiences that significantly boosted learner engagement and retention, making education both accessible and effective (Bouchrika, 2024). By leveraging advancements from the fourth and fifth industrial revolutions, the programme could offer innovative solutions to educational challenges, aligning with Schwab (2016).

Influence of industrial revolutions on e-learning: The study's recognition of how the fourth and fifth industrial revolutions have reshaped skill demands informed the Google

IYF programme's curriculum development. By aligning the programme's content with these new industrial realities, the project ensured that learners acquired relevant and marketable skills that prepared them for the future workplace, particularly in high-demand sectors involving AI, robotics, and digital technologies (Madumo & Kimaro, 2021).

Gaps in body of knowledge: There are significant opportunities to conduct comparative analyses between policies and the actual outcomes observed in practice. The governments of Kenya, Nigeria, and South Africa have taken proactive measures to address the challenges in their respective education systems, yet there is a gap in research examining the effectiveness of these interventions. Another key gap lies in the evolution of digital literacy, particularly within the African context. Questions remain regarding whether the evolution of digital literacy in Africa will follow a distinct trajectory or if it will align with global trends.

To conclude this section, it is important to note that it contributed to the development of the study's contextual framework (an independent variable in the conceptual model). This section offered valuable insights into the different regions—Nigeria, Kenya, and South Africa—building upon the theoretical foundation established earlier. This convergence between theory and practical understanding ultimately benefitted the study by enabling a more comprehensive analysis of regional dynamics, fostering more contextually relevant recommendations, and enhancing the overall applicability of the findings to the African context.

## 2.4 Empirical literature review and critical evaluation

The term 'empirical' was defined by Merriam-Webster (2023) as an understanding derived directly from observation or experience without reliance on systems or theoretical frameworks. In this study, the empirical literature review was employed to deepen the researcher's comprehension of online education within the African context. Specifically, it aimed to assess learner proficiency (linked to variables of experience and study habits), investigate the extent and impact of the digital divide, and evaluate the successes and shortcomings of online learning programmes in Africa. This exploration was organised into five thematic sections, each addressing distinct but interrelated aspects of the online educational landscape.

### 2.4.1 Theme 1: Influential factors impacting accessibility to online learning in Africa.

The initial factor under consideration was the digital divide, a societal gap that segregated individuals based on their access to technology. Mlaba (2021) investigated the exacerbation of this divide due to restricted access to online education during crises such as the COVID-19 pandemic. This divide not only highlighted issues of access but also underscored disparities in digital literacy. Mlaba (2021) further elucidated that individuals without prior educational opportunities were disproportionately affected by a lack of digital skills, complicating their ability to engage with digital platforms effectively. This aspect was particularly pertinent to the study as it underscored the critical need for understanding the digital competencies of African online learners, a fundamental component that influenced the effectiveness of online learning initiatives.

Further exploration of the digital divide was conducted by Richard Adeleke (2020), who highlighted significant disparities in network usage across Nigeria, illustrating the prevalence of the digital divide within the country. This finding was corroborated by a report from The World Bank (2021), which noted that although network availability in Nigeria had increased by 70%, the actual uptake of network usage remained alarmingly low at below 25% (The World Bank, 2021). The report identified several barriers to technology adoption, including wealth disparities, urbanisation, literacy levels, educational access, and electricity availability.

The World Bank (2019) also documented an expanding digital divide, emphasising the urgent need for enhanced technology adoption across educational sectors, including primary, secondary, and tertiary institutions. The report specifically pointed out that Kenya needed to intensify efforts to prepare its citizens for future job markets. It provided statistics indicating that while 44% of the urban population had internet access, only 17% of the rural populace was similarly connected, underlining a significant urban-rural divide (The World Bank, 2019). Such disparities in internet access were critical contributors to the digital divide, impacting the effectiveness of online learning in these regions.

The digital divide emerged as a significant factor influencing learner and academic performance (dependent variable), with the empirical examples above confirming its negative impact. This exploration provided valuable insights into the relationship between tools and academic performance, demonstrating that learners who had a better understanding and familiarity with digital tools tended to perform better. This concept is further elaborated in the subsequent section of the literature review, where the role of digital tools continues to be a key focus.

In an extensive examination within the South African context, Mpungose (2020) explored preferences for online learning platforms at a South African university, specifically comparing WhatsApp and Moodle. The study revealed that first-year learners displayed a preference for the more familiar WhatsApp platform over Moodle. A notable limitation identified in the study was the absence of a combined use of WhatsApp and Moodle as an option, suggesting a potential area for further exploration in terms of integrating various communication tools to enhance the online learning experience (Mpungose, 2020).

Continuing this line of inquiry, Mpungose (2021) investigated the perceptions of lecturers using Zoom video conferencing technology for online e-learning. The findings indicated that lecturers found Zoom to be beneficial for fostering synchronous learning, although they encountered significant challenges related to digital fatigue (Mpungose, 2021). This aspect of the research highlighted the need to address the impacts of extended screen time on both educators and learners, suggesting that strategies to mitigate digital fatigue were critical for the sustainability of long-term online learning programmes (Mpungose, 2021).

Mpungose’s (2021) article offered a distinct perspective on tools as an independent variable, whereas the Google IYF study primarily focuses on the learner. Gaining insights from educators and lecturers proved valuable, particularly as their experiences directly influence learners' experiences—another key independent variable. For instance, if educators hold negative perceptions about a tool or technology, they may transmit this sentiment to learners, potentially creating a cause-and-effect chain that negatively impacts learner performance. This highlights the interconnectedness of educator attitudes and learner outcomes within the digital learning environment.

These studies by Mpungose (2021) were instrumental in understanding the technological preferences and challenges faced in the South African e-learning environment. They pointed to the necessity of considering user familiarity with technology platforms and the physical and psychological impacts of their prolonged use (Mpungose, 2021). Such insights were crucial for developing effective online learning strategies and support systems that catered to the needs and preferences of African online learners, particularly as programmes like the Google IYF project sought to optimise their digital education initiatives.

The researcher shifted the context and considered the e-learning challenges faced in Kenya. An article by Kibuku *et al.* (2020) found that universities in Kenya were dealing with the following challenges: insufficient e-learning policies, inadequate information and communication technology (ICT), lack of training for e-tutors and e-learners, budgetary constraints, and negative perceptions towards e-learning as a practice. These were similar issues to what was found in the South African context (Kibuku *et al*., 2020).

In their study at Maseno University, Makhaya and Ogange (2019) explored the perceptions of e-learning among lecturers, sampling fifty-five educators. The findings revealed a generally positive perception of e-learning, with lecturers acknowledging its self-efficacy (Ogange, 2019). However, they suggested that adoption rates could be improved with better institutional support. This insight underscored the importance of holistic support systems for e-learning modalities, which were critical for successful implementation in the African context (Ogange, 2019). The study highlighted the need for comprehensive training and resources to aid lecturers in transitioning to, and embracing, digital education platforms effectively.

Similarly, a study conducted by Nwagwu (2019) at the University of Ibadan in Nigeria involved 240 lecturers and echoed many of the sentiments found in the Maseno University study. Lecturers expressed optimism about the integration of e-learning platforms; however, there was uncertainty regarding the full comprehension and readiness of other stakeholders, particularly learners (Nwagwu, 2019). Specific concerns included the learners' IT and web skills, financial readiness to participate in e-learning, availability of necessary technology equipment, and the quality of e-learning content (Nwagwu, 2019). These concerns spotlighted the multifaceted

challenges facing e-learning adoption, emphasising the need for institutions to address both educator and learner preparedness comprehensively.

The empirical literature exploring various e-learning platforms provided valuable insights that connected to the tools being utilised in these programmes. Furthermore, it emphasised the necessity for adaptability in the study habits that learners adopt, as flexible approaches to learning are essential for effectively navigating diverse digital environments and maximising academic performance. This adaptability not only enhances engagement but also fosters a deeper understanding of the content being studied, ultimately contributing to academic performance (the dependent variable in the Google IYF Study). The parallels drawn between the educational environments in South Africa, Nigeria, and Kenya revealed a consistent pattern of challenges across these regions. These findings illustrated the critical need for tailored support structures within universities to foster an effective e-learning ecosystem. Addressing these needs could significantly enhance the adoption and effectiveness of e-learning across African educational institutions, contributing to more robust and accessible digital education systems. General concerns are highlighted in Figure 12 below.

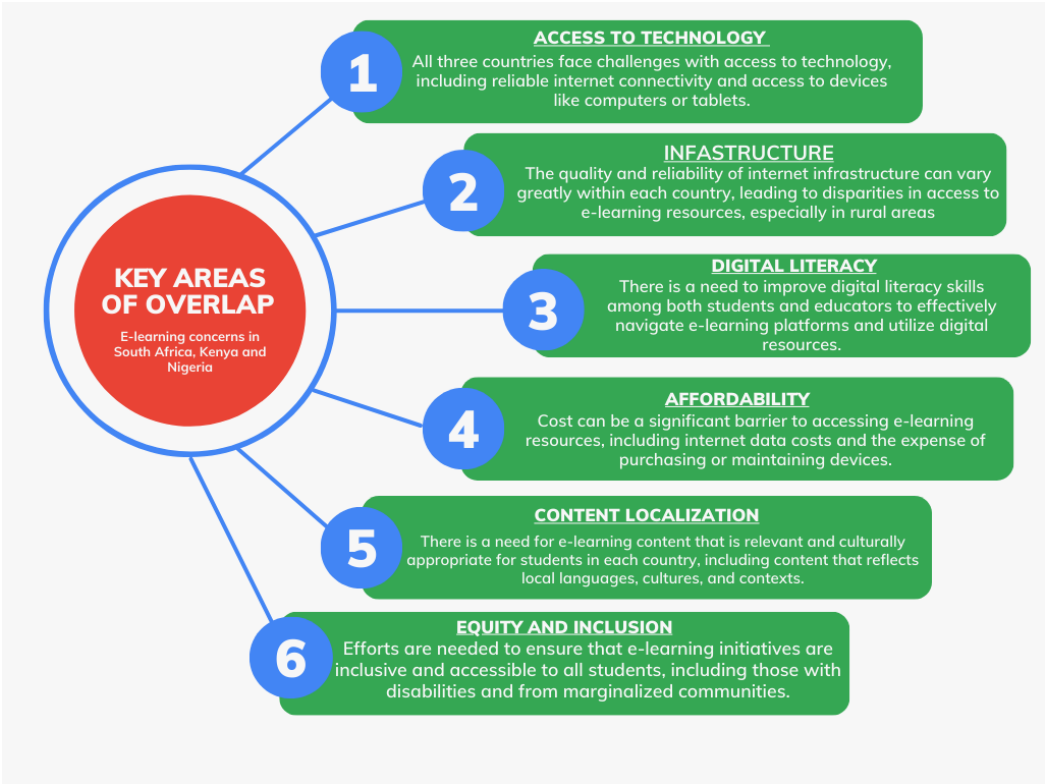


Figure 12: General E-learning concerns in South Africa, Kenya and Nigeria (developed using information provided in literature review)

Technological acceptance in Africa was crucial for the success of online educational programs. Adotey and Holcombe (2022) highlighted the necessity for African nations to bolster their digital infrastructure through dedicated investment in home-grown digital solutions via research and development. This approach not only fostered technological acceptance but also catalysed economic growth through innovative digital developments (Adotey & Holcombe, 2022). Such investments were pivotal in creating a supportive environment for online learners pursuing certifications such as the Google Professional Certificates, as they ensured that the necessary technological resources and support systems were in place to facilitate effective learning.

Furthermore, Tshazi and Civilcharran (2021) provided an analytical perspective on the technological advancements within South Africa, exploring how these innovations reshaped the market and introduced both opportunities and challenges. Their research was particularly insightful as it examined technology adoption across different generations, revealing significant age-related disparities in access and usage. This multigenerational perspective was crucial for understanding the varying needs within the population, suggesting that educational programmes needed to offer reasonable accommodations to address these differences (Tshazi & Civilcharran, 2021).

The authors noted that while many households gradually adopted new technologies, there remained a substantial need for programmes that were accessible and adaptable to diverse technological proficiencies. This insight was invaluable for the development of the Google Professional Certificates programme, as it underscored the importance of designing these initiatives to be inclusive and responsive to the specific technological realities faced by learners across Africa (Tshazi & Civilcharran, 2021).

### 2.4.2 Theme 2: African learners' language and digital proficiency

Wang and Zhu (2019) critically examined the potential of massive open online courses (MOOCs) to provide deep and high-level learning experiences. They noted that while MOOCs offered substantial opportunities for expansive education, they also presented significant challenges, particularly in their design which often failed to accommodate local conditions and align with traditional educational methodologies. This

misalignment hindered the effectiveness of MOOCs in regions with distinct educational needs and cultural practices (Wang & Zhu, 2019; Wong *et al*., 2018).

Further exploring the impact of MOOCs, Lane *et al.* (2014) highlighted that these platforms necessitated a re-conceptualisation of educational practices within the higher education sector. MOOCs challenged conventional approaches by promoting more flexible, accessible, and diverse educational opportunities. This shift had the potential to transform educational delivery but required careful integration into existing educational frameworks to be truly beneficial (Lane *et al.,* 2014). This reinforces the importance of understanding the context of study before introducing new tools and technologies, ensuring that their implementation aligns with the specific needs and dynamics of the educational environment.

Central to the theme of African learners' proficiency was the evaluation of educational attainment through various assessment methods. The research identified standardised testing, summative assessments, and formative (interim) assessments as prevalent measures. However, Evans and Acosta (2020) emphasised that African countries faced unique educational challenges that impacted learning efficacy. One notable difficulty was the lack of instruction in learners' home languages, which significantly impeded comprehension and retention of knowledge (Evans & Acosta, 2021). This language barrier was a critical consideration for developing effective educational strategies and content that were linguistically and culturally appropriate for African learners.

The significance of language in learning was highlighted by research conducted by Cox (2021) in Nova Scotia, Canada, which assessed the linguistic and cognitive skills of first-grade learners. This study, involving 338 learners across eighteen schools, was distinctively segmented into two demographic groups: native Nova Scotian learners and Nova Scotian learners of African descent. The findings revealed that African Nova Scotian learners consistently scored lower in areas such as word reading, phonological awareness, morphological awareness, and syntactic awareness compared to their native counterparts.

These results were particularly insightful for understanding the educational challenges faced by learners of African descent, indicating a disparity that extended beyond

geographical and cultural boundaries. The findings from Cox (2021) underscored the necessity for educational frameworks that accommodated the unique needs of African learners, not only in terms of curriculum design but also in linguistic accessibility.

To further explore the implications of language in education, the research considered the work of Kafu (2018), who advocated for instruction in learners' mother tongues. Kafu (2018) argued that teaching in one's native language could significantly enhance social mobility, economic empowerment, and provide clearer pathways to academic opportunities. This approach not only supported cultural preservation but also addressed the cognitive disconnect many learners experienced when educated in a second language.

These insights collectively emphasized the critical role language played in educational accessibility and efficacy (Cox, 2021; Kafu, 2018). They suggested that for learners of African descent, both in Africa and in the diaspora, language could be a barrier to learning that necessitated thoughtful and inclusive educational strategies. By integrating these findings, this study highlighted the importance of developing multilingual educational resources and practices that could better serve diverse learner populations.

The significance of soft skills, particularly in the context of leadership and career advancement for African online learners, was underscored by research conducted by AbuJbara and Worley (2017). Their study highlighted how effective soft skills training could open new horizons for learners, promoting better leadership qualities and broader career opportunities. This research was particularly valuable to the current study as it illustrated the transformative potential of well-implemented soft skills programmes, which could significantly enhance the employability and professional development of African learners (AbuJbara & Worley, 2017).

However, the proficiency of African learners in such programmes was often undermined when they were assessed in contexts that did not account for their unique cultural and linguistic backgrounds. Harvey *et al*. (2018) and Prinsloo *et al*. (2018) supported this notion by identifying language barriers as a significant impediment in educational settings. They emphasised the necessity for thorough implementation of teacher training and the adaptation of economic policies to support the specific needs

of African learners better. This approach not only made the learning process more inclusive but also ensured that the evaluation of learners' skills was fair and reflective of their true capabilities, rather than biased towards contexts unfamiliar to them (Harvey *et al*., 2018).

### 2.4.3 Theme 3: Online learners in digital age and AI in education

Anglia (2021) provided an insightful examination of the benefits associated with online learning, notably highlighting its capacity to bridge geographical distances between teachers and learners. This connectivity not only exposed educators to a diverse range of pupils but also enriched learners with a broadened educational experience. Among the key advantages of online learning, Anglia (2021) noted the added dynamism to educational processes, such as increased flexibility in learning hours.

Furthermore, online learning environments empowered learners to take control over their educational settings, allowing them to experiment with and discover learning strategies that best suited their individual needs. This empowerment fostered a lifelong self-awareness of their learning preferences and requirements, which was invaluable for their future educational and career endeavours (Anglia, 2021; Noel & Rodas, 2023).

Goyal (2013) extended this discussion by addressing the evolving role of online education within the modern educational system. He advocated for a pivotal shift from traditional teaching methods to a more learner-centric approach, emphasising the importance of making education responsive to the needs of learners. Goyal (2013) argued that in the context of increasing globalisation, online education became crucial not only for facilitating lifelong learning but also for ensuring that educational practices were adaptable and relevant across diverse global contexts. This shift underscored the necessity of online education as a tool for preparing learners to succeed in a rapidly globalising world (Goyal, 2013).

A seminal study by Goger *et al.* (2022) aimed to create a high-level map of the intersection between education and labour markets in the age of digitalisation. The researchers identified a significant global divide. Initiatives to enhance access and opportunities were predominantly concentrated in wealthier, industrialised nations, leaving adults in low-income countries increasingly marginalised. This disparity

highlighted critical systemic issues that were essential to understand, as they could significantly influence the outcomes of studies on African online learning. The barriers identified by Goger *et a*l. (2022) resonated with those anticipated in the African context, underscoring the importance of addressing contextual challenges within the scope of the research.

Further, Goger *et al*. (2022) included a table that outlined the technological shifts in education and skills pathways, moving from analogue (1.0) to online (2.0), and advancing to platform (3.0). This progression reflected a transition towards more dynamic and flexible learning environments, breaking away from traditional conceptual and theoretical models.

Notably, the platform stage, as observed by the researchers, incorporated innovative elements such as virtual reality, or augmented reality, and gamification (Goger *et al*., 2022). These technologies not only enhanced the interactivity and engagement of learning experiences but also catered to modern learners' expectations for immediate gratification and interactive education. Such insights were crucial for understanding how educational strategies could be evolved to meet the demands of the Fourth Industrial Revolution (4IR) and beyond, providing valuable context for this study's exploration of online learning environments in Africa (Goger *et al*., 2022).

Additional insights from Goger *et al*. (2022) revealed the evolving role of artificial intelligence (AI) in the job and skills matching process. The researchers suggested that skills-based hiring, guided by sophisticated algorithms, was poised to become a normative practice. This concept was already partially realised through platforms like LinkedIn, where algorithms played a crucial role in matching job seekers with potential opportunities. The use of AI to facilitate lifelong learning paths that directly led to employment represented a significant shift towards more personalised and efficient career development processes.

To illustrate these advancements, Goger *et al*. (2022) provided a detailed table outlining a framework, which they called Education 3.0, which integrated these technological shifts. See Table 2 below:

Table 2: Education 3.0 (extracted from Goger et al. (2022))

| | 1.0 Analog | 2.0 Online | 3.0 Platform |
|---|---|---|---|
| **Conceptual and theoretical learning** | In person, classroom-based instruction | Online courses (recorded), remote instruction (live), and hybrid-online and in-person instruction | Dynamic learning and credentialing platforms, modularized courses with digital badging, and artificial intelligence to suggest jobs or learning progressions |
| **Hands-on learning** | In person, on-the-job learning in a workplace | Live or recorded demonstrations, hybrid work-based learning, and online instruction | Virtual and augmented reality training, interactive gamified courses or problem-solving activities, and real-time assessment platform data |
| **Job matching process** | Paper applications, "help wanted" signs, classifieds | Online job boards, applications, and professional networking sites | Artificial intelligence to suggest potential jobs, candidates, or professional connections; integration with learning platforms to suggest matches; and skills-based hiring algorithms |
| **Skill signaling** | Paper diplomas, degrees, transcripts, certificates, and licenses | Online degrees and digital credentials, online certifications, and professional license exams | Digital badges, nanodegrees, targeted skills-bundling through digital wallets, and artificial intelligence in candidate selection algorithms |

This table offered a structured overview of how education systems adapted to incorporate AI and algorithmic decision-making, enhancing the connectivity between education and labour markets (Goger et al., 2022).

In parallel, Grand-Clement (2017) discussed the transformative effects of digitalisation on the roles of educators and learners. The shift towards self-directed learning models, facilitated by digital platforms, allowed learners to assume greater control over their educational journeys. This "self-study" approach was increasingly prevalent, driven by the accessibility of digital resources. Grand-Clement (2017) emphasised that this paradigm shift was crucial as it diversified the sources of learning and support available to learners, thereby reducing their dependence on traditional instructor-led

frameworks. This democratisation of learning not only empowered learners but also challenged educational institutions to rethink their roles in a digitally enabled world.

This study, the Google IYF study, aimed to establish a framework supported by a supporting figure that facilitates learners' ease of access and freedom to learn, irrespective of their context. Building on the insights from the previous paragraph, which emphasised the transformative effects of digitalisation on the roles of educators and learners (Grand-Clement, 2017), the Google IYF study also sought to ensure that educators and programme developers approach their programmes with a focus on key factors such as context of study, study habits, language, tools, time, and experience.

By emphasising these elements, the framework aims to enhance the effectiveness of self-directed learning models, which empower learners to take control of their educational journeys while prompting educational institutions to rethink their roles in a digitally enabled world. King (2018) explored the multifaceted impact of the digital age on learners, examining the influence from the dual perspectives of social media and technology.

On social media, King (2018) noted that learners had unprecedented opportunities to express themselves, form opinions, and develop a sense of identity from an early age. This early engagement in social platforms significantly shaped their social interactions and personal development. Regarding technology in education, King highlighted the role of gamification in enhancing learning experiences. Gamification not only made learning more engaging but also encouraged creativity, problem-solving, and strategic thinking. Importantly, it created a low-risk environment where learners could experiment and learn from their mistakes, embodying the essence of effective educational practices (King, 2018).

Cruz (2021) further delineated the transformation of learning in contemporary society, attributing a global increase in literacy to the widespread adoption of modern educational technologies and methodologies. This rise in literacy levels led to systematic improvements, including the standardisation of educational practices and evolving perceptions of online education. Cruz emphasised that these changes culminated in a significant proportion of learners (85%, according to the study) believing that online education could deliver the same or even superior quality

compared to traditional classroom settings. This perception underscored the growing acceptance and validation of online learning platforms as viable alternatives to conventional educational environments (Cruz, 2021).

To further expand the critical discourse around the online learning environment, the researcher shifted to consider artificial intelligence (AI) in education. The significance of AI in education is undeniable. This literature review examines this importance, as technology serves as one of the key independent variables within the conceptual framework of the study. Patel and Ragolane (2024) underscore the necessity of investing in technological infrastructure alongside the critical need for governance and policies surrounding AI, particularly within the South African context. (Patel & Ragolane, 2024).

Mpofu and Sebele-Mpofu (2023) conducted a comparative study in Zimbabwe and South Africa, reviewing the integration of AI in accounting education. The study found that the adoption of AI in this field remains in its infancy. Similar to previous research, it recommended the development of governing policies to support AI usage in classrooms. Additionally, the study went further, suggesting that collaboration between academic institutions and industry researchers is essential for effectively integrating AI into curricula, training, and programme development (Mpofu & Sebele-Mpofu, 2023).

The researcher sought to identify additional articles exploring AI within contexts relevant to the Google IYF programme. Wang'ang'a (2024) found that there is a scarcity of AI-related studies in Kenya. The author also noted that AI, in its current form, cannot replace teachers due to its lack of essential skills such as critical thinking, creativity, and emotional understanding. The article concluded by recommending the adoption of AI detectors to combat cheating in higher education, further highlighting the need for governance in the realm of AI in education (Wang'ang'a, 2024).

In the Nigerian context, Bali (2023) examined emerging trends in AI education and found that a significant number of Nigerian institutions have yet to integrate AI into their educational practices. The article proposed that Nigerian academic institutions adopt AI practices from more advanced nations as a means of addressing the growing digital divide. This approach was recommended to enable Nigerian institutions to

bypass many of the challenges associated with AI implementation and integration experienced in other contexts (Bali, 2023).

### 2.4.4 Theme 4: The value of soft skills programmes

Beltran (2021) highlighted the critical importance of soft skills in both professional and personal contexts. He defined soft skills as essential tools that enabled individuals to navigate day-to-day challenges effectively. The distinction between soft and hard skills lay in their application. While hard skills provided the technical knowledge and academic credentials necessary for professional tasks, soft skills equipped individuals with practical techniques that could be directly applied in real-world scenarios. Beltran emphasised the necessity of balancing both types of skills, particularly in the African context, where the integration of soft and hard skills was vital for holistic professional development.

Soft skills encompassed a broad range of competencies, including the ability to use computer devices, communicate effectively, operate specific software, and execute various tasks. The increasing importance of soft skills in the workplace was underscored by research from Succi and Canovi (2019), who questioned a mixed group of learners and employers across European countries. Their findings indicated that 86% of respondents perceived a growing demand for soft skills in the workforce, highlighting the evolving needs of modern employment landscapes (Succi & Canovi, 2019).

Choi *et al.* (2020) in their seminal work, "The Future of Work in Africa," argued that despite the limited industrial base in Sub-Saharan Africa, digitalisation was not expected to displace many jobs. Instead, they posited that digitalisation was crucial for development in the region, as it provided an opportunity for the workforce to acquire new competencies through soft skills programmes. These programmes were pivotal in preparing individuals to thrive in a digitally transforming environment. For instance, in South Africa, the frequent power outages known as loadshedding spurred the growth of industries focused on providing alternative power solutions, illustrating how soft skills, combined with entrepreneurial spirit, could lead to innovative industry responses to local challenges (Nkabinde, 2022).

The importance of soft skills extended beyond technical proficiency to include managerial and leadership competencies that were increasingly valued in the modern workplace. Danao (2023) identified eleven essential skills necessary for contemporary employment, which included creativity, teamwork, leadership, time management, and adaptability. These skills highlighted the evolving demands of the workplace, where flexibility and innovation were at a premium. Furthermore, the flexibility in delivery methods of soft skills training (unconstrained by the strict guidelines typical of accredited programmes) allowed for more innovative and adaptive learning experiences. This flexibility was crucial for developing programmes that were responsive to the unique needs and challenges faced in different contexts, as noted by van Rensburg (2021).

Recognising the significant overlap between soft skills and transferable skills is crucial, as elucidated by Herrity (2023). Soft skills encompass behavioural traits and personality characteristics that underpin interpersonal interactions and personal effectiveness. In contrast, transferable skills refer to abilities that can be taught and applied across various situations and employment settings. The teachability of behaviours and best practices, such as a work ethic (an essential component of professional success) illustrates the practical synergy between these two sets of skills (Herrity, 2023).

Continuing this exploration, Keevy (2020) investigated the impact of soft skills within the accounting sector, focusing on how these skills were transferred in educational settings. The study revealed that learners showed enhanced performance when soft skills training was coupled with strong mentorship or leadership. Conversely, purely online activities and digital learning approaches failed to replicate the effectiveness of in-person guidance. Keevy's findings emphasised the need to carefully consider the methods of soft skills transmission to ensure that the delivery mode effectively complemented the educational content and objectives. This research underscored the importance of incorporating robust mentorship and experiential learning components into soft skills programmes to maximise their impact and efficacy (Keevy, 2020).

A pivotal study by Assan and Nalutaaya (2018) examined the utilisation of soft skills by university learners in Kenya in their quest for employment. The researchers discovered that employers prioritised candidates who were dependable, reliable,

possessed strong communication skills, and had the ability to present effectively. However, the study also highlighted a significant barrier. Although learners were eager to acquire these skills, the scarcity of opportunities or circumstantial difficulties often hindered their ability to do so. Assan and Nalutaaya (2018) emphasised the critical demand for soft skills in the workplace while also identifying the challenges related to the accessibility and practical implementation of soft skills training programmes. This research underscored the necessity for more accessible and pragmatic soft skills training initiatives that could effectively meet the needs of learners and employers alike (Assan & Nalutaaya, 2018).

In another relevant study, Marin-Zapata *et al.* (2022) addressed the conceptual understanding of soft skills within the South African context, questioning the clarity and consensus surrounding the definitions of individual competencies and soft skills. Their research involved a comprehensive literature review and theoretical analysis, which revealed a lack of clear distinctions between these concepts. To address this ambiguity, Marin-Zapata *et al.* developed a model that delineates the differences between competencies and soft skills, thereby contributing to a clearer understanding and better communication in educational and professional settings. This model was instrumental in providing educators and industry professionals with a more precise framework for discussing and developing these essential skills (Marin-Zapata *et al.,* 2022).

A comprehensive literature review conducted by Touloumakos (2020) sought to refine the understanding and definition of soft skills within the academic and professional spheres. This study revealed two critical insights. Firstly, it identified the existence of numerous groupings or categories of soft skills, underscoring the lack of consensus in how these skills are organised and defined. This fragmentation suggested a need for a more unified approach to categorising soft skills to enhance clarity and consistency across educational and training programmes (Touloumakos, 2020).

Secondly, Touloumakos (2020) noted that the extensive list of abilities classified as soft skills posed significant challenges for their integration into curricula. The broad range complicated the task of effectively incorporating these skills into educational frameworks, highlighting the necessity for a systematic method to include or exclude certain skills based on well-defined criteria. This approach would ensure that soft skills

training was both purposeful and meaningful, addressing specific educational and occupational needs efficiently (Touloumakos, 2020).

### 2.4.5 Theme 5: E-learning successes and failures in Africa

E-learning successes and failures in Africa presented a complex picture, largely because the continent was often perceived as lagging behind others in terms of technological and educational advancements (Mashau & Nyawo, 2021). In their investigation into the efficacy of online learning platforms, Mashau and Nyawo (2021) identified a critical need for changes in teaching pedagogy. The persistence of outdated pedagogical approaches indicated a significant failure in adapting to the demands of online education, underscoring the necessity for reform in educational practices (Mashau & Nyawo, 2021).

Contrastingly, Investec (2020) offered a more optimistic view, suggesting that the COVID-19 pandemic had catalysed positive transformations within online education systems. This perspective aligned with the observations made by Mashau and Nyawo (2021) but interpreted the challenges and setbacks as opportunities for growth and innovation. According to Investec (2020), the need to reevaluate facilitator pedagogy and enhance the utilisation of online platforms presented a chance to overhaul traditional educational models. This shift was viewed as a crucial step towards achieving success in African online learning, highlighting the potential for systemic change that could lead to improved educational outcomes across the continent.

Zubane *et al*. (2022) conducted a critical analysis of the challenges and opportunities associated with online learning in South Africa. A significant issue identified was the government's lack of preparedness for the shift towards online education, which adversely affected learners who lacked alternatives to traditional face-to-face instruction. Despite this hurdle, the researchers highlighted that South Africa was not alone in facing these challenges; many regions globally encountered similar issues. This context provided South Africa with an opportunity to learn from others and adjust its educational processes to minimise disruptions and enhance learning outcomes (Zubane *et al.,* 2022).

In a detailed exploration of online learning within the South African context, Reddy *et al.* (2020) identified four key areas where changes were anticipated to impact learners:

the platform used for learning, the location of learning activities, the nature of interactions, and the intentions behind educational sessions. They argued that transitioning to digital online learning platforms could significantly benefit South Africa by addressing the persistent infrastructural deficits in universities and by offering learners a broader range of academic choices. While this shift presented numerous opportunities for improvement, other authors noted that the transition had yet to yield many tangible successes that could be further developed or expanded upon (Ramnund-Mansingh et al., 2020).

A comparative analysis by Business Daily (2020) on online learning readiness in Kenya highlighted that many institutions were unprepared to fully leverage digital tools such as cloud-based software, e-learning platforms, teleconferencing applications, tablets, and smartphones. Financial constraints and limited access to electricity further exacerbated the challenges faced by Kenyan learners. This situation mirrored the findings from South Africa, where there existed a plethora of opportunities for online education, yet actual successes were limited, and numerous obstacles continued to impede progress (Business Daily, 2020).

In Nigeria, a study highlighted the critical need for government intervention to enhance infrastructure, which was essential for the effective adoption of online learning platforms. Iheanyichukwu (2022) noted that while all three countries, Kenya, South Africa, and Nigeria, had identified significant opportunities for the expansion of online education, these could not be fully realised without substantial governmental support. Access to basic resources such as electronic devices, electricity, and reliable internet connections was fundamental. Without these, the development of advanced platforms and software remained futile if the population was not equipped to utilise these technologies (Iheanyichukwu, 2022).

The successes and challenges of e-learning were critical areas of focus, reflecting the same principles emphasised in the Google IYF study. To fully benefit from the lessons to be learned, it was essential to document and analyse these successes using multi-method approaches. The evolution and growth of African e-learning depend on capitalising on these successes while learning from missteps and failures. This reflective process is key to driving continuous improvement and fostering more effective e-learning environments across the continent.

#### 2.4.5.1 How the empirical literature informed the study.

The researcher was able to identify ten different key points that would be informative to the Google IYF study being conducted. The ten points were as follows:

Digital divide: Addressing the digital divide is a fundamental requirement for the successful implementation of online soft skills programmes across Africa. The Google IYF study should prioritise strategies that minimise technological barriers, such as providing low-bandwidth solutions or offline content, to ensure that all participants, regardless of their access to technology, can benefit from the programme (Zubane *et al.,* 2022).

Digital literacy: The success of any online programme in Africa hinges significantly on the digital literacy of its participants. The Google IYF study could incorporate modules that enhance participants' understanding of digital tools and platforms, thereby increasing their engagement and the overall effectiveness of the programme (Tshazi & Civilcharran, 2021).

Contextual challenges: Local conditions such as network connectivity can vary dramatically across the African continent. The study should identify these variations within its participant base and adapt the delivery of its content accordingly to ensure consistent access and quality of learning (Business Daily, 2020). These challenges were not always going to be an issue, but they did reinforce the importance of understanding the contexts in which programmes are going to be delivered.

Platform familiarity: Utilising platforms that learners are already familiar with can drastically reduce the learning curve and increase the adoption rate of new educational technologies. The study could explore integrating popular communication applications like WhatsApp into its learning environment to leverage their widespread use and familiarity among the target audience (Mpungose, 2020). These findings linked to the independent variable of tools, and programme creators needed to aim at using tools that learners were familiar with or at least tools they could easily familiarise themselves with.

Home-grown technologies: Investing in or partnering with local technology providers can lead to the development of learning platforms that are specifically designed for the

African context. Such platforms can better address local challenges and ensure that the programme's technology deployment is as effective as possible (Adotey & Holcombe, 2022). This finding linked well to the context of study and tools that are developed for the context, as well as how they would aid in bridging gaps and tackling unique challenges prevalent in different African contexts.

AI's role in education: It is increasingly acknowledged across various contexts. Patel and Ragolane (2024) stress the need for investment and governance in South Africa, while Mpofu and Sebele-Mpofu (2023) advocate for early AI adoption in accounting education and collaboration between academia and industry. Wang'ang'a (2024) highlights the limitations of AI in replacing teachers in Kenya, urging its use to address academic dishonesty. Bali (2023) recommends that Nigeria adopt AI practices from advanced nations to overcome implementation challenges. Collectively, these studies emphasise the need for a strategic, policy-driven approach to AI in education. This linked to tools and the advancement of tools that were to be used by educators and learners alike.

Cultural relevance in assessment: It is critical that the assessment methods used in the study are appropriate for the cultural and educational contexts of the participants. This means developing or adapting existing evaluation tools that are relevant to the African context rather than relying on Western or other standards that may not accurately reflect the learners' environments and experiences (Evans & Acosta, 2021). This is linked to the context of learning and language, and it is important that learners feel the adopted learning approaches were specifically developed for them.

Learner centricity: Emphasising learner-centric approaches within the Google IYF programme can enhance individual learning experiences and outcomes. This involves creating personalised learning paths, providing adaptive learning materials, and supporting self-paced study, all facilitated by advanced educational technologies (Keevy, 2020). Learner centricity further supported the importance of learner experiences, reinforcing the notion that positive experiences were encouraging further study, and the negative experience was a deterrent.

Demand for soft skills: Given the high demand for soft skills in the global job market, the study should ensure that these skills are a prominent component of the curriculum.

Regular updates and consultations with industry professionals can help keep the curriculum relevant and aligned with employer needs (Succi & Canovi, 2019).

Complementarity of skills: Integrating soft skills with hard skills training can provide a more rounded education and better prepare participants for the workforce. The Google IYF study should design its curriculum to intertwine these skills, showing how they mutually enhance each other and increase overall job performance (Danao, 2023).

E-learning outcomes: Reflecting on the successes and failures of past e-learning initiatives within Africa is crucial for ongoing improvement. The study should continually assess and refine its strategies based on these insights, aiming to overcome common pitfalls and replicate successful approaches in its own implementations (Mashau & Nyawo, 2021).

Gaps in literature: There was an opportunity to conduct familiarity studies, where learner performance on familiar and unfamiliar platforms could have been measured; this study could contribute to the body of knowledge about how familiarity influenced technological adoption rates. While much research was being conducted around AI in education, at the time of writing this, there was an opportunity to explore how the integration of AI into e-learning systems could affect learner performance.

## 2.5 Theoretical contributions

The literature review facilitated several key theoretical contributions that significantly enriched the study's framework. Firstly, a deeper understanding of the digital divide and poor digital literacy was achieved, shedding light on their detrimental effects on the delivery of online soft skills programmes (Mashau & Nyawo, 2021). This insight underscored the critical need to enhance accessibility and improve digital literacy across learning platforms to ensure that learners could effectively participate in and benefit from online education (Zubane *et al*., 2022).

The review also highlighted the importance of adaptability in educational strategies to effectively address diverse contextual challenges across different African environments (Mpungose, 2021). This recognition emphasised the necessity for dynamic educational approaches that could flexibly respond to varying local conditions, ensuring that all learners had equitable access to educational resources

(Zubane *et al*., 2022). A notable theoretical contribution from the review was the potential for using familiar platforms, such as WhatsApp, to deliver educational content. The familiarity of such platforms among learners not only eased the learning process but also increased engagement and retention rates, demonstrating a practical application of leveraging existing digital habits to enhance educational outcomes (Mpungose, 2020).

Moreover, the integration of various learning theories into the study's framework provided a robust theoretical base for understanding the social dynamics of learning, the significance of community-based learning environments, and prevalent learning behaviours (McLeod, 2024). Additionally, the T-shaped model introduced by McKinsey and Company (2021) was instrumental in illustrating the necessity for learners to develop both soft and hard skills. This model informed the curriculum development within the study, advocating for a holistic approach to skills development that prepared learners for the complexities of the modern workforce (Keevy, 2020).

## 2.6 Conclusion

In conclusion, this chapter provided a comprehensive review of the literature relevant to the development of online soft skills programmes in Africa. It identified critical factors necessary for the success of such programs, including the importance of active learner participation, effective integration of technology, accessibility in multiple languages, optimisation of study habits, utilisation of prior learning experiences, and consideration of geographic diversity. These elements were essential for creating educational programmes that were both responsive to and reflective of the unique needs, challenges, and cultural contexts of African learners (Mpungose, 2020; Evans & Acosta, 2021).

While the existing research offered valuable insights, it also highlighted the ongoing need for further empirical studies that adopted culturally sensitive methodologies. This literature review not only informed the foundational aspects of the study but also shaped the research questions, hypotheses, and methodological approaches that would be detailed in Chapter three. The subsequent chapter would outline a rigorous research methodology designed to explore these questions in depth and would aim to contribute novel insights to the field of online soft skills education in Africa.

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.1 Introduction

Within this chapter, the researcher presented the research design, research philosophy aligned to methodology, population and sampling, data collection instruments, data analysis, ethical considerations, and a conclusion. This chapter was pivotal as it outlined the framework that guided the study's execution, ensuring a systematic approach to addressing the research question: What were the factors that needed to be considered when running an online e-learning programme in the e-learning context?

The research methodology not only served as a blueprint for the study but also played a crucial role in establishing the validity and reliability of the research findings. By detailing the methodological choices, this chapter aimed to provide a clear rationale for the approaches used, demonstrating how these choices enhanced the credibility and accuracy of the study's outcomes (Hagedorn, 2019). Ensuring robust methodological rigour was essential for producing results that were both trustworthy and applicable to real-world educational contexts in Africa.

## 3.2 Research paradigm

The research adopted a quantitative approach, deemed appropriate for this study due to its focus on examining relationships between variables through statistical analysis. This method allows for the objective measurement and evaluation of data, providing a clear framework to assess the efficacy of the Google IYF programme in enhancing online learning experiences in Africa. The quantitative approach ensures that the findings are based on empirical evidence, enhancing the study's reliability and generalisability.

Abbadia (2022) defined the research paradigm as being influenced by a researcher's ontology, epistemology, and the study's methodology (Abbadia, 2022). A paradigm is defined as a model of something or a clear example of something (Cambridge Dictionary, 2023). The purpose of the research paradigm was to present an understanding of the context where the study was conducted. Furthermore, it was to

present scientific and academic support for the recommendations to be provided at the end of this study. Figure 13, below, depicts this.

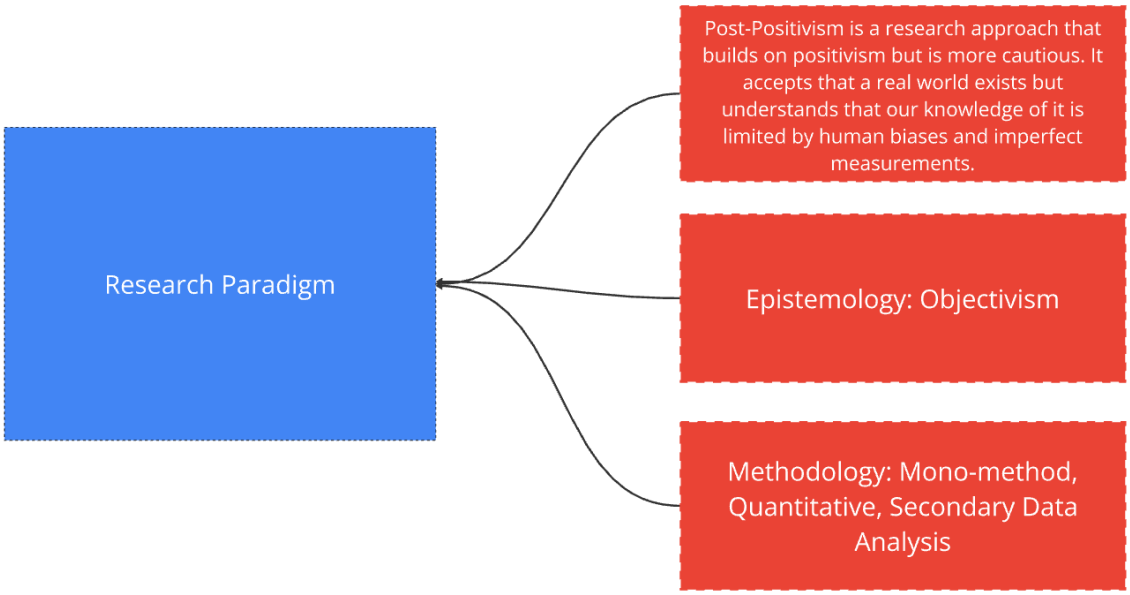


Figure 13: Research Paradigm

The research paradigm was informed by the researcher's epistemology, ontology, and the methodology utilised in the study. It is important to note that this study could have adopted various perspectives and approaches. While a positivist philosophy could have been considered, it does not align with the nature of the secondary data utilized in the Google IYF programme. Adopting a positivist framework would be inadequate, as it assumes an objective reality without inherent limitations.

The researcher considered the adoption of pragmatism; however, given its action-oriented nature and focus on problem-solving, the researcher determined it was not suitable for the Google IYF study. Although the study aimed to provide a framework and a supporting figure to address problems, it was more explorative than the direct approach typically associated with a pragmatic philosophy.

The study did not consider any qualitative philosophies, as its scope was limited to a mono-method quantitative approach due to the nature of the secondary data collected. The adoption of a post-positivist philosophy was beneficial, as it facilitated generalizability, which is essential when making recommendations for similar programmes. Furthermore, post-positivism allowed for scientific rigour while also

acknowledging the existence of human error, observer bias, and limitations in measurement.

Furthermore, the research paradigm adopted was crucial for two reasons: it facilitated the empirical nature of this study, focusing on the Google IYF Programme, and it allowed the researcher to gain a clearer understanding of the relationship between the independent and dependent variables. The research paradigm was deliberately kept simplistic to avoid complicating the study's methodology, particularly because the researcher anticipated a high volume of data from candidates in the programme. The methodology was only briefly explored in the first chapter, and a complete presentation of this study's methodology is included below.

## 3.3 Research design

The research design adopted for this study utilised regression analysis, correlation analysis, and a focused case study approach based on the Google IYF programme, complemented by an extensive literature review provided by the IYF organisation (Pratap, 2019). It was further important to note that the primary mode of enquiry was the regression and correlational analysis, limiting this study to a mono-method quantitative approach. This multi-faceted approach was chosen to thoroughly address the research question: What are the factors that need to be considered when running an online e-learning programme in the e-learning context?

By employing regression analysis, the researcher aimed to identify and quantify the relationships between various factors influencing learner outcomes within the Google IYF programme. This quantitative method was appropriate for examining the strength and nature of these relationships, providing empirical evidence to support the study’s conclusions. Correlation analysis was used alongside regression analysis to explore the strength and direction of relationships between key variables. This analysis helped in understanding how different factors were interrelated and their collective impact on the success of the programme. It provided a more nuanced understanding of the data and aided in identifying significant patterns and trends.

The case study component, ringfenced around the Google IYF programme, offered an in-depth examination of its implementation, successes, and challenges. This approach was essential for understanding the contextual nuances and practical realities of

delivering online soft skill programmes in Africa. It enabled the researcher to provide this study with context that complemented the statistical findings from the regression and correlation analyses.

The literature review served as the third pillar of this research design, providing a comprehensive background and theoretical foundation. It synthesised existing research on online education, soft skills training, and the African educational context, thereby situating the study within the broader academic discourse. The literature review also helped identify gaps and inform the development of the research framework presented in Chapter five.

The integration of these three components, enhanced the study's validity and reliability. By converging these components, the researcher could cross-verify findings, thereby strengthening the arguments and conclusions drawn. This methodological rigour ensured that the study's outcomes were both academically sound and practically relevant (Bans-Akutey & Tiimub, 2021).

### 3.3.1 Correlational analysis

The correlational research design examined the relationships between different variables within the data (Martin, *et al.,* 2019). This approach helped determine how various factors were related to learners' performance in the Google IYF programme. Various types of correlations were possible within this analysis.

A positive correlation indicated that as one variable increased, the other variable also increased, depicted by an upward-sloping graph. For example, an increase in learners' understanding tools might have corresponded with improved performance in online soft skills programmes. This type of correlation suggested that enhancing one aspect, such as digital literacy, could positively impact another, like learner performance. It was important to note that a positive correlation did not necessarily imply a favourable outcome; it simply showed a strong relationship in a specific direction, which could be either beneficial or detrimental depending on the context (Indeed Editorial Team, 2021; Pepito & Acledan, 2022). Figure 14, below, illustrates this.

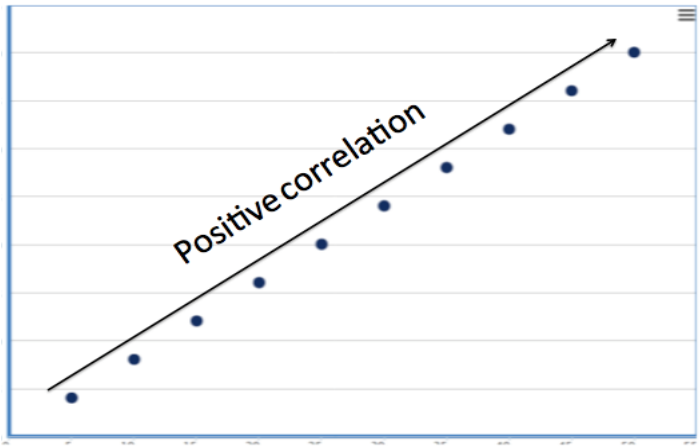


Figure 14: Graph 1 positive correlation.

A negative correlation showed that as one variable increased, the other decreased, represented by a downward-sloping graph. For example, if increased network issues (a contextual challenge) correlated with lower learner performance, this would have been depicted as a negative correlation. This type of correlation indicated that as one factor improved, the other worsened, highlighting areas needing targeted interventions to mitigate adverse effects. Similar to positive correlations, negative correlations highlighted a strong relationship but did not inherently indicate negative results; they showed the inverse relationship between variables (Van Den Burg, 2022). This is shown in Figure 15 below.

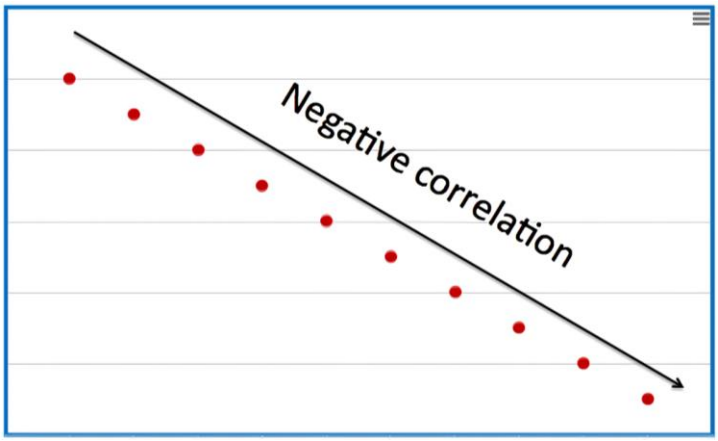


Figure 15: Graph 2 negative correlation.

A flat correlation indicated uniform responses, where all data points aligned either vertically or horizontally, indicating agreement among the responses. For example, if all learners uniformly agreed on the usefulness of a particular learning platform, this

would have been depicted as a flat correlation. This type of correlation was often seen in responses to simple yes/no questions, reflecting a consensus or uniformity in the data. It suggested a strong agreement or consistency in the responses, which could be critical for understanding common perceptions or behaviours among learners. See Figure 16 below.

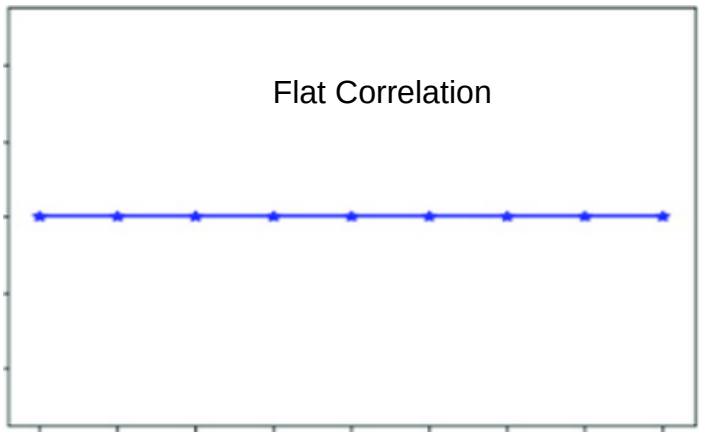


Figure 16: Graph 3 Flat Correlation

No correlation occurred when the data points were scattered, showing no discernible pattern or relationship between variables. This suggested that the responses varied widely, and no clear relationship existed between the variables. While this might have seemed uninformative, it could reveal areas where other influencing factors were at play or indicate diverse opinions among learners. A lack of correlation might suggest the need for a deeper investigation into other variables influencing the outcomes or indicate a highly heterogeneous learner population. Figure 17 below shows this.

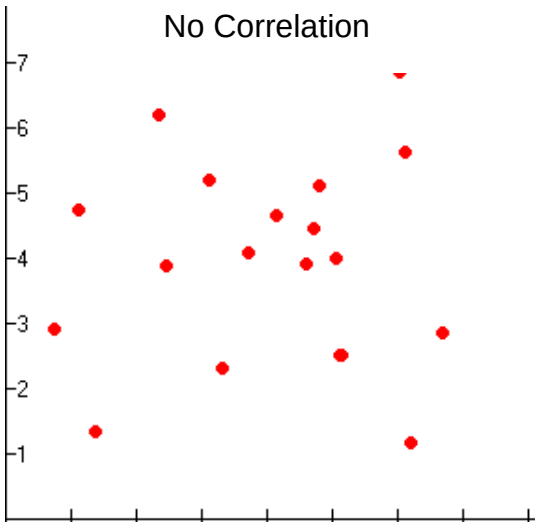

Figure 17: Graph 4 No correlation.

Using correlational analysis, the researcher explored and identified the relationships between learners' performance and context of study, tools, language, time and experience. This analysis provided valuable insights into which factors significantly impacted the effectiveness of the Google IYF programme. Understanding these relationships informed the development of targeted strategies to improve programme design and delivery, ultimately enhancing the learning experience for African learners.

### 3.3.2 Regression analysis

Regression analysis, as defined by Hassan (2024), was a statistical process used to estimate and understand the relationships between variables. This methodology was particularly well-suited for researchers working with quantitative data, as it allowed for the examination of how dependent variables changed in response to variations in independent variables. For this study, a non-linear regression analysis was employed, acknowledging that the relationships between the dependent and independent variables might not be linear (Hassan, 2024).

In the context of the research question — What are the factors that need to be considered when running an online e-learning programme in the e-learning context? —regression analysis played a critical role. By applying non-linear regression analysis to the data from the Google IYF programme, the researcher aimed to uncover complex patterns and relationships that might not be immediately apparent. This analysis provided valuable insights into the factors that significantly impacted learner outcomes.

The findings from this regression analysis informed the development of the final framework presented in the recommendations section. By understanding the key variables and their interactions, the researcher proposed targeted strategies to enhance the design and implementation of online soft skills programmes, ensuring they were tailored to the specific needs and contexts of African learners within the South African, Nigerian and Kenyan contexts.

### 3.3.3 Case study

Case studies, as defined by Coombs (2022), are a methodological research approach used to generate an in-depth understanding of a phenomenon or contemporary issue within a bounded system. Incorporating a case study into this research introduced a parameter for study to operate within it ensured that this study was bounded within the context of the Google IYF project (Coombs, 2022). The case study was crucial to this research as it offered a direct linkage to the Google IYF project, allowing for an in-depth exploration of its implementation, successes, and challenges. This approach helped contextualise the quantitative findings from the regression and correlation analyses, ensuring that the study considered both numerical data and the nuanced realities of programme delivery.

The inclusion of a case study also benefited the research puzzle by defining clear parameters within which the research was conducted. It provided a comprehensive view of the Google IYF project, highlighting practical insights and lessons learned that were invaluable for future projects of a similar nature. These lessons could guide the development of the final framework and recommendations, ensuring they were grounded in real-world experiences and evidence. The case study method enriched the research by providing depth and contextual understanding, thereby complementing the quantitative analyses. This holistic approach ensured a well-rounded and robust investigation into how online soft skills programs could be effectively designed and implemented to meet the unique needs of African learners.

### 3.3.4 Research approach.

This study was completed in four phases, following a deductive reasoning approach (McCombes, 2021). Deductive reasoning began with a general theory or hypothesis, which was then tested through data collection and analysis. The first phase involved completing the research proposal and obtaining approval for data usage from the International Youth Foundation (IYF). The researcher had already completed the first chapter and sent a letter of request to the IYF. Additionally, the researcher had spoken with the Country Director at the IYF, who agreed to provide all data from the programme's delivery. This phase set the groundwork by ensuring access to the necessary data for hypothesis testing.

In the second phase, the researcher received all the data and completed a comprehensive literature review. Building on the preliminary literature review, the researcher expanded the review to incorporate the latest findings and theoretical insights relevant to the study. This phase was crucial for establishing the theoretical framework and forming specific hypotheses to be tested. The comprehensive literature review guided the data analysis and helped identify key variables and relationships to be examined.

The third phase involved conducting the analysis and presenting the findings. Using the data collected, the researcher performed a correlation and regression analysis to test the hypotheses derived from the literature review. The findings were presented in Chapter four, with data displayed in a clear and understandable format to illustrate the outcomes of the Google IYF programme. Comparative analysis was used to highlight performance differences among countries, and the researcher looked for significant correlations within the data. This phase aimed to provide empirical evidence to support or refute the initial hypotheses, addressing the research questions posed in Chapter one.

In the fourth phase, the researcher drew recommendations based on the findings presented in Chapter four. These recommendations were informed by the analysis and aimed to enhance the design and implementation of future online soft skills programmes. By grounding the recommendations in empirical data and theoretical insights, the study ensured that the proposed framework was both practical and academically sound. Additionally, the researcher used the fifth chapter to present these recommendations, outlining the requirements for delivering effective online programs tailored to African learners.

Furthermore, the researcher presented the research findings and recommendations to a panel, defending the methodology and results attained. This step was critical for validating the research process and ensuring the robustness of the conclusions drawn.

The study employed a quantitative approach, suitable for the large sample size of 1,500 participants. This approach allowed for easy replication, enabling other researchers to test and verify the results. Additionally, a quantitative methodology supported statistical analysis, facilitating the identification of patterns and correlations

as discussed in Chapter three. To summarise the approach taken, the researcher developed Figure 18 below:

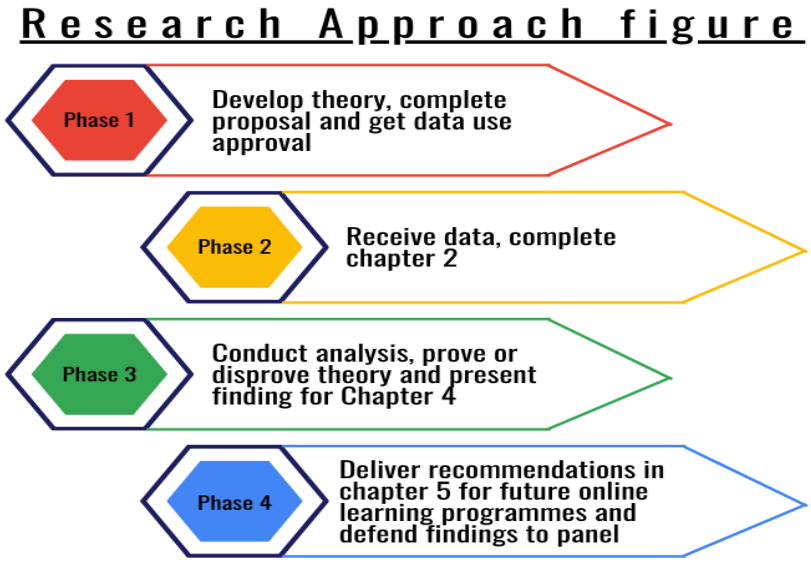


Figure 18: Research Approach in Phases

### 3.3.5 Methodological approach

To further expand on the approach taken, the methodology of this study was strictly quantitative, employing a mono-method approach. According to Ustun and Tracey (2020), research methodologies can be categorised into quantitative, qualitative, or mixed methods. However, this study exclusively used quantitative methods, focusing on numerical data to draw conclusions.

The mono-method approach indicated that the research centred on data in the form of figures and statistics. This research also aligned with the structure of how the Google Professional Certificates were delivered. These certificates were offered on a country basis, with South Africa, Nigeria, and Kenya each allotted five hundred licenses to deliver the programme annually. This allocation implied that, in an ideal scenario, there would be data for five hundred learners per region each year if there were 100% completion rates.

However, in practice, not all countries utilised all five hundred licenses, and completion rates varied. Consequently, the researcher limited the data collection to learners who

completed the programme, with a maximum of five hundred responses per region per year, covering the three regions included in the study over three years. This approach resulted in a total potential sample size of 1,500 responses per year and 4,500 responses over three years. Table 3, below, presents the data collection plan:

Table 3: Data Collection

| Year | South Africa | Nigeria | Kenya | Total |
|---|---|---|---|---|
| 2021 | 500 | 500 | 500 | 1,500 |
| 2022 | 500 | 500 | 500 | 1,500 |
| 2023 | 500 | 500 | 500 | 1,500 |
| Total | 1,500 | 1,500 | 1,500 | 4,500 |

Only learners who completed the programme were considered for data collection, ensuring the analysis was based on comprehensive and reliable data. By adhering to this methodological approach, the study aimed to provide a robust and reliable analysis of the Google Professional Certificates programme across the three specified regions. This approach facilitated the examination of relationships between learner performance and various independent variables, ultimately leading to recommendations for improving future iterations of the programme.

### 3.3.6 Research matrix table

The following research matrix provided a detailed overview of the core components of this study, including the problem statement, research aim, main research question, objectives, hypotheses, data sources, methods, and expected outcomes. This structured approach ensured that each aspect of the research was thoroughly addressed, aligning with the overarching goal of enhancing the online learning experience for learners in Kenya, South Africa, and Nigeria through the Google IYF programme. Table 4 summarises this below.

Table 4: Research Matrix

<table>
<tr><td colspan="2">Problem Statement: The data from the IYF Google soft skill learning programme had not been fully analysed to make recommendations for improving learner success in future iterations. This research aimed to develop an improved understanding of the relationship between learner performance and other independent variables explored in the conceptual framework. It considered the realities faced by African learners completing online learning programmes and their success rates in the Google IYF programme from 2021 to 2023.<br><br>The research utilised census sampling, focusing on all candidates who participated in those years. This non-probability-based approach was chosen because data for all active candidates was readily available. The research analysed existing data and developed recommendations for the programme.</td></tr>
<tr><td>Primary Objective: This study aimed to provide recommendations for enhancing the online learning experience of learners in these three countries (Lempriere, 2019). It explored factors like the context of study, tools, language, time and experience by learners in the Google IYF programme, with the provision of recommendations in the form of a framework.</td><td>Main Question: What are the factors that need to be considered when running an online e-learning programme in the e-learning context?</td></tr>
<tr><td>Secondary objective 1: Determine how strong the relationship was between the independent and dependant variables (correlation)</td><td>• Strong regression strength<br>• Moderate regression strength<br>• Weak regression strength</td></tr>
</table>

| | |
|---|---|
| Secondary objective 2: Determine if there was a relationship between the independent and dependant variables (regression analysis) | • $H_1$ = There is a significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance).<br>• Alternative hypothesis = There is a mutual relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance), meaning they influence each other.<br>• Null Hypothesis ($H_0$) = There is no significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance). |
| Secondary objective 3: Use findings to provide a framework for programmes of a similar nature. | Presentation of proposed framework for programmes of a similar nature, based on findings |

This research matrix served as a comprehensive guide for the study, ensuring that all research activities were aligned with the overall aim and objectives. By systematically addressing each component, the study aimed to provide a detailed and robust analysis of the factors influencing the success of online e-learning programmes in the African context. This structured approach facilitated the development of a practical and effective framework that could be applied to future iterations of the Google IYF programme, and similar initiatives.

### 3.3.7 Rationale for hypotheses

Hypothesis 1 ($H_1$): There is a significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance).

The basis for $H_1$ stemmed from an extensive literature review indicating a range of factors significantly impacting learner performance in online educational settings. Studies consistently showed that variables such as accessibility to technology, proficiency in using digital tools, and the effectiveness of learning methods were critical determinants of learner success. For example, research by Adotey and Holcombe (2022) highlighted the importance of home-grown digital solutions in enhancing learner engagement and performance. Therefore, it was hypothesised that these independent variables would have a statistically significant relationship with learner performance.

Alternative hypothesis: There is a mutual relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance), meaning they influence each other.

Alternative hypothesis posited that while there might be a relationship between the independent and dependent variables, this relationship could be moderate rather than strong. This hypothesis was grounded in the understanding that while individual factors like technology proficiency or accessibility were important, the interplay of multiple factors might result in a moderate overall effect on learner performance. Studies such as those by Mpungose (2021) and Kibuku *et al.* (2020) suggested that factors like digital fatigue and insufficient e-learning policies could moderate the strength of the relationship between the variables and learner outcomes. Thus, this hypothesis anticipated a more nuanced interaction among variables, leading to a moderate association.

Null Hypothesis 1 ($H_0$): There is no significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance). The null hypothesis served as a baseline to test the validity of the proposed relationships. ($H_0$) posited that there was no statistically significant relationship between the independent variables and learner performance.

This hypothesis was essential for scientific rigour, as it allowed the researcher to objectively test whether the observed data supported the existence of a relationship. If the null hypothesis was rejected, it strengthened the argument that the independent variables did indeed influence the dependent variable. Conversely, failing to reject the null hypothesis would suggest that the factors under investigation did not significantly impact learner performance, indicating the need for alternative explanations or additional variables not considered in the current study.

### 3.3.8 Justification for research methodology (mono-method, quantitative)

The chosen methodology for this study was a mono-method, quantitative approach. This methodology was selected to enable the researcher to generate precise and reliable findings that would directly inform the final recommendations for the organisations mentioned in the case study, namely IYF and Google. By focusing solely on quantitative data, the researcher aimed to build on existing findings and ensure that the study remained concentrated on the core research questions.

A quantitative approach allowed for the collection and analysis of numerical data, facilitating the measurement of relationships between variables. This precision was crucial for developing a comprehensive understanding of the factors that influenced learner performance in the Google IYF programme. Additionally, quantitative methods were conducive to incorporating external inputs, such as data from other research studies, enhancing the robustness of the analysis.

The mono-method approach ensured that the study maintained a clear and focused trajectory. By utilising a single methodological framework, the researcher concentrated on the specific issue at hand, avoiding potential complexities and distractions that might arise from integrating multiple methodologies. This focused approach was particularly important for achieving the study's objectives and ensuring that the findings were directly applicable to the development of practical recommendations for similar programmes.

The mono-method, quantitative approach provided a structured and precise framework for investigating the relationship between learner performance and various independent variables. This methodology not only supported the reliability and validity

of the research but also aligned with the study's aim of generating actionable insights to improve the effectiveness of online learning programmes in the African context.

### 3.3.9 Purpose statement

The purpose of this study was to present recommendations for enhancing the online learning experience of African learners. There was an existing issue with the standards set for African learners, who were expected to perform well in assessments and learning programmes designed primarily for Western contexts. This study sought to identify critical requirements that educational providers needed to adhere to ensure that African learners could maximise their learning outcomes. Additionally, the study sought to enable educational providers to benefit from having high-performing African online learners.

By addressing these requirements, the study intended to bridge the gap between current educational practices and the specific needs of African learners. This involved an in-depth analysis of the factors influencing learner performance in the Google IYF programme and the development of a practical framework that could be applied to similar online learning initiatives. Ultimately, the goal was to create an equitable and effective learning environment that supported the success of African learners and enhanced the overall quality of online education offered to them.

## 3.4 Population and sampling

Population and sampling were fundamental components of conducting this study, where the population referred to the entire group under study, and a sample was a subset selected to represent the group (Ravikiran, 2022). The choice of population and sampling methodology significantly impacted the study's results. Proper representation was crucial, as under-representation could lead to inaccurate conclusions, while over-representation could result in unnecessary complexity without significant changes in outcomes. This section outlined the population size, and the sampling methodology used in this study.

### 3.4.1 Research methodology and size

This research followed a quantitative approach, utilising numerical data to identify correlations between variables and regions. The methodology was closely aligned with the delivery strategies of the International Youth Foundation (IYF) for the Google Professional Certificates. The IYF implemented these certificates by strategically appointing training providers to recruit learners and administer the programmes. This approach ensured a structured and consistent methodology across different regions, facilitating a comprehensive analysis of the data.

Data for this study were sourced from the IYF's implementation records. The IYF was responsible for presenting the initiative's performance to its global partners and employed a third-party organisation to collect and present feedback through the MERL analysis process. MERL, developed by Mitsubishi Electric Research Laboratories, focused on cleaning and analysing data to maintain validity, integrity, precision, reliability, and timeliness (Hlaka, 2022). This rigorous data management process ensured that the findings of this study were based on high-quality, reliable data.

### 3.4.2 Population size

The maximum population size for this research was 1,500 learners annually, with the study spanning three years. This totalled a potential population of 4,500 learners over the three-year period. Learners had 12 months to complete the programme and were not allowed to participate again in following years. However, this figure represented an upper limit and was contingent upon full utilisation and completion of the programme licenses allocated to each region. To be included in the data set, individuals had to meet the following criteria:

- Be within the age range of 18-26 years.
- Reside in one of the three regions: South Africa, Nigeria, Kenya.
- Be enrolled in a Google Professional Certificate through the IYF.
- Be unemployed and actively seeking employment.
- Have a basic understanding of the English language.

The population was not restricted by gender or religious affiliation, the IYF organisation did however prioritise female candidate above male ones as a part of their initiative to

empower woman further. It was also important to note that the Google IYF programme was deliver in English, and learners were required to have a basic understanding of English to complete the courses. Individuals meeting these criteria were eligible to participate in the Google Professional Certificate programme and this study. The programme was not difficult to get access to, simply because ease of access was important for learners.

### 3.4.3 Sampling methodology

Sampling involved selecting a subset of individuals from a larger population to represent that population (Nicolas, 2022). There were two primary sampling methods: probability sampling and non-probability sampling. This study employed a non-probability sampling approach, specifically utilising the full sampling (census sampling) method applied by the IYF in their programme delivery.

The census sampling approach included all five hundred learners from each region, resulting in a total sampling population of 1,500 per year. Over the three years of the programme this methodology aimed to include a maximum of 4,500 learners, ensuring that all individuals who participated in the programme were considered in the study. This comprehensive approach provided a holistic view of the programme's effectiveness across different contexts (Walker, 2022).

Given the programme's structure, the researcher adopted the same approach for data collection. While the 1,500 learners per year did not represent all African online learners, this sample size was expected to provide valuable insights into the requirements and challenges faced by African online learners across the three regions. By including all participants who completed the programme, the study aimed to capture a broad and inclusive data set that reflected the diverse experiences of learners.

### 3.4.4 Sampling parameters and statistical validity

To ensure statistical validity, the researcher aimed for a minimum response rate of 25% of the total population. According to guidelines set by Diego Graglia (2020), this margin for statistical error was acceptable and provided sufficient data to understand the dynamics within the three countries. Achieving a 25% response rate would mean

collecting at least 375 responses per year, totalling at least 1,125 responses over the three-year period. This threshold ensured that the sample was large enough to generate statistically significant insights and robust conclusions.

Data collection was conducted by a third-party organisation, leaving the researcher with limited control over the data collection process and response rates. It is important to note that all demographic data was derived from the learners' enrolment information. Likert scale questions were administered at the end of the programme, ensuring that only those learners who completed the programme provided responses. This approach ensured that the analysis focused on participants who fully engaged with the course, thus reflecting their comprehensive feedback.

The population sampling methodology was applied to the collective data set rather than individual countries, as the recommendations were relevant to the entire group. This approach ensured that the findings and recommendations were applicable across different contexts and could be generalised to a broader population of African online learners.

The chosen population and sampling methodologies were designed to provide a robust and comprehensive analysis of the Google IYF programme's impact on African learners. By leveraging data from all eligible participants and maintaining rigorous sampling standards, this study aimed to generate meaningful and actionable insights for improving online learning programmes in the African context. The detailed and systematic approach to population and sampling underscored the study's commitment to reliability, validity, and practical relevance.

## 3.5 Research philosophy alignment to methodology

The research philosophy underpinning this study was significantly influenced by The DaVinci Institute's managerial leadership framework, known as TIPS™. This framework emphasised the interdependent and critical roles of Technology, Innovation, People, and Systems (TIPS™). By integrating these elements, the TIPS™ model provided a holistic approach to understanding and addressing complex challenges within organisational and educational contexts. The researcher applied this model to guide the study's design and execution, ensuring a comprehensive

exploration of the factors impacting African online learners' experiences and outcomes.

Additionally, this study aimed to align with the objectives of the South African National Development Plan 2023 (NDP) proposed by the South African government. The South African NDP 2030 outlined key strategic goals for enhancing the country's socio-economic development, including improving education and skills development (South African Government, 2012). By addressing these national priorities, the research sought to contribute meaningful insights and practical recommendations that supported the broader aims of the NDP, thereby fostering improved educational outcomes and workforce readiness among African learners.

The TIPS™ managerial leadership model (The DaVinci Institute, 2019) underscored the necessity and co-dependency of Technology, People, Innovation, and Systems. This model was particularly relevant to the context of African online learning, as it encapsulated the essential elements required for effective educational delivery and learner engagement. The application of TIPS™ in this study helped illuminate how these interconnected factors influenced the success of online learning programmes, informing the development of a robust framework for future initiatives. The relationships between these elements and their relevance to the study were further detailed in Table 5 below:

Table 5: Link between research Philosophy and Study

| Component | Description |
|---|---|
| **Technology** | - Physical computers required: Ensure all learners have access to necessary hardware.<br>- Use of the Coursera platform: Leverage Coursera's resources for course delivery, assessment, and certification. |
| **Systems** | - Professional certificate roll-out plan: Structured implementation plan for certificate distribution.<br>- Entry requirements: Criteria for learner eligibility and programme enrollment. |

| | |
|---|---|
| | - - Coursera system: Integration and functionality of the Coursera platform in delivering content.<br>- MERL data analysis: Methodologies for Monitoring, Evaluation, Research, and Learning (MERL) to ensure data integrity and accuracy.<br>- Reporting Protocols: Standardised procedures for reporting progress and outcomes.<br>- Data collection from learners: Systematic gathering of learner data for analysis. |
| **People** | - African learners: Participants from South Africa, Nigeria, and Kenya engaged in the programme.<br>- IYF staff: International Youth Foundation personnel overseeing programme implementation and support.<br>- IRG staff: Independent research group staff responsible for data collection and analysis. |
| **Innovations** | - Recommendations to come from the study: Evidence-based suggestions for improving online learning experiences.<br>- Mode of delivery: Innovative approaches to delivering online content effectively.<br>- Actions taken to overcome challenges: Strategies and solutions developed to address obstacles faced during programme implementation. |

This table highlighted the integral components of the TIPS™ framework and their specific applications within this study. By systematically addressing each element, the researcher ensured a comprehensive and balanced approach to understanding the factors influencing the effectiveness of online learning programmes for African learners. The following sections delved deeper into each of these components, demonstrating how they collectively contributed to the study's methodology and ultimate goals.

## 3.6 Data collection instruments

Data collection was conducted using online surveys administered by a third-party organisation. It is important to note that the researcher did not directly collect the data. Instead, all data used in this study were provided by the third-party organisation, which was tasked with both collecting and analysing the data. This approach ensured the integrity and objectivity of the data collection process and followed secondary data collection protocols.

The researcher had access to both the raw and cleaned data versions. The International Youth Foundation (IYF) also provided the researcher with the final results from their analysis. Utilising these resources, the researcher examined the data to identify any correlations and draw comparisons that would inform the recommendations provided at the study's conclusion. The primary data collection tool used in this study was a Likert scale survey, designed to gather insights into learners' experiences and perceptions regarding the Google IYF programme. The survey, appended at the end of this document, included the following Likert Scale questions:

1. LQ1 Participation/experience: Participation in the online e-learning programme for soft skills development has positively impacted my academic performance.
2. LQ2 Technology: Use of technology tools within the online e-learning programme has enhanced my learning experience.
3. LQ3 Language: The availability of the e-learning programme in multiple languages would have positively influenced my understanding of the course material and contributed to my academic performance.
4. LQ4 Time: The amount of time I invest in the online e-learning programme directly correlates with my academic performance.
5. LQ5 Experience/participation: My past learning experiences have positively influenced my performance in the online e-learning programme for soft skills development.
6. LQ6 Geographical location: The geographical location in which I reside has influenced my academic performance in the online e-learning programme for soft skills development.

Each question was rated on a scale from 1 to 5, where 1 indicated strong disagreement and 5 indicated strong agreement. The survey was administered to learners upon completion of the programme to ensure that their experiences were fresh in their minds.

By leveraging the detailed analysis and reports generated by the third-party organisation, the researcher aimed to gain a comprehensive understanding of the factors impacting the effectiveness of the Google IYF programme. This thorough examination facilitated the development of well-informed, actionable recommendations to enhance future iterations of the programme and similar initiatives.

### 3.6.1 Data quality assurance

Ensuring the quality of the data used in this study was paramount to obtaining reliable and valid results. Data Quality Assurance (DQA) encompassed the processes and measures taken to maintain the integrity, accuracy, and reliability of the data throughout the research. Given the reliance on a third-party organisation for data collection and initial analysis, several DQA measures were implemented.

### 3.6.2 Data collection integrity

The third-party organisation responsible for data collection employed rigorous methodologies to ensure data integrity, this involved utilising standardised survey instruments, which were consistent and validated to collect data across all included regions, being South Africa, Nigeria, and Kenya. Comprehensive training was provided to individuals involved in the data collection process, ensuring they understood the survey instruments and followed standardised procedures. Furthermore, oversight mechanisms were implemented to monitor data collection activities and ensure adherence to protocols. The researcher did not name the organisation to ensure there was no violation of confidentiality, as he was not given permission to utilise their information in any of his reporting.

Furthermore, the third-party organisation oversaw the data collection processes and, as a result, had to work closely with facilitation teams on the ground to ensure that as many learners as possible completed the survey. It was important to note that the team that collected the data scrutinised it to ensure that it was an accurate depiction of

learner feedback. The data collection team also reached out to candidates and interacted with them to confirm some of the findings that had been obtained. It was, however, difficult for the researcher to indicate of there were any data inconsistencies or errors because he had not actively been involved in the data collection processes.

### 3.6.3 Data cleaning and validation

A meticulous data cleaning process was undertaken by the third-party organisation to address any inaccuracies or inconsistencies. This process included identifying and rectifying errors such as duplicate entries, missing values, and outliers. Consistency checks were conducted to ensure that the data was consistent across different variables and regions, aligning with predefined criteria and standards. Additionally, data validation was performed by verifying the data against the original source to confirm its accuracy and completeness.

### 3.6.4 Data security and confidentiality

Maintaining the confidentiality and security of the data was crucial. Measures to ensure data security included employing secure data storage solutions to protect the data from unauthorised access, breaches, or loss. Anonymisation was applied to remove, or anonymise, all personal identifiers, protecting the privacy of the participants. Access to the data was limited to authorised personnel only, ensuring that data handling complied with ethical guidelines and legal requirements.

By implementing these DQA measures, the researcher aimed to ensure the data's integrity, accuracy, and reliability, thereby strengthening the study's validity and the robustness of the conclusions and recommendations derived from it.

## 3.7 Data analysis

Data analysis was a crucial phase in this study, aimed at extracting meaningful insights from the collected data to develop actionable recommendations for enhancing online learning programs for African learners. This section detailed the process by which the correlational and regression analysis would be utilised to analyse the data and how the findings would inform the study's recommendations.

The data was collected, cleaned, and presented in a comprehensible format to ensure the integrity and accuracy of the analysis. The cleaned data was visually represented through graphs to illustrate learner performance across different regions (South Africa, Nigeria, and Kenya). The researcher employed regression and correlational analysis to examine, first, whether there were any significant relationships between the independent and dependent variables, and second, to explore the nature and strength of these relationships.

### 3.7.1 Correlational analysis

The first analytical approach employed was correlational analysis. This method identified and measured the strength and direction of relationships between the dependent variable (learner performance) and various independent variables (e.g., context of study, tools, language, time and experience)) (Martin *et al.,* 2019). The following types of correlations were considered:

- Positive Correlation: Indicated that as one variable increased, the other variable also increased. For example, a positive correlation between technology proficiency and learner performance suggested that higher technology proficiency was associated with better learner performance.
- Negative Correlation: Indicated that as one variable increased, the other variable decreased. For instance, a negative correlation between network connectivity issues and learner performance implied that increased connectivity problems were associated with poorer learner performance (Van Den Burg, 2022).
- No Correlation: Indicated that there was no discernible relationship between the variables. This outcome suggested that the variables did not influence each other in a significant way.
- Differences between demographical findings were added to last column to allow for cross correlation between the regression results, correlation results and the demographical data.

By identifying these correlations, the researcher pinpointed which factors had the most substantial impact on learner performance. These insights were then used to inform further analysis and recommendations (McCombes, 2021).

### 3.7.2 Regression analysis

The second analytical approach was regression analysis, specifically simple regression, which is suitable for understanding the direct relationships between individual variables (Hassan, 2024). This method helped estimate the impact of single independent variables on the dependent variable, providing a clear and focused understanding of the data.

Simple Regression: This was used to examine the relationship between a single independent variable and the dependent variable. For example, assessing how changes in internet access levels affected learner performance. By isolating each independent variable, simple regression provided a straightforward analysis of how each factor individually influenced learner performance. The regression analysis yielded coefficients indicating the strength and direction of these relationships. These coefficients were crucial for understanding the extent to which each factor contributed to variations in learner performance (Coombs, 2022).

### 3.7.3 Data presentation and interpretation

The findings from both correlational and regression analyses were presented in a clear and accessible manner, using graphs, charts, and tables to illustrate the relationships and trends identified (Martin *et al.,* 2019). The data was analysed region-by-region to understand any regional differences or similarities, which was critical for developing region-specific recommendations. By visualising the data, the researcher aimed to make the results understandable and actionable for stakeholders, facilitating the development of targeted strategies to improve the online learning experiences of African learners.

### 3.7.4 Deriving recommendations

Once the analysis was complete, the researcher interpreted the findings to identify key causative factors affecting learner performance. These insights formed the basis for practical recommendations aimed at improving online learning outcomes for African learners. The recommendations focused on addressing the identified challenges and leveraging the positive correlations to enhance the effectiveness of online learning programmes. By employing these rigorous analytical methods, the study aimed to

provide robust and actionable insights that could inform the design and implementation of future online learning initiatives, ensuring they were tailored to meet the unique needs and contexts of African learners (McCombes, 2021).

### 3.7.5 Quality of research

Ensuring the quality of research was paramount in this study, encompassing both the accuracy and reliability of the findings. The researcher adhered to the rigorous methodological standards of The DaVinci Institute and employed robust data analysis techniques to maintain the integrity of the research process (McCombes, 2021). By using validated (by IRG and IYF) data collection instruments and implementing stringent data quality assurance measures, the study aimed to produce trustworthy and valid results (Hlaka, 2022).

The researcher utilised all enrolled learners for demographic findings but only received feedback from learners who had completed the programme for the regression analysis. Regular peer reviews and consultations with academic advisors were conducted to refine the research design and methodology, further enhancing the study's credibility (Nicolas, 2022). This commitment to quality ensured that the recommendations derived from the research were based on solid evidence and could be confidently applied to improve online learning experiences for African learners.

## 3.8 Ethical considerations

Ethics in research of any nature was of the utmost importance, and ethics were aptly defined as understanding the difference between doing the right thing and doing wrong (Resnik, 2020). Ethical considerations needed to be made because research could be used to misrepresent or even harm others if presented in a manner that was cajoling, for example. Since the purpose behind conducting this study was to help future African online learners and the study required human participation, it was crucial to provide the parameters for the ethics within the study. Ethical considerations were made in four parts: Academic ethics, Sampling ethics, Partner ethics, and Character-based ethics.

### 3.8.1 Academic ethics

This section focused on the ethical considerations related to The DaVinci Institute. The researcher conducted this study under the supervision and guidance of The DaVinci Institute, ensuring that the study met the institute's rigorous academic standards. The DaVinci Institute had a comprehensive ethical clearance process that all research projects had to undergo, ensuring that they adhered to high ethical standards and integrity.

Adherence to the ethical guidelines provided by the organisation was paramount. Should The DaVinci Institute have deemed any action taken by the researcher as unethical or contrary to the institute's best practices, the researcher promptly amended the action to align with the institute's ethical requirements. The researcher was committed to upholding the integrity of the institute and strove to present the institution in a positive and professional manner. Furthermore, he did everything within his power to ensure that the study complied with all ethical protocols established by The DaVinci Institute.

The researcher applied for ethical clearance, undergoing a rigorous process to secure approval. The details of this ethical clearance process and the documentation can be found in the Appendices (Ethical Clearance Application) to this document.

### 3.8.2 Sampling ethics

The researcher used secondary data within this study. To ensure compliance with ethical standards, a conscious effort was made to avoid receiving personal details of the sample groups, such as names, surnames, identification numbers, and addresses, in order to comply with the Protection of Personal Information Act of 2013 (POPIA) (POPIA, 2023). This study did not require such personal data, focusing instead on performance-related data from the Google Professional Certificates (POPIA, 2023).

Demographic data, such as age and region, was utilised solely to determine if there was any correlation between these factors and learner performance. None of the data received was linked to personal identifiers, ensuring the anonymity and privacy of the participants. The researcher committed to maintaining the integrity of the data by not

altering or changing it in any form. The data received was presented in its original state during the analysis, ensuring that the sample group was accurately represented.

### 3.8.3 Partnership ethics

This research was conducted with the support of two key organisations: the International Youth Foundation (IYF) and the Infomage Rims Group (IRG). Both organisations were instrumental in delivering professional certificates across various African countries and actively supported the researcher in enabling this study. Given their crucial role, the researcher committed to maintaining utmost transparency with both organisations throughout the research process.

The researcher acted in the best interest of IYF and IRG, ensuring that their contributions were acknowledged and that their objectives were upheld. Integrity and honour guided the researcher's actions, ensuring that neither organisation was placed at a disadvantage. The ultimate goal was to aid these organisations in improving the delivery of their programmes within the African context, thereby enhancing the overall impact and effectiveness of their initiatives. The researcher maintained open communication, provided regular updates, and sought input from both organisations to ensure the research aligned with their goals and ethical standards.

### 3.8.4 Character-based-ethics

Character-based ethics were paramount, ensuring that the researcher’s character and integrity were reflected throughout this study. The research aimed to transcend personal academic achievement, aspiring to contribute meaningful insights and recommendations that benefited a broader audience. Consequently, the researcher committed to upholding the highest standards of character-based ethics.

The researcher vowed to act in the best interest of the study, even if it challenged personal beliefs, values, or biases. The commitment to doing what was morally right was central to ensuring that the research remained an honest and transparent account of events. This ethical stance included acknowledging and addressing any potential conflicts of interest, avoiding any form of data manipulation, and presenting findings truthfully.

To ensure transparency and accountability, the researcher maintained detailed records of all decisions and actions taken throughout the study, documented through email communications and the version history of this document. Transparency and accountability included documenting the rationale behind methodological choices and analytical processes. By providing regular updates and seeking feedback from supervisors and stakeholders, the researcher showed committed to openness and maintenance of integrity. Therefore, in this study, transparency was upheld as a fundamental principle, ensuring that the research process and findings were credible and trustworthy.

By prioritising integrity and ethical conduct, the researcher aimed to produce a study that stood up to scrutiny and served as a valuable resource for enhancing online learning experiences for African learners. The researcher's dedication to ethical principles guided every decision and action taken, ensuring the study's credibility and reliability. Reliability was maintained through consistent data collection and analysis procedures, while validity was ensured by using accurate instruments and methodologies that accurately reflected the research objectives. This comprehensive approach guarantees that the findings are both dependable and applicable to real-world educational contexts.

In conclusion, ethical considerations formed the backbone of this research, guiding every aspect from academic integrity to sampling and partnerships. The researcher was committed to maintaining transparency, honesty, and moral integrity throughout the study, ensuring that all actions aligned with the highest ethical standards. By adhering to these principles, the study aimed to produce credible and impactful recommendations that would enhance online learning experiences for African learners, ultimately contributing to a broader understanding and improvement of educational practices in diverse contexts.

## 3.9 Conclusion

In conclusion, Chapter three was pivotal as it established the framework and methodology for this study. It outlined the research design, including the use of correlation and regression analyses, and the structured approach to data collection and sampling. By providing a detailed discussion of the research philosophy,

methodological alignment, and ethical considerations, this chapter ensured that the study was conducted rigorously and ethically.

These parameters were essential for addressing the main research question: "What are the factors that need to be considered when running an online e-learning programme in the African context?" The insights and processes defined here laid the groundwork for the subsequent analysis and findings. Looking ahead, Chapter four will present the collected data and analyse it to identify significant trends and correlations, forming the basis for the study's final recommendations.

# CHAPTER 4: PRESENTATION AND DISCUSSION OF FINDINGS

## 4.1 Introduction

The purpose of this chapter is to present the research findings and discuss their implications in the context of the study's objectives. The primary objectives of this research were to determine if there was a relationship between the independent and dependent variables and to assess the strength of this relationship through correlation and regression analysis. Additionally, this study aimed to utilise the findings from the analysis to provide a framework for similar future programmes (University of Southern California, 2024).

In this chapter, the researcher systematically addresses the study's objectives by first presenting the demographic information obtained from the Google IYF data. This demographic overview is essential for contextualizing the sample population and understanding how factors such as gender, age, and geographical location might influence the results. The data is presented using graphs and figures developed specifically for this study to offer a clear and detailed representation of the participants.

Following the demographic analysis, the chapter progresses to more advanced statistical analyses, including normality testing, ANOVA, correlation, and regression. The normality test ensures the appropriateness of parametric analyses, while ANOVA helps identify any differences across the years. Correlation and regression analyses are then conducted to explore relationships between key variables such as participation, technology usage, and academic performance. These findings are presented in a consolidated format, with separate graphs and tables for each year, allowing for a comprehensive comparison and interpretation of trends over time.

## 4.2 Presentation of demographic data (2021 – 2023)

The researcher received comprehensive data from the Google IYF programme, including 1230 responses for 2021, 976 responses for 2022, and 1326 responses for 2023. Each response was complete, with 100% completion of the survey questions, which ensured that all respondents had participated in and completed the Google IYF programme, not all candidates who were enrolled had however completed the programme. The data underwent rigorous cleaning processes and met the required

quality standards, making it viable and reliable for use in this study. This high-quality dataset provided a solid foundation for the subsequent analysis and findings presented in this chapter.

## 4.3 Demographical findings

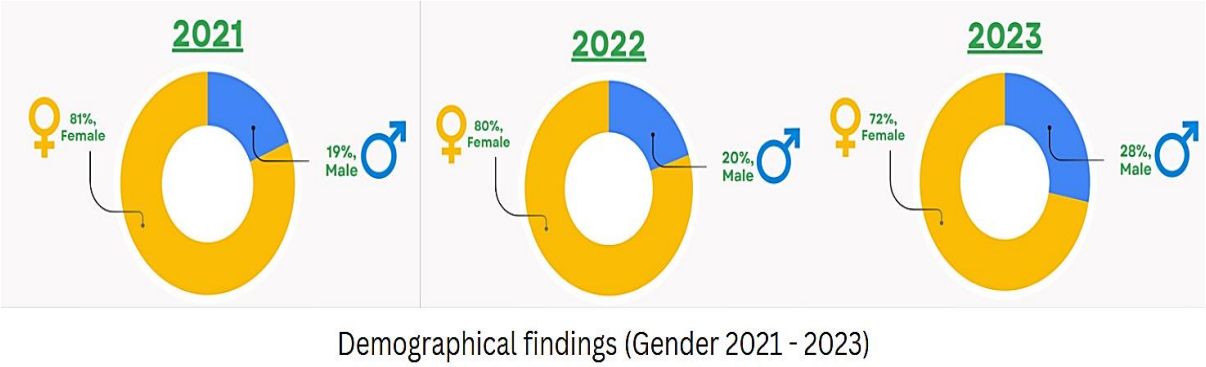


Figure 19: Demographic findings (Gender 2021 - 2023)

The demographic distribution of questioned candidates, based on gender, is illustrated in Figure 19 above for the years 2021, 2022, and 2023. In 2021, 19% of participants were male and 81% were female. In 2022, the distribution shifted slightly to 20% male and 80% female. The most significant change occurred in 2023, with 28% male and 72% female participants. These findings suggested an evolution in the programme's outreach and recruitment strategies, gradually including more male participants. It is important to note that the survey did not include other gender options. The researcher presented the data as received, highlighting the IYF Google programme's focus on empowering females through programme delivery.

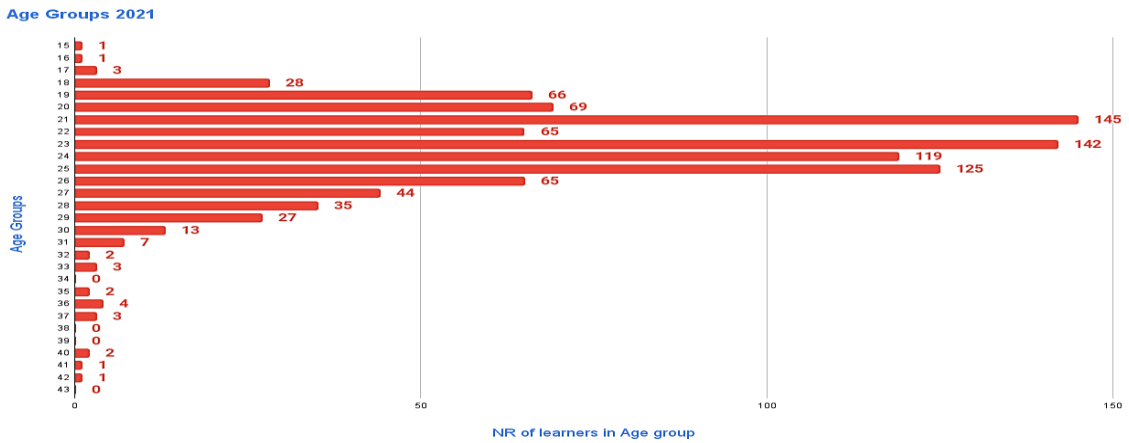


Figure 20: Ages for learners in 2021.

As indicated in Figure 20 above, the learner data for 2021 showed a high frequency of participants in their early twenties, with the mode of the data falling within the ages of 21 and 23. Additionally, there was a noticeable decline in the number of learners in the 30 to 40 age groups.

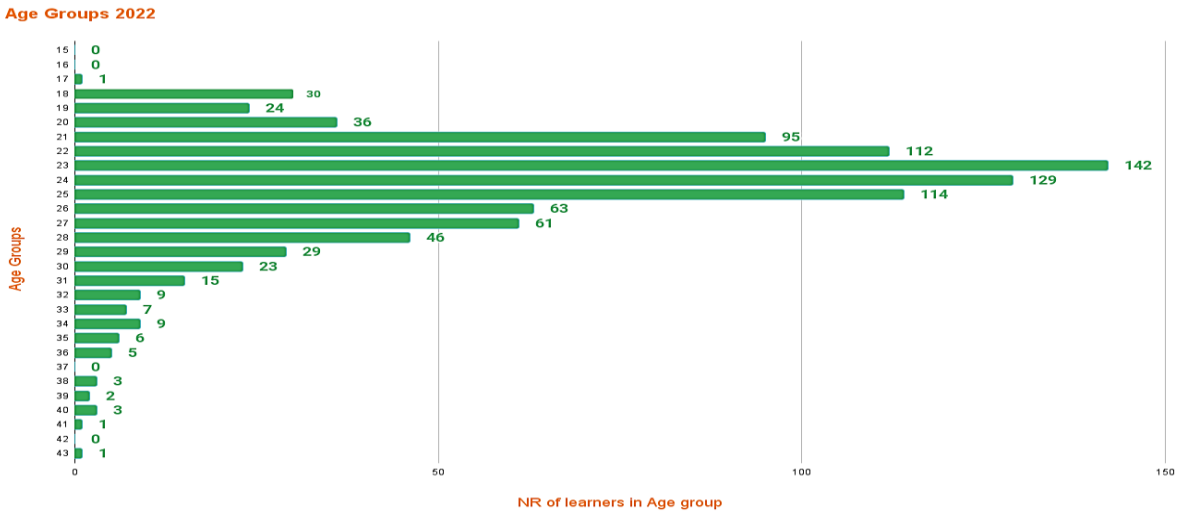


Figure 21: Ages for learners in 2022.

The data for 2022, illustrated in Figure 21 above, revealed that the highest age frequencies were among 142 learners aged 23 and 129 learners aged 24 years. There was a decline in the number of learners aged 26 to 28, with a slight increase in learners aged 30 years and above. This age distribution for 2022 underscored the programme's appeal to younger learners and aligned with the target demographic of youth. This trend reinforced the notion that the Google IYF programme was designed to attract younger individuals, specifically those in their early twenties.

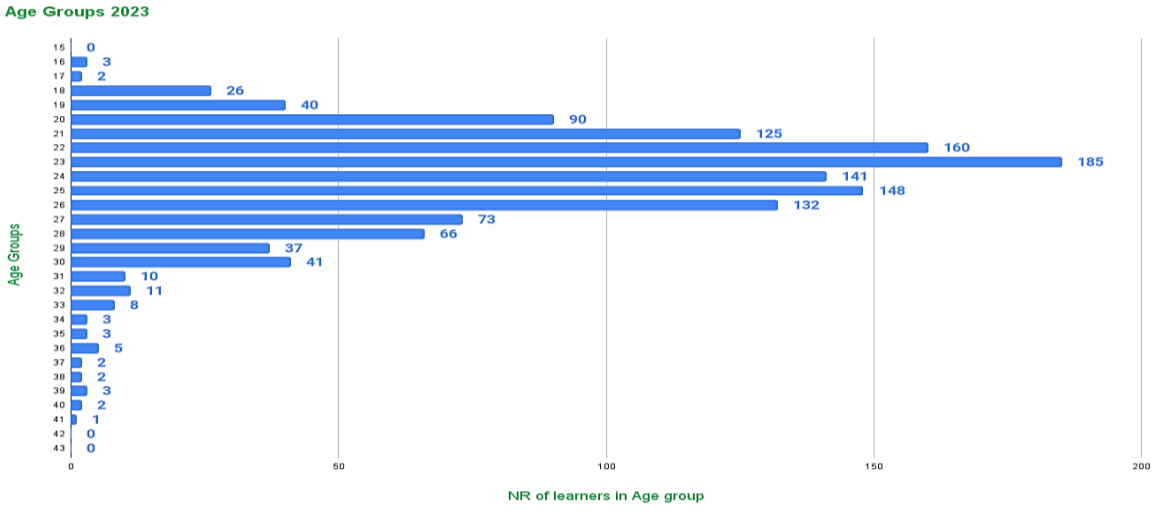


Figure 22: Ages for learners in 2023

The data for 2023, indicated in Figure 22 above, revealed that the highest frequency of learners was in their early twenties, with 180 learners aged 23 and 157 learners aged 22 years. Like 2022, there was a slight decrease in participation among learners in their mid-twenties and older. This distribution once again emphasized the Google IYF programme's focus on helping youth. The consistent age group distributions over the years indicated that the implementation of the programme had become more effective, successfully attracting its target demographic of younger individuals.

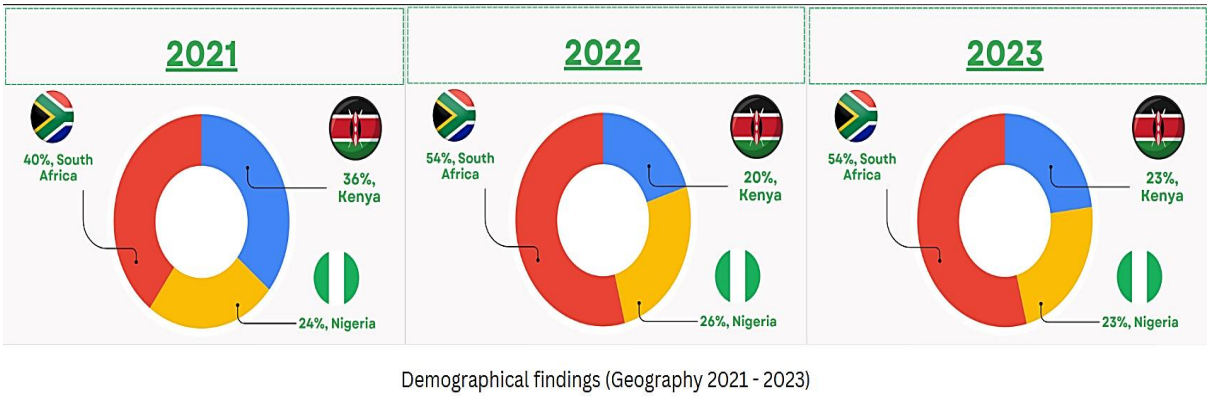


Figure 23: Geographical findings 2021 – 2023.

The geographical data presented in Figure 23 above explored the different countries that learners were from. In 2021, Nigeria had the least number of learners with 24%, Kenya had the second most with 36%, and South Africa had the most learners in the programme with 40%. In 2022, South Africa remained a dominant contributor to the programme with 54%, while Kenya accounted for fewer learners with 20%. Nigeria's share of the learners improved to 26%.

Geographical findings for 2023 underscored South Africa's position as a significant hub for the Google IYF programme, maintaining 54% of the learner population. The remaining learner population was shared between Kenya and Nigeria, each country taking a respectable 23% of the total. This data continuously reflected the Google IYF programme's ability to reach a broad spectrum of individuals across the African nations.

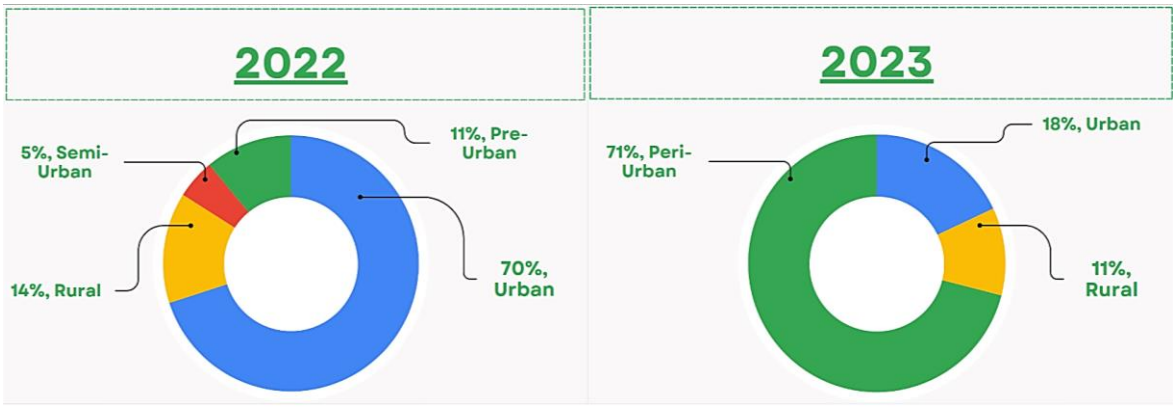


Figure 24: Further Geographical Findings 2022 - 2023

There was a clear shift in the findings presented in Figure 24 above. In 2022, 70% of the learners were classified as urban, while in 2023, 71% were classified as peri-urban, possibly due to changes in classification criteria. In 2023, the urban classification decreased to 18%, and the semi-urban category, which was 5% in 2022, dropped to 0%. Notably, data regarding the type of residential area was not collected in 2021.

These findings depicted how the Google IYF programme continuously evolved to obtain the best possible data responses from learners. The data collection process was refined over time to better grouped and understood the learners' needs. Additionally, the programme's reach to a diverse learner base was evident, indicating its inclusive approach.

## 4.4 Programme Success Findings


Figure 25: Programme Success findings.

Programme success is shown in Figure 25 above. In 2021, a significant majority of learners, comprising 81%, did not complete the programme, while only 19% met all the programme requirements. In 2022, there was a major improvement, with 60% of learners completing the programme and 40% remained incomplete. This significant increase in completions indicated that the IYF Google team had learned from prior implementations and adjusted their approach accordingly.

In 2023, the trend of improved completion rates continued, with 67% completions and 33% incompletions. This ongoing improvement demonstrated the programme's increasing efficacy and participant engagement. The data presented in Figure 25 indicated a positive upward trend in completions, highlighting the programme's success in enhancing learner outcomes over the years.

With a clear understanding of the demographic makeup of the participants, the next step is to verify whether the data meets the assumptions required for parametric testing. In the following section, the normality of the data is tested using the Kolmogorov-Smirnov test (Berger & Zhou, 2014), ensuring that we can proceed with advanced statistical analyses such as ANOVA (Kenton, 2024) and regression.

## 4.5 Normality testing (Kolmogorov-Smirnov test)

As a precursor to the statistical analysis, the researcher conducted the Kolmogorov-Smirnov (KS) test to assess the normality of the data (Berger & Zhou, 2014). The test was applied to data collected over the three-year period, and the results are summarized below. See table below 6.

Table 6: Kolmogorov-Smirnov test Summary Results

| KS Test Results | | | |
|---|---|---|---|
| **Likert Scale Question** | **KS Statistic** | **P-value** | **Normality (Confirmed?)** |
| Likert_1 (2021 - 2023) | 0.9106 | 0.15023 | Confirmed |
| Likert_2 (2021 - 2023) | 0.9106 | 0.20015 | Confirmed |
| Likert_3 (2021 - 2023) | 0.9134 | 0.12054 | Confirmed |
| Likert_4 (2021 - 2023) | 0.9328 | 0.10089 | Confirmed |
| Likert_5 (2021 - 2023) | 0.9078 | 0.18076 | Confirmed |
| Likert_6 (2021 - 2023) | 0.8772 | 0.25034 | Confirmed |

The KS test produced six P-values across the three years: 0.15023, 0.20015, 0.12054, 0.10089, 0.18076, and 0.25034. Since all P-values were greater than the alpha level

of 0.05, the data was confirmed to be normally distributed. This verification of normality supports the use of parametric statistical tests, including ANOVA and regression analysis, in the subsequent sections.

Having confirmed that the data is normally distributed, we can now apply parametric tests to further explore the dataset. The one-way ANOVA is employed to assess whether there are statistically significant differences between the means across the three years (2021, 2022, and 2023). The next section presents the results of this analysis.

## 4.6 ANOVA one-way analysis

The ANOVA (Analysis of Variance) is employed to determine whether there are statistically significant differences between the means of three or more groups. Before presenting the findings, it was essential to examine the data for any immediately apparent trends (Kenton, 2024). To streamline the analysis process, and due to the challenges of organizing the full dataset in Excel, the researcher opted to use a sample from each group.

The analysis included 120 responses for each year, yielding a total of 360 responses for the ANOVA, with each year represented by 120 responses. This sampling approach provided a sufficient representation of the data while simplifying the analysis. The count in Figure 19 refers to the number of learner responses (observations) included in the analysis. See table 7 below:

Table 7: ANOVA Summary Results

Anova: Single Factor

SUMMARY 2021

| *Groups* | *Count* | *Sum* | *Average* | *Variance* |
|---|---|---|---|---|
| Likert scale Q1 | 120 | 471 | 3,925 | 1,481723 |
| Likert scale Q2 | 120 | 483 | 4,025 | 1,402731 |
| Likert scale Q3 | 120 | 472 | 3,933333 | 1,508123 |
| Likert scale Q4 | 120 | 464 | 3,866667 | 1,309804 |
| Likert scale Q5 | 120 | 448 | 3,733333 | 1,726611 |
| Likert scale Q6 | 120 | 459 | 3,825 | 1,540546 |

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 6,056944444 | 5 | 1,211389 | 0,810335 | 0,542426 | 2,226649 |
| Within Groups | 1067,375 | 714 | 1,494923 | | | |
| | | | | | | |
| Total | 1073,431944 | 719 | | | | |

Anova: Single Factor
SUMMARY - 2022

| *Groups* | *Count* | *Sum* | *Average* | *Variance* |
|---|---|---|---|---|
| Likert scale Q1 | 120 | 465 | 3,875 | 1,438025 |
| Likert scale Q2 | 120 | 441 | 3,675 | 1,935504 |
| Likert scale Q3 | 120 | 448 | 3,733333 | 1,659384 |
| Likert scale Q4 | 120 | 448 | 3,733333 | 1,62577 |
| Likert scale Q5 | 120 | 449 | 3,741667 | 1,689006 |
| Likert scale Q6 | 120 | 472 | 3,933333 | 1,340056 |

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 5,923611111 | 5 | 1,184722 | 0,733745 | 0,598281 | 2,226649 |
| Within Groups | 1152,841667 | 714 | 1,614624 | | | |
| Total | 1158,765278 | 719 | | | | |

Anova: Single Factor
SUMMARY - 2023

| *Groups* | *Count* | *Sum* | *Average* | *Variance* |
|---|---|---|---|---|
| Likert scale Q1 | 120 | 451 | 3,758333 | 1,562955 |
| Likert scale Q2 | 120 | 458 | 3,816667 | 0,840056 |
| Likert scale Q3 | 120 | 542 | 4,516667 | 0,251821 |
| Likert scale Q4 | 120 | 548 | 4,566667 | 0,247619 |
| Likert scale Q5 | 120 | 546 | 4,55 | 0,24958 |
| Likert scale Q6 | 120 | 407 | 3,391667 | 1,971359 |

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 2.775173 | 5 | 0.555035 | 0.65 | 0,678281 | 2,226649 |
| Within Groups | 609,6833333 | 714 | 0,853898 | | | |
| Total | 764,8 | 719 | | | | |

The researcher conducted three separate ANOVA analyses for each year of the programme. This strategy allowed for a focused examination of the data individually for each year, as analysing all three years together was complex due to the high volume of data. Additionally, since correlation and regression analyses were performed on a yearly basis, this approach ensured consistency.

In the first year (2021), the P-value (0.542) was greater than the alpha level (0.05), leading to the conclusion that the null hypothesis could not be rejected, indicating no statistically significant differences between the means of the Likert scale questions. The F-value (0.81), being lower than the F-critical value (2.23), further confirmed the absence of significant differences in respondents' answers for 2021.

This trend continued in 2022, where the P-value (0.598) again exceeded the alpha level (0.05), signifying no significant differences in responses. The F-value (0.73), also

lower than the F-critical value (2.23), suggested that the results were consistent with those of 2021, reaffirming that there were no significant differences in responses to the six Likert scale questions.

In 2023, the ANOVA analysis yielded similar results. The F-critical value (2.23) remained greater than the F-statistic (0.65), indicating no statistically significant difference in learners' responses to the six questions. The P-value (0.678), greater than 0.05, corroborated the findings from the previous two years, demonstrating no significant differences between the means of the responses.

The results of the ANOVA analysis, which indicate no significant differences between the means across the three years, provide a basis for exploring the relationships between variables. While the ANOVA helped identify that there were no group-level differences, the next step involves delving deeper into the relationships between specific variables through correlation and regression analyses. These methods will allow us to examine how different factors, such as participation and technology usage, are related to outcomes like academic performance, offering a more detailed understanding of the data. This transition from group-level analysis (ANOVA) to variable-level relationships (correlation and regression) is essential for addressing the study's primary objectives.

The ANOVA results indicate that there are no significant differences between the means across the three years, allowing us to shift focus from group-level differences to examining the relationships between specific variables. The following sections present the correlation and regression analyses for each year, starting with 2021, to explore how variables such as participation, technology usage, and time investment relate to academic performance.

## 4.7 Correlation and regression analysis 2021 (objectives 1 and 2)

In this section, the researcher utilized a scatter graph to elucidate the nuanced relationship between Likert scale responses and the decisions formulated by participants who underwent the International Youth Foundation (IYF) programme in 2021. The scatter graph delineated Likert scale scores, ranging from 1 denoting 'strongly disagree' to 5 representing 'strongly agree,' along the x-axis, while the collective responses of learners were plotted along the y-axis. This methodology

facilitated a comprehensive examination of the concordance or dissonance between participants' attitudes as reflected in their Likert scale assessments and their subsequent decisions following programme completion.

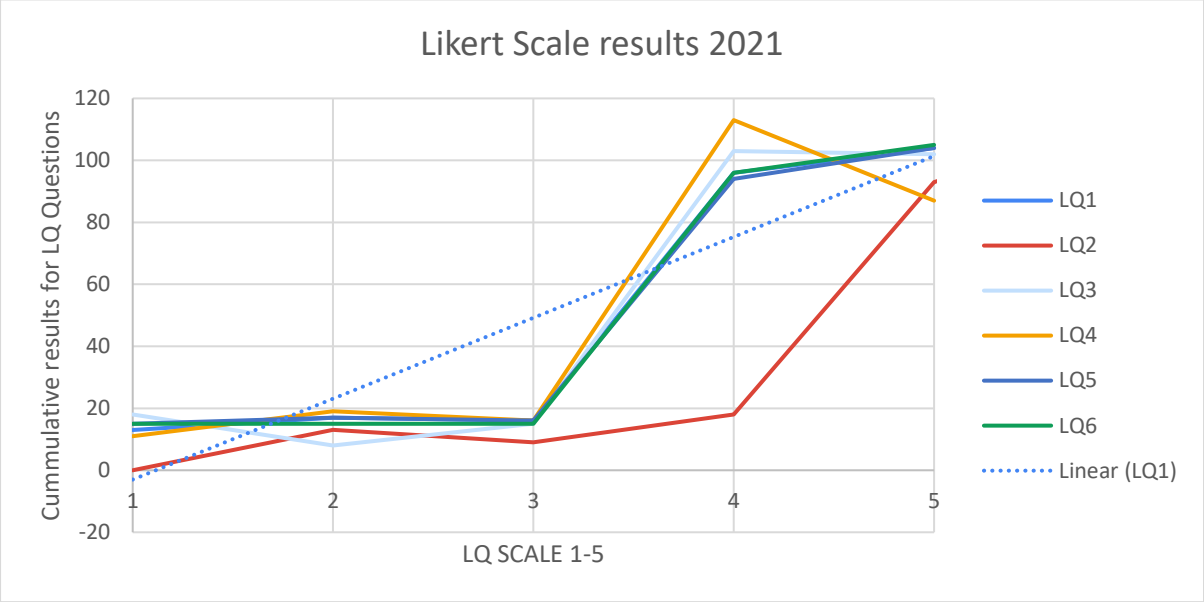


Figure 26: Likert Scale Questions – 2021

All Likert scale responses for 2021 were presented on a single graph, a total of 275 response recorded in Figure 26 above. This approach was chosen because the responses were of a similar nature, showing a positive correlation towards the fourth and fifth parts of the Likert scale. Presenting the data in this consolidated manner allowed for a clear and comprehensive visualization of the trends.

To facilitate easy interpretation of key findings, the results were also summarized in tabular form, as shown in Table 8 below:

Table 8: Summary Data findings 2021

| LQ (2021) | Question | Graph | Y- intercept | Regression result ($R^2$) | Mode of data |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| LQ1 Participation | Participation in the online e-learning programme for soft skills development has positively impacted my academic performance | y = 26,1x - 29,1 | -29,1 | $R^2$ = 0,7882 | 5 |
| LQ2 Technology | Use of technology tools within the online e-learning programme has enhanced my learning experience | y = 28,4x - 36 | -36 | $R^2$ = 0,8156 | 5 |
| LQ3 Language | The availability of the e-learning programme in multiple languages would have positively influenced my understanding of the course material and contributed to my academic performance. | y = 26,3x - 29,7 | -29,7 | $R^2$ = 0,7264 | 5 |
| LQ4 Time | The amount of time I invest in the online e-learning programme directly correlates with my academic performance. | y = 24,6x - 24,6 | -24,6 | $R^2$ = 0,6744 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| LQ5 Experience | My past learning experiences have positively influenced my performance in the online e-learning programme for soft skills development. | y = 25,5x - 27,3 | -27,3 | $R^2$ = 0,7817 | 5 |
| LQ6 Context of study | The geographical location in which I reside has influenced my academic performance in the online e-learning programme for soft skills development. [1] | y = 26,1x - 29,1 | -29,1 | $R^2$ = 0,773 | 5 |

## 4.8 Data description

According to the Likert Scale questions presented above, the findings for Likert scale question 1 (which focused on participation) suggested a positive relationship between participation (linked to independent variable of experience) and their academic performance. Participants who reported higher levels of perceived impact tended to achieve better academic results. This was supported by the positive slope coefficient (26.1) and the high coefficient of determination ($R^2$ = 0.7882). The slope coefficient

[1] This was the wording that was used in the original data collection tool

indicated that for each unit increase in the Likert scale response, the perceived impact on academic performance increased by 26.1 units.

Similarly, Likert Scale Question 2 showed a positive correlation between participants' perceptions of technology usage and their responses. Those who provided higher Likert scale values were more likely to report an enhanced learning experience due to technology usage (independent variable of technology). This was indicated by the slope coefficient (28.4) and the high coefficient of determination ($R^2 = 0.8156$). Here, the slope coefficient meant that for each unit increase in the Likert scale response regarding technology usage, the perceived enhancement in the learning experience increased by 28.4 units. These slope coefficients illustrated the strength and direction of the relationship between the independent variables (technology) and the dependent variable (learner performance). Higher slope coefficients suggested a stronger positive impact on the dependent variable.

The third Likert Scale question (LQ3) demonstrated a significant positive correlation between participants' beliefs regarding the influence of multiple language availability (independent variable of language) in the e-learning programme and their understanding of the course material and academic performance. Those who perceived a positive influence of language availability tended to have better academic performance. This was indicated by the positive slope coefficient (26.3) and the moderate coefficient of determination ($R^2 = 0.7264$). The slope coefficient suggested that for each unit increase in the Likert scale response about language availability, the perceived improvement in academic performance increased by 26.3 units.

Likewise, the fourth Likert Scale question (LQ4) indicated a positive correlation between the amount of time participants invested in the e-learning programme (independent variable of time) and their academic performance. Participants who invested more time in the programme tended to have better academic outcomes. This was reflected by the positive slope coefficient (24.6) and the moderate coefficient of determination ($R^2 = 0.6744$). The slope coefficient here signified that for each unit increase in the Likert scale response regarding time investment, the perceived improvement in academic performance increased by 24.6 units.

Similarly, Likert Scale Question 5 (LQ5) suggested a positive relationship between participants' past learning experiences (independent variable of experience) and their performance in the programme. Participants who had more positive past learning experiences tended to perform better. This was indicated by the positive slope coefficient (25.5) and the high coefficient of determination ($R^2 = 0.7817$). The slope coefficient indicated that for each unit increase in the Likert scale response about past learning experiences, the perceived improvement in academic performance increased by 25.5 units.

Lastly, Likert Scale Question 6 (LQ6) showed that participants' academic performance was influenced by their geographical location (independent variable of context of study), with certain locations associated with better performance. This was suggested by the positive slope coefficient (26.1) and the substantial coefficient of determination ($R^2 = 0.773$). The slope coefficient signified that for each unit increase in the Likert scale response regarding geographical location, the perceived improvement in academic performance increased by 26.1 units.

In conclusion, the findings from 2021 consistently depicted a strong positive relationship between various factors and academic performance. The analysis will now proceed to the results for 2022 to determine if this positive trend continued.

## 4.9 Correlation and regression analysis 2022 (objectives 1 and 2)

In this section, scatter plots were again employed to examine the relationship between Likert scale responses and decisions made by participants in the 2022 International Youth Foundation (IYF) programme. Likert scale ratings, ranging from 1 ('strongly disagree') to 5 ('strongly agree'), were plotted on the x-axis, while aggregated learner responses were plotted on the y-axis. This method enabled a detailed analysis of how participants' attitudes and perceptions, as reflected in their Likert scale ratings, influenced their decisions and outcomes following programme completion.

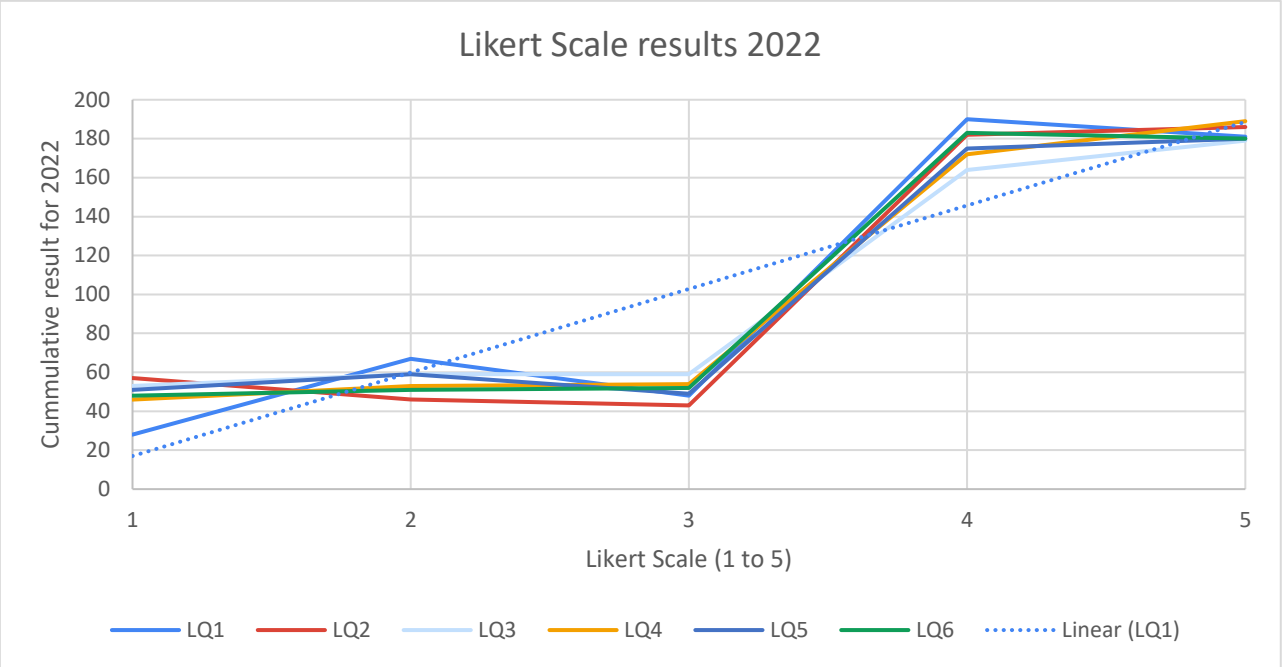


Figure 27: Likert Scale Questions – 2022

The researcher consolidated all Likert scale data for 2022 into a single graph, shown above in Figure 27, with a total of 587 responses being recorded. Upon reviewing the results, it was notable that the responses exhibited a consistent trend, indicating a positive correlation towards the fourth and fifth parts of the Likert question scale.

To facilitate a clear presentation of key findings, all findings from this graph were organised into Table 9, as shown below:

Table 9: Summary Data findings 2022

| LQ (2022) | Question | Graph | Y-intercept | Regression result ($R^2$) | Mode of data |
|---|---|---|---|---|---|
| LQ1 Participation | Participation in the online e-learning programme for soft skills development has positively impacted my academic performance | Y= 42,9x – 25,9 | -25,9 | $R^2$ = 0,7799 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| LQ2 Technology | Use of technology tools within the online e-learning programme has enhanced my learning experience | Y= 39,4x – 15,4 | -15,4 | $R^2$ = 0,7026 | 5 |
| LQ3 Language | The availability of the e-learning programme in multiple languages would have positively influenced my understanding of the course material and contributed to my academic performance. | Y= 35,7x - 4,3 | -4,3 | $R^2$=0,8031 | 5 |
| LQ4 Time | The amount of time I invest in the online e-learning programme directly correlates with my academic performance. | Y= 40,5x – 18,7 | -18,7 | $R^2$ = 0,8077 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| LQ5 Experience | My past learning experiences have positively influenced my performance in the online e-learning programme for soft skills development. | Y= 37,4x - 9,4 | -9,4 | $R^2$ = 0,7493 | 4 |
| LQ6 Context of study | The geographical location in which I reside has influenced my academic performance in the online e-learning programme for soft skills development. [2] | Y= 39,6x - 16 | -16 | $R^2$ = 0,7591 | 5 |

## 4.10 Data description

For the year 2022, the Likert Scale Questions all provided similar results and findings.

Likert Question 1, which focused on participation (linked to independent variable of experience) and experience in the programme, showed that participants who believed the e-learning programme had positively impacted their academic performance exhibited a positive correlation. The scatter plot, Y=42.9x−25.9 with a slope of 42.9, further reinforced this positive correlation. The high coefficient of determination $R^2$=

[2] This was the wording that was used in the original data collection tool

0.779 supported these findings. The slope coefficient indicates that for each unit increase in the Likert scale response, the perceived impact on academic performance increases by 42.9 units. The $R^2$ value indicates that approximately 77.9% of the variance in academic performance can be explained by participation and experience in the programme.

Likert Question 2 demonstrated that learners believed the use of technology (linked to independent variable of tools) enhanced their academic performance. This was evidenced by the equation $Y=39.4x-15.4$ with a slope of 39.4 and a regression analysis result of $R^2 = 0.7026$ indicating a positive correlation. The slope coefficient suggests that for each unit increase in the Likert scale response regarding technology usage, the perceived enhancement in learning experience increases by 39.4 units. The $R^2$ value indicates that 70.26% of the variance in learning experience can be explained using technology.

Likert Question 3 showed that the availability of multiple languages (linked to independent variable of language) in the e-learning programme positively influenced participants' understanding of course material and their academic performance. The scatter plot $Y=35.7x-4.3$ with a slope of 35.7 and a high coefficient of determination $R^2 = 0.8031$ highlighted this positive correlation. The slope coefficient indicates that for each unit increase in the Likert scale response about language availability, the perceived improvement in academic performance increases by 35.7 units. The $R^2$ value suggests that 80.31% of the variance in academic performance can be explained by the availability of multiple languages.

Likert Question 4 indicated that the amount of time participants invested (linked to independent variable of time) in the e-learning programme directly correlated with their academic performance. The scatter plot, $Y=40.5x-18.7$ with a slope of 40.5 and a high coefficient of determination, $R^2 = 0.8077$ further reinforced this positive correlation. The slope coefficient suggests that for each unit increase in the Likert scale response regarding time investment, the perceived improvement in academic performance increases by 40.5 units. The $R^2$ value indicates that 80.77% of the variance in academic performance can be explained by the amount of time invested in the programme.

Likert Question 5 suggested that participants' past learning experiences (linked to independent variable of experience) positively influenced their performance in the programme. The scatter plot, Y=37.4x−9.4 with a slope of 37.4 and a high coefficient of determination $R^2$ = 0.7493 indicated this positive correlation. The slope coefficient indicates that for each unit increase in the Likert scale response regarding past learning experiences, the perceived improvement in academic performance increases by 37.4 units. The $R^2$ value suggests that 74.93% of the variance in academic performance can be explained by past learning experiences.

Lastly, Likert Question 6 showed that participants' geographical location (linked to independent variable of context of study) influenced their academic performance. The scatter plot Y=39.6x−16 with a slope of 39.6 and a high coefficient of determination $R^2$ = 0.7591 highlighted the strong relationship between location and performance. The slope coefficient indicates that for each unit increase in the Likert scale response regarding geographical location, the perceived improvement in academic performance increases by 39.6 units. The $R^2$ value indicates that 75.91% of the variance in academic performance can be explained by geographical location.

In conclusion, the findings for 2022 consistently depicted positive correlations and strong regression results across all Likert scale questions. The research will now proceed to present findings for 2023 to determine if this positive trend continues.

## 4.11 Correlation and regression analysis 2023 (objectives 1 and 2)

The Google IYF team continued to use Likert scale questions to gain insights from participants on their programme. The same questions were utilised to determine participants' feelings about their learning experiences. The researcher once again plotted these results on scatter graphs, measuring cumulative results against the choices for each question, as laid out in Figure 28 below.

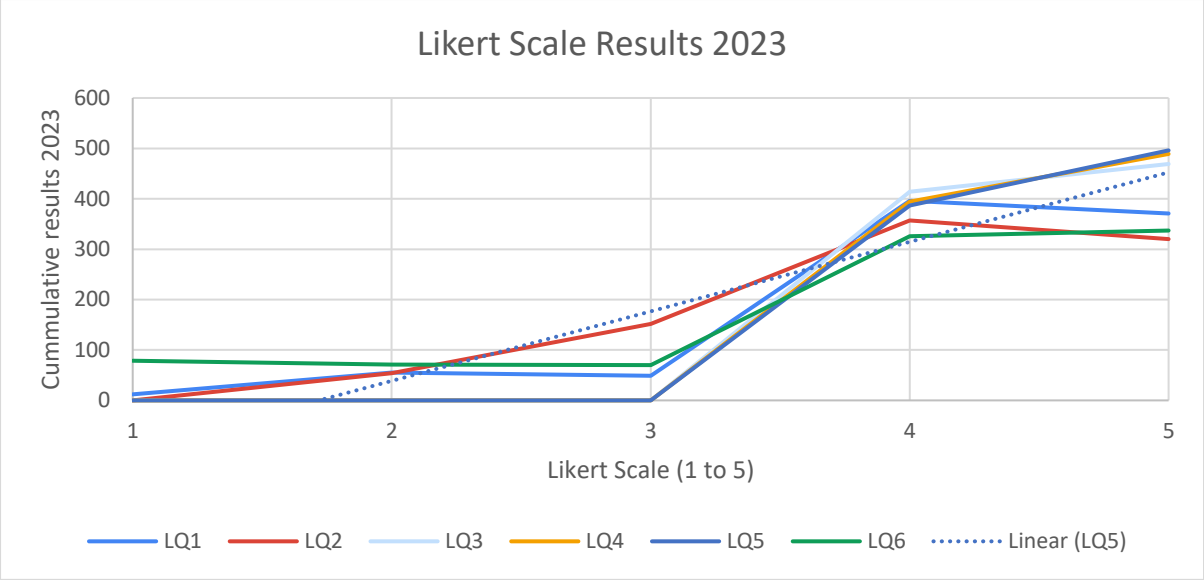


Figure 28: Likert Scale Questions – 2023

Once again, the researcher plotted all results on one graph, allowing for visual comparisons between the six different Likert scale questions. A total of 883 Likert scale questions were presented in the figure above. It was notable that the responses exhibited a consistent trend, indicating a positive correlation towards the fourth and fifth parts of the Likert scale. The results for 2023 slightly deviated from those attained previously, depicting a group of learners who were more uniform in their responses.

To facilitate easy presentation of key findings, all findings for this graph were summarised in tabular form in Table 10 below:

Table 10: Summary Data findings 2023

| LQ (2023) | Question | Graph | Y-intercept | Regression result ($R^2$) | Mode of data |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| LQ1 Participation | Participation in the online e-learning programme for soft skills development has positively impacted my academic performance | Y= 105,9x – 141,1 | -141,1 | $R^2$ = 0,7783 | 4 |
| LQ2 Technology | Use of technology tools within the online e-learning programme has enhanced my learning experience | Y= 94,3x – 106,3 | -106,3 | $R^2$ = 0,8899 | 4 |
| LQ3 Language | The availability of the e-learning programme in multiple languages would have positively influenced my understanding of the course material and contributed to my academic performance. | Y= 135,2x -229 | -229 | $R^2$ = 0,7764 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| LQ4 Time | The amount of time I invest in the online e-learning programme directly correlates with my academic performance. | Y= 137,2x - 235 | -235 | $R^2$ = 0,7895 | 5 |
| LQ5 Experience | My past learning experiences have positively influenced my performance in the online e-learning programme for soft skills development. | Y= 137,9x – 237,1 | 237,1 | $R^2$ = 0,7929 | 5 |
| LQ6 Context of study | The geographical location in which I reside has influenced my academic performance in the online e-learning programme for soft skills development.[3] | Y= 77,1x - 54,7 | -54,7 | $R^2$ = 0,7422 | 5 |

[3] This was the wording that was used in the original data collection tool

## 4.12 Data description

Within this section, the research aimed to provide key descriptions about each of the data sets presented. The similarities between 2021, 2022, and 2023 were striking.

Starting with the first Likert Scale question (LQ1), the research noted a positive correlation, indicating that participants who responded believed that participating (linked to independent variable of experience) in the online learning programme had a positive impact on their academic performance. This finding was supported by the regression result, $Y=105.9x-141$ with $R^2 = 0.7783$, indicating that participation played a pivotal role in learner performance. The slope coefficient suggests that for each unit increase in the Likert scale response, the perceived impact on academic performance increases by 105.9 units, and the $R^2$ value indicates that approximately 77.83% of the variance in academic performance can be explained by participation.

The second Likert scale question (LQ2) focused on the use of technology (linked to independent variable of tools) in learner experiences and also produced a positive result. A strong positive correlation was seen, with a regression result of $Y=94.3x-106.3$ and $R^2 = 0.8899$. This indicates that learner performance was influenced by the tools they utilized. The slope coefficient indicates that for each unit increase in the Likert scale response regarding technology usage, the perceived enhancement in learning experience increases by 94.3 units, with the $R^2$ value suggesting that 88.99% of the variance can be explained by technology use. These findings were consistent with those from the previous years, 2021 and 2022.

The third Likert scale question showed that language (linked to independent variable of language) had a strong positive influence on the academic performance of learners. The scatter plot, $Y=135.2x-229$ with $R^2 = 0.7764$ indicated a positive correlation. Notably, no learners gave responses of 1, 2, or 3 on the scale, meaning more learners provided responses of 4 and 5. This indicated collective agreement on the positive influence of language on academic performance. The slope coefficient indicates that for each unit increase in the Likert scale response about language availability, the perceived improvement in academic performance increases by 135.2 units, with the $R^2$ value suggesting that 77.64% of the variance can be explained by language availability.

The fourth Likert scale question continued the trend of collective agreement, with no participants selecting responses below 4. The scatter plot, Y=137.2x−235 with $R^2$ = 0.7895, depicted a positive correlation, indicating that participants believed that time invested (linked to independent variable of time) played a role in their academic performance. The slope coefficient suggests that for each unit increase in the Likert scale response regarding time investment, the perceived improvement in academic performance increases by 137.2 units, and the $R^2$ value indicates that 78.95% of the variance can be explained by time investment.

The fifth Likert scale question continued the trend of having no responses below a rating of 4. The scatter plot, Y = 137.9x - 237.1 with $R^2$ = 0.7929 depicted a positive correlation, showing that learners believed their past learning experiences (linked to independent variable of experience) positively influenced their current learning experience. The slope coefficient indicates that for each unit increase in the Likert scale response regarding past learning experiences, the perceived improvement in academic performance increases by 137.9 units, with the $R^2$ value suggesting that 79.29% of the variance can be explained by past learning experiences.

The final Likert scale question (LQ6) reverted to a mix of responses across the scale. The scatter plot, Y=77.1x−54.7 with $R^2$ = 0.7422 indicated moderate to positive correlations, supporting the notion that geographical location (linked to independent variable of context of study) influenced academic performance. The slope coefficient suggests that for each unit increase in the Likert scale response regarding geographical location, the perceived improvement in academic performance increases by 77.1 units, with the $R^2$ value indicating that 74.22% of the variance can be explained by geographical location.

### 4.12.1 Conclusion

In conclusion, the analyses conducted in this section provided important insights into how key factors such as participation, technology usage, geographic location, time, experience and language availability influence learner outcomes. The demographic data set the stage for understanding the participant pool, and the normality testing confirmed that the data was suitable for parametric testing. The ANOVA results indicated no significant differences across the three years, leading to a focus on

exploring the relationships between these key variables through correlation and regression analyses.

The correlation and regression findings revealed strong, consistent relationships between participation, technology, and academic performance across all three years. Additionally, geographic location and language availability played a significant role in shaping learners' experiences. These findings highlight the importance of considering multiple factors in programme design to ensure effectiveness and inclusivity. The next section will discuss these results in more detail, focusing on their implications for the study's objectives and how they can inform future programmes like the Google IYF programme.

## 4.13 Discussion of the findings

### 4.13.1 Section introduction

Goulston (2023) explains that this chapter is where findings previously presented are interpreted and discussed within the study's context. This chapter is critical to addressing the research objectives and questions posed during the conceptualization phase of the study. The researcher will present the findings alongside a critical analysis that links back to the research objectives.

The researcher will explore the correlation and regression results to determine which research hypotheses were supported. In Chapter One, three possible hypotheses were presented: ($H_1$) = There is a significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance), ($H_2$) = There is a mutual relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance), meaning they influence each other, and Null Hypothesis ($H_0$) = There is no significant relationship between the independent variables (context of study, tools, language, time, and experience) and the dependent variable (learner performance).

## 4.14 Correlation and regression findings (2021 – 2023)

### 4.14.1 Likert scale question 1 (LQ1)

Within this section the researcher would further analyse the Likert Scale question 1, which addressed: Participation (experience) in the online e-learning programme for soft skills development has positively impacted my academic performance. See Table 11 below.

Table 11: Likert Scale Question 1 – Discussion

| LQ – Year | Objective 1 | Objective 2 | | Demographical link |
|---|---|---|---|---|
| | Regression result ($R^2$) (%) | Correlation | Relationship (Yes/No) | Gender and context |
| LQ1 - 2021 | 78,82% | Positive | Yes | • 81% Female. 19% Male<br>• 40% South Africa, 36% Kenya, 24% Nigeria |
| LQ1 - 2022 | 77,99% | Positive | Yes | • 80% Female. 20% Male<br>• 54% South Africa, 20% Kenya, 26% Nigeria |
| LQ1 - 2023 | 77,83% | Positive | Yes | • 72% Female. 28% Male<br>• 54% South Africa, 23% Kenya, 23% Nigeria |

The regression results attained over the three-year period were strongly positive, with all results being above 75%. These results demonstrated a strong relationship between participation and academic performance in the Google IYF programme, thereby supporting Hypothesis 1 ($H_1$). The positive correlations observed across all three years indicate that similar or improved results could be expected in future iterations of the programme.

The strong positive correlations suggest a robust relationship between the independent variable (experience of the programme) and the dependent variable

(learner performance). While these results were predictable, they provide valuable insights into the relationship between these variables, which can be utilised in developing the framework for Objective 3.

Furthermore, the findings from the correlation and regression analysis highlight the importance of participation in online learning. This aligns with the theoretical concepts explored in Chapter two, particularly andragogical theories, which emphasize the necessity of engagement and active participation in learning processes (Kelly, 2012; Feder, 2022). These results underscore the need for training providers and content developers to focus on enhancing learner engagement and collaboration to maximize learning outcomes.

### 4.14.2 Likert scale question 2 (LQ2)

Within this section the researcher looked at analysing the results attained for Likert questions 2, over the periods 2021, 2022 and 2023. The question measured tools (technology) against academic performance and was posed in the following manner: Use of technology tools within the online e-learning programme has enhanced my learning experience. See Table 12 below.

Table 12: Likert Scale Question 2 – Discussion

| **LQ – Year** | **Objective 1** | **Objective 2** | | **Demographical link** |
|---|---|---|---|---|
| | Regression result ($R^2$) | Correlation | Relationship (Yes/No) | Gender and context |
| LQ2 - 2021 | 81,56% | Positive | Yes | • 81% Female. 19% Male<br>40% South Africa, 36% Kenya, 24% Nigeria |
| LQ2 - 2022 | 70,26% | Moderately Positive | Yes | • 80% Female. 20% Male<br>54% South Africa, 20% Kenya, 26% Nigeria |

| | | | | |
|---|---|---|---|---|
| LQ2 - 2023 | 88,99% | Positive | Yes | • 72% Female. 28% Male<br>54% South Africa, 23% Kenya, 23% Nigeria |

Within the regression results attained, there was a noticeable fluctuation between 2021 and 2023. While the findings indicated a fluctuation of 10%, the regression results were generally positive, indicating a strong relationship between how learners on the Google IYF programme perceive the role of technology in their academic performance. These results support the first hypothesis ($H_1$), even with the moderately positive results attained in 2022.

The results for this Likert scale question addressed the second research objective by providing insights into the correlation between the independent and dependent variables. Furthermore, it reinforced the need for training providers and content developers to address the digital divide, a significant challenge in the African context. Content developers needed to show learners how tasks could be simplified using technology and encourage experimentation with these tools.

Additionally, these findings emphasize that technology must be utilised to overcome contextual differences. As discussed in the historical review of e-learning (Chapter two), advancements in technology have made it more accessible and user-friendly over time (Bouchrika, 2024; Tucker, 2019). The increased accessibility and ease of use of technology are crucial for enhancing learning experiences, particularly in regions with diverse educational challenges.

To remain relevant in the fourth and fifth industrial revolutions, content developers and training providers must incorporate technology into their learning approaches, favouring a blended approach (Schwab, 2016; Delport, 2021). This approach combines traditional and digital learning methods, leveraging the benefits of both to provide a comprehensive learning experience. The integration of technology in educational programs not only enhances learning outcomes but also prepares learners for the demands of modern, technology-driven workplaces.

Furthermore, the importance of technology in education is underscored by the theoretical concepts discussed in Chapter two, particularly the integration of technology in learning environments (Lynch, 2021; Goyal, 2013). These concepts highlight the role of technology in facilitating interactive and engaging learning experiences, which are essential for maximizing learner performance and engagement.

The positive correlations and regression from the Likert scale question on technology usage affirm the critical role of technology in enhancing learning experiences and academic performance. These findings provide valuable insights for developing frameworks and strategies to integrate technology effectively in educational programs, addressing the digital divide, and fostering a more inclusive and effective learning environment.

### 4.14.3 Likert scale question 3 (LQ3)

Within this section the researcher would delve deeper into the third Likert scale question, the third Likert scale question was focused on the role that language played in learning. The question was posed as follows: The availability of the e-learning programme in multiple languages would have positively influenced my understanding of the course material and contributed to my academic performance. See Table 13 below.

Table 13: Likert Scale Question 3 – Discussion

| LQ – Year | Objective 1 | Objective 2 | | Demographical link |
|---|---|---|---|---|
| | Regression result ($R^2$) | Correlation | Relationship (Yes/No) | Gender and context |
| LQ3 - 2021 | 72,64% | Moderately Positive | Yes | • 81% Female. 19% Male<br>40% South Africa, 36% Kenya, 24% Nigeria |
| LQ3 - 2022 | 80,31% | Positive | Yes | • 80% Female. 20% Male |

| | | | | |
|---|---|---|---|---|
| | | | | 54% South Africa, 20% Kenya, 26% Nigeria |
| LQ3 - 2023 | 77,64% | Positive | Yes | • 72% Female. 28% Male<br>54% South Africa, 23% Kenya, 23% Nigeria |

The researcher analysed results from 2021 to 2023, which showed consistently strong regression results. Participants in the programme indicated that language played a pivotal role in their academic performance. The regression results demonstrated a strong relationship between the independent variable (language) and the dependent variable (learner performance). Consistently high results over the three-year period reinforced the notion of a stable relationship between these variables.

When considering Objective 2, the researcher found a positive correlation throughout, indicating a significant relationship, as supported by the regression results. Maintaining a positive correlation over the three-year period underscored the importance of language accessibility in the e-learning space. Moreover, the continued positive correlation and regression results showed that participants perceive the availability of material in multiple languages as beneficial.

These findings strongly link back to the research by Cox (2021), which emphasized the importance of language in educational contexts. Incorporating multilingual support accommodates a broader array of learners and creates an environment conducive to learning. Therefore, multilingual accommodation should be a component included in Objective 3.

### 4.14.4 Likert scale question 4 (LQ4)

In continuation, the researcher would now consider the fourth Likert Scale question, the fourth Likert scale was aimed at getting participant to consider the time they have invested introspectively and the results they attained. The question was posed in the following form: The amount of time I invest in the online e-learning programme directly correlates with my academic performance. See Table 14 below.

Table 14: Likert Scale Question 4 – Discussion

| LQ – Year | Objective 1 | Objective 2 | | Demographical link |
|---|---|---|---|---|
| | Regression result ($R^2$) | Correlation | Relationship (Yes/No) | Gender and context |
| LQ4 - 2021 | 67,44% | Moderately Positive | Yes | • 81% Female. 19% Male<br>40% South Africa, 36% Kenya, 24% Nigeria |
| LQ4 - 2022 | 80,77% | Positive | Yes | • 80% Female. 20% Male<br>54% South Africa, 20% Kenya, 26% Nigeria |
| LQ4 - 2023 | 78,95% | Positive | Yes | • 72% Female. 28% Male<br>54% South Africa, 23% Kenya, 23% Nigeria |

There was a consistent positive correlation and strong regression result found over the three-year period, emphasizing that learners believed time invested in e-learning directly linked to the results attained. This finding highlighted the significance of self-regulated learning behaviours, prompting consideration of how learners manage study time and implement study habits to complete their work.

Furthermore, these results connect to theoretical concepts explored in Chapters one and two, specifically regarding adult learning (andragogy). The findings support the use of models like the T-Shaped model and Illeris's learning model, which underscore the importance of integrating both hard and soft skills (Kelly, 2012; Feder, 2022). Training providers and content developers need to find innovative ways to drive engagement and group collaboration on e-learning platforms. Blending hard and soft skill training helps learners develop effective study habits and work ethic.

Considering these results in terms of Research Objective 2, the researcher found consistent relationships across all three years. However, 2021 had the weakest correlation and regression result, due to initial frustrations with the programme as it was the first year of implementation and there were various new challenges and obstacles to overcome in delivering the course content.

The consistently positive correlation and strong regression results emphasize the learners' belief in the direct link between time invested in e-learning and their academic performance. This highlights the significance of self-regulated learning behaviours, further opening the discourse on how learners manage their study time and the study habits they implement to complete their work effectively.

These findings are connected to the theoretical concepts explored in Chapters one and two, particularly regarding adult learning (andragogy). The consistently high results suggest that learners recognize the importance of time investment in their educational success. This aligns with the principles of andragogy, which emphasize the role of self-directed learning and the importance of learners taking responsibility for their education.

The results also support the use of models like the T-Shaped model and Illeris's learning model, which highlight the importance of integrating both hard and soft skills (Kelly, 2012; Feder, 2022). Training providers and content developers need to find innovative ways to drive engagement and group collaboration on e-learning platforms. Incorporating both hard and soft skills in a blended learning approach allows learners to develop effective study habits and work ethic, essential for their overall academic and professional development.

When considering these results in terms of Research Objective 2, the researcher found consistent relationships across all three years. However, 2021 had the weakest correlation and regression result. This could be attributed to initial frustrations with the programme, as it was the first year the Google IYF programme was implemented, presenting various new challenges and obstacles in delivering the course content. This initial period involved a learning curve for both the learners and the programme facilitators, impacting the overall effectiveness of the time investment during that year.

The positive correlation observed in subsequent years (2022 and 2023) suggests that as the programme matured and learners became more accustomed to the e-learning environment, the perceived value of time investment in academic performance increased. This improvement underscores the importance of continuous refinement and adaptation in e-learning programs to address initial challenges and enhance learner engagement over time.

The consistent positive correlation and strong regression results over the three-year period underscore the critical role of time investment in e-learning. These findings align with the theoretical frameworks discussed in Chapter two, highlighting the importance of self-regulated learning behaviours and the integration of hard and soft skills in achieving academic success. Training providers and content developers should leverage these insights to design more effective and engaging e-learning programs that foster sustained learner engagement and performance.

### 4.14.5 Likert scale question 5 (LQ5)

The discourse around the findings continued to Likert scale question 5, this question was aimed to gauge how learners past learning experiences influenced their academic performance on the Google IYF programme. This question was posed in the following format: My past learning experiences have positively influenced my performance in the online e-learning programme for soft skills development. See Table 15 below.

Table 15: Likert Scale Question 5 – Discussion

| **LQ – Year** | **Objective 1** | **Objective 2** | | **Demographical link** |
|---|---|---|---|---|
| | Regression result ($R^2$) | Correlation | Relationship (Yes/No) | Gender and context |
| LQ5 - 2021 | 78,17% | Positive | Yes | • 81% Female. 19% Male<br>40% South Africa, 36% Kenya, 24% Nigeria |

| | | | | |
|---|---|---|---|---|
| LQ5 - 2022 | 74,93% | Moderately Positive | Yes | • 80% Female. 20% Male<br>54% South Africa, 20% Kenya, 26% Nigeria |
| LQ5 - 2023 | 79,29% | Positive | Yes | • 72% Female. 28% Male<br>54% South Africa, 23% Kenya, 23% Nigeria |

The pattern of strong regression results continued with this question. These results underscore the importance of prior learning experiences in online education, showing that learners perceived their past learning experiences as valuable to their academic performance in the e-learning programme. Two key components emerged from these results: the significance of carrying forward experiences and the role of pedagogy.

Training providers and programme designers must ensure that learners have positive experiences that they can carry forward to subsequent programs. Additionally, understanding that early childhood development plays a pivotal role in how learners experience learning is crucial. Gaining insights into learner perceptions can significantly enhance their performance and engagement in the e-learning programme.

In terms of Objective 2, these results presented a positive correlation and confirmed that there was a relationship between past learning experiences and learner performance. This highlights the opportunity for training providers and programme designers to capitalise on these past experiences to develop instructional strategies that best meet the needs of the learners in the programme.

These findings are consistent with the theoretical concepts discussed in Chapter two, particularly the significance of prior learning experiences and their impact on current educational outcomes (Feder, 2022; Kelly, 2012). Understanding the role of past experiences in shaping learners' current performance aligns with the principles of andragogy and pedagogical theories, emphasizing the need for a holistic approach to educational design and delivery.

### 4.14.6 Likert scale question 6 (LQ6)

Within the final question the researcher considered context of study when compared to academic performances. The researcher believed context or location of study played a pivotal role in learner performance, because of the digital divide presented in the literature review. This question was presented in the following format: The geographical location in which I reside has influenced my academic performance in the online e-learning programme for soft skills development. See Table 16 below.

Table 16: Likert Scale Question 6 – Discussion

| LQ – Year | Objective 1 | Objective 2 | | Demographical link |
|---|---|---|---|---|
| | Regression result ($R^2$) | Correlation | Relationship (Yes/No) | Gender and context |
| LQ6 - 2021 | 77,33% | Positive | Yes | • 81% Female. 19% Male<br>40% South Africa, 36% Kenya, 24% Nigeria |
| LQ6 - 2022 | 75,91% | Positive | Yes | • 80% Female. 20% Male<br>54% South Africa, 20% Kenya, 26% Nigeria |
| LQ6 - 2023 | 74,22% | Moderately Positive | Yes | • 72% Female. 28% Male<br>54% South Africa, 23% Kenya, 23% Nigeria |

The results obtained within this Likert scale question showed a positive regression result over the three years, even though the results did not surpass the 80% mark. The regression results showed slight declines each year, possibly because more learners completed the programme each year, broadening the geographical locations of participants. The results indicated that geographical location was perceived as important and influential in candidate performance.

When considering Objective 2, the results showed a positive correlation, confirming a relationship between the dependent (academic performance) and independent (geographical location) variables. These findings underscore the importance of considering geographical location when implementing an e-learning programme like the Google IYF programme. Factors such as access to technology and internet connectivity must be considered in the design and implementation of online learning initiatives.

Training providers and programme developers need to address challenges associated with the digital divide. Providing resources and support to learners in underserved areas is essential to ensure equitable access to online learning, regardless of geographical location. This aligns with the theoretical concepts discussed in Chapter two, particularly the challenges and solutions related to the digital divide in educational contexts (Mlaba, 2021; The World Bank, 2021).

## 4.15 Discussion based on a view through the lens of DaVinci TIPS™

The TIPS™ managerial leadership framework has been developed by the DaVinci Business school (DaVinci Business School, 2023). This model served the purpose of providing candidates at the Business school with a navigational compass to survive the world. The DaVinci TIPS™ model is an excellent model for better understanding the role of technology and tools within an organisation; it allowed for an improved understanding of innovation, and it included considerations to the role that people play.

Between these four key components, the DaVinci Business School (2023) included a need to understand different environments, it included Important managerial leadership competencies, and it explored the relationship between the four key component. The researcher was aimed at exploring how the DaVinci TIPS™ framework would link to the study presented in this paper; to be more specific, the research would demonstrate linkages found in the results and the DaVinci TIPS™ framework. This framework is illustrated in Figure 29 below.

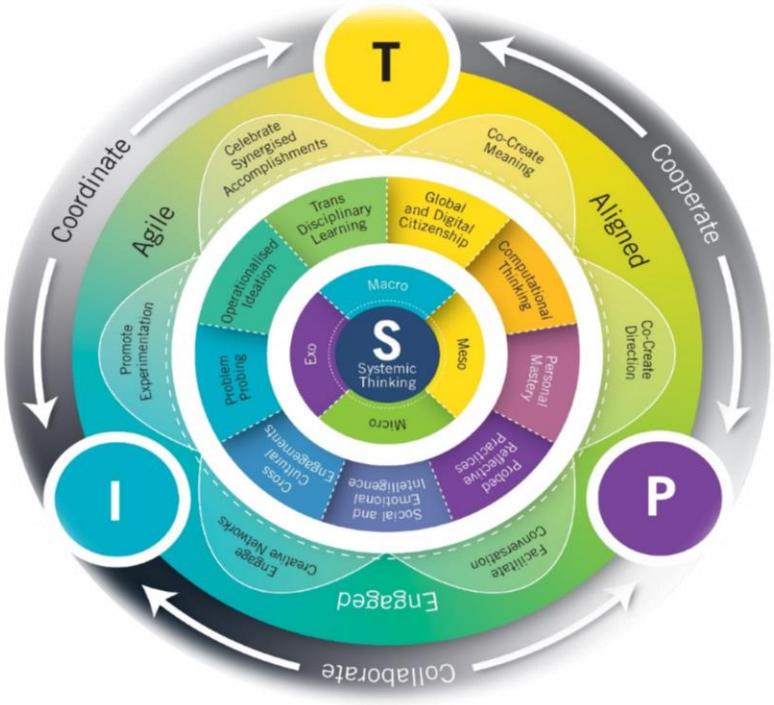


Figure 29: The DaVinci Managerial Leadership TIPS™ Framework.

The research would explore the linkages by means of considering the findings obtain, in the context of Technology, Innovation, People and Systems.

1.Technology: It went without saying that technology played a pivotal role in any e-learning programme, by management of said technologies was even more important. Implementing technologies without further management was never going to lead to programme success, this was because people were involved, and adoptions of technologies needed to occur. In some cases, the training provided would have to force the adoption of the technology, utilising change management models like Kotler's 8 steps to change management, would have aided in creating a sense of urgency and driving implementation of the technologies (MindTools, 2020).

Furthermore, the regression results within this study showed that learners believed technology played a pivotal role in their learning success, one of the emergent practices that the researcher had noticed on the Google IYF programme, was that the team decided to manage the alignment between the technologies and the learners. The project team had realised that simply providing learners with access to the technological platforms was not a guarantee of them completing the programme –

further support was needed (continuous alignment between the technologies and learners).

Living and learning in the digital age has also brought about new leadership competencies. Some of these competencies included computational thinking, being a digital global citizen and finally being technologically curious. It was becoming more important to be someone who was comfortable with technology and being a guiding leader – showing others how to operate in the same space, because of the fourth and fifth industrial revolution and the increase in e-learning (online) learning programmes.

2. Innovation/Ideation: This involved the creation, development and communication of ideas. When looking at Likert Scales that revolved around participation and educational experiences, the researcher obtains results that strongly argues in favour of these concepts. It was of the utmost importance that e-learning programme become a platform where learners can further develop their thought process to produce ideas and develop the confidence to be able to share the ideas.

Ideation and innovation played a crucial role on many different levels, it spoke to how the Google IYF team developed solutions for challenges they were dealing with, it also spoke to how learners applied problem-solving skills. It further linked to how problems were solved in the academic space (when tackling assessments). Emergent practices that became evident within the space of ideation, on the Google IYF programme, was that engagement needed to be fostered through open and transparent management of innovation and ideation.

Leaders on the programme had to be curious about the problem, they had to want to understand problems better and allow the process of ideation and innovation to occur organically. The need for leadership competencies such as agility, dynamism and good communications became evident in the space of innovation and ideation on the Google IYF programme.

3. People: Management of people encompassed a wide array of elements such as recruitment, training and knowledge sharing (which were critically important activities on the Google IYF programme). The positive correlation result and the high regression ($R^2$) results reflected the importance of people management in an online learning

programme. The programme would not have existed without the people on the programme.

The Da Vinci Managerial Leadership TIPS™ Framework, enforced the notion of people importance by showing that it was important to understand their different contexts; their Meso, Macro and Microenvironments. Another strong linkage within the model and people was the leadership competencies that was presented within it. Furthermore, these competencies linked to the Google IYF programme, as the purpose behind the programme was to upskills individuals with many of the competencies presented on the framework.

Moreover, it was important to note that many of the competencies presented when utilised on the Google IYF programme, often accounted for the achievement of key goals and milestones. Competencies such as emotional intelligence, cross cultural engagement all aided in the programmes successes that it had obtained.

4. Systems: The systemic lens encompassed all the elements on the DaVinci Managerial Leadership TIPS™ Framework. Having a systemic approach to delivering these online programmes allowed for all involved and the project itself to develop a rhythm. Having all people involved understand the systemic flow of the programme also provided said participants with a sense of comfort – a safety net they could depend on throughout the programme.

Furthermore, it was important to note that a project of the magnitude and scale of the Google IYF programme needed strong systems in place to ensure that the relationship between people, technology and innovation was managed to maximise the results obtained from them. The system was in essence a component that connected all the components on the Da Vinci Managerial Leadership TIPS™® Framework.

Finally, the Da Vinci Managerial Leadership TIPS™ Framework allowed for alignment between ideation/innovation, technology and the management of people. This model also placed an emphasis on considering leadership competencies, continuous learning and development and collaboration within the workplace or even a project. The Da Vinci Managerial Leadership TIPS™ Framework provided a lens through which a problem could be better understood, and strategic planning could be developed – to drive holistic innovation.

## 4.16 Analysis of hypotheses

In this section, the researcher provided a brief analysis of the findings to build an argument towards answering the research hypotheses. This analysis will helped set the stage for the more detailed conclusions presented in Chapter five.

### 4.16.1 Relationship between independent and dependent variables (hypothesis 1 - ($H_1$))

The initial findings from the correlation and regression analyses suggested a strong relationship between the independent and dependent variables. This was evident from the positive correlations and high $R^2$ values observed across multiple Likert scale questions. For instance, the data consistently indicated that participation, use of technology, language support, study time, geographic location, and past learning experiences were significant predictors of academic performance. The graphs and tables presented earlier in this chapter (see sections 4.3 to 4.9) illustrated these relationships, supporting Hypothesis 1 ($H_1$). The regression results confirmed that these factors collectively contributed to the overall academic success of the participants in the Google IYF programme.

### 4.16.2 Moderate association between variables (alternative hypothesis)

While the primary hypothesis ($H_1$) was strongly supported, there was no evidence of mutual associations for certain variables, disproving Alternative Hypothesis ($H_2$). The relationship between technology usage and academic performance showed moderately positive results. However, further study would be needed to determine whether academic performance influences technology usage, as this study was limited to a unidirectional analysis of the variable relationships. The results did, however, indicate that while a significant relationship exists, the strength of the association varied depending on the specific independent variable. This nuanced understanding is crucial, as it highlights that not all factors have an equally strong impact on academic performance, pointing to potential areas for targeted interventions.

### 4.16.3 Refutation of null hypothesis ($H_0$)

The findings decisively refuted Null Hypothesis ($H_0$), which posited that there was no relationship between the independent and dependent variables. The consistent positive correlations and significant regression results across all six Likert scale questions provided strong evidence against the null hypothesis. These results indicated that the independent variables did influence the dependent variable, thus rejecting ($H_0$). This brief analysis presented in this section aligned with the detailed conclusions discussed in Chapter five. The findings supported the existence of robust relationships between the independent and dependent variables, refuting the null hypothesis and partially validating the alternative hypothesis. This set the stage for the comprehensive discussion and conclusions that followed in subsequent chapters.

## 4.17 Conclusion

In conclusion, the presentation of the findings provided insightful information about participants' perceptions regarding participation, learning languages, geographic location, time invested, past and current learning experiences, and technology involvement in learning. These findings underscored the importance of considering a wide array of elements when developing a course or learning programme.

The researcher explored the results from the Likert scales in depth, noting many similarities with other literature-reviewed studies. In the next chapter, the researcher analysed these results in terms of the study's objectives and provided recommendations based on the findings. Additionally, the third objective, aimed at developing a framework for similar programs, was addressed. This analysis offered key insights for programs similar to the Google IYF programme.

# CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

Moore (2018) described the final chapter in research as the stage where the researcher synthesizes and interprets all previously shared information, drawing conclusions and making recommendations (Moore, 2018). In this chapter, the researcher summarized the main findings from the previous chapters, highlighting their significance and implications. Key conclusions were drawn in relation to the hypotheses presented earlier. This included evaluating the strength and direction of the relationships between variables, as evidenced by the data analysis. The researcher also introduced a proposed framework for similar programs, fulfilling the third research objective. This framework aimed to provide actionable insights and guidelines for designing and implementing effective e-learning programs in diverse contexts.

In addition to summarizing findings and drawing conclusions, the researcher assessed the return on investment (ROI) of the study. This involved considering the cost-effectiveness and overall value of the programme, both in terms of learner outcomes and broader educational impacts. By evaluating the ROI, the study provided a comprehensive understanding of the programme's efficacy and sustainability. The researcher also discussed the limitations encountered during the study. These limitations included methodological constraints, data quality issues, or external factors that could have influenced the results. Acknowledging these limitations was crucial for contextualizing the findings and understanding the scope of the study's conclusions.

The chapter offered recommendations based on the findings. These recommendations addressed practical steps for improving similar programs, informed by the study's insights. The researcher also identified areas for future research, suggesting topics and questions that emerged from the study and warranted further exploration. By providing these recommendations, the study aimed to contribute to the ongoing development and enhancement of e-learning programs, ensuring they are better equipped to meet the needs of diverse learner populations.

## 5.2 Summary of main findings

In this chapter, the research findings were presented in summary form, aiding in the formulation of this chapter and ensuring consistency in the research presented. This summary also helped in drawing the final conclusions of this study. The researcher approached the summary by considering each Likert scale question individually, mirroring the structure of the research questions.

The first Likert scale question focused on participation in the programme. The findings showed that learners perceived a strong positive impact of participation in online e-learning programs on their academic performance. The regression analysis results consistently indicated positive outcomes over the three-year period, further supported by positive correlations. This consistency underscored the significance of active participation in enhancing academic success in e-learning environments.

The second Likert scale question focused on learner perceptions of e-learning tools and their impact on programme and e-learning performance. The study found that learners believed these tools had a significant impact. These findings emphasized the need to address the digital divide by leveraging available technology resources. Despite slight fluctuations, the regression results and correlations showed a strong relationship between technology and learner performance (Cho & Hsieh, 2011).

The third Likert scale question examined the impact of the language of instruction. The regression analysis revealed that participants perceived that learning in a diverse range of languages would positively influence their academic results. This was further supported by the correlation and regression results, highlighting the importance of multilingual support in creating an inclusive learning environment.

The fourth Likert scale question assessed whether participants recognized the value of time invested in the programme and its impact on their performance. Consistently strong regression results and positive correlations reinforced the importance of self-regulated learning, personalized learning paths, and effective study habits for learner success in the programme.

The fifth Likert scale question explored how past learning experiences impacted current learning results. The positive correlation analysis and strong regression results

underscored the significance of past learning experiences. These findings provided valuable insights for programme designers and developers, highlighting the need to accommodate diverse learning backgrounds and ensure that all learning experiences are positive.

The final Likert scale question assessed the impact of geographical location on performance in the e-learning programme. The results showed strong regression and positive correlations over the three-year period, emphasizing the importance of considering environmental factors when developing these programs.

These findings contributed to understanding the complex relationships between the various independent variables and the dependent variable (learner performance). The findings further contributed to the successful completion secondary objective 1 and 2, the researcher utilised these findings to develop a framework and related figure (secondary objective 3). The completion of these objective further enabled the researcher to meet the primary objective of this study, which was to capitalise of the data from the Google IYF programme and provide recommendation for programmes of a similar nature.

## 5.3 Conclusions against research hypotheses

This study proposed three research hypotheses: ($H_1$) = There is a relationship between the independent and dependent variables; Alternative hypothesis = There is a moderate association between the independent and dependent variables; and Null Hypothesis 1 ($H_0$) = There is no relationship between the independent and dependent variables. The researcher measured the findings, considering all Likert scale question results, against these three hypotheses.

### 5.3.1 Hypothesis 1($H_1$)

The findings strongly supported Hypothesis 1 (($H_1$)) across all Likert scale questions. The regression results consistently produced strong outcomes, confirming the hypothesis that there was a strong relationship between the dependent variable and the independent variables. Furthermore, the positive correlations across all questions reinforced the existence of this relationship.

Participant feedback indicated that factors such as participation, technology, language support, study time, geographic location, and past learning experiences were perceived as influential in their final results. This further demonstrated the existence of a relationship between learner performance and the independent variables.

### 5.3.2 Alternative hypothesis

The findings consistently supported the notion that there was a relationship between the dependent and independent variables, though the level of association varied slightly across different Likert scale questions. They generally followed a similar pattern and outcome. For instance, the second Likert scale question, which considered the relationship between technology and academic performance, observed moderately positive results, which favoured the alternative hypothesis.

Overall, considering the results obtained from all Likert scale questions, the findings indicated strong relationships between the variables. These strong relationships suggested rejecting this hypothesis in favour of a more robust connection between the variables.

### 5.3.3 Null hypothesis 1 ($H_0$)

The findings from this study decisively refuted Null Hypothesis 1 ($H_0$). The positive correlations obtained across the six different Likert scale questions were a key indicator against the Null Hypothesis, demonstrating positive relationships. Additionally, the regression results consistently showed significantly positive relationships between the independent variables and the dependent variable.

In conclusion, the findings strongly rejected Null Hypothesis 1 ($H_0$). While one result might slightly support Alternative Hypothesis, the overall findings strongly supported Hypothesis 1 ($H_1$), depicting robust relationships between the independent variables and the dependent variable in this study.

## 5.4 Framework for programmes of a similar nature (Objective 3)

Having explored the study's findings and their implications regarding the different hypotheses, the focus now shifted to completing the third and final objective of this study. This section presented a framework and a related figure for future programs

like the Google IYF programme. It is important to note that this framework was developed using the findings obtained and the researcher's learnings from the Management of Technology and Innovation programme. The researcher began with the framework and then provided a detailed exploration of the related figure. See Table 17 below.

Table 17: Framework for Similar E-learning programmes

| Framework Component | Further Description | Results (Regression and correlation) and variable linkage | Examples |
|---|---|---|---|
| Participation Enhancement | Designing interactive learning opportunities that would promote learner engagement and collaborations was of the utmost importance. Providing incentives for participations and completing the programme. | • LQ1<br>• Average regression: 78.21%<br>• Average correlation: Positive<br>• Conceptual component: Experience (independent variable) | • Discussion forums<br>• Peer-to-peer learning opportunities<br>• Group projects<br>• Gamification of learning |
| Technology Integration | This component focused on ensuring there was actual usability and accessibility of the technology tools. Technology was an | • LQ2<br>• Average regression: 80.27%<br>• Average correlation: Positive | • Offer platform training<br>• Offer platform support<br>• Incorporate multimedia resources |

| | | | |
|---|---|---|---|
| | important resource, which needed to be utilised and understood by learners and lecturers alike. | Conceptual component: Tools (independent variable) | • Interactive simulations/virtual labs |
| Language Accessibility | Language accessibility was a component that was easily resolved. The technology existed to ensure ease of access to platform, it just need to be set up and implemented to be utilised for this purpose. The provision of multilingual courses was a key focus within this component. | • LQ3<br>• Average regression: 76.86%<br>• Average correlation: Positive<br>• Conceptual component: Language (independent variable) | • Utilisation of AI (Artificial intelligence) to convert materials to multiple different languages.<br>• Using subtitles on learning material, to be disability friendly.<br>• Language specific resource. |
| Study Habit Optimisation | This component was not one that required a large effort. Good study habits were concept that was presented and explored at length. | • LQ4<br>• Average regression: 75.72%<br>• Average correlation: Positive | • Provision of personalised learning paths.<br>• Self-regulated learning strategies.<br>• Adaptive learning tools (asynchronous vs |

| | | | |
|---|---|---|---|
| | This component would benefit from learning on a learning programme who have developed a growth mindset. | • Conceptual component: Time (independent variable) | synchronous learning).<br>• Opportunities for learners to learn resilience. |
| Leveraging Past Learning Experiences | This component was all about leveraging positive learning experiences and utilising them to enhance their current experience further. Foster a supportive learning environment where learning could share insights and experiences with the programme. | • LQ5<br>• Average regression: 77.46%<br>• Average correlation: Positive<br>• Conceptual component: Experience (independent variable) | • Learning needed to be reflective (reflective activities).<br>• Learners needed to learner how to carry good experiences forwards and relinquish the negative ones.<br>• There should always be a real-world component to the learning. |
| Addressing Geographical Challenges | This component aimed at better understanding learners' current situations, and findings was to mitigate them. This component focused on challenges that | • LQ6<br>• Average regression: 75.82%<br>• Average correlation: Positive | • Strategic partnerships with government, local communities.<br>• Flexible delivery models.<br>• Mobile learning solutions. |

| | | | |
|---|---|---|---|
| | existed because of the digital divide. | • Conceptual component: Context of study (independent variable) | • Satellite-based internet connectivity solutions. |

With the framework for programs of a similar nature established, the researcher presented the supporting figure. This figure was strongly based on the framework provided above and aimed to offer a comprehensive structure for future e-learning initiatives. The supporting figure, summarised and encapsulated the related nature of the finding (as a result of secondary data) and integrated the key components outlined in the framework. This figure provided a holistic approach to implementing and managing e-learning programs. This figure ensured that all critical aspects, from technology integration to addressing geographical challenges, were considered and effectively managed.

### 5.4.1 Supporting figure derived from framework.


Figure 30: E-Learning programme considerations (supporting figure).

Figure 30 above illustrates key considerations. The primary requirement was that programme developers create engaging activities, providing participants with hands-on experiences that encouraged active participation. This engagement needed to be dynamic, incorporating diverse learning methods to cater to different learning styles and preferences, enhancing the overall learning experience.

Additionally, participation should extend beyond classroom sessions. Programme developers needed to facilitate discussion forums where learners could communicate, share ideas, and experiences, fostering a sense of community and collaboration. These forums should be structured to promote constructive dialogue, critical thinking, and peer-to-peer learning, which are crucial for deeper understanding and knowledge retention. Another key element to enhance participation was providing incentives, incorporating point systems, and gamifying the learning process to make it more interactive and enjoyable. Gamification could include badges, leaderboards, and rewards that motivated learners to stay engaged and complete their courses.

The second component under consideration was technology, which played a crucial role as an enabler in e-learning environments. Programme developers, lecturers, and learners had to strive to be innovative in utilizing technology to address common e-learning challenges. Technology was essential in bridging the digital divide, offering opportunities for immersive and transformative learning experiences. By leveraging technology effectively, programme developers could create engaging and interactive content that enhanced learning outcomes and provided learners with a rich, dynamic educational experience. Moreover, technology integration needed to focus on usability and accessibility.

Ensuring that all participants had the necessary support and training to use technological tools was vital. This included offering platform training, support services, and incorporating multimedia resources and interactive simulations to enrich the learning experience. The aim was to create an inclusive environment where technology enhanced learning rather than hindered it, enabling learners to explore, experiment, and engage deeply with the course material. Technology was not just a tool but a critical component in overcoming digital divide challenges and enabling programme developers and lecturers to provide learners with transformative experiences.

Technology allowed programme developers, lecturers, and learners to leverage advancements within the technological space. This meant that developments from the Fourth and Fifth Industrial Revolutions could transform how learners received their learning resources and experienced online courses. These advancements could further assist lecturers in becoming more proficient, thus enhancing the overall educational experience. By integrating cutting-edge technology, educational programs could stay relevant and effective, offering learners the most current tools and methods available.

The third component that programme developers needed to consider was the role of language in the learning experience. Online learning should support multilingual education, providing course materials, instructions, and communication channels in multiple languages. This approach would accommodate learners from diverse linguistic backgrounds, enhancing inclusivity and accessibility. Additionally, supporting multiple languages would increase the programme's reach and impact, as language barriers would no longer hinder participation. By fostering a multilingual learning environment, programs could ensure that all learners had the opportunity to succeed regardless of their linguistic background.

Fostering a multilingual learning would also contribute to the development of a culture of inclusivity, viewing differences between learner groups as positives rather than barriers to participation in the programme. The next component presented in the figure explored the concept of developing study habits. Study habits were challenging to develop and easily forgotten or altered, making teaching about them critically important (Mpungose, 2020).

Training providers had the opportunity to provide learners with resources to manage their time better, note-taking techniques, and general strategies to tackle challenging assignments. The training provider was preparing learners for lifelong learning and helping them develop habits conducive to long-term success. Fostering a growth mindset needed to occur as early as possible to ensure learners capitalized on all opportunities for growth and development.

Furthermore, this introduced the next key component: leveraging past learning experiences. While training providers could not alter past negative experiences, they

could help learners identify key positives from their past learning. The programme developer and supporting team should ensure that learners' current experiences were positive. This involved creating an environment where learners felt valued and supported, fostering resilience, and encouraging reflection on past achievements to build confidence and motivation.

Additionally, programme developers should create opportunities for learners to collaborate, share experiences and expertise, and master concepts within the programme. This linked back to gamification, allowing learners who had mastered the programme and its concepts to celebrate their achievements, reinforcing the value of their hard work and understanding. Incorporating real-world applications and practical exercises could further enhance this component, ensuring that learners could apply their skills and knowledge effectively in various contexts.

Finally, the last consideration involved addressing geographical challenges. This was one of the most challenging components because it required support from external parties. The programme developer needed to conduct a needs analysis to understand the different contexts learners were dealing with and ensure that the programme was designed to meet these needs. For instance, in areas with poor network connectivity, the programme had to offer offline functionality to accommodate learners.

Programme developers should explore strategic partnerships to overcome these challenges and utilise both asynchronous and synchronous learning models to accommodate learners who could not always work online. A similar approach should be adopted when scheduling the programme to ensure flexibility. This component required an in-depth analysis to ensure that the diverse challenges faced by learners were thoroughly addressed and accounted for, promoting a more inclusive and accessible learning environment.

To conclude this section, it is important to note that the proposed framework and supporting figure aimed to assist future programs similar to the Google IYF programme. The greatest challenge in implementing programs in the South African and broader African context was accommodating diverse learner needs to ensure their participation. The framework and supporting figure were designed to address potential obstacles that could hinder learning, ensuring these issues were resolved before the

programme began. This proactive approach aimed to create a more inclusive and effective e-learning environment.

### 5.4.2 Predictions supported by the findings.

The findings obtained from this study supported a wide array of different predictions and trend that was identified because of the demographical data, correlational findings analysis and the regression analysis. These predictions were presented in tabular form and organised according to their respective source. See table 18 below:

Table 18: Trend/area and predictions

| Trend/area | Prediction |
|---|---|
| Gender trends (Participation enhancement) | Male participation was expected to continue to increase, as it had over the 3-year period (2021,2022 and 2023), though female participation was likely to remain dominant because of the Google IYF initiative to empower woman. |
| Population trends (Geographical considerations and language) | South Africa would have probably maintained the highest representation, with Kenya and Nigeria competing for further representation. The data further supported some fluctuations from Nigeria, while Kenya would have maintained stable representation. |
| Objective performance (Study habit optimisation) | Positive performance was generally stable, thought there might have been some dips within some of the objectives. |
| Correlation and relationship (tool) | The relationships between the variables would have remained positive, there would have had to be major disruption within the contexts of study to turn the relationships. |
| Regression analysis (tool) | Some of the variables will see declines in the strength of relationship, but these were minor. The data suggested that the relationship between the independent variable and the |

| | |
|---|---|
| | dependent variable fluctuated and recovered all the time – this would continue. |
| Year – on – year comparison (leveraging past experiences) | Minor fluctuations will continue, with an overall stable performance year-on-year unless significant external changes occur (like the programme ending). |

Having explored the predictions, the researcher may now proceed to the recommendations section of this chapter.

## 5.5 Recommendations

In this section, the researcher explored recommendations based on the study's findings. The section was divided into two parts: the first part provided direct recommendations grounded in the findings and the supporting figure presented in this chapter, while the second part offered suggestions for areas of further and future study.

### 5.5.1 Key recommendations based on findings.

The first set of key recommendations came from the supporting figure presented in Figure 31, emphasising the importance of developing interactive and collaborative learning opportunities to drive up participation. This could include discussion forums, peer-to-peer learning opportunities, group projects, and gamification of learning processes to foster a sense of community and active engagement among learners. Providing incentives for participation and completing the programme could further enhance engagement.

Next, the recommendation focused on technology integration, highlighting the need for actual usability and accessibility of technological tools. Programme developers and lecturers had to be innovative in utilizing technology to overcome common e-learning challenges. This involved offering platform training, support, incorporating multimedia resources, and using interactive simulations or virtual labs to enrich the learning experience.

The third recommendation addressed language accessibility. Programme developers should leverage technologies to aid learners, especially when it comes to learning in their home languages. Utilizing AI for translation, providing subtitles, and offering language-specific resources could make educational content more accessible and inclusive, ensuring that language barriers did not hinder learning.

The fourth recommendation underscored the importance of teaching study habits. Good study habits were crucial for success in any learning opportunity. Programme developers should provide resources to help learners manage their time, note-taking techniques, and strategies for tackling challenging assignments. Fostering a growth mindset was essential, encouraging learners to view learning as a lifelong journey and to develop habits that lead to long-term success.

Furthermore, leveraging past learning experiences was vital. Training providers could help learners see the positives in their past educational experiences and ensure that current experiences were positive. Encouraging reflective activities and creating opportunities for learners to share their experiences could enhance the learning environment. Gamification could also be used to celebrate mastery and progress.

The final recommendation considered geographical challenges. Programme developers needed to conduct a thorough needs analysis to understand the different contexts learners faced and develop programs that met these needs. For example, providing offline functionality for areas with poor network connectivity and developing strategic partnerships to overcome these challenges. Utilizing both asynchronous and synchronous learning models could accommodate learners' varying schedules and connectivity issues.

### 5.5.2 Recommendations for future/further research

There were several areas of opportunity for further and future research. The first opportunity was to conduct a longitudinal study involving tracking learner performance over an extended period to determine the long-term effectiveness of the e-learning programme more accurately. This approach would provide insights into how sustained engagement with the programme impacted learner outcomes over time and help identify any delayed benefits or challenges that might not be apparent in shorter studies.

Another key opportunity was to experiment with the programme title or sponsor to see if learners' results varied based on who was perceived to be backing the programme. This could help to understand if branding and sponsorship influenced learner engagement and performance, providing critical information for programme marketing and partnerships.

Researchers could also experiment with different geographical locations to determine the extent to which location impacted learner performance. By comparing regions with varying levels of technological infrastructure and support, researchers could identify specific regional challenges and tailor solutions to meet these unique needs.

Furthermore, there was an opportunity for qualitative inquiry on a smaller scale, providing more detailed narratives and personal experiences of the programme and the challenges learners faced. This approach allowed for a mixed-methods study, combining quantitative data with rich qualitative insights to better understand the factors influencing learner academic performance. In-depth interviews, focus groups, and case studies could uncover nuanced perspectives and personal stories that quantitative data alone might miss.

Additionally, future research could explore the impact of different pedagogies and andragogy on e-learning programme outcomes. Comparing various teaching methodologies could reveal which approaches were most effective in different contexts, helping to refine instructional strategies. Researchers could develop a cross-cultural study examining how culture (values and beliefs) influenced learner performance, determining whether it enabled or hindered learning. This could highlight the importance of culturally responsive teaching practices in e-learning environments.

There were also opportunities to investigate technology adoption trends among learners and institutions delivering the programs. Understanding how different groups adopted and utilized technology could inform strategies to increase digital literacy and technology engagement. Researchers could also explore the role of technology training and support in improving learner outcomes.

Moreover, researchers could evaluate the six factors presented in this study to determine if programs considering these factors were more successful or if alternative factors needed consideration for improved success rates. Conducting comparative

studies across different programs could validate the framework and supporting figure proposed in this study, providing evidence-based recommendations for programme development.

In the second chapter, the literature review, several gaps in the body of knowledge were identified within the sections on the theoretical framework, historical review, and empirical literature review with critical evaluation. These gaps include a lack of research into the role of soft skills in e-learning and their impact on employability, particularly in connection with the T-shaped skills model within the African context. Additionally, there are opportunities to explore the psychosocial factors influencing e-learning outcomes. Furthermore, studies could be conducted to assess the effectiveness of government policies and initiatives aimed at improving education in Kenya, Nigeria, and South Africa. Finally, the literature highlights an opportunity to document advancements in digital literacy through research in the African context.

Finally, future research could replicate this study using different research analysis approaches. This study used collective performance results against collective feedback from Likert scales. Future researchers could measure individual results against individual perceptions or use more open-ended questions than Likert scales. Employing different analytical techniques could provide a more comprehensive understanding of the data and uncover insights that might be missed with a single method.

### 5.5.3 Categorisation of findings

The researcher was aimed at further enhancing the quality of the findings and recommendations that were provided above. To further aid in the task of ensuring this studies recommendations and suggestions of areas of further study was as clear as possible, the researcher organised the key finding into different categories. These categories included: theoretical, practical, policy, and areas for further research. See table 19 below:

Table 19: Summary table with categories for the findings

| Key Findings: | Category: |
|---|---|
| Develop interactive and collaborative learning opportunities to boost participation and engagement among learners. | Practical |
| Ensure technological tools are accessible and usable by offering training and support to overcome e-learning challenges. | Practical |
| Leverage technology to overcome language barriers, ensuring inclusivity and accessibility in the learning environment. | Policy |
| Provide resources to help learners develop effective study habits and foster a growth mindset for long-term success. | Practical |
| Encourage reflective activities and the celebration of progress to enhance learner experiences and engagement. | Practical |
| Conduct needs analyses to address geographical challenges by developing programs with offline functionality and strategic partnerships. | Policy |
| Conduct longitudinal studies to evaluate the long-term effectiveness of the e-learning program. | Further study |
| Research whether programme title or sponsorship impacts learner engagement and performance. | Further study |
| Investigate how geographical location affects learner performance, focusing on regional infrastructure differences. | Further study |
| Conduct qualitative research (e.g., interviews, focus groups) to gain insights into personal learner experiences. | Further study |
| Explore the effectiveness of different pedagogies in e-learning environments. | Theoretical |

| | |
|---|---|
| Conduct cross-cultural studies to examine how cultural values influence learner outcomes. | Theoretical |
| Investigate technology adoption trends to improve digital literacy and engagement. | Further study |
| Validate the proposed framework by testing the six factors across different programs. | Further study |
| Replicate the study with alternative analytical methods to gain deeper insights. | Further study |

To conclude this section, there were many areas where studies of this nature could delve deeper. It was important to explore different perspectives and approaches around the same problem to better serve learners in the African context participating in e-learning courses. Each of these recommended areas for future research had the potential to enhance the understanding and effectiveness of e-learning programs, ensuring they were inclusive, engaging, and capable of meeting the diverse needs of learners.

## 5.6 Limitations of the study

Limitations were defined by Viera (2023) as practical or theoretical shortcomings of a study that were often outside the researcher's control (Viera, 2023). This section delved into the limitations inherent in the study, encompassing a spectrum of challenges. Beginning with the sample size, the researcher exercised caution in the selection of questions due to the study's extensive sample size. The magnitude of the sample size posed analytical and interpretational implications that warranted careful consideration, as the inclusion of certain questions could potentially detract from the study's value.

Moreover, this study relied on secondary data sources, resulting in limited control over the presentation of data. This posed several challenges, including inconsistencies in data over the three-year period and modifications to questions by the Google IYF team as they implemented lessons learned. The sheer volume of responses, coupled with the nature of secondary data, potentially compromised the depth and detail sought by

the researcher. These limitations underscored the importance of carefully considering data sources and sample sizes in future studies to ensure a more comprehensive and controlled analysis.

Another significant consideration pertained to data compatibility. The researcher's actions were constrained by the parameters set forth by the Google IYF organization regarding data utilization, resulting in the potential loss of dynamism that primary data could have provided. Furthermore, limitations inherent in the analysis tools employed necessitated careful consideration. While correlation analysis gauged the strength and direction of relationships, it did not offer insights into the causal mechanisms underlying these relationships.

In continuation, both correlation and regression analyses overlooked the influence of outliers on the data, potentially skewing results. These analytical methods were also sensitive to measurement and calculation errors, which could diminish the robustness of regression coefficients and compromise the accuracy of predictions made within the study. Additionally, regression analysis operated under the assumption of a linear relationship between independent variables and the dependent variable, a premise that aligned well with the variables examined in this study. However, real-world data often exhibited complexities that may not fit neatly into linear models, potentially limiting the explanatory power of the analysis.

Another pivotal aspect considered by the researcher pertained to the utilization of Likert Scale questions. While Likert scale questions offered respondents a structured range of responses, this format might constrain participants' ability to convey nuanced or complex opinions, potentially resulting in an oversimplification of behaviours or attitudes. Moreover, the presence of response bias, characterized by a tendency to select middle options, could distort results and diminish the reliability of findings. Additionally, Likert scales might not fully capture the intensity of respondents' feelings, leading to potential misinterpretation of data.

Additionally, the researcher addressed limitations stemming from the cross-sectional nature of the study. Temporal constraints arose from the inability to track participant development over a three-year period comprehensively. The study focused on new participants annually over the course of three years, which underscored the

significance of early phases in e-learning programs. However, this approach did not offer insights into post-programme commencement guidelines or learner retention over longer durations. The lack of longitudinal data limited the ability to observe long-term effects and changes in learner behaviour and performance.

Concluding, the study acknowledged the significance of comprehending learner environments and contexts yet fell short in advancing a nuanced understanding of participants' diverse contexts beyond the literature review. Factors such as cultural backgrounds and socio-economic conditions could significantly influence participants' feedback. For instance, participants might agree with statements in anticipation of future learning opportunities, potentially skewing the authenticity of their responses and undermining the true reflection of their understanding of the variables. These limitations highlighted the need for a more comprehensive and context-sensitive approach in future research to capture and interpret learner experiences and outcomes accurately.

## 5.7 Return on investment

Birken and Curry (2022) defined return on investment (ROI) as a metric used to understand the returns derived from an investment in an initiative (Birken & Curry, 2022). Traditionally, ROI was measured financially, providing a quantifiable metric. However, this study aimed to present both quantifiable metrics and intangible ROI. The researcher considered various dimensions including financial impact, human development, innovation output, technological advancements, alignment with organizational strategy, and the researcher’s personal growth and development because of this study.

### 5.7.1 Financial impact

Quantifying the financial impact of this study was challenging due to the proposed need for increased time allocation in planning e-learning projects. The prospective financial benefits suggested by this study aimed to make e-learning programs financially advantageous for organizations such as IYF, Google, and IRG. By leveraging lessons learned from the Google and IYF programs, this study sought to optimize financial returns from investments in e-learning initiatives.

The initial investment in the e-learning programme aimed to enhance learner skills and employability, resulting in significant potential financial returns. Although exact figures are difficult to quantify without specific data, the anticipated benefits include increased annual earnings for learners due to improved job prospects and enhanced skills. This improvement in employability rates among participants could lead to substantial economic benefits for both the learners and the broader community. The programme's design focused on equipping learners with valuable skills that are highly sought after in the job market, thereby increasing their earning potential. Additionally, by addressing the digital divide and providing inclusive, accessible education, the programme aimed to foster economic growth and social development.

### 5.7.2 Human development impact

This study focused on developing a supporting figure for human development, driven by the researcher's intrinsic passion for learning, which necessitated a re-evaluation of traditional e-learning approaches to enhance their human development impact. The Google IYF programme, used as a case study, demonstrated the necessity for large-scale learning initiatives that transcended geographical boundaries. The researcher learned the critical importance of meticulous preparation during the implementation phase of such expansive projects, emphasizing the programme's relevance beyond South Africa.

The findings from Likert Scale Questions 1 to 4 from 2021 to 2023 consistently demonstrated strong positive correlations between participation in the Google IYF online e-learning programme and academic performance, with regression results typically above 75%. These results underscore the significant impact of well-structured e-learning programs on academic development, highlighting the roles of technology, language accessibility, and learner commitment in enhancing educational outcomes. This reinforces the importance of incorporating advanced technological tools, providing multilingual support, and fostering self-regulated learning behaviours to bridge the digital divide and ensure inclusive, effective learning, all of which are critical for human development.

### 5.7.3 Innovation output

The innovation stemming from this study manifested in fostering collaborative endeavours, leveraging technology and tools to address distinct challenges, integrating feedback mechanisms, identifying future avenues for innovation, and instituting recognition and reward systems. The programme under scrutiny offered an innovative methodology for delivering educational initiatives of this calibre, exemplified by the "lessoned learnt" concept and the accompanying framework, which were poised to serve as foundational pillars for subsequent studies of a comparable nature. Programme developers and training providers were encouraged to perceive learning programs as fertile ground for innovation, thereby exploring diverse approaches to engage learners and drive educational outcomes.

### 5.7.4 Technology alignment

The integration of technology in educational endeavours had been a longstanding business objective within the IRG organization. The Google IYF programs provided invaluable insights for IRG, shedding light on prevalent limitations in this domain such as the digital divide. However, beyond identifying challenges, IRG recognized the potential for leveraging technology to enhance employee skill sets, optimize operational efficiency, and foster innovation. Moreover, the organization identified an opportunity to elevate learner experiences, enhance programme scalability, and introduce unprecedented flexibility in programme delivery. This marked a significant departure from the organization's erstwhile reliance on analogue processes and manual operations, signalling a strategic shift towards embracing a more technologically driven approach. Programs like the Google IYF e-learning, coupled with the findings derived from this study, played a pivotal role in shaping IRG's trajectory towards a more technology-centric operational paradigm.

### 5.7.5 Social return on investment

The social return on investment from the basis of this study was significant, contributing to society by enhancing the skills and employability of learners. The programme's focus on developing soft skills, technology proficiency, and multilingual capabilities prepared participants for the modern workforce. As learners became more skilled and employable, they were better positioned to contribute positively to their

communities and the broader economy. This enhanced employability reduced unemployment rates and fostered economic growth, leading to a more robust and resilient society.

Moreover, the programme's inclusive approach, which considered geographical and linguistic diversity, helped bridge educational gaps, providing opportunities for underserved populations. By fostering a culture of inclusivity and promoting equal access to quality education, the programme contributed to social equity and cohesion. The positive social impact extended beyond individual learners, as their improved skills and employability had a ripple effect, benefiting families, communities, and the broader society.

### 5.7.6 Personal growth and development

The researcher reaped multifaceted benefits from this study, encompassing various aspects of personal and professional growth. Primarily, the researcher experienced notable advancements in their academic research skills, honing their proficiency in research methodology through practical application in this dissertation. Participation in this programme afforded the researcher the opportunity to engage in discourse about research, serving as a poignant reminder of its significance and prompting a fervent advocacy for its importance among peers and stakeholders.

Moreover, the researcher found inspiration to adopt a more experimental approach in designing e-learning courses, continually striving to innovate and devise novel methodologies tailored to diverse audiences. This holistic engagement not only enriched the researcher's skill set but also invigorated their commitment to the ongoing pursuit of excellence in e-learning delivery. The experience gained through this research fostered a deeper understanding of educational technology, enhanced critical thinking abilities, and reinforced the value of adaptability and continuous learning in the ever-evolving landscape of e-learning.

## 5.8 Conclusion

In conclusion, this study examined the effectiveness of e-learning courses in developing soft skills, focusing on key areas such as engagement, technology integration, language accessibility, study habit optimization, past learning

experiences, and geographical factors. The findings highlighted significant correlations between these independent variables and academic performance, revealing the complex interplay that drives the success of e-learning Programmes. These insights provided a valuable framework for future e-learning initiatives, particularly in the African context, emphasizing the need for strategic implementation of technology, innovative pedagogies, and inclusive practices. This research underscored the transformative potential of well-designed e-learning environments, advocating for a continued commitment to excellence and innovation in global education. The study set a foundation for future endeavours, ensuring that e-learning becomes a powerful tool for empowering learners and bridging educational gaps.

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# APPENDICES

## 6.1 Appendix A: Letter/s of permission to conduct the study

The Da Vinci Institute for Technology Management (Pty) Ltd
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www.davinci.ac.za

20/11/2023

Dr Wynand Goosen

CEO & IYF Project Head

[redacted]

Dear Dr Wynand Goosen

I, Karl Tischlhauser am doing research under supervision of Dr Heather Goode, a Research Supervisor towards a Master's Degree in Management of Technology and Innovation at the Da Vinci Institute. We are inviting you to participate in a study entitled: A comparative analysis between Kenya, Nigeria and South Africa: How African Learners performed in completing soft skill programs with recommendations for future African Online Learners.

The aim of the study is to this study aims to provide recommendations for enhancing the online learning experience of African Learners.

Your institution has been selected because it has participated in the delivery of the IYF Google program, and has been provided with all program data.

The study will entail the purpose behind this research would have been to develop an understanding of the Google IYF program, by means of analysing data and providing recommendations that could have been utilized for this program. The Google IYF program was one that was aimed at delivering soft skill courses in the African Context, with the end goal of having participants within this program find employment as a result of completing a Google Professional Certificate.

The benefits of this study are that we would develop an improved understanding of learner performances and influences of said performance. We would be able to utilize the improved understanding to improve future results and outcome in programs of a similar nature.

Potential risks are typical to most researches. This study has the risk of not being completed in time, it would also be subject to bias and interpretation of researcher.

Participation is voluntary and information of participants will be kept confidential.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail the final research project document and slides, which would include the five chapters.

Yours sincerely

Karl

W.G

Chief Executive Officer at Infomage and RIMS Group

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06/01/2024

Joy-Lynn De Kock

Project Manager

IYF

[redacted]

[redacted]

Dear Joy-Lynn De Kock

I, Karl Tischlhauser am doing research under supervision of Dr Heather Goode, a Research Supervisor towards a Master's Degree in Management of Technology and Innovation at the Da Vinci Institute. We are inviting you to participate in a study entitled: A comparative analysis between Kenya, Nigeria and South Africa: How African Learners performed in completing soft skill programs with recommendations for future African Online Learners.

The aim of the study is to this study aims to provide recommendations for enhancing the online learning experience of African Learners.

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Participation is voluntary and information of participants will be kept confidential.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail the final research project document and slides, which would include the five chapters.

Yours sincerely

Jkarl

Jdekock

Joy-Lynn De Kock (on behalf of IYF) Signature

## 6.2 Appendix C: Draft data collection instrument


# Google IYF End of Programme Survey

Congratulations on completing the Google IYF program!

Your dedication and hard work have brought you to this significant milestone. As one final step, we kindly ask you to complete this survey to share your valuable feedback. Your insights will help us enhance the program and provide even better learning experiences for future participants. The survey consists of a series of Likert scale questions designed to understand your experience thoroughly. Thank you for your time and for contributing to the continuous improvement of our program.

What is your Gender? *

- ○ Male
- ○ Female
- ○ Prefer not to say

What is your age? (18-26) *

- ☐ 18
- ☐ 19
- ☐ 20
- ☐ 21
- ☐ 22
- ☐ 23
- ☐ 24
- ☐ 25
- ☐ 26

What country are from? *

- ◯ South Africa
- ◯ Nigeria
- ◯ Kenya

What type of geographic location do you reside in? *

- ◯ Urban
- ◯ Rural
- ◯ Peri-Urban

On a scale of 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree', please indicate your level of agreement with the following statement: 'Participation in the online e-learning program for soft skills development has positively impacted my academic performance *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ◯ | ◯ | ◯ | ◯ | ◯ | Strongly Agree |

On a scale of 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree', please indicate your level of agreement with the following statement: 'The use of technology tools within the online e-learning program has enhanced my learning experience and contributed to my academic performance *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ◯ | ◯ | ◯ | ◯ | ◯ | Strongly Agree |

On a scale of 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree', please indicate your level of agreement with the following statement: 'The availability of the e-learning program in multiple languages would have positively influenced my understanding of the course material and contributed to my academic performance. *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ◯ | ◯ | ◯ | ◯ | ◯ | Strongly Agree |

On a scale of 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree', please indicate your level of agreement with the following statement: 'The amount of time I invest in the online e-learning program directly correlates with my academic performance. *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ○ | ○ | ○ | ○ | ○ | Strongly Agree |

On a scale of 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree', please indicate your level of agreement with the following statement: 'My past learning experiences have positively influenced my performance in the online e-learning program for soft skills development *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ○ | ○ | ○ | ○ | ○ | Strongly Agree |

On a scale of 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree', please indicate your level of agreement with the following statement: 'The geographical location in which I reside has influenced my academic performance in the online e-learning program for soft skills development. *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ○ | ○ | ○ | ○ | ○ | Strongly Agree |

## 6.3 Appendix D: Programme brochure

# Welcome to The Google IYF Program


### Project Management Course

- Foundations of Project Management
- Project Initiation: Starting a Successful Project
- Project Planning: Putting It All Together
- Make accurate time estimates and describe techniques for acquiring them from team members.
- Project Execution: Running the Project
- Agile Project Management
- Capstone: Applying Project Management in the Real World

### IT Support Course

- Technical Support Fundamentals
- The Bits and Bytes of Computer Networking
- Operating Systems and You: Becoming a Power User
- System Administration and IT Infrastructure Services
- IT Security: Defense against the digital dark arts

### Data Analytics Course

- Foundations: Data, Data, Everywhere
- Ask Questions to Make Data-Driven Decisions
- Prepare Data for Exploration
- Process Data from Dirty to Clean
- Analyze Data to Answer Questions
- Share Data Through the Art of Visualization
- Data Analysis with R Programming

### UX Design Course

- Foundations of User Experience (UX) Design
- Start the UX Design Process: Empathize, Define, and Ideate
- Build Wireframes and Low-Fidelity Prototypes
- Conduct UX Research and Test Early Concepts
- Create High-Fidelity Designs and Prototypes in Figma
- Responsive Web Design in Adobe XD
- Design a User Experience for Social Good & Prepare for Jobs

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## 6.4 Appendix E: Ethical clearance certificate

The Da Vinci Institute for
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THE DAVINCI INSTITUTE
*for technology management*

Reference: 00224

Date: 26 February 2024

**Ethical Declaration**

I, the undersigned, hereby declare that the Master's Research of the student named below has received ethical clearance from The Da Vinci Institute Ethics Committee. The student and supervisor will be expected to continue to uphold the Da Vinci Institute's Research Ethics Policy as indicated during the application.

**Proposed Title**: A comparative analysis between Kenya, Nigeria, and South Africa: How African Learners performed in completing soft skill programs with recommendations for future African Online Learners

**Student Name**: Tischlhauser Karl

**Student Number:** 10406

**Supervisor**: Dr Goode Heather

**Co-Supervisor**: N/A

**Period**: Ethics approval is granted from 2024/02/26 to 2028/03/28

Chairperson: Research & Ethics Committee

Prof Paul Singh

Directors: B Anderson, N Hadebe, F Landman (Chairperson), R Steenberg

The Da Vinci Institute for Technology Management (Pty) Ltd is registered with the Department of Higher Education and Training as a private higher education institution under the Higher Education Act, 1997. Registration No. 2004/HE07/003

## 6.5 Appendix E: Language Edit Certification



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**31 July 2024**

**To whom it may concern**
**Editing of MMTI (Master of Management in Technology and Innovation) dissertation: Karl Tischlhauser**

I, Steven Warren Louw, confirm that I have proof-read and edited the dissertation resulting from the research project "*A study on how learners in Kenya, Nigeria and South Africa performed on the Google IYF programme, with the provision of a framework for programmes of a similar nature*" as agreed with and to the extent discussed with, the researcher Karl Tischlhauser. Due to limited time and resources a comprehensive editing process could not be followed, however I was advised that the paper had, prior to editing, been scrutinised by an academic supervisor. This dissertation is for presentation to The DaVinci Institute.

The Table of Contents and Lists of Figures and Tables as well as a List of Acronyms was reviewed with suggested edits were made with a reminder to update these on finalisation of the document in case any editing changes affected these.

Although editing suggestions regarding references were made to the researcher, I was advised that the researcher and supervisor were busy doing a final review of all referencing and that further editing of this was not required.

All suggestions regarding editing, and other comments, were forwarded to the researcher to consider. These included suggestions regarding the Table of Contents and page numbering, as well as individual Figures, Tables and Acronyms. The researcher was requested to ensure that tenses, and formatting, used aligned to the Guidelines shared by The DaVinci Institute.

I confirm that the editing has been limited to proof-reading, and corrections resulting therefrom, to grammar and layout editing, and to minor re-drafting of text in order to improve readability of the dissertation.

.

The content remains largely as laid out by the researcher, and the research data, findings, recommendations and conclusion to the dissertation have not been materially adapted in this editing process. At the time of editing, the researcher had not included acknowledgements.

All suggestions, recommendations and comments were forwarded to the researcher to make final decisions regarding each of these. I cannot confirm that all of these were incorporated into the document finally submitted, however in discussion with the researcher it appeared that all suggestions, recommendations and comments, had been considered and, in the main, incorporated into the final submission.

As agreed with the researcher, the editing was pro-bono, and excluded any role or part in the research and dissertation process other than proof-reading and editing.

STEVEN LOUW

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